2011 Broadband Strategic Plan

Gigabit Squared
Strategic Planning Group

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Our Delivery and Research Partners:

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Strategic Planning Process Overview

The Task at Hand

The Holland Board of Public Works is at a crossroads. An early adopter of broadband technology, it built its first 16.8 mile fiber 48-count fiber optic ring circling downtown Holland back in 1992. It made this investment anticipating the role that information communication technologies (ICT) were going to play in business operations, energy management and the quality and reliability of service the BPW provides to its traditional electric, water and wastewater customers. The ring was initially constructed for internal company use, interconnecting core facilities and providing synchronous connectivity for data exchange.

As the ICT revolution swept the world, however, it became clear that the fiber assets had additional value outside of internal operations. Carriers, independent service providers, CLECs, government facilities, schools, hospitals and even businesses began clamoring for access to the fiber optic network for data transport services and a mechanism to connect with upstream providers and downstream customers. Thus, a new line of business for the Holland BPW was born: the selling of indefeasible rights of use (IRUs) for dark fiber (typically purchased by carriers, schools and a hospital) and direct data transport services through the creation of virtual private networks (VPNs) running over BPW fiber (typically purchased by businesses, ISPs, CLECs, schools and health care providers). This led to a gradual expansion and extension of the BPW fiber facility, to today's nearly 76 backbone miles (150+ route miles) featuring fiber counts of up to 288 strands.

Which leads us back to the crossroads. In the intervening years since 1992, the demand for services and the growth of bandwidth consumption by government, business and residential customers has been exponential, but no third parties have 'stepped up to the plate' to directly invest in the core ICT infrastructure required (namely fiber) to meet this need. If Holland and the surrounding communities are to thrive, prosper, and enjoy a high quality of life, this must be addressed. Will the traditional carriers invest in the middle and last mile infrastructure needed to deliver tomorrow's services to our citizenry? If the Holland Board of Public Works directly invests, to what extent should it do so? How deep within each community in its operating footprint should it go? Fiber-to-the-Business? Fiber-to-the-Home? How should it structure its internal line-of-business operations and customer service offering? Open Network? Vendor-Neutral? Transport Only? Internet and VoIP? Video? Triple Play? This Strategic Plan examines these issues and provides analysis to assist BPW in determining the course best suited for meeting internal fiscal requirements and larger community needs.

The purpose of the Broadband Strategic Planning Process is to chart a course for the development of the BPW fiber plant that is responsive to the socio-economic needs of Holland's businesses and citizenry.

Success requires the proper mix of capacity, capabilities and business models to meet the demands of the 21st century global economy.

If the tools (approaches) are wrong, or the weather (market condition) isn't favorable…

Options Examined in this Plan

"Maintain Current Operating Model"
Explores the implications of maintaining the current opportunistic approach to fiber backbone and customer development.

"Fiber to the Business"
Explores the implications of extending last mile connections to a critical mass of government, business and citizen services institutions.

"Fiber to the Home"
Explores the implications of extending last mile connections to a critical mass of residential units within Holland and surrounding areas.

Maintaining the Current Fiber Build and Operations Strategy

Areas Examined in the Broadband Strategic Plan

Planning Elements	SWOT Analysis Considerations	Viability & Recommendations
Financial History & Outlook ▪ Revenue & Customer Trends ▪ Financial Model & Profitability ▪ CAPX and OPX	❖ Historic performance, profitability, annual customer/revenue growth ❖ Staffing requirements and projected longevity of existing assets ❖ Investment Payback Timeframes	❖ Do the numbers support maintaining current business and operating models? ❖ Does ROI support additional investment?
Business Model Analysis ▪ Service Offering ▪ 'Go-to-Market' Strategy ▪ Operating Practices	❖ Service offering, take rate, customer trends, place in market ❖ Direct vs. channel partner sales, customer/partner value proposition ❖ Fee structures, resources, last mile connectivity reimbursement policies	❖ Is BPW's product a growth product? ❖ Can BPW capture additional market share? ❖ Is core business model viable in 5 – 10 years?
Market Outlook ▪ Competitive Analysis ▪ Customer Trends ▪ Local/National Trends	❖ What do customers want? What are customers buying today? ❖ Where are our competitors investing? What's the regional transport picture? ❖ What are the local/national trends for transport and bandwidth consumption?	❖ Is product set viable in 5 – 10 years? ❖ Does BPW have capacity and footprint required? ❖ Is BPW keeping pace with other communities?
Logical Fiber Pathways ▪ Core Backbone Extensions ▪ Lateral Extensions ▪ Peering and Interconnect	❖ What's the relative value of the BPW transport system today from a customer and partner perspective? What peering and interconnect arrangements exist? ❖ How can network footprint extensions increase the utility of the network as a whole over time? Who and where are competitors building in our market?	❖ What fiber pathways provide ROI potential from clustered customer acquisition? ❖ Where are the competitive gaps?
Technology Assessment ▪ Network Architecture ▪ Physical Plant ▪ Logical Design & Practices	❖ What's the condition of the physical plant and core networking equipment? ❖ Is the logical and physical architecture deployed today consistent with customer and channel partner needs? ❖What are the known logical and physical issues? Current obsolescence cycle?	❖ What will it take to meet current and future customer and channel partner needs?
Socio-Economic Impact & Value ▪ Citizen Services ▪ Economic Development ▪ Cost-of-Living	❖ What are the current & sustainable benefits to Holland and the surrounding areas provided by our network? ❖ Is BPW's current model part of the solution or part of the problem?	❖ Can BPW be a socio-economic accelerator?

Fiber to the Business (FTTB): Connecting Holland's Commercial Sector

Areas Examined in the Broadband Strategic Plan		
Planning Elements	**SWOT Analysis Considerations**	**Viability & Recommendations**
Financial Outlook ▪ Revenue Streams & Take Rate ▪ Financial Model & Profitability ▪ CAPX and OPX	❖ Anticipated revenue streams and customer take rates by area ❖ Staffing requirements and impact of varied service offerings on profitability ❖ Investment payback timeframes	❖ Do the numbers support moving to FTTB? ❖ Are additional revenue streams needed to support/maximize return-on-investment (ROI)?
Business Model Analysis ▪ Service Offering(s) ▪ 'Go-to-Market' Strategy ▪ Operating Practices	❖ Service offering options, take rate, by service, customer trends, place in market ❖ Direct vs. channel partner sales, end-user vs. partner engagement model(s) ❖ Fee structures, impact of extended services, investment recovery model	❖ What impact will FTTB have on business model? ❖ How can BPW capture additional market share? ❖ What service set is viable in 5 – 10 years?
Market Outlook ▪ Competitive Analysis ▪ Customer Trends ▪ Local/National Trends	❖ What services do our customers want? What are customers buying today? ❖ Where are our competitors investing? What services are they selling? ❖ What are the local/national trends for services and bandwidth consumption?	❖ Is current product set viable for FTTB? ❖ What take rates can BPW expect by product? ❖ What will customers need 5 years from now? ❖How will decisions made today impact viability?
Logical Fiber Pathways ▪ Core Backbone Extensions ▪ Communities Impacted ▪ Depth of Fiber Penetration	❖ Over what footprint should BPW extend the network to FTTB? ❖ Where will our physical DMARC be placed within existing businesses? ❖ Where are new commercial developments arising?	❖ What geographies provide the greatest ROI? ❖ What depth of penetration makes the greatest economic sense?
Technology Assessment ▪ Network Architecture ▪ Physical Plant ▪ Logical Design & Practices	❖ Will the logical and physical architecture support FTTB? ❖ What changes will have to be made to expand our service offering? ❖ Do we have the backbone transport capacity to handle the anticipated increase in bandwidth traffic?	❖ What will it take to meet current and future customer and channel partner needs under current service offering? Under additional?
Socio-Economic Impact & Value ▪ Citizen Services ▪ Economic Development ▪ Cost-of-Living	❖ Anticipated socio-economic impact with current service offering. ❖ Anticipated socio-economic impact with extended service offering.	❖ Can BPW be a socio-economic accelerator?

Fiber to the Home (FTTH): Bringing Big Bandwidth to the Residence

Areas Examined in the Broadband Strategic Plan

Planning Elements	SWOT Analysis Considerations	Viability & Recommendations
Financial Outlook ▪ Revenue Streams & Take Rate ▪ Financial Model & Profitability ▪ CAPX and OPX	❖ Anticipated revenue streams and customer take rates by area ❖ Staffing requirements and impact of varied service offerings on profitability ❖ Investment payback timeframes	❖ Do the numbers support moving to FTTH? ❖ Are additional revenue streams needed to support/maximize return-on-investment (ROI)?
Business Model Analysis ▪ Service Offering(s) ▪ 'Go-to-Market' Strategy ▪ Operating Practices	❖ Service offering options, take rate, by service, customer trends, place in market ❖ Direct vs. channel partner sales, how will current providers react? ❖ Fee structures, impact of extended services, investment recovery model	❖ What impact will FTTH have on business model? ❖ How can BPW capture additional market share? ❖ What service set is viable in 5 – 10 years?
Market Outlook ▪ Competitive Analysis ▪ Customer Trends ▪ Local/National Trends	❖ What services do our customers want? What are customers buying today? ❖ Where are our competitors investing? What services are they selling? ❖ What are the local/national trends for services and bandwidth consumption?	❖ Is current product set viable for FTTH? ❖ What take rates can BPW expect by product? ❖ What will customers need 5 years from now? ❖How will decisions made today impact viability?
Logical Fiber Pathways ▪ Core Backbone Extensions ▪ Communities Impacted ▪ Depth of Fiber Penetration	❖ Over what footprint should BPW extend the network to FTTH? ❖ Is there an opportunity to leverage fiber for enhanced smart grid solutions? ❖ Where are new residential developments arising?	❖ What geographies provide the greatest ROI? ❖ What depth of penetration makes the greatest economic sense?
Technology Assessment ▪ Network Architecture ▪ Physical Plant ▪ Logical Design & Practices	❖ Will the logical and physical architecture support FTTH? ❖ What changes will have to be made to expand our service offering? ❖ Do we have the backbone transport capacity to handle the anticipated increase in bandwidth traffic?	❖ What will it take to meet current and future customer and channel partner needs under current service offering? Under additional?
Socio-Economic Impact & Value ▪ Citizen Services ▪ Economic Development ▪ Cost-of-Living	❖ Anticipated socio-economic impact with current service offering. ❖ Anticipated socio-economic impact with extended service offering.	❖ Can BPW be a socio-economic accelerator?

2011 Broadband Strategic Plan

Overall Findings & Recommendations

Mega Trends Impacting Holland BPW

Rapid growth in FTTH adoption for non-traditional providers (Non-ILEC/MSO)
•35 % Take rates common among ILECs/MSOs
•50% Take rates for non-traditional providers
•70% and greater take rates for Utility companies within 6 to 8 years of operations providing triple play
•Significant early penetration for broadband - 4.5% to 8% in first 6 months
•Long-term trends show video services necessary for early adoption and higher take rates

Increased demand for network services and transparency
•Greater access to low cost physical and logical transport services
•Needs for more than physical transport
•Network services - enterprise WAN and access to cloud services
•Reliable and redundant Ethernet Services
•Reliable and redundant IP Transport and Services (Growing Needs for Value Added Networked IP Services)

Reliable, resilient, scalable and affordable Internet
•Big broadband is a significant difference
•Access to high quality voice and video delivery services
•Access to content service providers and cloud services
•Wireless mobility through IP based services

Residential growth
•Still driven by video content, roughly 70% of broadband adopters also buy video services from their broadband providers
•Over the top trends having some impact on video, but not yet ready for 'prime time'
•Voice service trends towards VoIP
•Integration of home area network and wireless services

Commercial growth
•Driven by available bandwidth/cost
•Availability of value added network services
•Connection to community and network assets
•Connection to alternative providers/services

Commercial Provider Trends
•Incumbents and MSOs are:
○reliant on aging infrastructure that has slowed down investment in FTTH in most areas
○trending towards higher cost for services to alternative providers and resellers
○unwilling to overbuild other FTTH networks

•Alternative providers and resellers:
○need reliable Ethernet and IP transport services
○require advanced MPLS/QoS service delivery
○require multi-carrier/facilities/service access
○need local IP Service Exchange
○reduced time to market

FTTH/B Infrastructure Trends
•Fiber to the curb deployments
•Preference for underground solutions even if at higher cost
•Fiber management solutions in the field
•Active electronics closer to the distribution centers
•Hybrid architecture (WDM/GPON/AE)
•Ethernet to the edge and IP transport at the head-end
•Carrier neutral Ethernet interconnection
•Internet head-end for ISPs/wireless providers
•Integration of Home Area Network solutions into service offering

FTTH/B Business Model Trends
•Movement away from wholesale infrastructure separation in small, mid-size and rural markets
•Movement towards hybrid (e.g., ISP – Internet/VoIP/Cloud Services) business services and partnerships
•Full vertical integration in small to mid-size market
•Hybrid wholesale/retail service offerings (e.g., Creating Friendly Competition)
•Taking more participative role in the sale/marketing of services (even with partners)

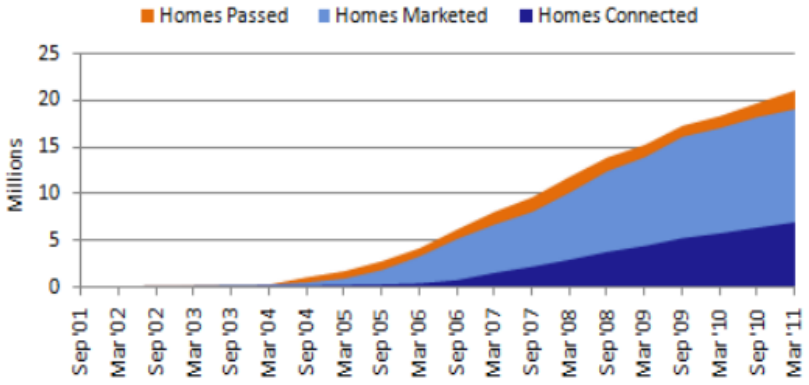
U.S. Fiber-to-the-Home (FTTH) Trends in Focus

As the figures on this page illustrate, the fiber-to-the-home market is one of the fastest growing trends in technology today here in the United States. Globally, the U.S. currently ranks 11th in terms of market penetration for FTTH, and has deployments occurring across the country in an effort to catch market leaders South Korea, Japan, Hong Kong , China and a host of European nations.

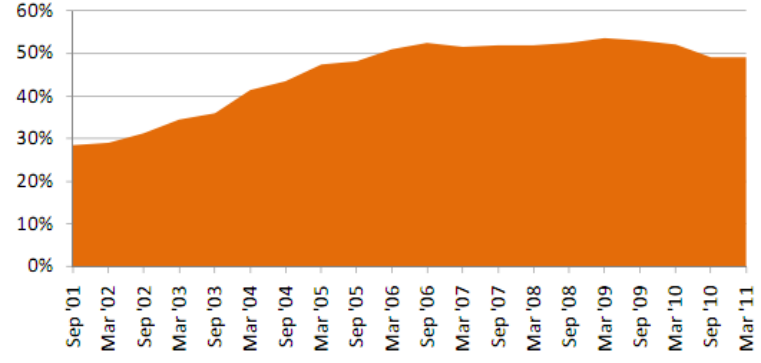
In the past 10 years the number of homes passed with fiber has grown from 19,000 in 2001 to nearly 20.9 million as of March 30, 2011. There is typically a lag between the time networks are constructed and when the actual marketing to consumers begins, and this is reflected in the gap between homes connected and homes passed. Take rates for non Regional Bell Operating Companies (RBOC) for FTTH deployments have remained steady at nearly 50%, with the cumulative total homes connected (fully lit and using the service) passing 7 million as of March 30, 2011.

The U.S. has reached an important milestone with just over 18% of all homes passed of which 6% are connected. The market forecast for homes connected projects a doubling of that figure within 18 months as marketing efforts and markets deployed mature.

North American FTTH Homes Cumulative



FTTH Non RBOC Take Rates
Homes Connected vs. Homes Marketed



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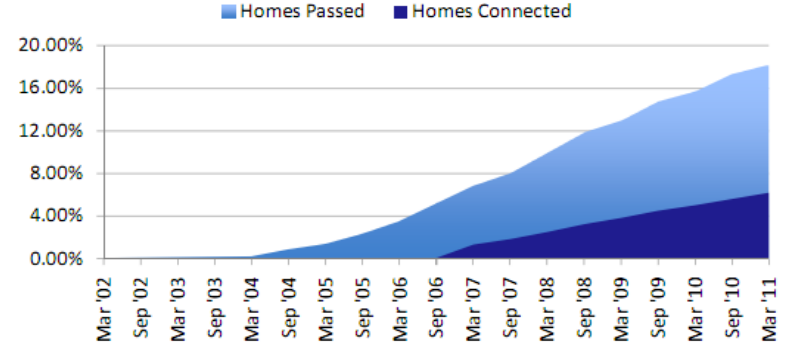
FTTH Penetration Cumulative – United States



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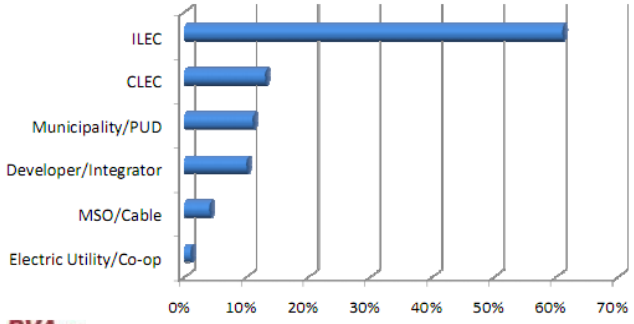
U.S. Fiber-to-the-Home (FTTH) Trends

FTTH Non RBOC Deployments by Provider Type



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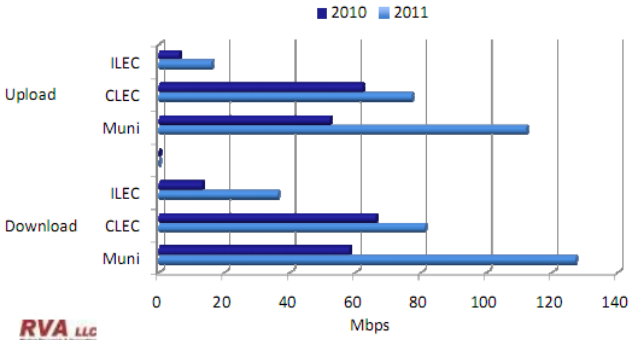
Highest Average Internet Speeds Offered by Non RBOC Provider Type



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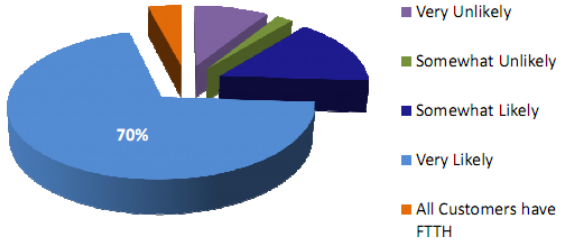
Although Verizon is the clear market leader in terms FTTH deployments by a large margin, municipalities, public utility districts, electric utilities and local Competitive Local Exchange Carriers (CLECs) have been a major force in fiber deployments across the country, far outstripping the FTTH investments of cable companies. A survey of hundreds of non-Regional Bell Operating Companies (RBOC) across the nation revealed that this trend is likely to continue, with 70% indicating that investment in FTTH connectivity was very likely in the near future.

Non RBOC providers are also among the most aggressive in terms of services offered. Double, Triple and Quadruple Plays (Internet, VoIP, Video, Energy Management) are the rule, with customer Internet connectivity speeds averaging 100 MB per second (upload and download) for municipalities and utilities.

Take rates for video are in sync with the take rates for Internet and VoIP services, with roughly 5 million of the 7 million homes lit by fiber receiving video services today. The vast majority of the remaining 2 million are being provided services by companies that are not offering video services currently. The bundling of packages, similar to that which occurs in the cable industry, is the dominant trend at this time. For video, HD and 3D channels are in high demand, and most providers offer 80 to 250 channels including premium channels and movies on-demand.

Likelihood of Adding FTTH Lines by Current Non RBOC FTTH Providers



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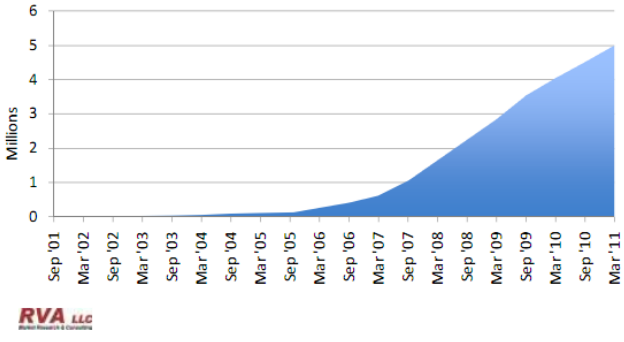
North American FTTH Video Homes Cumulative



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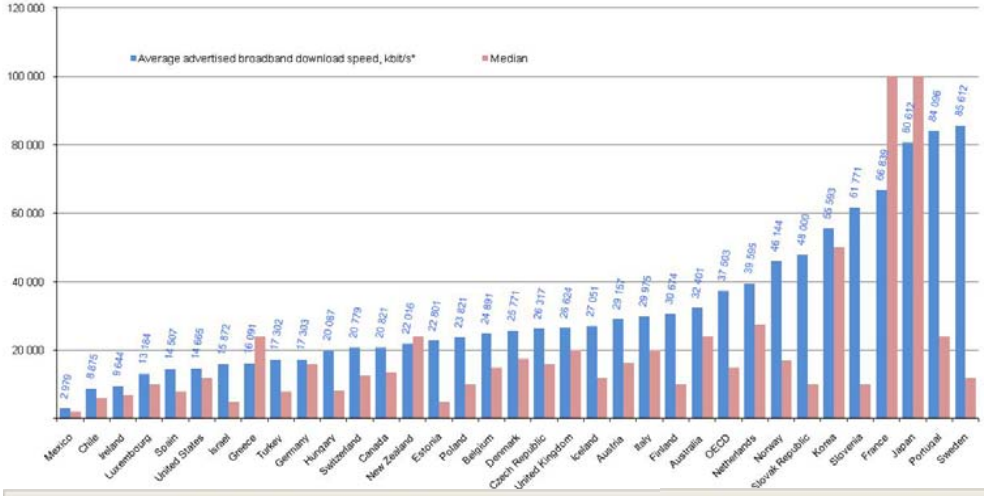
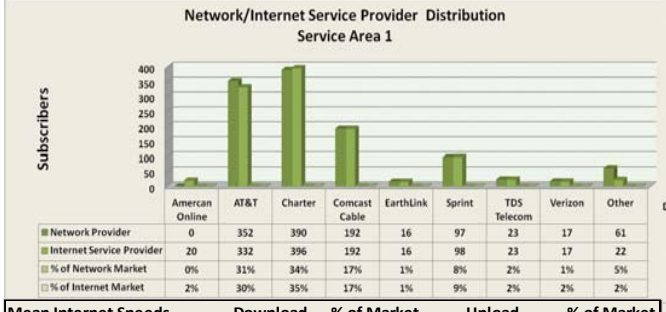
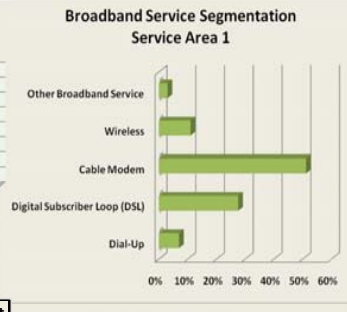
NORTH AMERICAN FTTH STATUS (AS OF THE END OF THE FIRST QUARTER OF EACH YEAR)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Homes passed	35,700	110,000	189,000	1,619,500	4,089,000	8,003,000	11,763,000	15,170,900	18,249,900	20,914,500
Homes marketed	35,700	110,000	189,000	829,700	3,218,600	6,643,000	10,082,000	13,875,600	16,992,600	19,344,700
Homes connected	10,350	38,000	78,000	213,000	671,000	1,478,600	2,912,500	4,422,000	5,804,800	7,094,800

Global & Local Internet Speed Trends





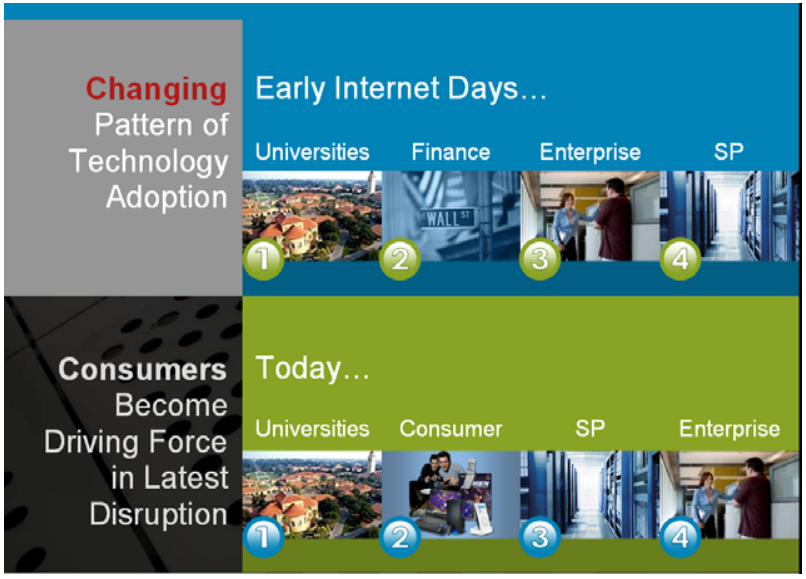


Mean Internet Speeds	Download	% of Market	Upload	% of Market
< 300 KB	5	0.56%	20	2.25%
300 KB - 786 KB	13	1.46%	284	31.95%
786 KB - 1.5 MB	31	3.49%	376	42.29%
1.5 MB - 2 MB	35	3.94%	123	13.84%
2 MB - 5 MB	225	25.31%	82	9.22%
5 MB - 10 MB	395	44.43%	3	0.34%
10 MB - 15 MB	180	20.25%	1	0.11%
15 MB - 25 MB	4	0.45%	0	0.00%
25 MB - 50 MB	1	0.11%	0	0.00%
50 MB - 100 MB	0	0.00%	0	0.00%
100 MB +	0	0.00%	0	0.00%
Subtotal Speed Samples	**889**		**889**	

- U.S. has fallen behind in the global broadband speed race, and is currently ranked #30 behind a host of Asian and European countries. Average advertised U.S. download speed is 14.7 Mbps.
- Governments across the world are investing heavily in broadband infrastructure to enhance their ability to compete in the global marketplace and provide enhanced citizen services and public safety solutions. Although their investment has moved the U.S. from 1st to 30th in less than a 7-year period, investments by the U.S. federal government through the ARRA BTOP and BIP programs as well as strong FTTH efforts across the country by Verizon, AT&T and municipal/utility companies is allowing us to begin closing the gap and enhance the global competitiveness of our communities.
- Investment disparity, however, remains significant: to put it in perspective, the Australian Government dedicated $43 billion for its national FTTP infrastructure (NBN) population in its drive to make Australia the new IT capital of the East. The U.S. government allocated $7 billion for its infrastructure backbone upgrade (primarily middle mile transport) for a population over 10x the size of that in Australia.
- South Korea, France and Japan all offer between 50 Mbps to 100 Mbps to over 80% of the population. Metropolitan areas in the Netherlands, France, South Korea, Japan, China, Switzerland, Singapore and Germany offer 100 Mbps FTTH to large segments of the population, with businesses enjoying synchronous 100 Mbps to 10 Gbps services.
- The greater Holland metropolitan area is far below U.S. averages (and 10x slower than leading global metro areas) for both download and upload speeds, with nearly 80% of the commercial establishments and residences having download speeds of less than 10 Mbps, and 90% having upload speeds of less than 2 Mbps.
- Both commercial and residential bandwidth consumption are doubling every year, as video, cloud computing, advanced storage solutions, telemedicine, telecommuting, video conferencing, etc., and there is no entity investing in replacing the aging greater Holland infrastructure with fiber save BPW and MERIT (ARRA middle mile award).
- Deployment of an FTTH infrastructure presents the opportunity for the City of Holland to leapfrog competing communities across the country and cash in on the recent economic development successes of Lakeshore Advantage to attract further corporate investment, jobs and quality of life for its citizenry.

Broadband Application Bandwidth Trends

Conventional models are under pressure



Application	Rate
Personal communications	300 to 9,600 bits/sec or higher
E-mail transmissions	2,400 to 9,600 bits/sec or higher
Remote control programs	9,600 bits/sec to 56 Kbits/sec
Digitized voice phone call	64,000 bits/sec
Database text query	Up to 1 Mbit/sec
Digital audio	1 to 2 Mbits/sec
Access images	1 to 8 Mbits/sec
Compressed video	2 to 10 Mbits/sec
Medical transmissions	Up to 50 Mbits/sec
Document imaging	10 to 100 Mbits/sec
Scientific imaging	Up to 1 Gbit/sec
Full-motion video	1 to 2 Gbits/sec

Service	Bandwidth	Number of Devices	Bandwidth Home Area Network	Bandwidth Residential Gateway to Network
TV	2 to 20 Mbps	3.5	2 to 70 Mbps	2 to 70 Mbps
DVR	2 to 20 Mbps	2	2 to 40 Mbps	0
Home Theater	1 to 6 Mbps	1	1 to 6 Mbps	0
Internet Browsing	1 to 20 Mbps	1 to 5	1 to 100 Mbps	1 to 10 MBPS
Printer	.5 to 1 Mbps	1 to 5	.5 to 5 Mbps	0
Digital imaging	1 to 20 Mbps	1 to 3	1 to 60 Mbps	0
On-line Gaming	.2 to 1 Mbps	1 to 3	.2 to 3 Mbps	.2 to 1 Mbps
Video Capture	.1 to 1 Mbps	1 to 10	.1 to 10 Mbps	.2 to 3 Mbps
Portable Audio	.1 to 20 Mbps	1 to 3	.1 to 60 Mbps	0
Total	**70 to 100 Mbps**		**12.5 to 354 Mbps +**	**4 to 84 Mbps +**

New Tools Enable Innovation

Current HBPW Broadband Operations

Broadband Line-of-Business at a Glance

•Revenues Flat for 4 Years: Holding at $900k per year;

•Customer Count Flat for 4 Years: Holding steady at around 60 customers;

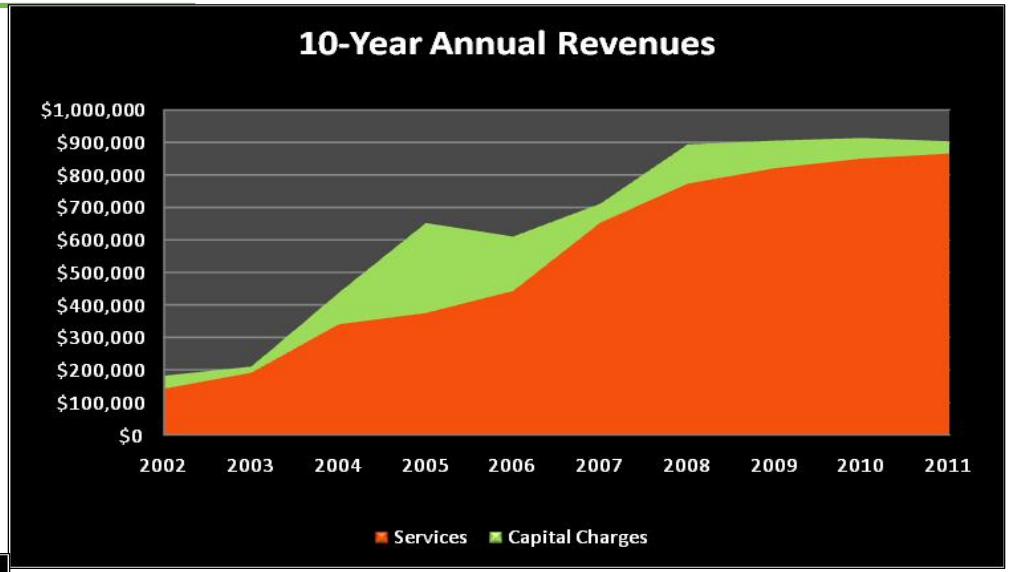
•Fiber Builds and Contracts: A direct correlation (and HBPW isn't building);

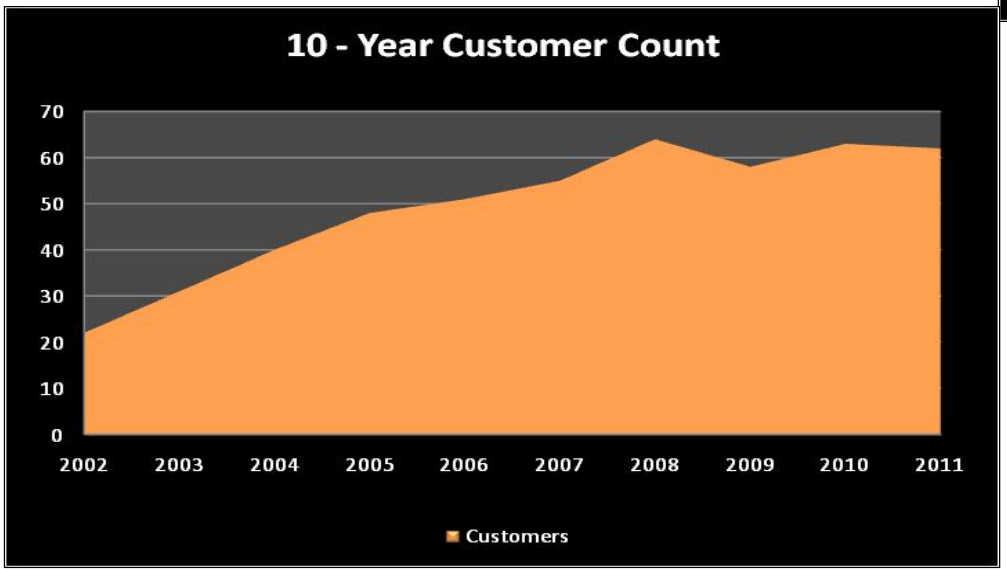
•57% of All Revenues are Dark Fiber Leases: Since 2006, 41% of the revenues were generated from a single contract with MCI;

•19% of All Revenues are Internal, Government or K-12: Primarily dark fiber or low speed transport circuits;

•13% of All Revenues are Health Care or NGO: Trending towards dark fiber leases to access enhanced services via MERIT network;

•Only 11% of All Revenues are Derived from the Commercial Sector: 50% of those revenues are from dark fiber leases with large companies like Herman Miller.





Why the Broadband Line-of-Business is Stagnate: What's Not Working

•Market Conditions: The market has been in decline and the economy has been somewhat stagnant. Revenue from fiber has simply offset costs to the Transmission and Distribution Department.

•'Get in or Get Out': Line-of-business is not run as a true business with separate P&L and associated performance/profit expectations and investment decision tree.

•Flawed Sales Approach: 100% dependency upon channel sales partners is not working: in fact, most channel sales partners state that HBPW is not first choice of provider and that they are using dark fiber IRUs provided by HBPW to extend the life cycle of their own aging plant and services offerings (e.g. DSL) through customer aggregation. HBPW has NO sales or marketing personnel dedicated (or even part-time) to broadband.

•Core Value Proposition: Without enhanced services (e.g. Internet, VoIP, Video, AMI), what is HBPW actually providing to its prospective customers (outside of 3rd party providers)?

•No Reason for Fiber: Average node speeds being sold by channel partners using HBPW are comparable to ADSL with "high end circuits" in the 5 MB – 10 MB range, significantly slower than cable modems and the equivalent of buying a Ferrari to sit idling in Tulip Festival traffic. Circuits sold should be in the 25 MB, 50 MB, 100 MB, 250 MB, 1 GB range.

SWOT Analysis: Existing Business Model

SWOT Analysis: Existing Business Model

Strengths

- ✓ Experts in fiber outside plant (OSP) construction & maintenance
- ✓ Own outright or are in possession of rights to poles for aerial deployments
- ✓ Control majority of backbone fiber in region
- ✓ Core base of 62 customers with over 130 sites
- ✓ Strong base of recurring revenue from long-term fiber IRUs
- ✓ Small base of Ethernet transport services with third party providers
- ✓ Well-established provider partner relationships acting as channel sales arm
- ✓ Core operations team with well-established BPW tenure and IP
- ✓ Executive support and commitment to strengthening fiber line-of-business
- ✓ Network used for both internal and multi-provider traffic (Cost Avoidance/ROI)
- ✓ Reputation as a positive force and progressive company within Holland

Opportunities

- ✓ Expansion of Backbone Fiber Penetration: Build reliability and redundancy closer to the premise shortening time-to-market
- ✓ Improve Cost Recovery and Customer Acquisition: Work with channel sales partners to increase ROI through reduction (and restructuring) of last mile construction costs through collaborative core route design and revised amortization of construction
- ✓ Open New Markets: Expansion to emerging high-growth business corridors of Zeeland, Saugatuck and regional/national backbones (Tier 1, FCC RHCPP/MERIT)
- ✓ FTTx: Diversify product portfolio and potential channel partners to offer higher speed transport and service options that drive sales
- ✓ Integrate with Smart Grid Solutions: Accelerate ROI, reduce peak loads and increase customer value proposition through FTTx-enabled energy solutions

Weaknesses

- X No sales force to drive customer acquisition – dependent on sales channels
- X Revenue and customer growth flat for 5-year period
- X Current method of amortizing last mile expense cost-prohibitive for all parties
- X Lack of geographic penetration and physical redundancy in deployed fiber plant limits commercial opportunities
- X Network isolation – no/limited interconnection services with facilities, carriers and upstream service providers
- X Limited customer value proposition – transport only (no services)
- X Inability to provide partners enhanced network services and visibility into network performance and QoS
- X Aging plant and equipment, some questions regarding fiber quality
- X Not run as an independent business unit with associated expectations and managed approaches to CAPX and OPX investment decisions

Threats

- X Competition in core transport by encroaching public and private fiber networks (e.g. Holland hospital, MERIT)
- X Declining price trends regionally and nationally for fiber IRUs, leased transport for last mile circuits
- X Introduction of cost-effective connectivity options to commercial sector by traditional cable companies and Tier 1 carriers (removing need for transport circuits for low-end and mid-range (e.g. 25 MB down, 5 MB up) speeds
- X Key core customers abandoning current multi-circuit VPN structure in favor of fiber IRUs or carrier MPLS services poviding greater control at a reduced cost
- X Future sales/growth/margin entirely dependent on sales channels
- X Dependency on small alternative (and often under-capitalized) providers as sales partners and customer care: what happens if they close shop?

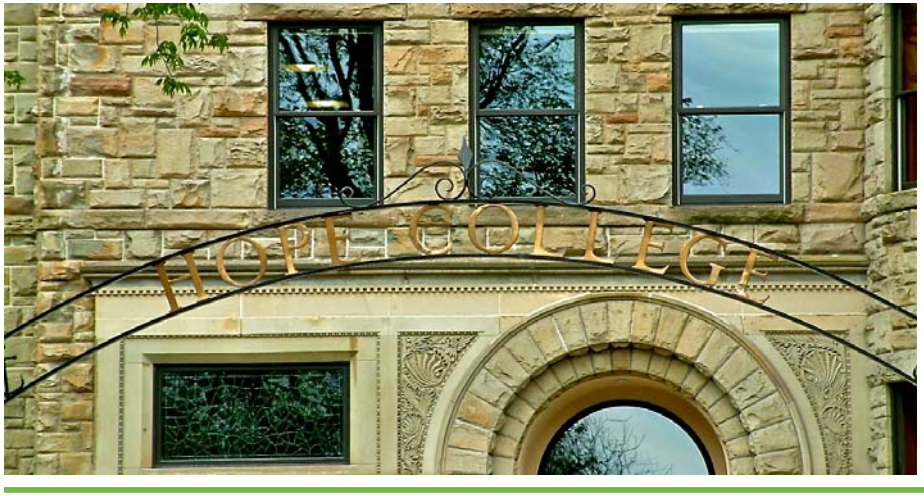
Summary of Findings: Basic Business Model

Complete Separation Model

This "build it and they will come" approach, lacks underlying financials and product sets that are sustainable. We highly recommend that Holland BPW reject outright the full separation model. The existing fiber lease revenue simply offsets the cost to the transmission and Distribution Department. We see no situation in which this is financially viable in the current political, regulatory and market dynamic.

Passive Sharing Model

Overall, this is the model that BPW would pursue if deciding to abandon the line-of-business altogether as a focused effort, and instead accept ad hoc, opportunistic revenue as the fiber network continued to expand over coming years for BPW's own internal use for the electric, water and wastewater activities.



Active Sharing Model

We firmly recommend that BPW alter its business model to become a vertically integrated provider rather than an active sharing network operator. BPW is leaving far too much money on the table by adopting the active sharing model, and providing far less community socio-economic impact than it could given its assets.

At a minimum, BPW should remain a network operator under the active sharing model and 'step up its game.' The broadband "division" is not currently being run as a true business, and it needs to be. This is a viable and profitable operating model if managed correctly.

Vertically Integrated Model

The vertically integrated model is the model we recommend for Holland BPW. In the model the broadband division would take control of its destiny and exploit the opportunity to maximize community socio-economic benefits, revenues and profitability from the broadband line-of business. While still operating under an open and vendor neutral model, BPW would introduce any combination of Internet, VoIP, Video (including TV), AMI and other services directly to the marketplace as retail services.

This does not preclude the continued provision of wholesale services as currently provided. BPW will, however, enter the market as a direct competitor (with transparent and published pricing) in enhanced services that will transform the service, pricing and competitive landscape within the greater Holland metropolitan area. We highly recommend entry into both the commercial (FTTB) and residential (FTTH) markets for BPW.

SWOT Analysis: Vertically Integrated Business Model

SWOT Analysis: Vertically Integrated Business Model

Strengths

- ✓ Experts in fiber outside plant (OSP) construction & maintenance
- ✓ Own outright or are in possession of rights to poles for aerial deployments
- ✓ Recognized as a reliable community partner/service organization
- ✓ First line of access to customer service changes (e.g., water, electric)
- ✓ Strong core operations team with well-established BPW tenure and IP
- ✓ Network already used for both internal and external customer services
- ✓ Capital expense creates barrier to entry for most providers and limits potential future competition
- ✓ Combination of network and bundled services reduces the competitive threats to BPWs existing network services and mitigates impact of vertical product price erosion
- ✓ Ability to create financial capitalization necessary to build FTTH infrastructure and services without accelerating payback (Long-term view)

Opportunities

- ✓ Invest/build/leverage core fiber infrastructure for internal services (e.g., Cost Center) and create value added services to generate additional revenues in new markets
- ✓ New and advanced infrastructure provides BPW with a preeminent position for development of new services with increased margins at nominal cost accelerating ROI
- ✓ Enables BPW to advance AMI without additional telecommunications costs accelerating ROI for both energy management and FTTH
- ✓ Ability to create product/service differentiation, increasing take rates and market penetration
- ✓ Increased customer value proposition with additional services
- ✓ Build internal capacity to support internal and new product communications technology enabled services
- ✓ Anchor tenants want better access to households for their own services

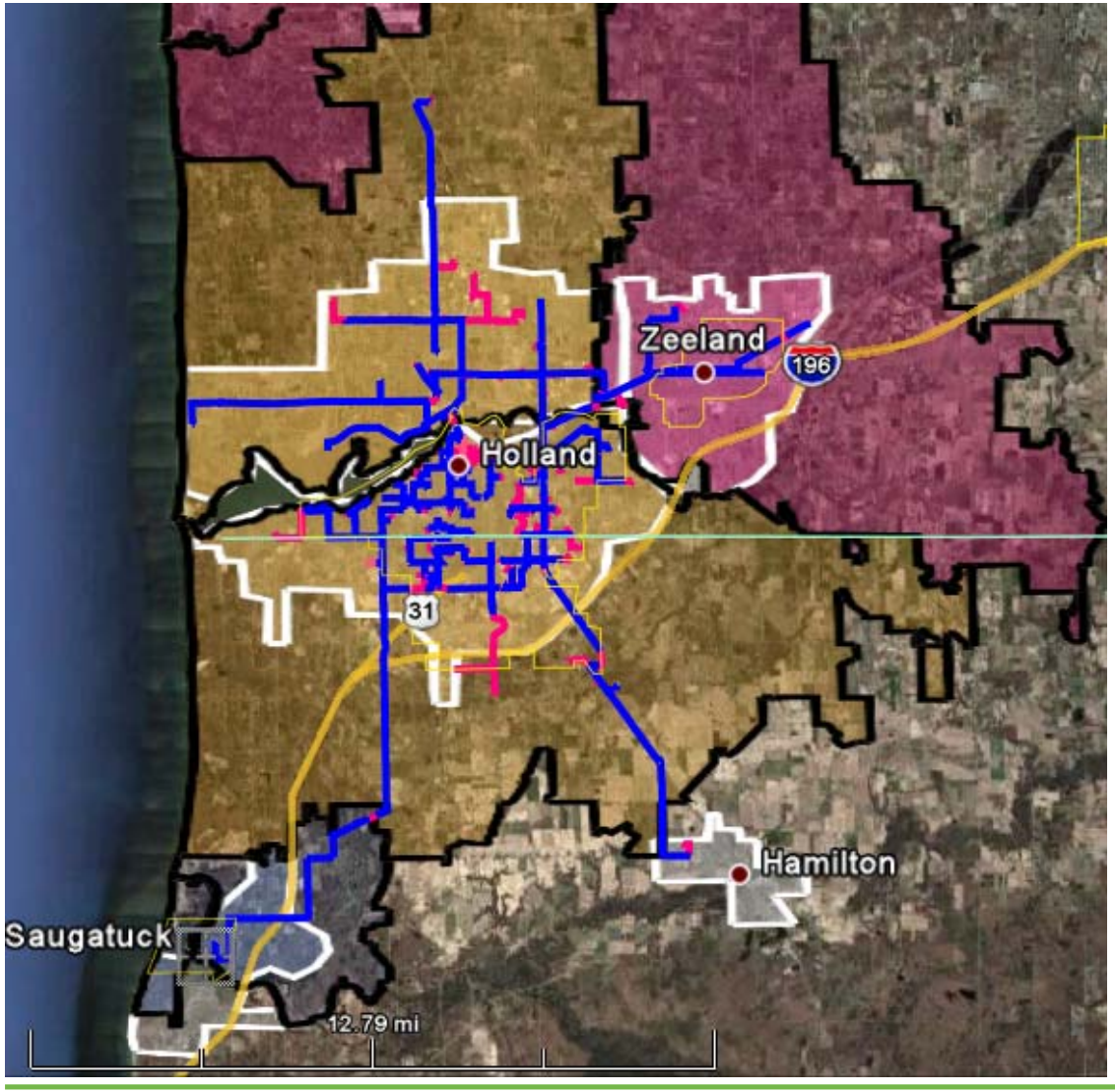
Weaknesses

- X Lack of sales experience in broadband services market – current dependency on channel sales
- X No experience in supporting complexity of diverse product offerings or providing enhanced network services, retail broadband and value added Internet, VoIP, CATV
- X Not currently considered a real/separate line of business with associated expectations and managed approaches to CAPX and OPX investment decisions
- X Not currently providing an open service exchange with upstream capacity
- X No experience in negotiating interconnect and content/distribution agreements

Threats

- X Established Single/Double/Triple Play Providers
- X Value added service providers pull through additional services such as Internet, VoIP, and CATV requiring BPW to continue to develop and invest in value added service products
- X Declining price trends regionally and nationally for fiber IRUs, leased transport and mid-range (e.g. 25 MB down, 5 MB up) speeds
- X Competition in core transport and broadband vertical to anchor tenants by encroaching fiber networks (e.g. MERIT)
- X Dependency on small alternative (and often under-capitalized) providers as channel sales partners and customer care: what happens if they close shop?

Where to Build: Recommended FTTH Footprint



Competition in the Marketplace

at&t Your world. Delivered.

Sirus TECHNOLOGY SOLUTIONS

123 NET

Charter

DIRECTV

Comcast

iserv

TDS

dish NETWORK

verizon

merit NETWORK

BPW

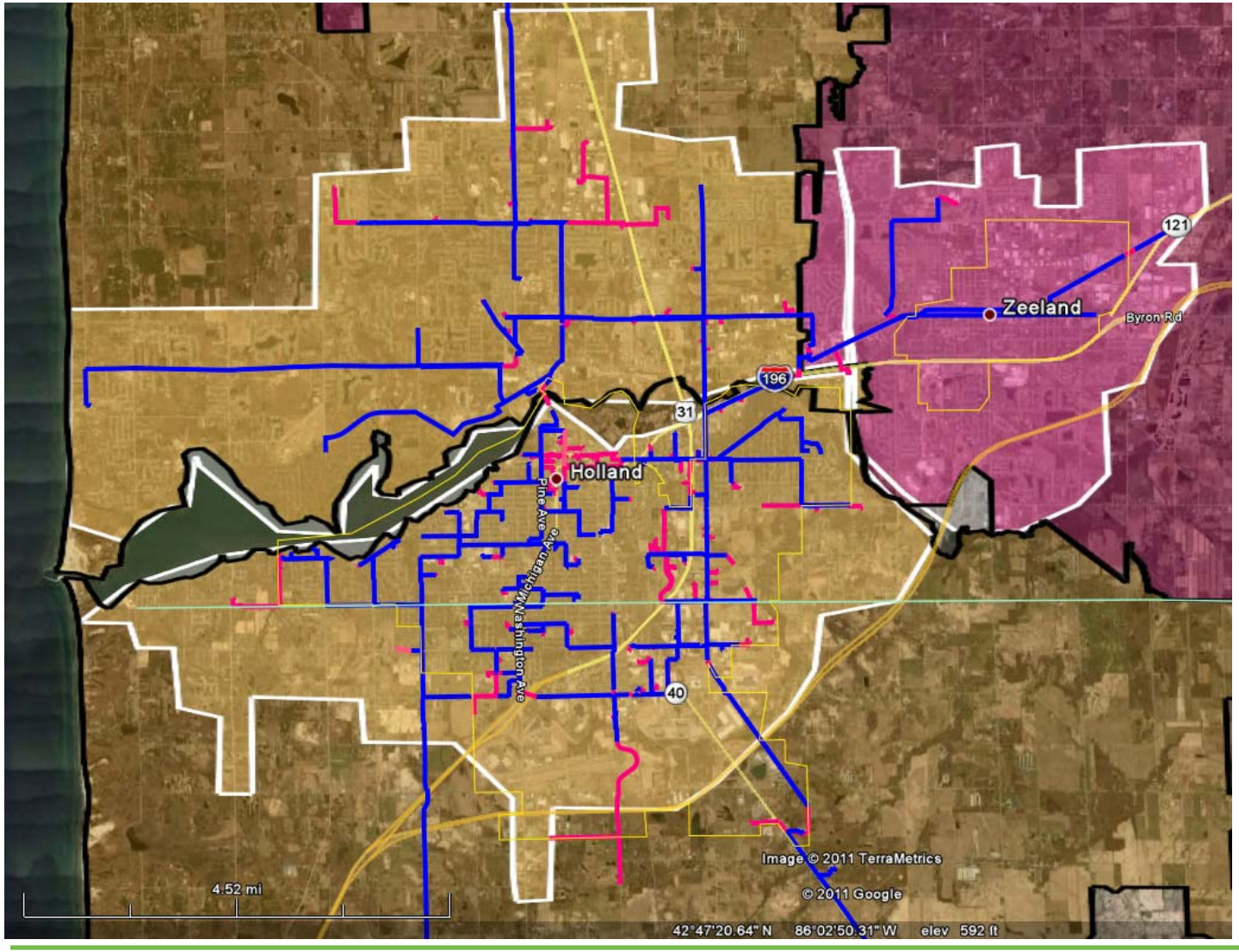
EarthLink

Sprint

Aol.

TI2 COMMUNICATIONS

Primary Service Areas



Primary Unified Service Area

The figure to the left provides a closer look at the primary operating footprint recommended for Holland BPW fiber network expansion. As in the previous slide, blue indicates existing aerial plant and pink indicates existing underground plant.

The map shows the density of the commercial and residential footprint within the contiguous area, an area that in total represents:

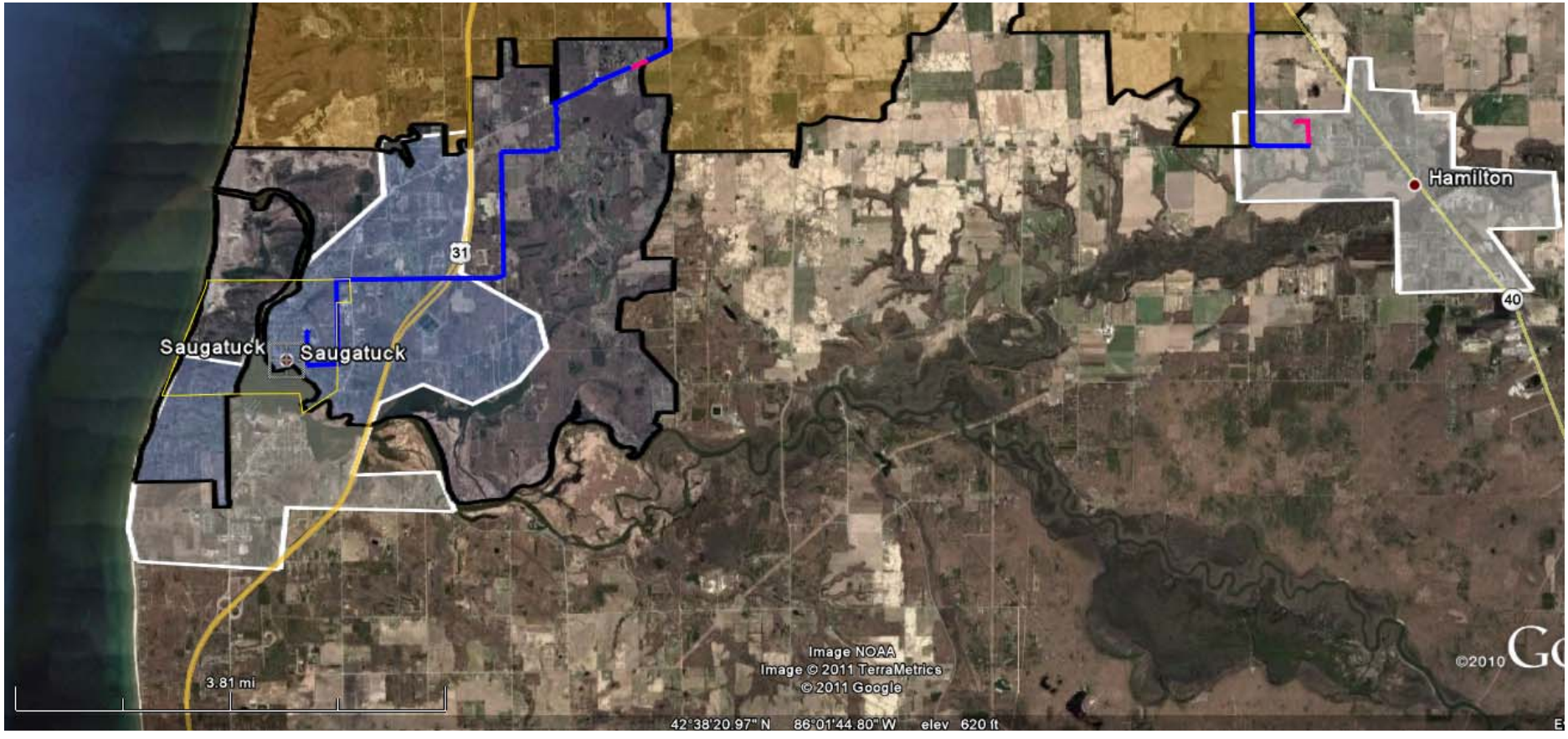
FOR FTTH:

•Roughly 750 fiber miles total (existing and new)
- Approximately 66 homes per mile
- 45,250+ homes passed

Holland North and Holland South are within the traditional operating footprint of the BPW. Zeeland represents an extension outside of that footprint, but one that makes strong sense based upon demographics, regional economic development considerations and the inter-dependencies of the two communities in terms of employment, healthcare, education and economics. Despite municipal and BPW operational boundaries, these three (3) areas essentially work together to form a single economic development zone.

This area represents the greatest opportunity for socio-economic impact within the greater Holland metropolitan area, and will provide HBPW with the greatest return-on-investment.

Secondary Service Areas



FOR FTTH: The secondary service are represents roughly 125 fiber miles total (existing and new), approximately 44 homes per mile, and 4500+ homes passed.

Saugatuck and Hamilton currently are connected to main fiber BPW fiber backbones. Access to the Douglas City area would require the construction of a main fiber trunk across the bridge into downtown Douglas. Both secondary service areas make strong economic sense based upon demographics, growth and regional economic development considerations, and essentially provide outer-edge boundaries for future FTTP development to fill in the gaps between the northern and southern most borders of the potential entire region to be developed for FTTH in subsequent phases. The 'gap' areas are low-density regions that could be added in subsequent years during the normal course of steady-state operations under a structured program of capital investment with the ultimate goal of full FTTH penetration for every residence and business within the Holland BPW operating footprint over a 20-year period.

Expand Open Network Framework

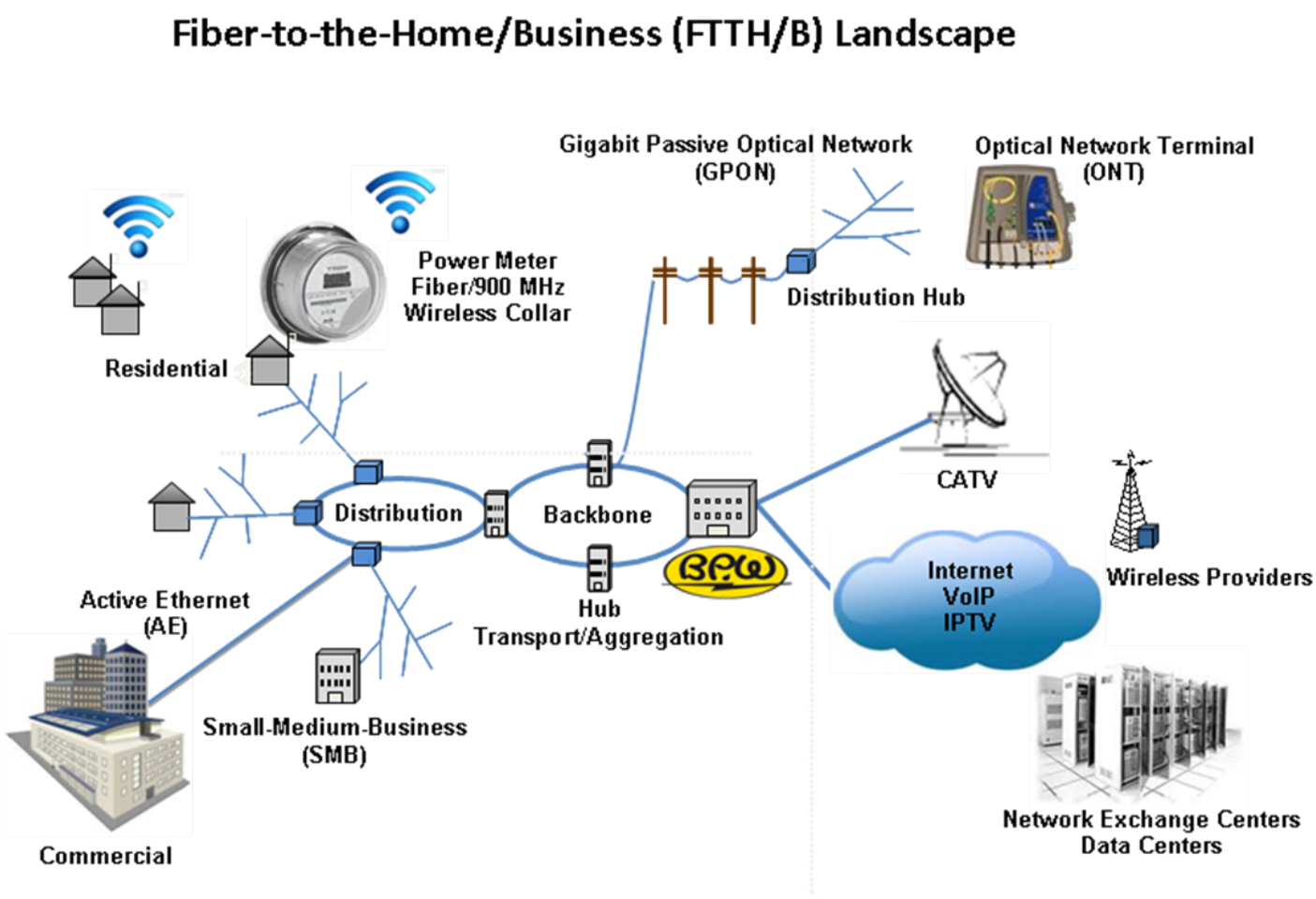
The FTTH/B Open Network Framework in Action

HBPW has decades of outside plant (OSP) experience and understands the value of fiber infrastructure. The in-house team has the technology and operational background to continue to build and scale additional fiber plant for its core FTTB strategy. They are also capable, given access to additional resources, to manage the design, deployment and operations of a much larger and more impactful fiber distribution system in support of FTTH services.

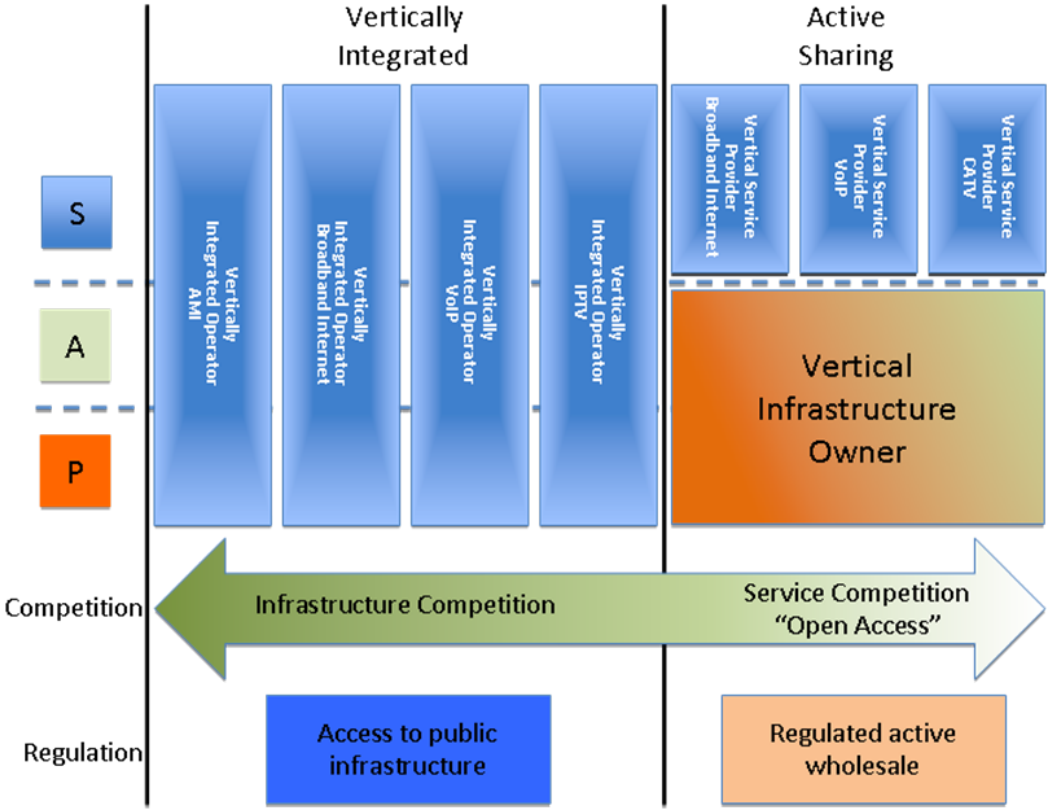
The challenge HBPW will face is not in the physical infrastructure, but instead in developing and scaling the logical and enhanced network services that are needed to stay current in the vertical infrastructure space. There is a need to both upgrade current skills through training and develop consistent commercial practices that will enable HBPW to service any carrier-class environment or enterprise.

HBPW will also need to consider staffing additional resources to manage the diversity and scale, or else outsource services to a capable network services organization with the level of skills and experience requisite for operating carrier class networks.

The FTTH/B Landscape diagram to the right provides an illustration of the interconnected framework that HBPW will need to manage if it intends to effectively grow/compete in the vertical infrastructure space for residential and commercial customers against entrenched incumbents.



Technical Architecture & Recommendations



We highly recommend that HBPW take a more proactive approach to investing in FTTH as an extended go-to-market strategy. This approach will enable HBPW to strategically position assets that would enable growth, increase the marketability its assets, the long-term integrity and sustainability of its fiber plant, and the socio-economic benefit to the citizens of Holland. .

The architectural approach to above provides HBPW with the flexibility to change and adapt its business strategies without compromising the integrity of its fiber plant and network services. This allows HBPW to improve the viability and value of its current assets within the marketplace, and enter into new vertically integrated markets to improve revenue and ROI opportunities.

Technical Considerations Recommendations Summary

Network Services

•Build-out fiber distribution via backbone/aggregation using distribution hubs to aggregate households and businesses in 500/1000 increments

•Develop a GPON distribution strategy using 32-way splitters with the intent to leverage the 10G/GPON infrastructure coming out over the next 12 to 18 months

•Develop a GPON/AE Architecture that enables both shared and dedicated fiber network services

•Provide Layer 2 & Layer 3 transport developing an MPLS VLAN QoS service model for carrier and ISP services

•Develop an Internet Service Exchange

•Build out backhaul fiber to Grand Rapids to develop an Internet Service Exchange for ISP and Vertical Service Provider Connections

•Connect to central offices, collocation and data center facilities in region to provide commercial service interconnection options

•Optionally consider building or partner to build a small 10,000 square foot Tier 4 data center facility for HBPWs local telecommunications and Internet service exchange operations

Enhanced Services

•Develop an Internet service platform and provide wholesale services to ISPs and retail Internet services to residential subscribers.

•Develop a VoIP residential/commercial offering

o Register as a CLEC

o Interconnect to local Cos and SIP providers in Grand Rapids

•Develop an IPTV residential/commercial offering

•Investigate the deployment of hybrid FTTH Smart Meter solution such as Carina that provide fiber and 900 MHz wireless collar solutions

Full Triple Play FTTH CAPX

	CAPX/Construction					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total (Year 1-5)
Construction Elements						
Headend Facilities						
Internet	$ 560,000	$ -	$ -	$ -	$ -	$ 560,000
VoIP	$ 509,962	$ -	$ -	$ -	$ -	$ 509,962
IPTV	$ 2,676,728	$ -	$ -	$ -	$ -	$ 2,676,728
Network Infrastructure						
Fiber Plant	$ 15,410,483	$ 15,410,483	$ -	$ -	$ -	$ 30,820,965
Network Service Electronics	$ 6,154,236	$ 6,154,236	$ -	$ -	$ -	$ 12,308,471
Subscriber Electronics						
Network Interface Device (NID)	$ 417,776	$ 2,335,308	$ 595,893	$ 665,394	$ 714,267	$ 4,728,638
Internet/VoIP Router	$ 64,859	$ 355,482	$ 91,029	$ 99,769	$ 103,921	$ 715,060
IPTV Set-Top-Box (STB)	$ 322,478	$ 1,345,325	$ 360,138	$ 383,148	$ 380,883	$ 2,791,972
Subscriber Installation Services						
Internet	$ 84,324	$ 699,573	$ 170,209	$ 207,278	$ 249,646	$ 1,411,030
Internet/VoIP	$ 173,622	$ 512,159	$ 144,648	$ 104,596	$ 17,504	$ 952,530
IPTV Set-Top-Box (STB)	$ 173,715	$ 659,525	$ 180,375	$ 219,225	$ 267,140	$ 1,499,980
Total Project Construction Costs (Years 1-5)	**$ 26,548,183**	**$ 27,472,089**	**$ 1,542,292**	**$ 1,679,410**	**$ 1,733,361**	**$ 58,975,336**

The CAPX requirements for the triple play include additional head-end facilities for the Internet, VoIP and IPTV services. Subscriber equipment and projected installation are based on a ramp up to a 50% take rate. The total CAPX cost for the first five years of operation are expected to be close to $59 Million. The fixed cost of CAPX includes the head-end facilities and network Infrastructure for approximately $47.9 Million or 80% of the total capital cost. The subscriber electronics and installation is subject to variables such as take rate.

The preliminary design for HBPW provides approximate 95% coverage for the areas in question with a total passing of over 55,000 residential and commercial buildings. The total cost per passing is expected to be approximately $865 for fiber and electronics for a total cost of approximately $1823 per active subscriber based on a 50% take rate. Increased take rates will require additional capital costs but will also reduce the total cost per active subscriber. These costs are on par with expectations and relatively low due to the household density of Greater Holland.

Triple Play (FTTH – Internet, VoIP, Video): 50% Take Rate

Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 2,863,034	$ 13,363,747	$ 15,722,899	$ 21,030,635	$ 27,132,845	$ 41,931,632	$ 46,305,757
Cost of Goods Sold (COGS)	$ 2,740,134	$ 8,886,770	$ 8,772,020	$ 13,102,480	$ 16,730,522	$ 25,544,191	$ 28,274,584
Gross Operating Margin	**$ 122,900**	**$ 4,476,977**	**$ 6,950,880**	**$ 7,928,155**	**$ 10,402,323**	**$ 16,387,441**	**$ 18,031,173**
	4%	34%	44%	38%	38%	39%	39%
Sales, General & Administrative (SG&A)	$ 1,460,330	$ 2,345,612	$ 1,674,623	$ 2,117,038	$ 2,370,845	$ 2,454,195	$ 2,791,916
Income Before Depreciation & Interest	**$ (1,337,430)**	**$ 2,131,366**	**$ 5,276,257**	**$ 5,811,117**	**$ 8,031,478**	**$ 13,933,245**	**$ 15,239,257**
	-47%	16%	34%	28%	30%	33%	33%
Depreciation	$ 2,299,958	$ 4,526,247	$ 4,675,827	$ 4,839,871	$ 5,011,167	$ 3,421,863	$ 4,184,414
Interest	$ 1,232,839	$ 1,251,331	$ 1,679,573	$ 2,003,567	$ 1,878,834	$ 917,787	$ 429,425
Net Income	**$ (4,870,227)**	**$ (3,646,212)**	**$ (1,079,142)**	**$ (1,032,321)**	**$ 1,141,477**	**$ 9,593,595**	**$ 10,625,418**
	-170%	-27%	-7%	-5%	4%	23%	23%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,169,407	$ 30,941,140	$ 30,147,020	$ 20,559,898	$ 7,994,829
Debt Service Balance (Loan)	$ 10,706,039	$ 20,896,389	$ 19,966,824	$ 16,029,719	$ 11,741,814	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 3,341,829	$ 5,412,148	$ 6,319,670	$ 3,302,560	$ 3,170,229
Debt Coverage Ratio	-23.08	-20.18	0.60	0.44	0.70	3.17	3.59
Cash	**$ 12,998,168**	**$ (1,959,939)**	**$ (841,479)**	**$ (2,413,554)**	**$ (2,815,749)**	**$ 13,933,245**	**$ 64,402,129**

At a 50% take rate the with the CAPX and Revenue Bond/HBPW Loan assumptions identified above, HBPW should be able to demonstrate positive income before depreciation and interest trends Year 2 and become income positive in Year 5. Cash flow shortfalls through Year 6 will require some cash management lending from HBPW or through other financial instruments. The existing income of approximately $890,000 from commercial services provides a base of revenue and a pipeline that can be accelerated through active marketing/pricing as the result of reduced costs associated with the additional fiber deployment. New service revenue can be generated as early as 6 months into the construction project. The model assumes only a 3% take rate the first year.

By Year 10 HBPW should see the full effect of the 50% take rate and approximately $9.5 million a year in net income. Because HBPW is a public entity there should not be a significant tax consequence unless laws for telecommunication services change. However there will be utility service fees associated with state and federal regulations and the Universal Service Fund (USF). These are largely pass through to the subscriber and additive to the subscriber invoice. As such they should have no material effect on the overall financials to HBPW and are not addressed in the existing model.

Double Play (FTTH – Internet, VoIP): 39% Take Rate

Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 2,131,511	$ 9,942,006	$ 11,870,509	$ 16,345,151	$ 21,399,629	$ 30,468,127	$ 33,686,817
Cost of Goods Sold (COGS)	$ 2,207,940	$ 6,460,399	$ 6,163,758	$ 9,790,260	$ 12,664,364	$ 17,141,923	$ 18,306,592
Gross Operating Margin	**$ (76,429)**	**$ 3,481,607**	**$ 5,706,750**	**$ 6,554,891**	**$ 8,735,266**	**$ 13,326,204**	**$ 15,380,225**
	-4%	35%	48%	40%	41%	44%	46%
Sales, General & Administrative (SG&A)	$ 1,367,524	$ 1,982,275	$ 1,516,916	$ 1,894,261	$ 2,095,754	$ 2,095,526	$ 2,376,624
Income Before Depreciation & Interest	**$ (1,443,953)**	**$ 1,499,332**	**$ 4,189,835**	**$ 4,660,630**	**$ 6,639,512**	**$ 11,230,678**	**$ 13,003,600**
	-68%	15%	35%	29%	31%	37%	39%
Depreciation	$ 1,858,775	$ 3,844,568	$ 3,929,539	$ 4,022,857	$ 4,120,254	$ 2,788,625	$ 3,544,282
Interest	$ 1,232,839	$ 1,251,331	$ 1,556,042	$ 1,836,888	$ 1,732,103	$ 969,216	$ 563,928
Net Income	**$ (4,535,567)**	**$ (3,596,567)**	**$ (1,295,746)**	**$ (1,199,115)**	**$ 787,155**	**$ 7,472,837**	**$ 8,895,391**
	-213%	-36%	-11%	-7%	4%	25%	26%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,204,015	$ 31,022,892	$ 30,336,497	$ 22,377,539	$ 11,742,677
Debt Service Balance (Loan)	$ 7,617,759	$ 16,124,637	$ 15,312,990	$ 12,279,687	$ 9,015,236	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 2,737,040	$ 4,462,587	$ 5,191,761	$ 2,822,085	$ 2,919,442
Debt Coverage Ratio	-20.54	-19.13	0.65	0.48	0.77	2.97	3.42
Cash	**$ 12,904,779**	**$ (2,620,575)**	**$ (1,804,196)**	**$ (2,906,148)**	**$ (2,875,339)**	**$ 11,230,678**	**$ 54,141,909**

The transition to a double play service profile has the net effect of reducing the effective take rate by 11% and drops the top line revenue by over 27%. The bottom line impact is a reduction of 22% in net income and 16% in HBPW cash position. Debt service remains higher due to the ANR calculation and extends the overall debt service terms for the Revenue bond. Bond terms will likely extend out to 15 years due to the reduced revenue projections.

The double play still provides a viable business services strategy but enables HBPW to achieve a strong cash position by Year 15. The double play scenario requires more proactive sales in the absence of a direct video bundle. A 10% negative swing in take rate can have dramatic impact on the net income and places long-term sustainability at risk.

Single Play (FTTH – Internet Only): 33% Take Rate

Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 1,464,263	$ 7,440,984	$ 9,073,339	$ 13,221,545	$ 18,266,559	$ 27,061,889	$ 29,724,666
Cost of Goods Sold (COGS)	$ 1,817,131	$ 5,093,914	$ 4,909,664	$ 8,379,255	$ 11,288,681	$ 15,589,266	$ 16,590,861
Gross Operating Margin	**$ (352,868)**	**$ 2,347,070**	**$ 4,163,675**	**$ 4,842,290**	**$ 6,977,879**	**$ 11,472,624**	**$ 13,133,805**
	-24%	32%	46%	37%	38%	42%	44%
Sales, General & Administrative (SG&A)	$ 1,274,924	$ 1,698,962	$ 1,365,640	$ 1,724,638	$ 1,955,467	$ 1,935,313	$ 2,195,282
Income Before Depreciation & Interest	**$ (1,627,793)**	**$ 648,108**	**$ 2,798,035**	**$ 3,117,652**	**$ 5,022,411**	**$ 9,537,311**	**$ 10,938,523**
	-111%	9%	31%	24%	27%	35%	37%
Depreciation	$ 1,757,405	$ 3,638,354	$ 3,694,595	$ 3,763,001	$ 3,845,625	$ 2,654,812	$ 3,383,318
Interest	$ 1,232,839	$ 1,251,331	$ 1,527,658	$ 1,787,559	$ 1,692,845	$ 1,052,089	$ 736,780
Net Income	**$ (4,618,036)**	**$ (4,241,577)**	**$ (2,424,218)**	**$ (2,432,908)**	**$ (516,059)**	**$ 5,830,410**	**$ 6,818,425**
	-315%	-57%	-27%	-18%	-3%	22%	23%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,283,280	$ 31,283,280	$ 30,942,611	$ 24,842,116	$ 16,581,863
Debt Service Balance (Loan)	$ 6,908,166	$ 14,681,137	$ 13,799,395	$ 11,037,842	$ 8,093,140	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 2,526,766	$ 4,012,885	$ 4,536,701	$ 2,512,189	$ 2,574,416
Debt Coverage Ratio	-20.07	-19.11	0.30	0.23	0.58	2.74	3.14
Cash	**$ 12,743,604**	**$ (3,550,693)**	**$ (3,820,810)**	**$ (5,770,512)**	**$ (6,539,522)**	**$ 9,537,311**	**$ 38,137,811**

The transition to a single play service profile has the net effect of reducing the effective take rate by 17% and drops the top line revenue by over 35%. The bottom line impact is a reduction of 39% in net income and 41% in HBPW cash position. Debt service remains higher due to the ANR calculation and extends the overall debt service terms for the Revenue bond. Bond terms will likely extend out to 20 years due to the reduced revenue projections.

The single play still provides a viable business services strategy and enables HBPW to achieve a strong cash position by Year 15. The single play scenario requires more proactive sales in the absence of a direct VoIP/video bundle. A 5% negative swing in take rate can have dramatic impact on the net income and places long-term sustainability at risk.

Wholesale (FTTH Fiber/GPON/AE): 36% Take Rate

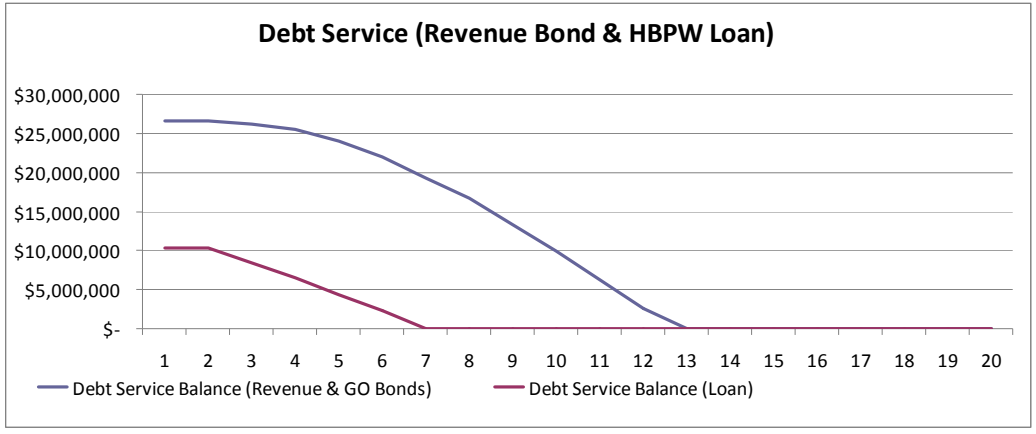
Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 2,808,837	$ 6,665,762	$ 7,343,795	$ 8,280,314	$ 9,311,123	$ 11,984,836	$ 13,073,720
Cost of Goods Sold (COGS)	$ 1,683,123	$ 3,112,253	$ 2,337,059	$ 3,163,954	$ 3,239,473	$ 3,796,505	$ 4,478,899
Gross Operating Margin	**$ 1,125,714**	**$ 3,553,509**	**$ 5,006,736**	**$ 5,116,360**	**$ 6,071,650**	**$ 8,188,331**	**$ 8,594,821**
	40%	53%	68%	62%	65%	68%	66%
Sales, General & Administrative (SG&A)	$ 1,450,470	$ 1,467,033	$ 1,223,206	$ 1,284,786	$ 1,347,005	$ 1,530,310	$ 1,781,637
Income Before Depreciation & Interest	**$ (324,756)**	**$ 2,086,476**	**$ 3,783,529**	**$ 3,831,573**	**$ 4,724,645**	**$ 6,658,021**	**$ 6,813,184**
	-12%	31%	52%	46%	51%	56%	52%
Depreciation	$ 1,816,239	$ 3,684,964	$ 3,743,362	$ 3,810,603	$ 3,887,283	$ 2,613,388	$ 3,351,377
Interest	$ 1,232,839	$ 1,251,331	$ 1,544,131	$ 1,794,579	$ 1,694,599	$ 1,123,230	$ 978,088
Net Income	**$ (3,373,833)**	**$ (2,849,819)**	**$ (1,503,963)**	**$ (1,773,608)**	**$ (857,237)**	**$ 2,921,404**	**$ 2,483,719**
	-120%	-43%	-20%	-21%	-9%	24%	19%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,208,522	$ 31,125,082	$ 30,820,834	$ 27,360,376	$ 23,674,699
Debt Service Balance (Loan)	$ 7,320,003	$ 15,007,412	$ 14,064,723	$ 11,239,889	$ 8,226,589	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 2,677,559	$ 4,156,615	$ 4,562,552	$ 1,843,606	$ 1,755,590
Debt Coverage Ratio	-19.49	-17.91	0.65	0.40	0.54	2.17	2.33
Cash	**$ 13,885,992**	**$ (986,620)**	**$ (382,676)**	**$ (1,730,569)**	**$ (2,664,938)**	**$ 6,658,021**	**$ 20,145,969**

The transition to a wholesale service profile has the net effect of reducing the effective take rate by 14% and drops the top line revenue by over 71%. The bottom line impact is a reduction of 70% in net income and 69% in HBPW cash position. Debt service remains higher due to the ANR calculation and extends the overall debt service terms for the Revenue bond. Bond terms will likely extend out to 20 years due to the reduced revenue projections.

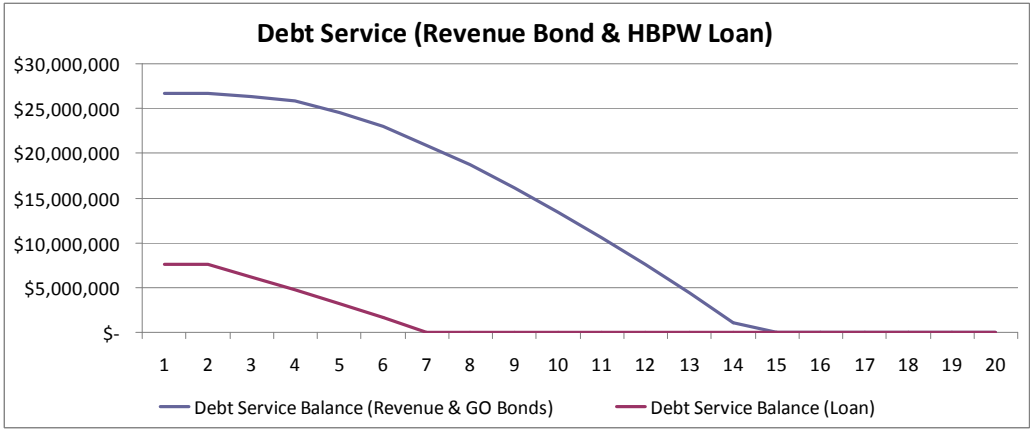
The wholesale scenario still provides a viable business services strategy and enables HBPW to achieve a relatively strong cash position by year 15. The wholesale scenario requires more proactive sales in the absence of any enhanced services. A 5% negative swing in take rate can have dramatic impact on the net income and places long-term sustainability at risk. The wholesale model is more vulnerable to price erosion since it is solely based on the availability of infrastructure and does not provide an effective service to increase its relative value proposition.

Debt Service Impact by FTTH Services Scenario

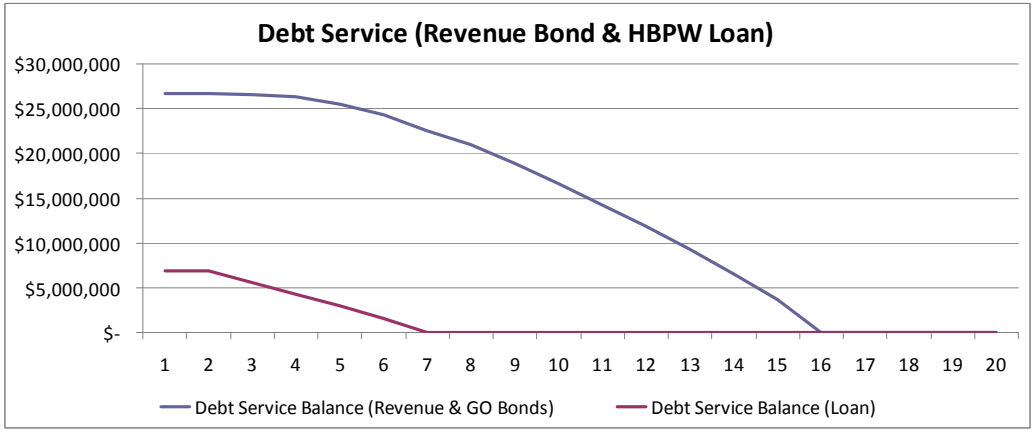
Scenario 1: Triple Play



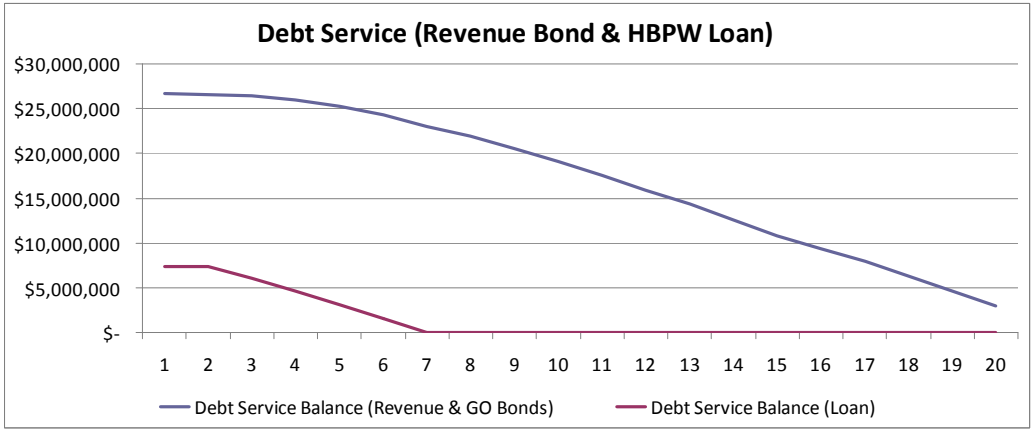
Scenario 2: Double Play



Scenario 3: Single Play



Scenario 4: Wholesale



2011 Broadband Strategic Plan

Market Overview

Broadband Market

Competitive Landscape

Holland BPW's operating footprint is a vibrant telecommunications marketplace featuring a wealth of residential and business consumer choices regarding carrier and type of retail service offering. Although the market is crowded and competitive, there is room for BPW to garner solid market share gains due to its position as one of the few providers with significant fiber holdings in the area and its ability to provide next-generation speeds to consumers. The vast majority of current providers are using legacy plant, primarily copper, and the broadband speeds currently offered are significantly below those found in urban markets and communities with similar demographics across the country.

Given the market size, it appears unlikely that the greater Holland area will be the beneficiary of an infrastructure upgrade by any of the Tier 1 or cable providers any time soon, as most investment by large telecommunication companies is happening in major markets. The smaller ISPs and CLECs are current customers of BPW, using the fiber backbone to aggregate customer traffic which is largely legacy copper DSL, with BPW providing last mile connectivity for their business customers that require more speed and can afford the build-out. Even then, however, the top speeds offered are relatively slow, and at a price point that is higher than customers are paying in the major metros. This landscape provides BPW with the opportunity to be the first to market with affordable next generation broadband services for the commercial and residential sectors, a tremendous opportunity to be the sole provider capable of filling the current void with a superior product that will completely separate BPW from the rest of the pack for years to come.

The market overview is comprised of four (4) primary sections:

1.Broadband Speed Survey: Over 4,700 unique customers connections and over 4.4 million Internet transactions were surveyed in Allegan and Ottawa counties for upload/download speeds and current provider.

2. Sample Provider Marketing Material: Illustrating how providers are selling their services and at what price point.

3.Demographics: A breakdown of the business and residential characteristics in each serving area.

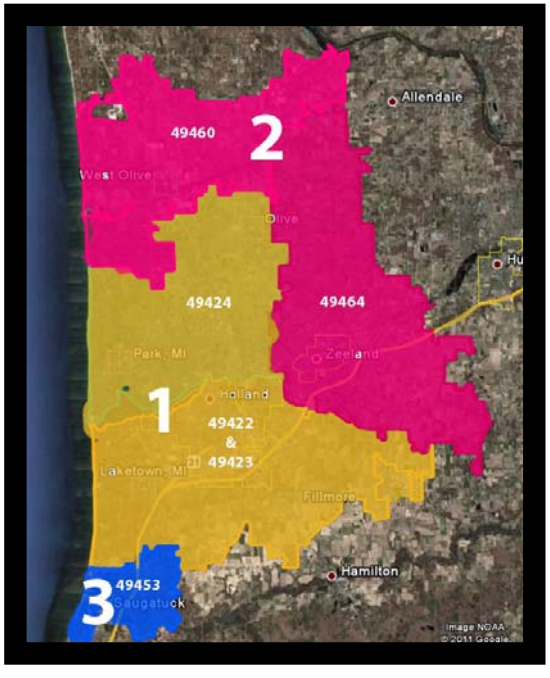
4.Current BPW Customer Survey: Direct from BPW's current broadband customers.

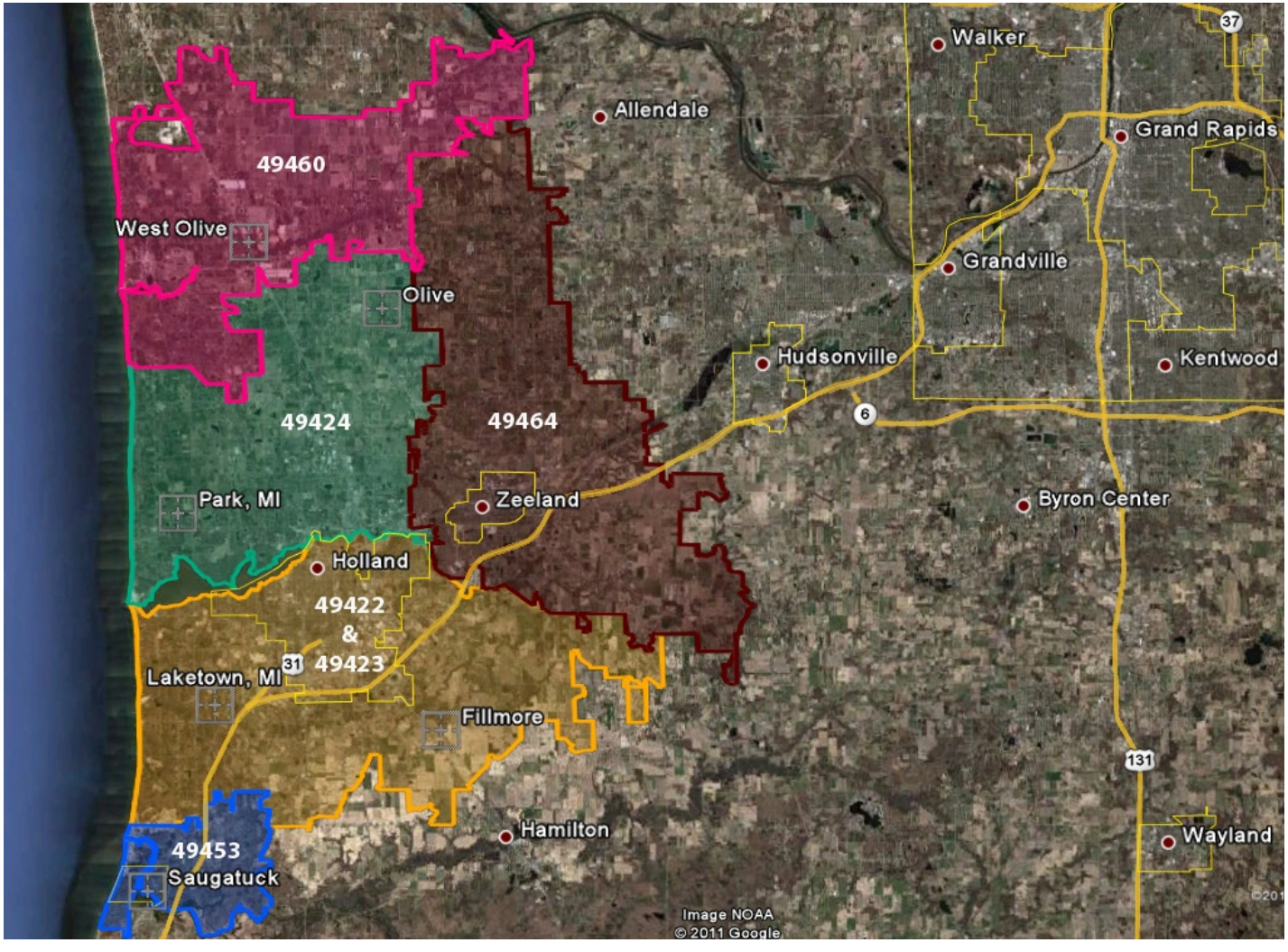
Who's in the Marketplace?

Data and Service Areas

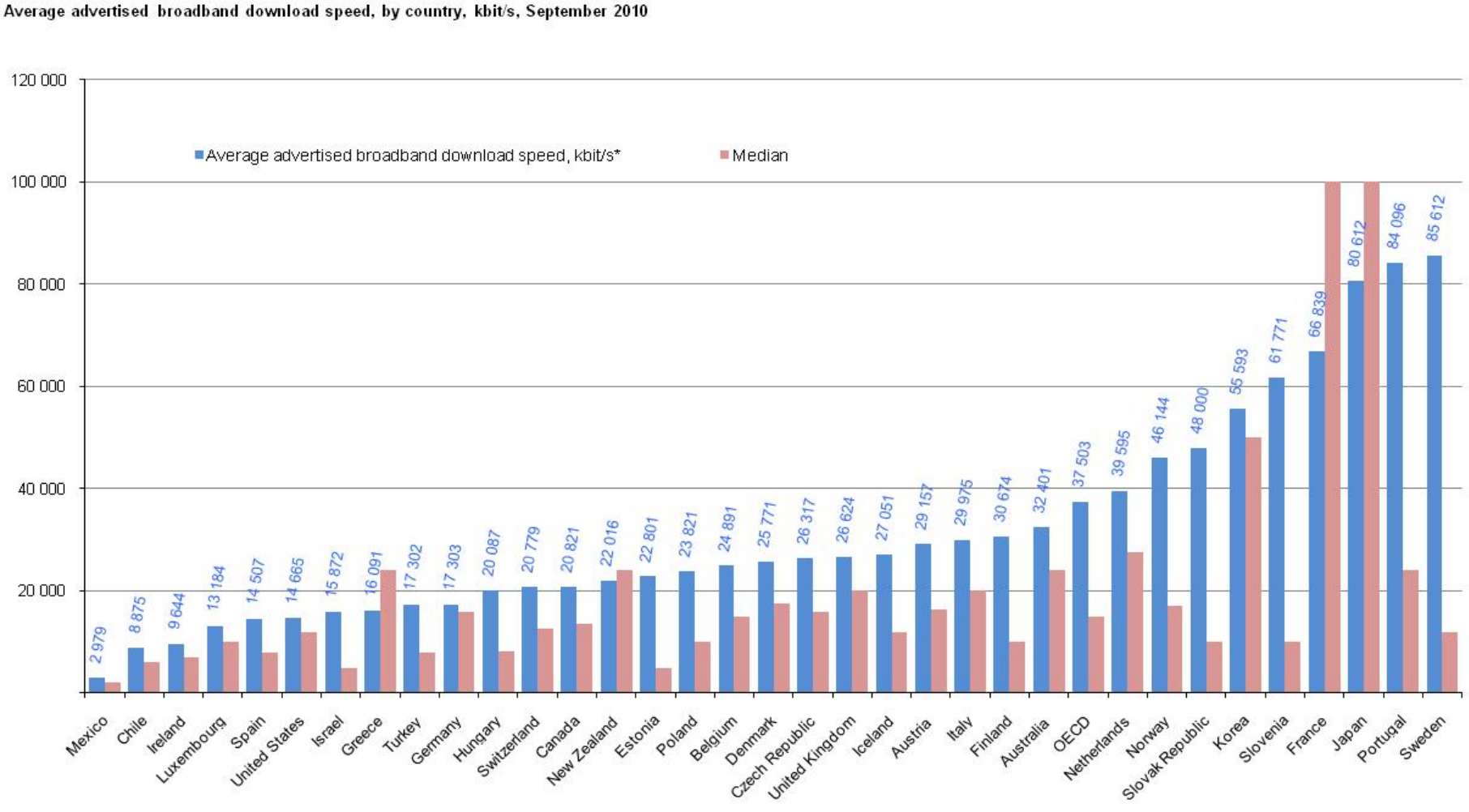
There are five (5) zip codes in the fiber optic footprint under consideration for the Holland BPW. These are illustrated in the map to the right.

In order to pinpoint the relevancy of our study to the drivers of the Holland BPW and the data sets available from the U.S. Census and other sources, we collected market and demographic information around the zip codes and then aggregated the data into three logical service areas based on geographic distance from Holland, population density and priority market considerations. The service areas used in this study are illustrated below:



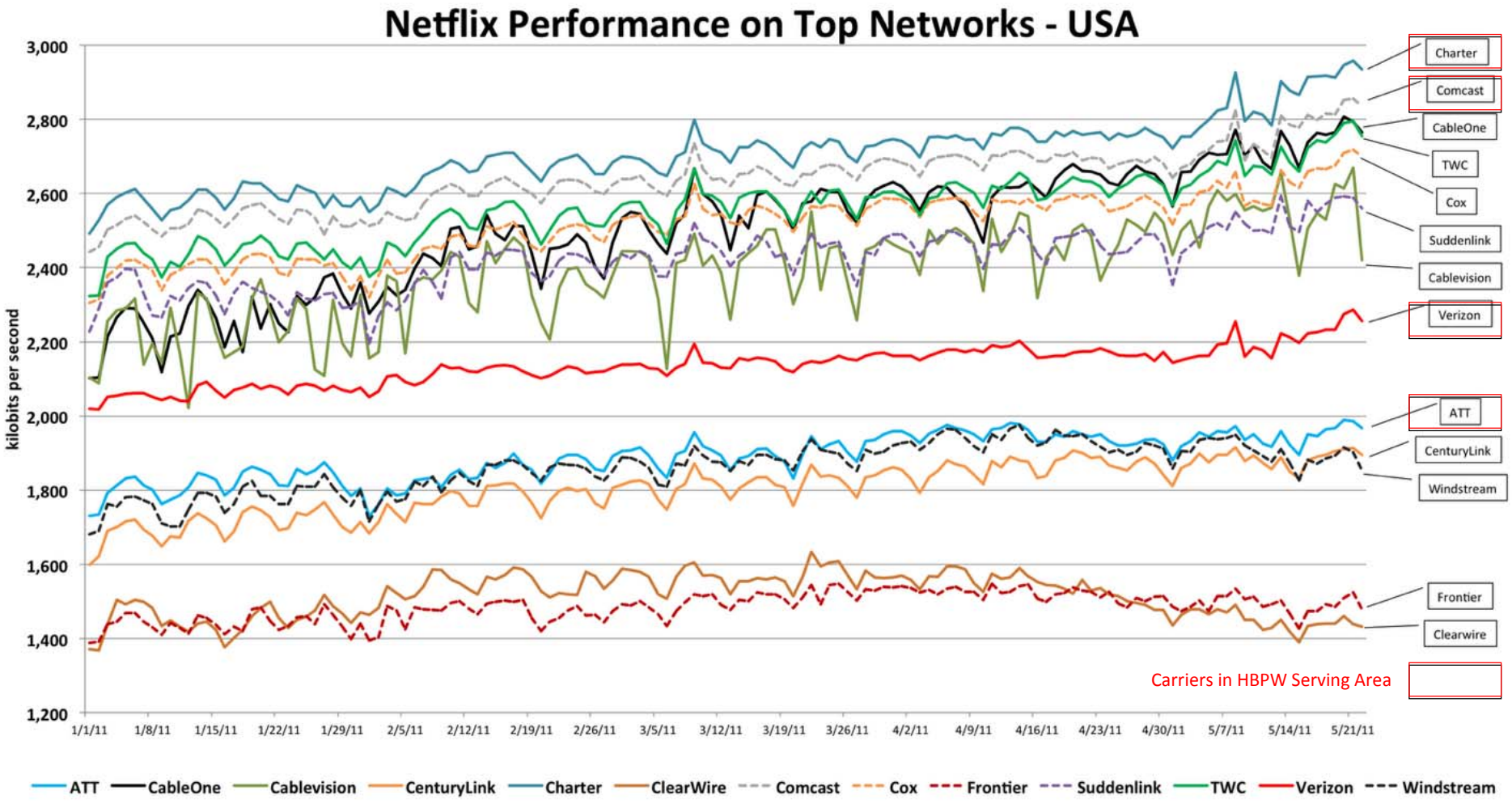


The Global Viewpoint



As illustrated in the chart above, the United States has lost its position as the leader in broadband connectivity speeds across the globe (currently ranked #30). European and Asian countries have invested heavily in this key infrastructure capability as a cornerstone of economic development programs designed to enhance their ability compete in today's global marketplace. As we will see in the coming pages, Holland's average broadband connections are even lower than the U.S. national average. Source: Organization for Economic Cooperation and Development

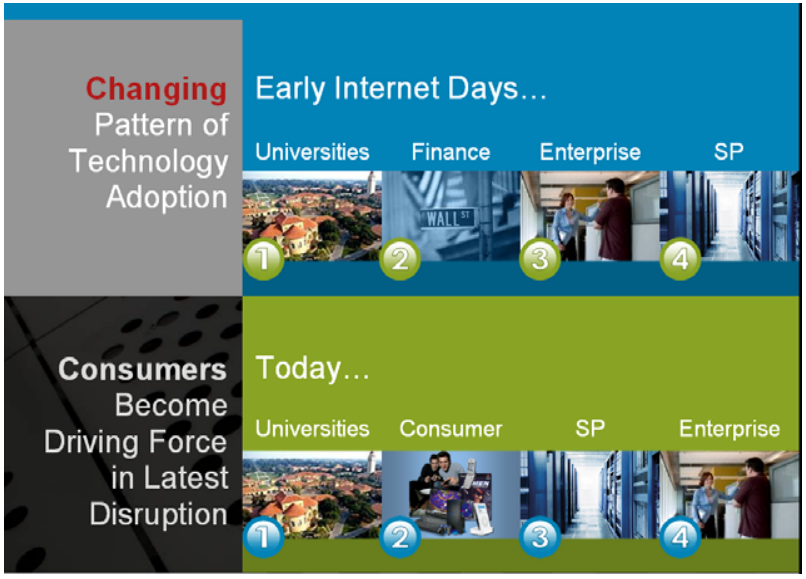
How Others View Carrier Services



This is further underscored by the newly released U.S. statistics regarding average download speeds by provider by Netflix, a company that depends upon high speed broadband Internet for its core business model. Note the average speeds and rank of the four (4) providers in the BPW serving area.

Broadband Application Bandwidth Trends

Conventional models are under pressure



Application	Rate
Personal communications	300 to 9,600 bits/sec or higher
E-mail transmissions	2,400 to 9,600 bits/sec or higher
Remote control programs	9,600 bits/sec to 56 Kbits/sec
Digitized voice phone call	64,000 bits/sec
Database text query	Up to 1 Mbit/sec
Digital audio	1 to 2 Mbits/sec
Access images	1 to 8 Mbits/sec
Compressed video	2 to 10 Mbits/sec
Medical transmissions	Up to 50 Mbits/sec
Document imaging	10 to 100 Mbits/sec
Scientific imaging	Up to 1 Gbit/sec
Full-motion video	1 to 2 Gbits/sec

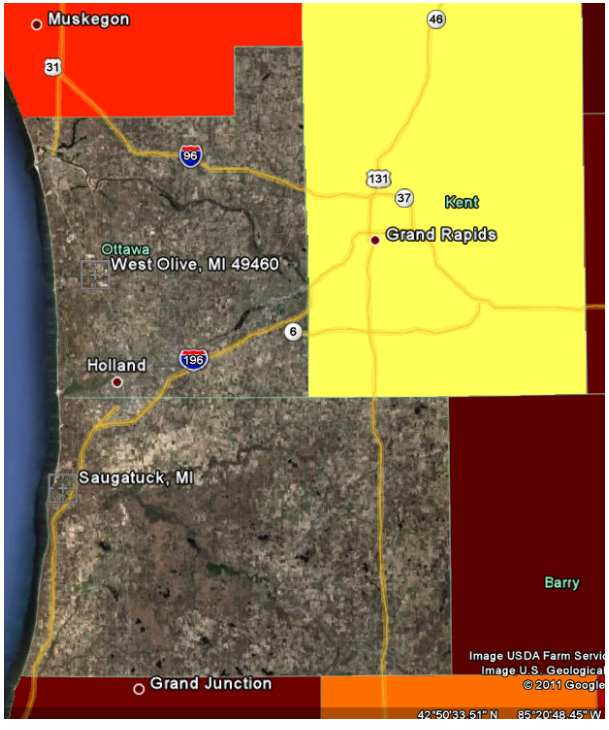
Service	Bandwidth	Number of Devices	Bandwidth Home Area Network	Bandwidth Residential Gateway to Network
TV	2 to 20 Mbps	3.5	2 to 70 Mbps	2 to 70 Mbps
DVR	2 to 20 Mbps	2	2 to 40 Mbps	0
Home Theater	1 to 6 Mbps	1	1 to 6 Mbps	0
Internet Browsing	1 to 20 Mbps	1 to 5	1 to 100 Mbps	1 to 10 MBPS
Printer	.5 to 1 Mbps	1 to 5	.5 to 5 Mbps	0
Digital imaging	1 to 20 Mbps	1 to 3	1 to 60 Mbps	0
On-line Gaming	.2 to 1 Mbps	1 to 3	.2 to 3 Mbps	.2 to 1 Mbps
Video Capture	.1 to 1 Mbps	1 to 10	.1 to 10 Mbps	.2 to 3 Mbps
Portable Audio	.1 to 20 Mbps	1 to 3	.1 to 60 Mbps	0
Total	**70 to 100 Mbps**		**12.5 to 354 Mbps +**	**4 to 84 Mbps +**

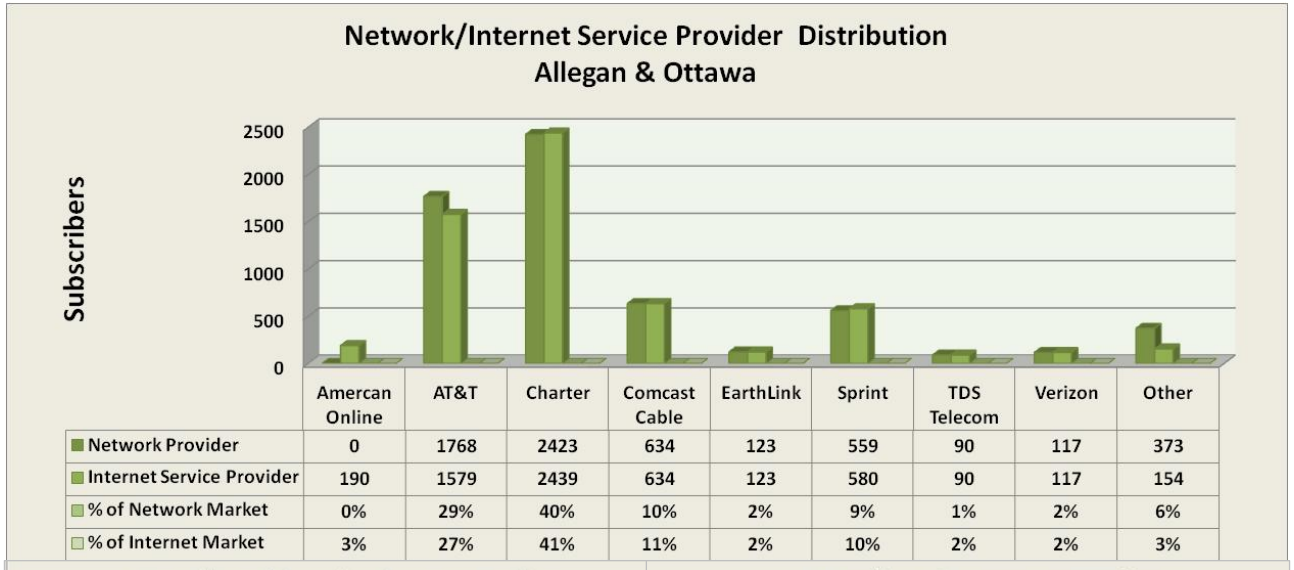
New Tools Enable Innovation

Speed Survey Results: Allegan and Ottawa Counties

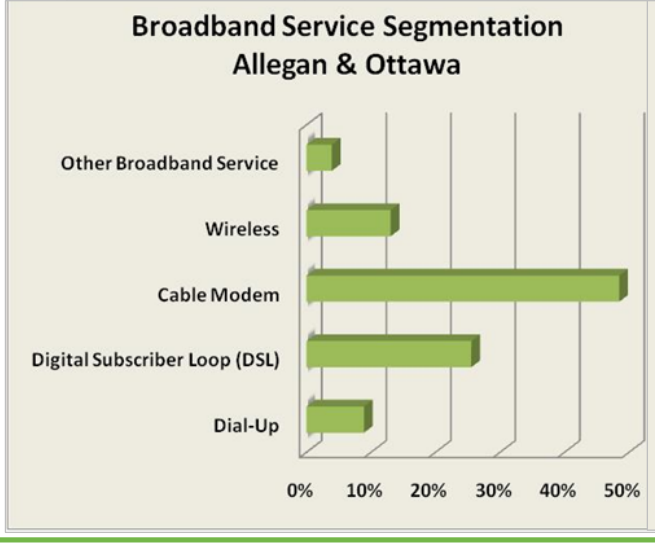
As illustrated in the charts to the right, broadband connectivity in Allegan and Ottawa counties is dominated by two (2) providers who collectively hold 68% market share in the residential and commercial space: Charter and AT&T. Sprint is the dominant wireless provider, with Verizon currently running a distant second.

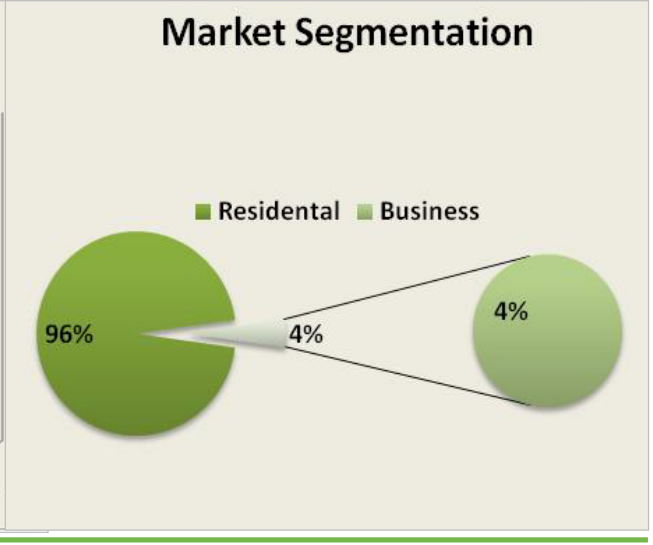
Cable modems dominate the market, accounting for 48% of all connections, with DSL holding strong in the territory with 26% market share. Only 9% of all subscribers are still using dial-up.





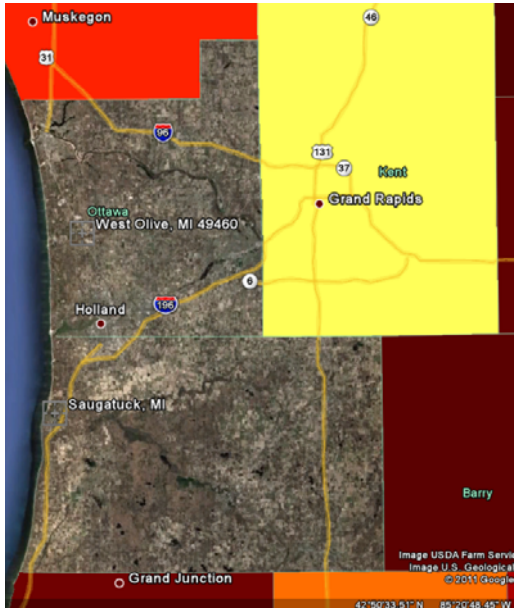
	Amercan Online	AT&T	Charter	Comcast Cable	EarthLink	Sprint	TDS Telecom	Verizon	Other
Network Provider	0	1768	2423	634	123	559	90	117	373
Internet Service Provider	190	1579	2439	634	123	580	90	117	154
% of Network Market	0%	29%	40%	10%	2%	9%	1%	2%	6%
% of Internet Market	3%	27%	41%	11%	2%	10%	2%	2%	3%





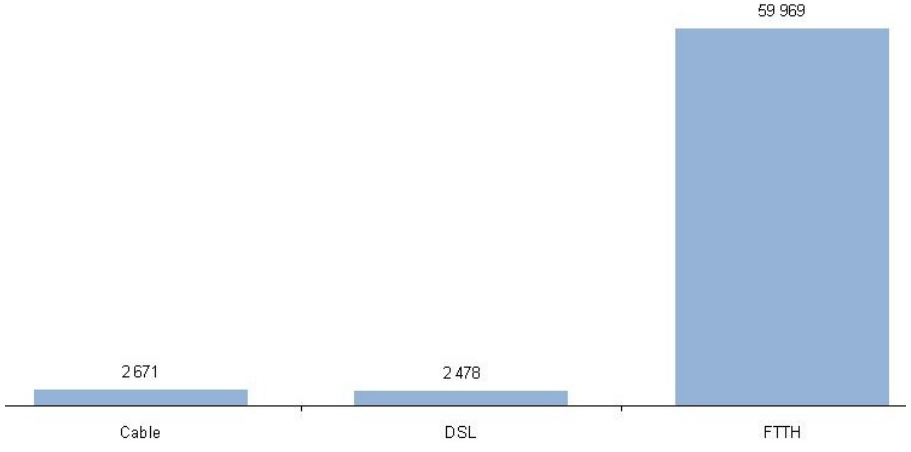
Allegan and Ottawa (continued)

Mean Internet Speeds	Download	% of Market	Upload	% of Market
< 300 KB	88	1.84%	238	4.99%
300 KB - 786 KB	174	3.65%	1702	35.67%
786 KB - 1.5 MB	242	5.07%	2096	43.93%
1.5 MB - 2 MB	188	3.94%	355	7.44%
2 MB - 5 MB	1109	23.24%	350	7.34%
5 MB - 10 MB	2508	52.57%	28	0.59%
10 MB - 15 MB	436	9.14%	1	0.02%
15 MB - 25 MB	24	0.50%	1	0.02%
25 MB - 50 MB	2	0.04%	0	0.00%
50 MB - 100 MB	0	0.00%	0	0.00%
100 MB +	0	0.00%	0	0.00%
Subtotal Speed Samples	**4771**		**4771**	



The chart for Ottawa and Allegan Counties above shows that 90% of the market currently has download speeds of less than 10 MB per second, with a nearly 38% of the market having download speeds below 5 MB per second. The heavy penetration of the cable providers in this marketplace is evident in the high number of customers surveyed with speeds between 2 MB and 15 MB per second, and represents the primary competition in the residential marketplace. Note that only one-half of 1% of the businesses and residents sampled enjoyed download speeds greater than 15 MB per second, the average advertised speed in Israel and Greece. The U.S. average is 14 MB per second, a speed obtained by less than 1% of the Holland service area.

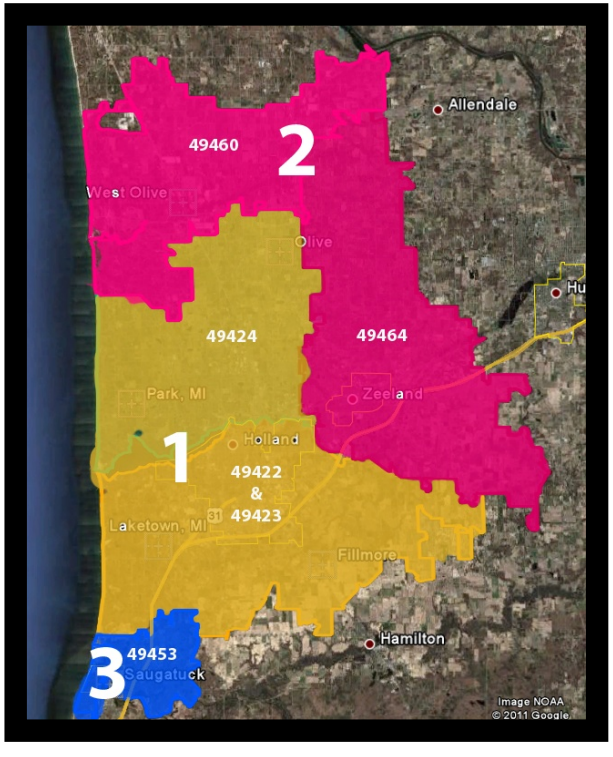
The chart also shows that 84.6% of the market currently has upload speeds slower than 1.5 MB per second, with less than 9% of the market having upload speeds in excess of 2 MB per second. This is exceedingly low. Globally, the average upload speeds for cable and DSL are 2.7 and 2.6 MB respectively, with average upload speeds for fiber at 60 MB according to the Organization for Economic Cooperation and Development.



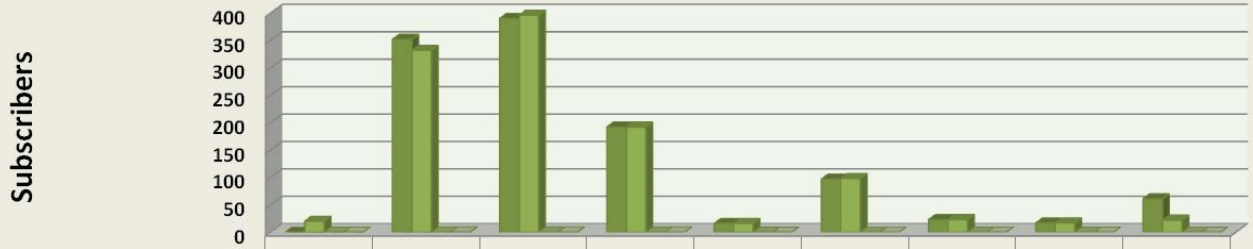
Speed Survey Results: Service Area 1

As illustrated in the charts to the right, broadband connectivity in Service Area 1 is dominated by three (3) providers who collectively hold 82% market share in the residential and commercial space: Charter, Comcast and AT&T. Sprint is the dominant wireless provider, with Verizon currently running a distant second.

Cable modems dominate the market, accounting for 51% of all connections, with DSL holding strong in the territory with 28% market share. Only 7% of all subscribers are still using dial-up.

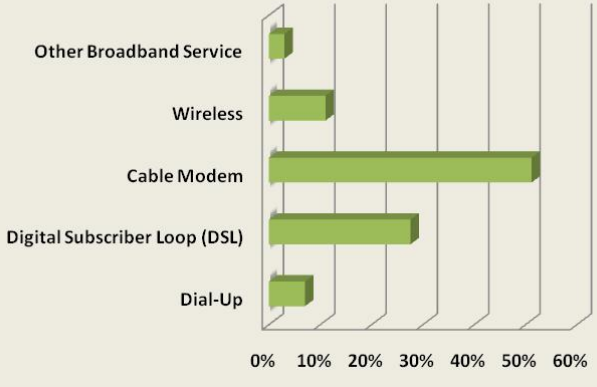


Network/Internet Service Provider Distribution Service Area 1

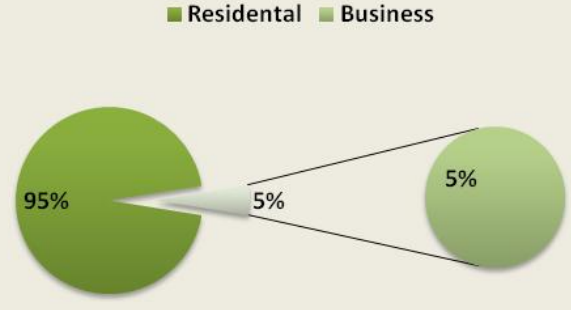


	Amercan Online	AT&T	Charter	Comcast Cable	EarthLink	Sprint	TDS Telecom	Verizon	Other
Network Provider	0	352	390	192	16	97	23	17	61
Internet Service Provider	20	332	396	192	16	98	23	17	22
% of Network Market	0%	31%	34%	17%	1%	8%	2%	1%	5%
% of Internet Market	2%	30%	35%	17%	1%	9%	2%	2%	2%

Broadband Service Segmentation Service Area 1

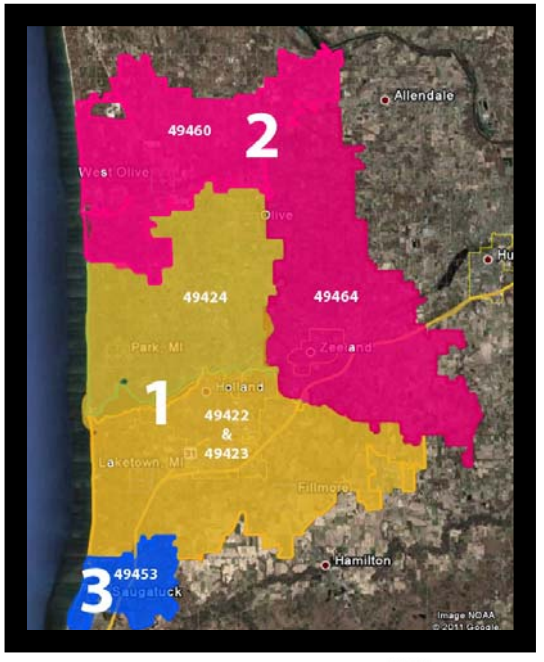


Market Segmentation



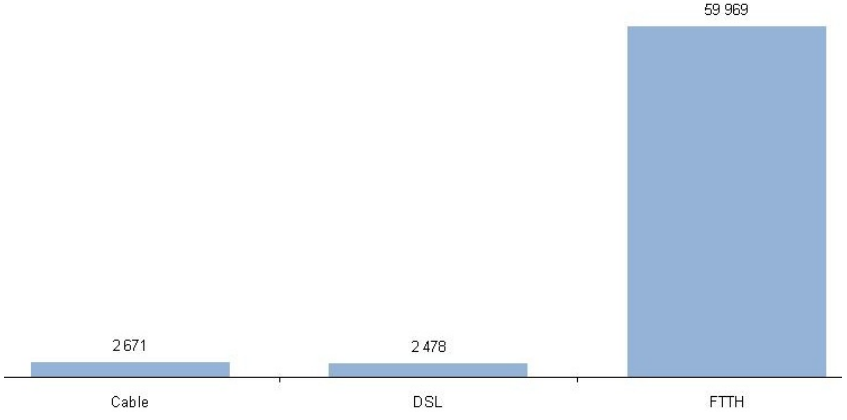
Service Area 1 (continued)

Mean Internet Speeds	Download	% of Market	Upload	% of Market
< 300 KB	5	0.56%	20	2.25%
300 KB - 786 KB	13	1.46%	284	31.95%
786 KB - 1.5 MB	31	3.49%	376	42.29%
1.5 MB - 2 MB	35	3.94%	123	13.84%
2 MB - 5 MB	225	25.31%	82	9.22%
5 MB - 10 MB	395	44.43%	3	0.34%
10 MB - 15 MB	180	20.25%	1	0.11%
15 MB - 25 MB	4	0.45%	0	0.00%
25 MB - 50 MB	1	0.11%	0	0.00%
50 MB - 100 MB	0	0.00%	0	0.00%
100 MB +	0	0.00%	0	0.00%
Subtotal Speed Samples	**889**		**889**	



The chart for Service Area 1 above shows that 79% of the market currently has download speeds of less than 10 MB per second, with a nearly 35% of the market having download speeds below 5 MB per second. The heavy penetration of the cable providers in this marketplace is evident in the high number of customers surveyed with speeds between 2 MB and 15 MB per second, and represent the primary competition in the residential marketplace. Note that less than 1% of the businesses and residents sampled enjoyed download speeds greater than 15 MB per second, the average advertised speed in Israel and Greece. The U.S. average is 14 MB per second, a speed obtained by less than 1% of the Holland service area.

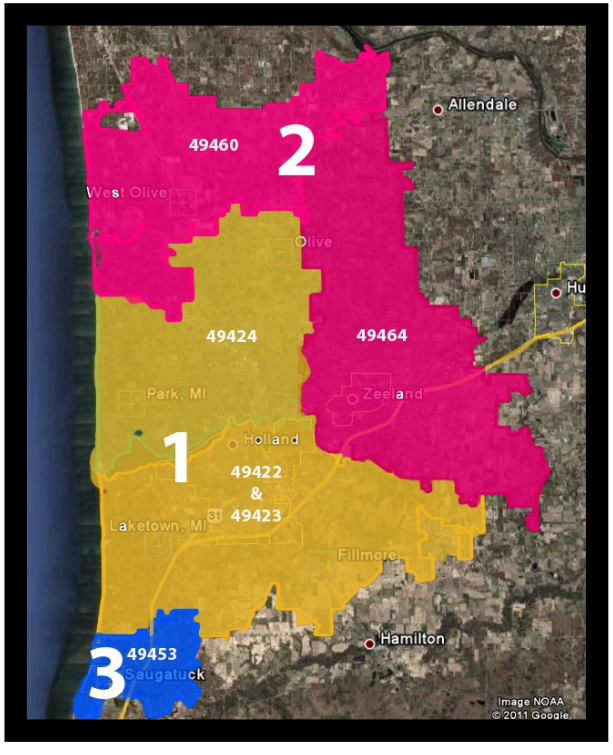
The chart also shows that 76.5% of the market currently has upload speeds slower than 1.5 MB per second, with less than 10% of the market having upload speeds in excess of 2 MB per second. This is exceedingly low. Globally, the average upload speeds for cable and DSL are 2.7 and 2.6 MB respectively, with average upload speeds for fiber at 60 MB according to the Organization for Economic Cooperation and Development.

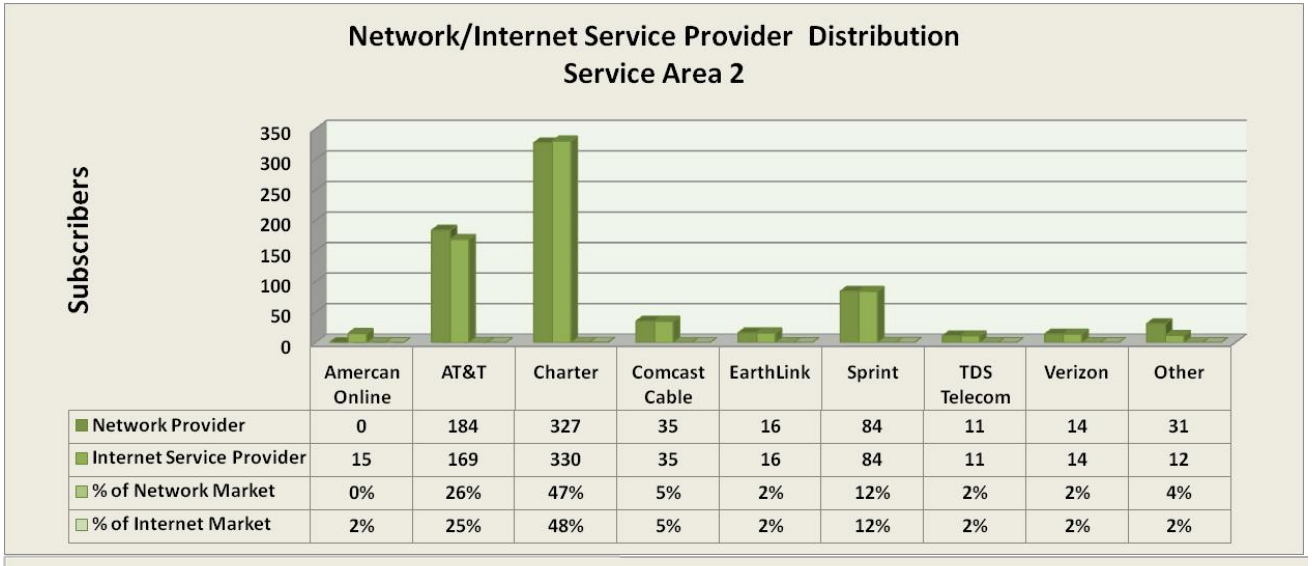


Speed Survey Results: Service Area 2

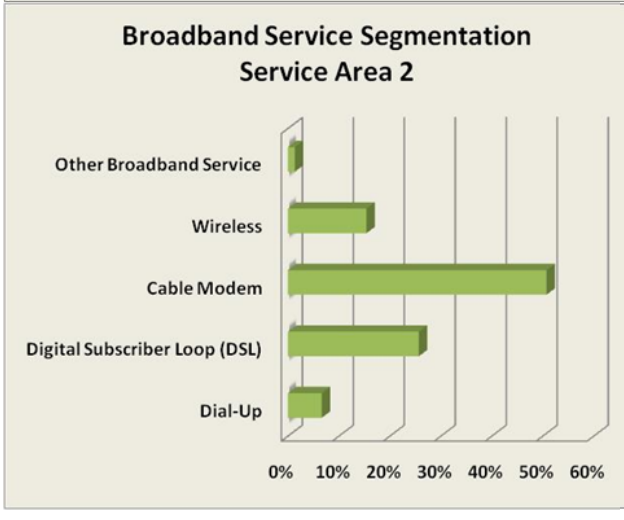
As illustrated in the charts to the right, broadband connectivity in Service Area 2 is dominated by two (2) providers who collectively hold 73% market share in the residential and commercial space: Charter and AT&T. Sprint is the dominant wireless provider, with Verizon currently running a distant second.

Cable modems dominate the market, accounting for 51% of all connections, with DSL holding strong in the territory with 26% market share. Only 7% of all subscribers are still using dial-up.



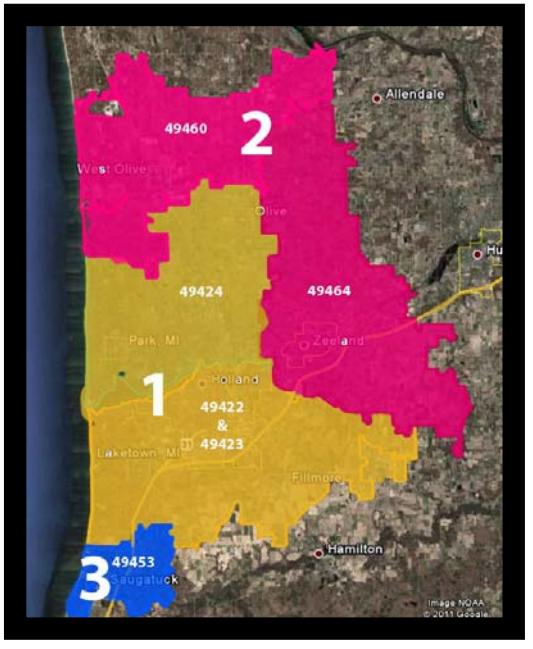


	Amercan Online	AT&T	Charter	Comcast Cable	EarthLink	Sprint	TDS Telecom	Verizon	Other
Network Provider	0	184	327	35	16	84	11	14	31
Internet Service Provider	15	169	330	35	16	84	11	14	12
% of Network Market	0%	26%	47%	5%	2%	12%	2%	2%	4%
% of Internet Market	2%	25%	48%	5%	2%	12%	2%	2%	2%



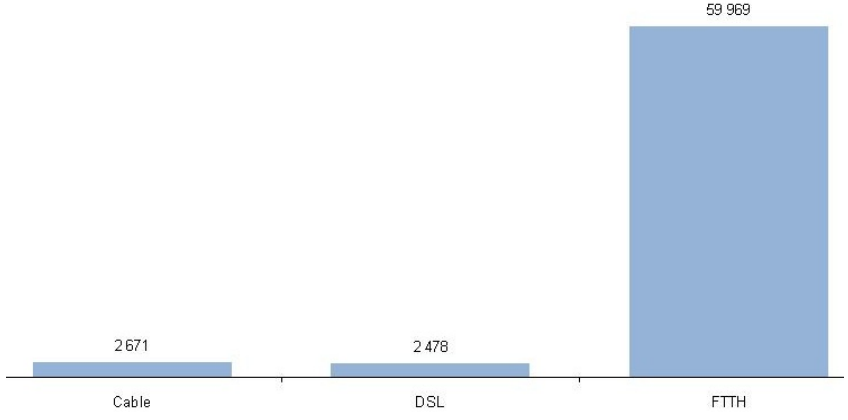
Service Area 2 (continued)

Mean Internet Speeds	Download	% of Market	Upload	% of Market
< 300 KB	1	0.18%	20	3.62%
300 KB - 786 KB	23	4.17%	170	30.80%
786 KB - 1.5 MB	17	3.08%	311	56.34%
1.5 MB - 2 MB	23	4.17%	15	2.72%
2 MB - 5 MB	115	20.83%	24	4.35%
5 MB - 10 MB	327	59.24%	10	1.81%
10 MB - 15 MB	40	7.25%	0	0.00%
15 MB - 25 MB	4	0.72%	0	0.00%
25 MB - 50 MB	0	0.00%	0	0.00%
50 MB - 100 MB	0	0.00%	0	0.00%
100 MB +	0	0.00%	0	0.00%
Subtotal Speed Samples	**550**		**550**	



The chart for Service Area 2 above shows that 92% of the market currently has download speeds of less than 10 MB per second, with 32% of the market having download speeds below 5 MB per second. The heavy penetration of the cable providers in this marketplace is evident in the high number of customers surveyed with speeds between 2 MB and 15 MB per second (80%), and represent the primary competition in the residential marketplace. Note that less than 1% of the businesses and residents sampled enjoyed download speeds greater than 15 MB per second, the average advertised speed in Israel and Greece. The U.S. average is 14 MB per second, a speed obtained by less than 1% of the Zeeland service area.

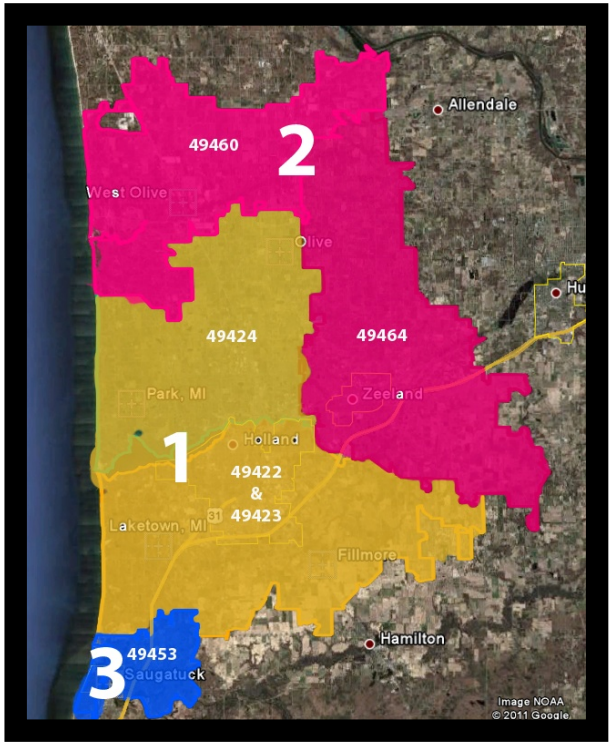
The chart also shows that 91% of the market currently has upload speeds slower than 1.5 MB per second, with less than 7% of the market having upload speeds in excess of 2 MB per second. This is exceedingly low. Globally, the average upload speeds for cable and DSL are 2.7 and 2.6 MB respectively, with average upload speeds for fiber at 60 MB according to the Organization for Economic Cooperation and Development.



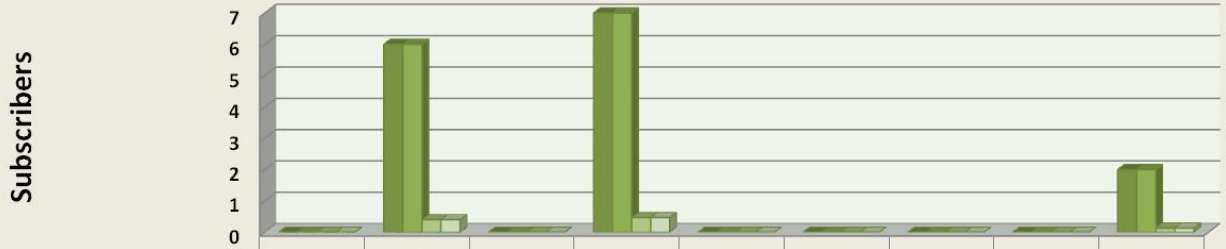
Speed Survey Results: Service Area 3

As illustrated in the charts to the right, broadband connectivity in Service Area 3 is dominated by two (2) providers who collectively hold 87% market share in the residential and commercial space: Comcast and AT&T. Wireless providers and small ISPs account for the remaining 13% of the market.

Cable modems dominate the market, accounting for 47% of all connections, with DSL holding strong in the territory with 27% market share. Only 7% of all subscribers are still using dial-up.

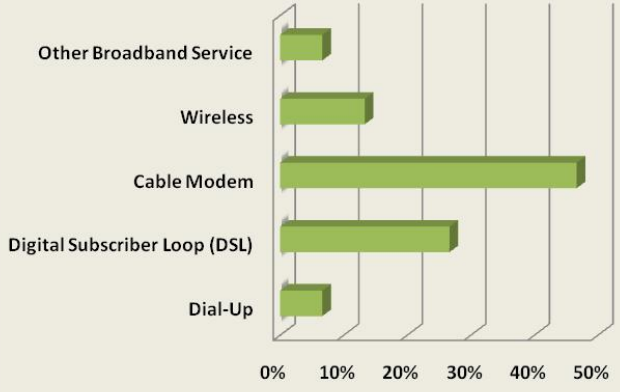


Network/Internet Service Provider Distribution Service Area 3

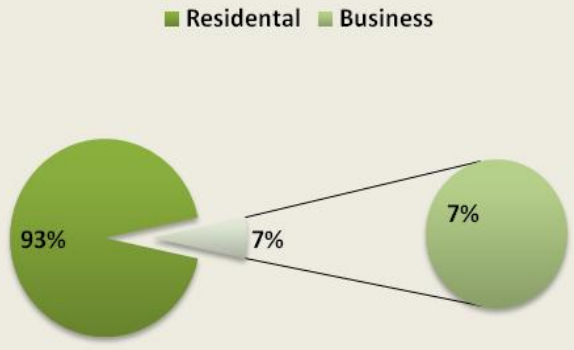


	Amercan Online	AT&T	Charter	Comcast Cable	EarthLink	Sprint	TDS Telecom	Verizon	Other
Network Provider	0	6	0	7	0	0	0	0	2
Internet Service Provider	0	6	0	7	0	0	0	0	2
% of Network Market	0%	40%	0%	47%	0%	0%	0%	0%	13%
% of Internet Market	0%	40%	0%	47%	0%	0%	0%	0%	13%

Broadband Service Segmentation Service Area 3

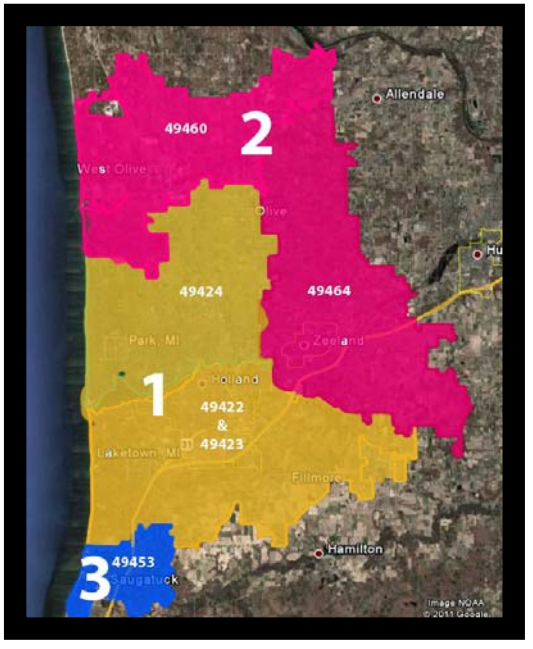


Market Segmentation



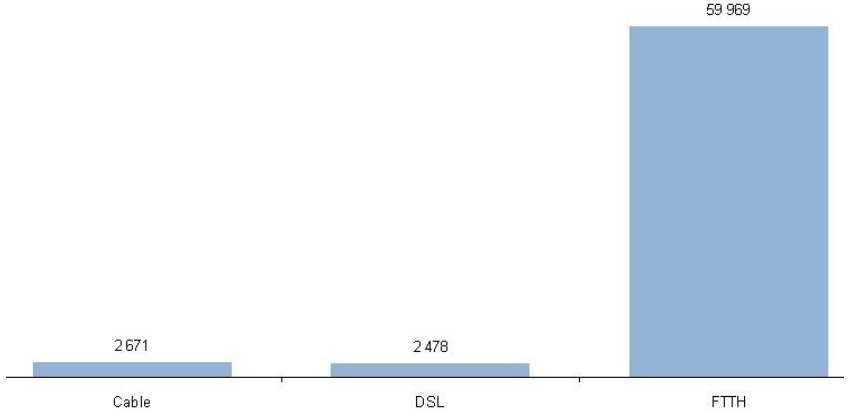
Service Area 3 (continued)

Mean Internet Speeds	Download	% of Market	Upload	% of Market
< 300 KB	0	0.00%	2	18.18%
300 KB - 786 KB	2	18.18%	5	45.45%
786 KB - 1.5 MB	1	9.09%	0	0.00%
1.5 MB - 2 MB	1	9.09%	3	27.27%
2 MB - 5 MB	3	27.27%	1	9.09%
5 MB - 10 MB	1	9.09%	0	0.00%
10 MB - 15 MB	3	27.27%	0	0.00%
15 MB - 25 MB	0	0.00%	0	0.00%
25 MB - 50 MB	0	0.00%	0	0.00%
50 MB - 100 MB	0	0.00%	0	0.00%
100 MB +	0	0.00%	0	0.00%
Subtotal Speed Samples	**11**		**11**	



The chart for Service Area 3 above shows that almost 73% of the market currently has download speeds of less than 10 MB per second, with 63% of the market having download speeds below 5 MB per second. The heavy penetration of the cable providers in this marketplace is evident in the high number of customers surveyed with speeds between 2 MB and 15 MB per second (72%), and represent the primary competition in the residential marketplace. Note that none of the businesses and residents sampled enjoyed download speeds greater than 15 MB per second, the average advertised speed in Israel and Greece. The U.S. average is 14 MB per second, a speed obtained by none surveyed in the Saugatuck service area.

The chart also shows that 62% of the market currently has upload speeds slower than 1.5 MB per second, with only 9% of the market having upload speeds in excess of 2 MB per second. This is exceedingly low. Globally, the average upload speeds for cable and DSL are 2.7 and 2.6 MB respectively, with average upload speeds for fiber at 60 MB according to the Organization for Economic Cooperation and Development.



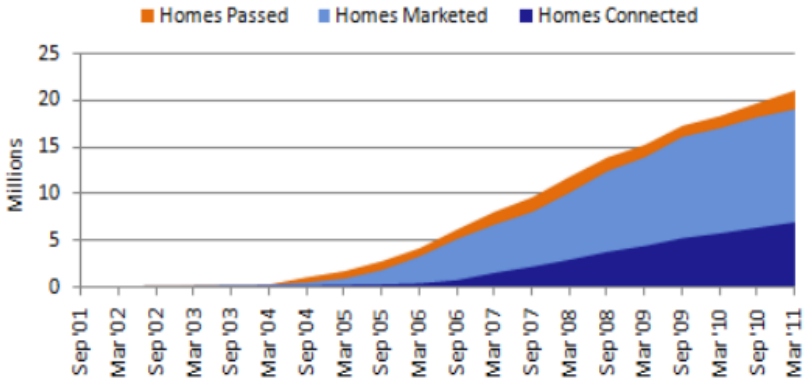
Fiber-to-the-Home (FTTH)

As the figures on this page illustrate, the fiber-to-the-home market is one of the fastest growing trends in technology today here in the United States. Globally, the U.S. currently ranks 11th in terms of market penetration for FTTH, and has deployments occurring across the country in an effort to catch market leaders South Korea, Japan, Hong Kong , China and a host of European nations.

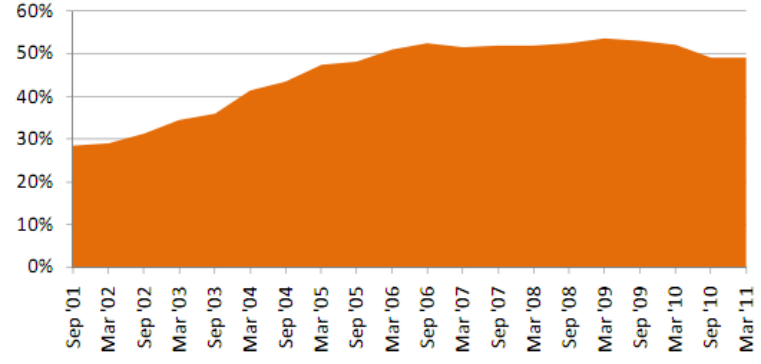
In the past 10 years the number of homes passed with fiber has grown from 19,000 in 2001 to nearly 20.9 million as of March 30, 2011. There is typically a lag between the time networks are constructed and when the actual marketing to consumers begins, and this is reflected in the gap between homes connected and homes passed. Take rates for non Regional Bell Operating Companies (RBOC) for FTTH deployments have remained steady at nearly 50%, with the cumulative total homes connected (fully lit and using the service) passing 7 million as of March 30, 2011.

The U.S. has reached an important milestone with just over 18% of all homes passed of which 6% are connected. The market forecast for homes connected projects a doubling of that figure within 18 months as marketing efforts and markets deployed mature.

North American FTTH Homes Cumulative

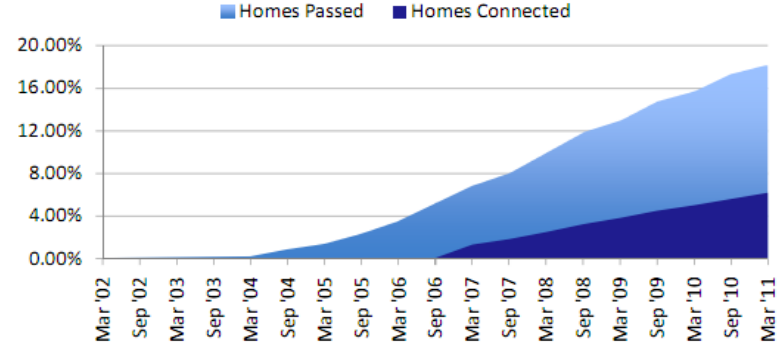


FTTH Non RBOC Take Rates Homes Connected vs. Homes Marketed



RVA LLC

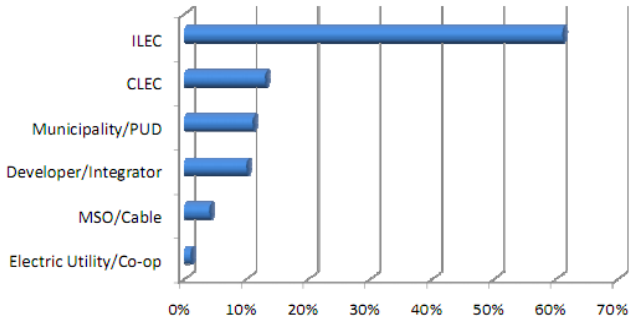
FTTH Penetration Cumulative – United States



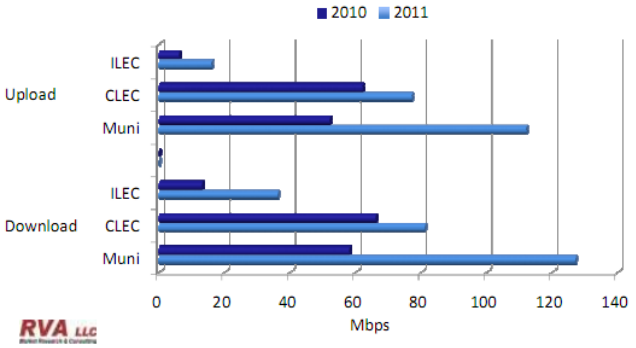
RVA LLC

FTTH Landscape

FTTH Non RBOC Deployments by Provider Type



Highest Average Internet Speeds Offered by Non RBOC Provider Type

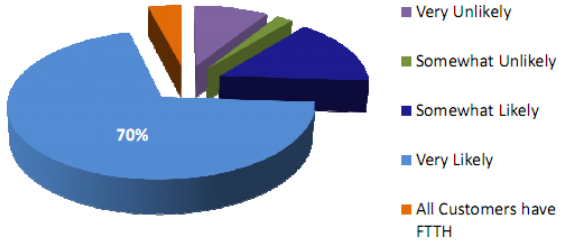


Although Verizon is the clear market leader in terms FTTH deployments by a large margin, municipalities, public utility districts, electric utilities and local CLECs have been a major force in fiber deployments across the country, far outstripping the FTTH investments of cable companies. A survey of hundreds of non-Regional Bell Operating Companies (RBOC) across the nation revealed that this trend is likely to continue, with 70% indicating that investment in FTTH connectivity was very likely in the near future.

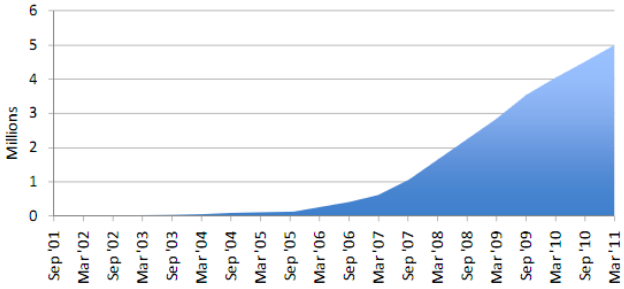
Non RBOC providers are also among the most aggressive in terms of services offered. Double, Triple and Quadruple Plays (Internet, VoIP, Video, Energy Management) are the rule, with customer Internet connectivity speeds averaging 100 MB per second (upload and download) for municipalities and utilities.

Take rates for video are in sync with the take rates for Internet and VoIP services, with roughly 5 million of the 7 million homes lit by fiber receiving video services today. The vast majority of the remaining 2 million are being provided services by companies that are not offering video services currently. The bundling of packages, similar to that which occurs in the cable industry, is the dominant trend at this time. For video, HD and 3D channels are in high demand, and most providers offer 80 to 250 channels including premium channels and movies on-demand.

Likelihood of Adding FTTH Lines by Current Non RBOC FTTH Providers



North American FTTH Video Homes Cumulative



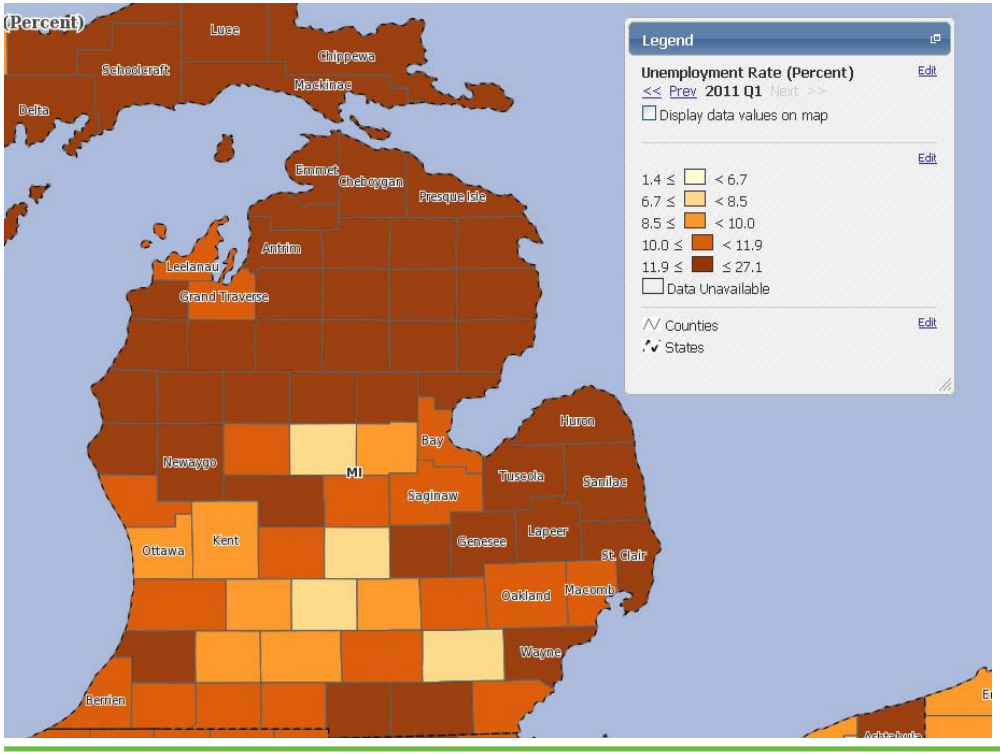
NORTH AMERICAN FTTH STATUS (AS OF THE END OF THE FIRST QUARTER OF EACH YEAR)

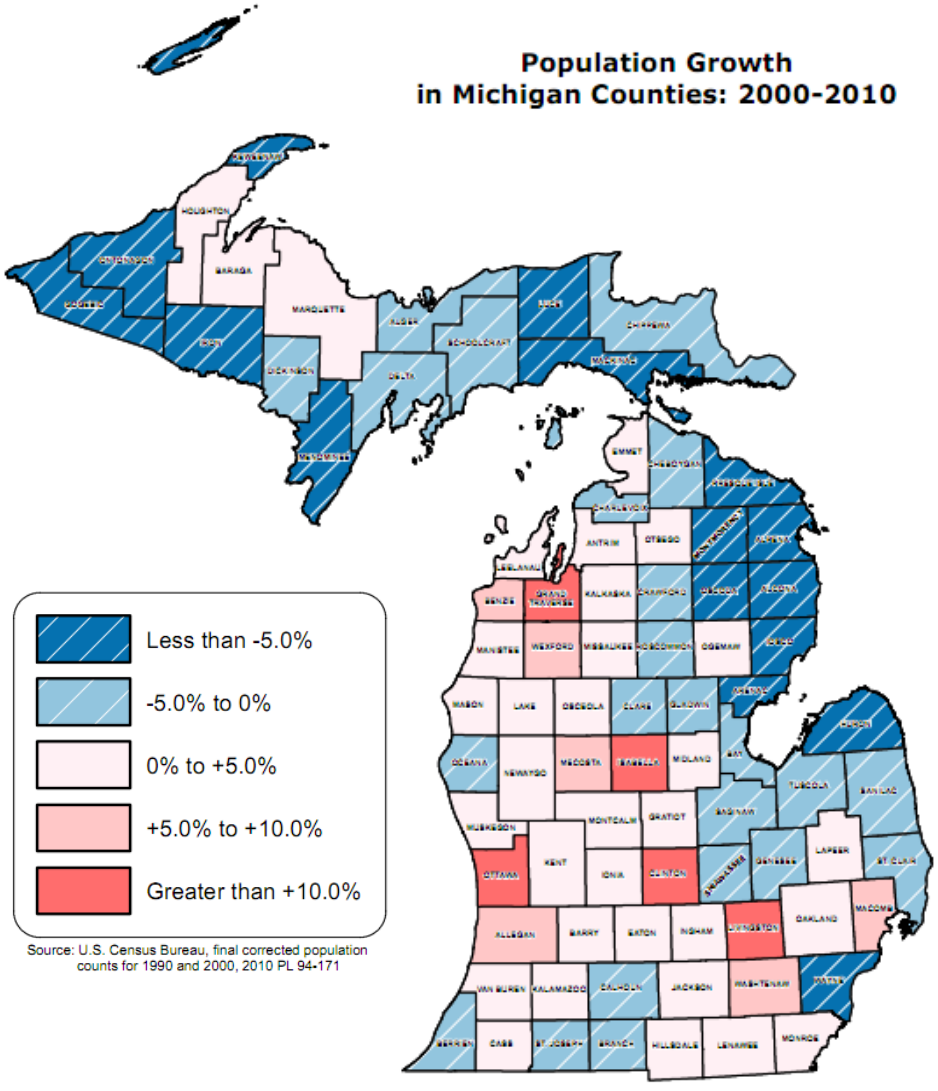
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Homes passed	35,700	110,000	189,000	1,619,500	4,089,000	8,003,000	11,763,000	15,170,900	18,249,900	20,914,500
Homes marketed	35,700	110,000	189,000	829,700	3,218,600	6,643,000	10,082,000	13,875,600	16,992,600	19,344,700
Homes connected	10,350	38,000	78,000	213,000	671,000	1,478,600	2,912,500	4,422,000	5,804,800	7,094,800

Demographics - Regional Data

Ottawa and Allegan counties are among the healthier economic areas in the hard-hit State of Michigan. In a state that has seen a drop in population over the past decade, both Ottawa and Allegan have seen a significant net increase in population, with Ottawa a top five county and Allegan a top 10 county in percentage of population gain (see population growth map on right). Nearly 50% of Michigan counties have dropped in population during the period 2000 – 2010, and over 20% of all Michigan counties have lost more than 5% of their population. Source: U.S. Census Bureau

Unemployment in Ottawa and Allegan counties are at or below the national averages, an achievement in a state as hard hit by the global financial crisis as was Michigan. As illustrated in the unemployment map below, Ottawa ranked in the top 10 and Allegan in the top 25 in terms of lowest unemployment rate by county in Michigan. Source: *Geographic Federal Reserve Economic Data*





% Population Change for Greater Region

The New York Times

Mapping the 2010 U.S. Census

Share this view on Twitter or Facebook

Browse population growth and decline, changes in racial and ethnic concentrations and patterns of housing development.

View More Maps

Change in population since 2000

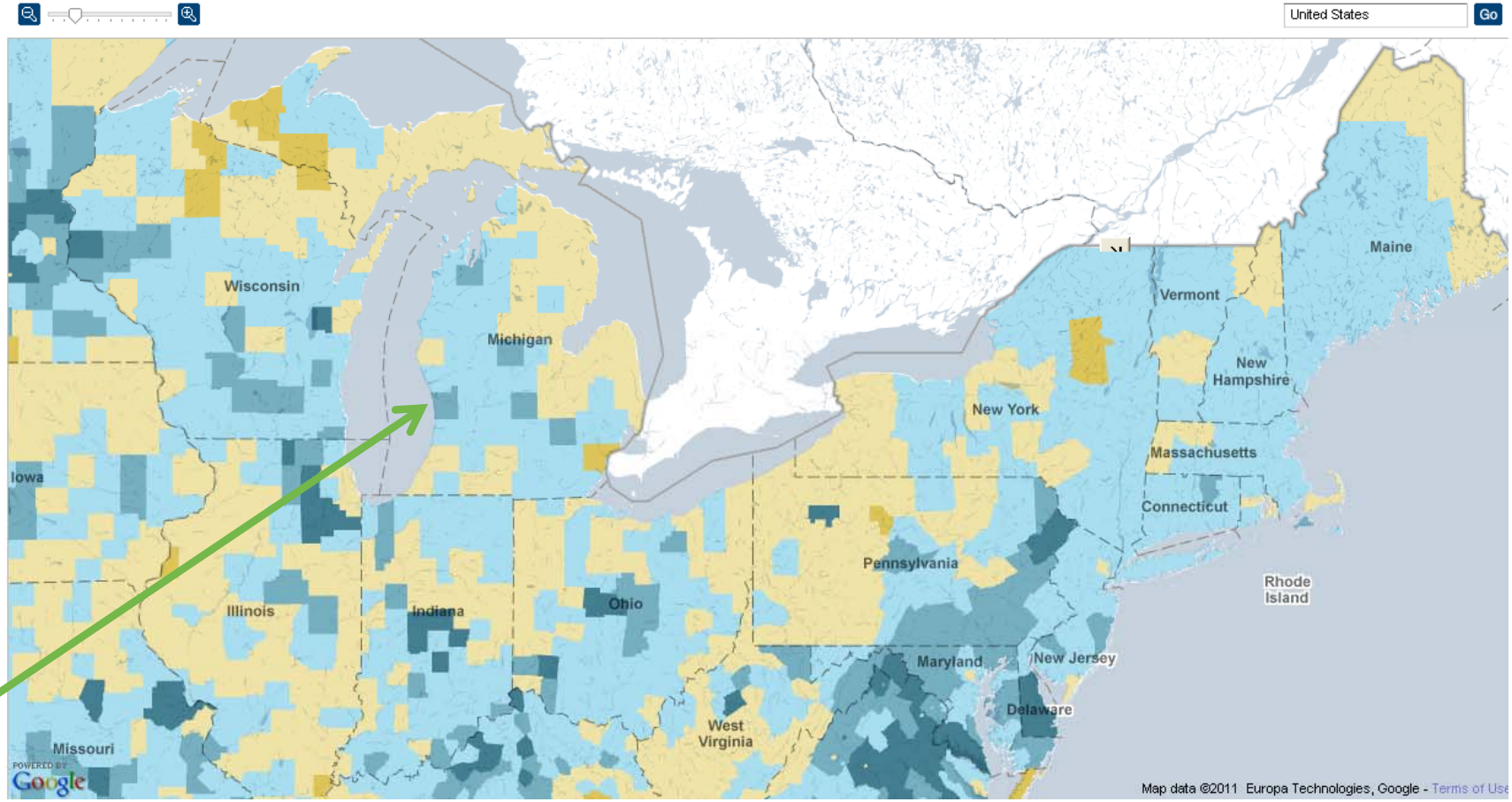
- Over 20% increase
- 10% to 20%
- 0% to 10%
- 0% to -10%
- -10% to -20%
- Over 20% decline

Zoom to a State

New Jersey

2010 POPULATION	CHANGE FROM 2000
8,791,894	+4.5%

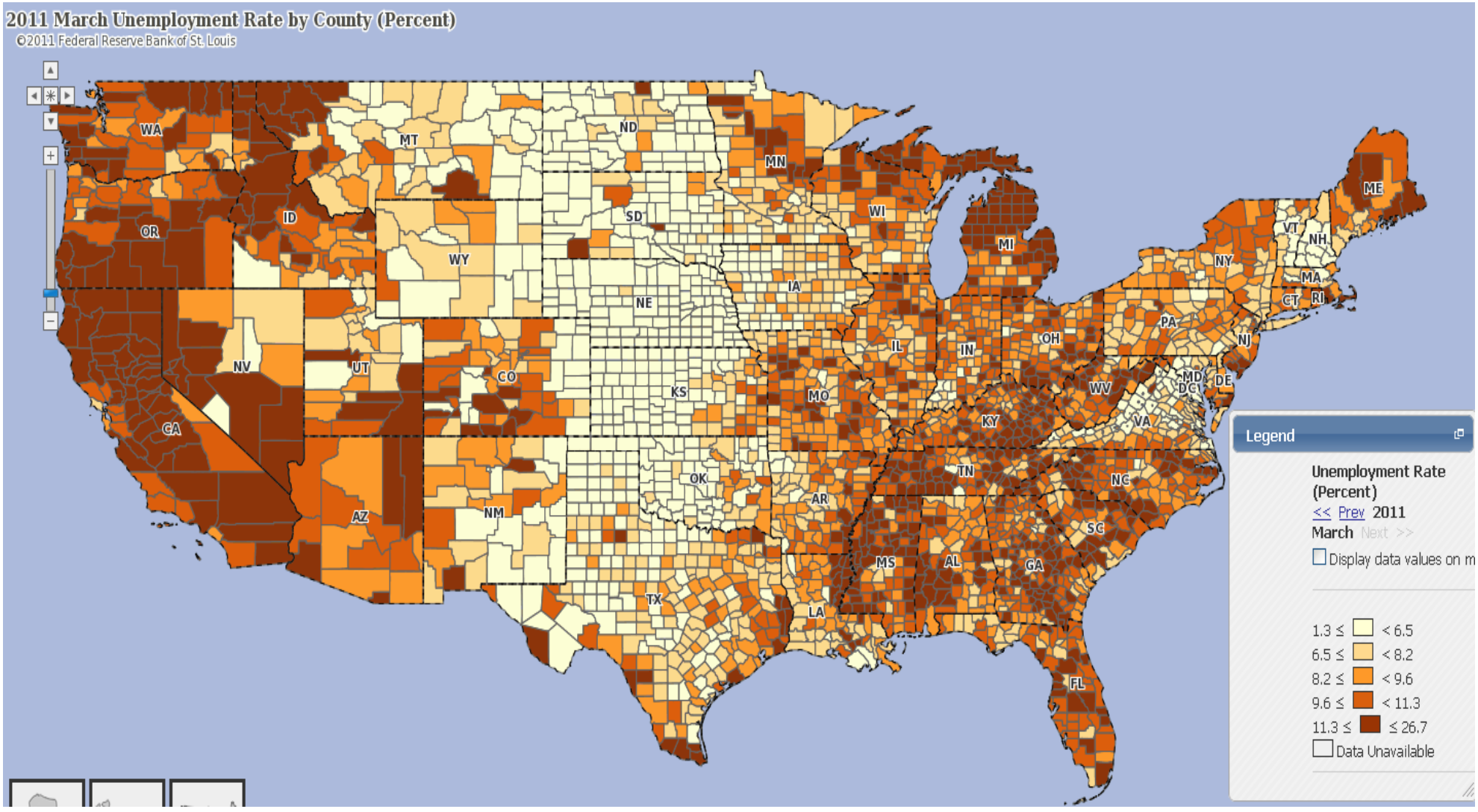
RACE/ ETHNICITY	SHARE OF POP.	CHANGE FROM 2000
Whites:	59%	–6%
Blacks:	13%	+3%
Hispanics:	18%	+39%
Asians:	8%	+51%
Native Amer.:	0%	+8%
Multiracial:	2%	+1%
Other groups:	0%	+36%



Allegan and Ottawa Counties:

Regional performers in a sea of negative migration.

Unemployment Statistics



Population Cities, Villages & Townships

Population of MI Cities, Villages, Townships: 2000 and 2010

		2000			2010		2000-2010
	Census Block	Original	Revised	% of Total	Original	% of Total	% Change
State of Michigan		9,938,444	9,938,823	100.00%	9,883,640	100.00%	-0.6%
Allegan County		105,665	105,665	1.06%	111,408	1.13%	+5.4%
Allegan city	00501260	4,838	4,717	0.05%	4,998	0.05%	+6.0%
Allegan township	00501280	4,050	4,181	0.04%	4,406	0.04%	+5.4%
Casco township	00513700	3,019	3,019	0.03%	2,823	0.03%	-6.5%
Cheshire township	00515200	2,335	2,347	0.02%	2,199	0.02%	-6.3%
Clyde township	00516720	2,104	2,104	0.02%	2,084	0.02%	-1.0%
Dorr township	00522680	6,579	6,579	0.07%	7,439	0.08%	+13.1%
Douglas city	00522740	*n.a.*	1,227	*0.01%*	*1,232*	*0.01%*	*+0.4%*
Fennville city	00527740	1,459	1,459	0.01%	1,398	0.01%	-4.2%
Fillmore township	00528120	2,756	2,756	0.03%	2,681	0.03%	-2.7%
Ganges township	00531360	2,524	2,524	0.03%	2,530	0.03%	+0.2%
Gun Plain township	00535720	5,637	5,568	0.06%	5,895	0.06%	+5.9%
Heath township	00537460	3,100	3,100	0.03%	3,317	0.03%	+7.0%
Holland city (pt.)	00538640	7,202	7,202	0.07%	7,016	0.07%	-2.6%
Hopkins village	00539200	592	592	0.01%	610	0.01%	+3.0%
Balance of Hopkins township	00539200	2,079	2,079	0.02%	1,991	0.02%	-4.2%
Laketown township	00545180	5,561	5,561	0.06%	5,505	0.06%	-1.0%
Lee township	00546600	4,114	4,114	0.04%	4,015	0.04%	-2.4%
Leighton township	00546760	3,652	3,652	0.04%	4,934	0.05%	+35.1%
Manlius township	00550840	2,634	2,634	0.03%	3,017	0.03%	+14.5%
Martin village	00552000	435	435	0.00%	410	0.00%	-5.7%
Balance of Martin township	00552000	2,079	2,079	0.02%	2,219	0.02%	+6.7%
Monterey township	00555200	2,065	2,069	0.02%	2,356	0.02%	+13.9%
Otsego city	00561620	3,933	3,941	0.04%	3,956	0.04%	+0.4%
Otsego township	00561640	4,854	4,846	0.05%	5,594	0.06%	+15.4%
Overisel township	00561820	2,594	2,594	0.03%	2,911	0.03%	+12.2%
Plainwell city	00564740	3,933	4,002	0.04%	3,804	0.04%	-4.9%
Salem township	00571100	3,486	3,486	0.04%	4,446	0.04%	+27.5%
Saugatuck city	00571700	1,065	1,065	0.01%	925	0.01%	-13.1%
Saugatuck township	00571720	3,590	2,363	0.02%	2,944	0.03%	+24.6%
South Haven city (pt.)	00574980	8	8	0.00%	3	0.00%	-62.5%
Trowbridge township	00580620	2,519	2,498	0.03%	2,502	0.03%	+0.2%
Valley township	00581580	1,831	1,828	0.02%	2,018	0.02%	+10.4%
Watson township	00584580	2,086	2,084	0.02%	2,063	0.02%	-1.0%
Wayland city	00584880	3,939	3,939	0.04%	4,079	0.04%	+3.6%
Wayland township	00584900	3,013	3,013	0.03%	3,088	0.03%	+2.5%

Population of MI Cities, Villages, Townships: 2000 and 2010

		2000			2010		2000-2010
	Census Block	Original	Revised	% of Total	Original	% of Total	% Change
State of Michigan		9,938,444	9,938,823	100.00%	9,883,640	100.00%	-0.6%
Ottawa County		238,314	238,314	2.40%	263,801	2.67%	+10.7%
Allendale charter township	13901360	13,042	13,042	0.13%	20,708	0.21%	+58.8%
Blendon township	13908940	5,721	5,721	0.06%	5,772	0.06%	+0.9%
Chester township	13915300	2,315	2,315	0.02%	2,017	0.02%	-12.9%
Coopersville city	13918020	3,910	3,910	0.04%	4,275	0.04%	+9.3%
Crockery township	13918800	3,782	3,782	0.04%	3,960	0.04%	+4.7%
Ferrysburg city	13927960	3,040	3,040	0.03%	2,892	0.03%	-4.9%
Georgetown charter townshi	13931880	41,658	41,658	0.42%	46,985	0.48%	+12.8%
Grand Haven city	13933340	11,168	11,168	0.11%	10,412	0.11%	-6.8%
Grand Haven charter townshi	13933360	13,278	13,278	0.13%	15,178	0.15%	+14.3%
Holland city (pt.)	13938640	27,846	27,846	0.28%	26,035	0.26%	-6.5%
Holland charter township	13938660	28,911	28,921	0.29%	35,636	0.36%	+23.2%
Hudsonville city	13939800	7,160	7,160	0.07%	7,116	0.07%	-0.6%
Jamestown charter township	13941520	5,062	5,062	0.05%	7,034	0.07%	+39.0%
Olive township	13960460	4,691	4,766	0.05%	4,735	0.05%	-0.7%
Park township	13962460	17,579	17,569	0.18%	17,802	0.18%	+1.3%
Polkton charter township	13965320	2,335	2,335	0.02%	2,423	0.02%	+3.8%
Port Sheldon township	13965940	4,503	4,428	0.04%	4,240	0.04%	-4.2%
Robinson township	13969000	5,588	5,588	0.06%	6,084	0.06%	+8.9%
Spring Lake village	13975840	2,514	2,514	0.03%	2,323	0.02%	-7.6%
Balance of Spring Lake towns	13975840	10,626	10,626	0.11%	11,977	0.12%	+12.7%
Tallmadge charter township	13977980	6,881	6,881	0.07%	7,575	0.08%	+10.1%
Wright township	13988820	3,286	3,286	0.03%	3,147	0.03%	-4.2%
Zeeland city	13989260	5,805	5,805	0.06%	5,504	0.06%	-5.2%
Zeeland charter township	13989280	7,613	7,613	0.08%	9,971	0.10%	+31.0%

Population Growth 2000 - 2010 in Detail: Allegan and Ottawa Counties

The charts above detail the population growth at the township level for the two counties impacted by the proposed Holland BPW fiber build. This detail has been provided to clearly delineate the high growth areas in terms of population within each county as preliminary considerations for staging the potential outside plant roll-out. Rows in yellow coincide with the proposed BPW fiber optic Service Areas 1, 2 & 3.

Source: U.S. Census Bureau

Key Demographics

Population Breakdown by Service Area

The population demographics of the three (3) service areas are favorable to the traditional broadband adopter demographics for broadband. Strengths are reflected in the lower median age (4 years below national average), and higher percentage of youth under 18 (3% higher than national average). Also note that since this census period (2000) there has been a significant increase in the population within the service areas (approximately 20% in Zones 1 & 3 and over 25% in Zone 2).

General Characteristics								
Indicator	**Service Area 1**		**Service Area 2**		**Service Area 3**		**TOTAL SERVICE AREA (1+2+3)**	
Total population	89,103	100%	28,735	100%	2,517	100%	120,355	100%
Male	43,904	49.27%	14,366	49.99%	1,246	49.50%	59,516	49.45%
Female	45,199	50.73%	14,369	50.01%	1,271	50.50%	60,839	50.55%
Median age (years)	31.10	N/A	32.20	N/A	41.40	N/A	31.7	N/A
Under 5 years	7,470	8.38%	2,426	8.44%	117	4.65%	10,013	8.32%
18 years and over	63,567	71.34%	19,428	67.61%	1,954	77.63%	84,949	70.58%
65 years and over	9,011	10.11%	2,845	9.90%	334	13.27%	12,190	10.13%
One race	87,059	97.71%	28,291	98.45%	2,498	99.25%	117,848	97.92%
White	73,838	82.87%	26,809	93.30%	2,408	95.67%	103,055	85.63%
Black or African American	1,702	1.91%	177	0.62%	26	1.03%	1,905	1.58%
American Indian and Alaska Native	373	0.42%	81	0.28%	13	0.52%	467	0.39%
Asian	3,878	4.35%	445	1.55%	12	0.48%	4,335	3.60%
Native Hawaiian/Other Pacific Islander	28	0.03%	2	0.01%	1	0.04%	31	0.03%
Some other race	7,240	8.13%	777	2.70%	38	1.51%	8,055	6.69%
Two or more races	2,044	2.29%	444	1.55%	19	0.75%	2,507	2.08%
Hispanic or Latino (of any race)	14,019	15.73%	1,594	5.55%	90	3.58%	15,703	13.05%
Household population	85,250	95.68%	28,080	97.72%	2,510	99.72%	115,840	96.25%
Group quarters population	3,853	4.32%	655	2.28%	7	0.28%	4,515	3.75%
Average household size	2.73	N/A	2.97	N/A	2.17	N/A	2.76	N/A
Average family size	3.24	N/A	3.36	N/A	2.82	N/A	3.25	N/A

Source: U.S. Census 2000, Zip Code Tabulation Area Data Sets

Note: Service Area 3 does not include Douglas City

Housing Types & Age

As BPW considers extending its fiber footprint for both basic transport (added backbone, spurs and laterals) and FTTH, the type of facility (i.e. multi-dwelling unit (MDU)), age and ownership status matter.

The value of MDUs is evident, more potential customers for the least capital outlay and marketing effort.

Owner-occupied single units have the advantage of both a positive impact on real estate value and the service decision-maker also being the owner of the property.

Age matters. Older homes are, on one hand a better target for smart grid energy solutions, but on the other, typically have older and more difficult wiring challenges for upgraded broadband connectivity.

Housing Characteristics								
Indicator	**Service Area 1**		**Service Area 2**		**Service Area 3**		**TOTAL SERVICE AREA**	
Total housing units	33,069	100%	9,923	100%	1,691	100%	44,683	100%
Occupied housing units	30,806	93.16%	9,442	95.15%	1,157	68.42%	41,405	92.29%
Owner-occupied housing units	22,923	69.32%	8,487	85.53%	868	51.33%	32,278	71.95%
Renter-occupied housing units	7,883	23.84%	955	9.62%	289	17.09%	9,127	20.34%
Vacant housing units	2,263	6.84%	481	4.85%	534	31.58%	3,278	7.31%
UNITS IN STRUCTURE								
1-unit, detached	21,959	66.49%	7,164	72.36%	1,217	71.17%	30,340	91.87%
1-unit, attached	1,824	5.52%	468	4.73%	127	7.43%	2,419	7.32%
2 units	1,447	4.38%	305	3.08%	46	2.69%	1,798	5.44%
3 or 4 units	1,459	4.42%	263	2.66%	101	5.91%	1,823	5.52%
5 to 9 units	1,618	4.90%	139	1.40%	90	5.26%	1,847	5.59%
10 to 19 units	1,004	3.04%	0	0.00%	33	1.93%	1,037	3.14%
20 or more units	1,421	4.30%	292	2.95%	27	1.58%	1,740	5.27%
Mobile home	2,285	6.92%	1,270	12.83%	69	4.04%	3,624	10.97%
Boat, RV, van, etc.	9	0.03%	0	0.00%	0	0.00%	9	0.03%
YEAR STRUCTURE BUILT								
1999 to March 2000	965	2.92%	517	5.22%	70	4.09%	1,552	4.70%
1995 to 1998	3,861	11.69%	1,606	16.22%	117	6.84%	5,584	16.91%
1990 to 1994	3,831	11.60%	1,493	15.08%	120	7.02%	5,444	16.48%
1980 to 1989	5,909	17.89%	1,285	12.98%	269	15.73%	7,463	22.60%
1970 to 1979	4,904	14.85%	1,458	14.73%	226	13%	6,588	19.95%
1960 to 1969	3,557	10.77%	721	7.28%	117	6.84%	4,395	13.31%
1940 to 1959	5,573	16.87%	1,307	13.20%	230	13.45%	7,110	21.53%
1939 or earlier	4,426	13.40%	1,514	15.29%	561	32.81%	6,501	19.68%

Source: U.S. Census 2000, Zip Code Tabulation Area Data Sets

Note: Service Area 3 does not include Douglas City

Employment & Income

Economic Characteristics								
Indicator	**Service Area 1**		**Service Area 2**		**Service Area 3**		**TOTAL SERVICE AREA (1+2+3)**	
Employed civilian population 16 years and over	45,586	100%	14,303	100%	1,395	100%	61,284	100%
OCCUPATION								
Management, professional, and related	14,287	31.34%	3,768	26.34%	483	34.62%	18,538	30.25%
Service occupations	5,954	13.06%	1,763	12.33%	126	9.03%	7,843	12.80%
Sales and office occupations	10,269	22.53%	3,271	22.87%	380	27.24%	13,920	22.71%
Farming, fishing, and forestry occupations	462	1.01%	175	1.22%	4	0.29%	641	1.05%
Construction, extraction, and maintenance	3,112	6.83%	1,481	10.35%	116	8.32%	4,709	7.68%
Production, transportation, and material	11,502	25.23%	3,845	26.88%	286	20.50%	15,633	25.51%
Households	30,773		9,482		1,169		41,424	
Median Household Income	$50,279		$53,461		$44,917		$49,877	
Mean Earnings	$59,533		$58,801		$66,300		$61,050	
Mean Retirement Income	$16,441		$16,579		$13,610		$15,754	
Families	22,430		7,688		702		30,820	
Less than $10,000	589	2.63%	68	0.88%	40	5.70%	697	2.26%
$10,000 to $14,999	469	2.09%	180	2.34%	18	2.56%	667	2.16%
$15,000 to $24,999	1,768	7.88%	364	4.73%	76	10.83%	2,208	7.16%
$25,000 to $34,999	2,362	10.53%	780	10.15%	55	7.83%	3,197	10.37%
$35,000 to $49,999	4,055	18.08%	1,484	19.30%	113	16.10%	5,652	18.34%
$50,000 to $74,999	6,214	27.70%	2,676	34.81%	158	22.51%	9,048	29.36%
$75,000 to $99,999	3,567	15.90%	1,275	16.58%	114	16.24%	4,956	16.08%
$100,000 to $149,999	2,262	10.08%	581	7.56%	83	11.82%	2,926	9.49%
$150,000 to $199,999	603	2.69%	166	2.16%	17	2.42%	786	2.55%
$200,000 or more	541	2.41%	114	1.48%	28	3.99%	683	2.22%
Median family income (dollars)	$57,139		$57,482		$57,083		$57,275	

Source: U.S. Census 2000, Zip Code Tabulation Area Data Sets

Note: Service Area 3 does not include Douglas City

The employment type and earnings demographics are favorable to increased broadband penetration, and indicate that higher bandwidths will be in demand as businesses move to cloud computing solutions.

Of particular note is that over 50% of the population is employed in management, professional or sales occupations, all of which are high consumers of bandwidth.

The breakdowns of both household and family incomes also indicate that there is flexible income available to spend on broadband, and when correlated with the family demographics numbers in prior pages, fit the profile of the largest growing group of Internet users for bandwidth intensive applications (i.e. video).

Business Climate

The table to the right shows the business establishments in each service area in 2008.

Although small 'Mom & Pop' businesses represent nearly 50% of the total, there is a vibrant business community in the 20 – 499 employee range that are strong targets for HBPW's broadband offerings.

Of particular note is the strong growth in Zeeland (Service Area 2), during the period 2000 to 2008, representing an excellent market opportunity given the lack of fiber optic infrastructure in the serving area.

Business Characteristics - Number of Establishments - 2008						
NAICS Code	NAICS Category and Establishment Type		Service Area 1	Service Area 2	Service Area 3	TOTALS
0	Total for all sectors	All establishments	2,485	744	165	3,394
0	Total for all sectors	Establishments with 1 to 4 employees	1,114	421	113	1,648
0	Total for all sectors	Establishments with 5 to 9 employees	520	114	33	667
0	Total for all sectors	Establishments with 10 to 19 employees	394	103	11	508
0	Total for all sectors	Establishments with 20 to 49 employees	265	67	7	339
0	Total for all sectors	Establishments with 50 to 99 employees	97	15	1	113
0	Total for all sectors	Establishments with 100 to 249 employees	60	13	0	73
0	Total for all sectors	Establishments with 250 to 499 employees	25	5	0	30
0	Total for all sectors	Establishments with 500 to 999 employees	8	4	0	12
0	Total for all sectors	Establishments with 1,000 employees or more	2	2	0	4
11	Agriculture, forestry, fishing and hunting	All establishments	0	4	0	4
21	Mining, quarrying, and oil and gas extraction	All establishments	2	1	0	3
22	Utilities	All establishments	1	6	0	7
23	Construction	All establishments	210	160	11	381
31-33	Manufacturing	All establishments	254	98	8	360
42	Wholesale trade	All establishments	150	62	4	216
44-45	Retail trade	All establishments	416	55	47	518
48-49	Transportation and warehousing	All establishments	55	27	4	86
51	Information	All establishments	25	6	4	35
52	Finance and insurance	All establishments	147	28	3	178
53	Real estate and rental and leasing	All establishments	86	19	6	111
54	Professional, scientific, and technical services	All establishments	218	61	9	288
55	Management of companies and enterprises	All establishments	20	10	0	30
56	Admin & Waste Mang and Remediation Srvs	All establishments	136	52	2	190
61	Educational services	All establishments	30	5	2	37
62	Health care and social assistance	All establishments	227	43	4	274
71	Arts, entertainment, and recreation	All establishments	40	10	7	57
72	Accommodation and food services	All establishments	180	32	43	255
81	Other services (except public administration)	All establishments	284	69	11	364
99	Industries not classified	All establishments	4	1	0	5

Source: U.S. Census 2008 County Business Patterns by Zip Code

Note: Service Area 3 does not include Douglas City

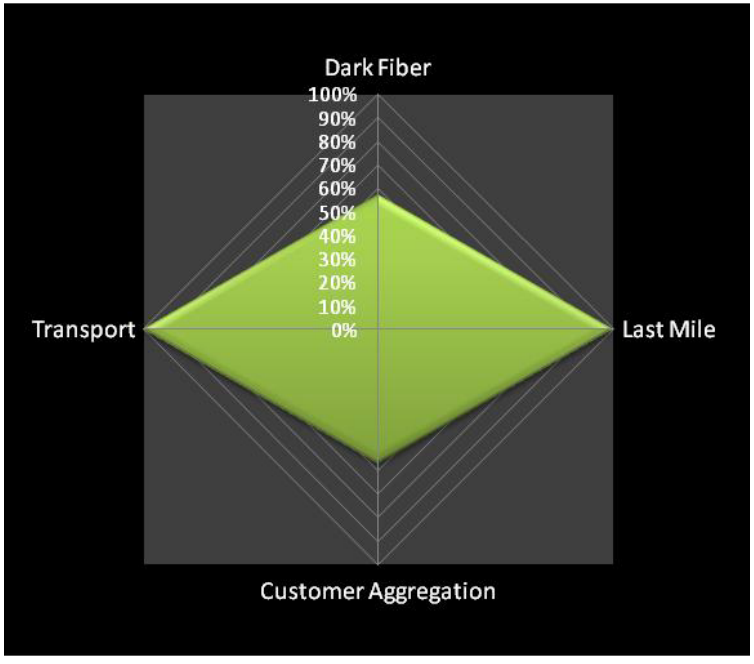
Survey Method Overview

A representative sampling of key Holland Board of Public Works' transport customers were surveyed in May of 2011 in order to receive open feedback regarding perceived value, footprint, service offering, strengths, weaknesses, technical fit and demand trends. The customers were a mix of ISPs, CLECs, dark fiber, and leased transport and last mile purchasers. Each customer interview lasted between 30 and 45 minutes.

Customers were asked the following:

1. How does your company use the infrastructure services provided by BPW?
2. Do you see BPW as a valued business partner?
3. What can BPW provide that would help you grow your business?
4. Is the backbone throughput robust enough to meet your current needs? What speeds would you like to see on the network backbone?
5. Are there any physical or logical integration issues that need improvement?
6. Do you have any security concerns or issues with services as provided?
7. Geographically, in what regions would you like to see an expanded fiber footprint to better serve your customers or expand market share?
8. Who do you sell to primarily now? (Business/Residential/NGO)?
9. What verticals are you targeting and where do you see the greatest potential for growth?
10. What is your average ordered speed? Do you see that trending in any direction?
11. What are the minimum and maximum speeds that you currently offer or receive?
12. What patterns in bandwidth consumption have you seen in existing customers or within your organization?
13. Would FTTH be of interest to you? What areas would you most like to see this in?
14. How easy is it to partner with HBPW?
15. Any thing else that you would like to share? Areas in which BPW can improve?

Question #1 – Use of HPW Plant



100% of customers surveyed were using the plant for transport and last mile connectivity, while 57% were using for customer aggregation to extend life of existing copper plant and/or direct purchasers of dark fiber.

Of Particular Interest:

29% of Transport customers said they had plans to drop service and replace with dark fiber lease due to expense of pricing model for multiple facilities.

80% of service providers said HBPW was 2nd or 3rd choice to work with in any given customer situation due to lead times, last mile circuit price and/ or construction cost amortization model.

Customer Survey Results (Continued)

Question #2

Notable Quotes:

"Absolutely! Just having the fiber around town has been great – it's an invaluable resource and an integral part of our operating plan and network build-out."

"Not really. Tier 2 or Tier 3 in my book as people to work with, certainly not the first choice. They have no idea what they are doing from a business model perspective."

"They are getting better, but historically have been difficult to work with. We had no choice though – they were the only ones with fiber so we had to deal with them."

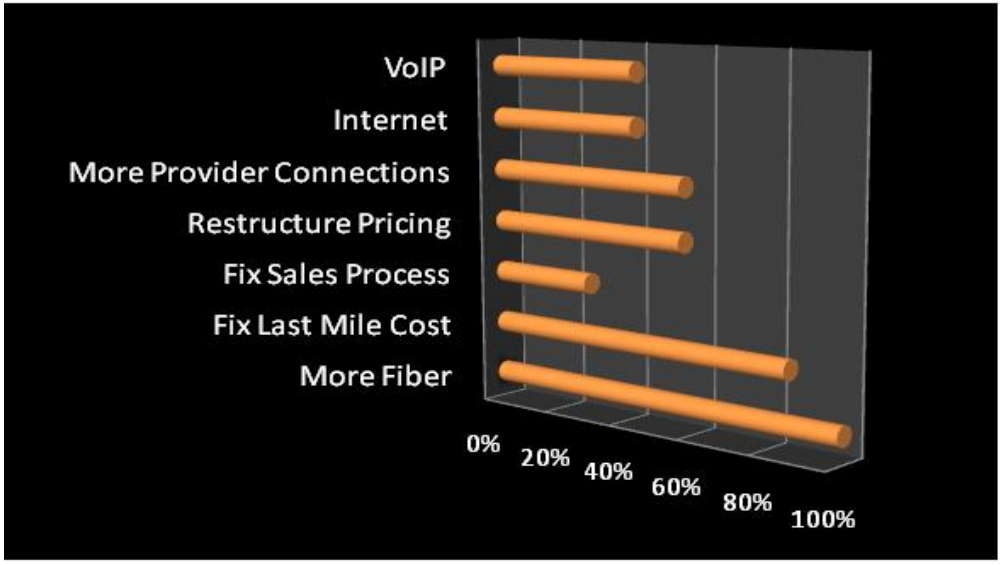
"Yes, but they are challenging to work with – you need to know exactly what to do with them because they have no flexibility from a business side. Engineering and outside plant teams are great though."

Question #3: How can BPW Grow Your Business?

FIBER, FIBER, FIBER! This question generated a lot of enthusiasm and some unexpected results. Deeper community penetration for fiber was the universal refrain – for providers and traditional customers alike ,it is their pathway to market and service delivery. There was a great deal of angst over the current structure for pricing last mile connectivity from all sectors, as well as a desire for a restructuring of pricing to reflect multi-locations and the perceived value of transport and last mile circuits in the marketplace.

Unexpectedly, there was a high degree of unsolicited interest in VoIP, Internet and more provider/ peer network interconnects amongst the ISPs and CLECs interviewed. The driving reasons for this interest centered around the inability to handle traditional SIP trunk clients, and a desire to have BPW act as an aggregator for both VoIP and upstream Internet traffic through wholesale purchasing (aggregate traffic value of multiple providers).

Several customers indicated that they would have been very interested in VoIP and Internet, but as it wasn't an offering, they are now in value-added service arrangements with providers located outside the Holland BPW footprint through dark fiber leases obtained from BPW.



Question #4: How's the Network Backbone Speed?

"The Black Hole"

Customer responses to this question were interesting for several reasons:

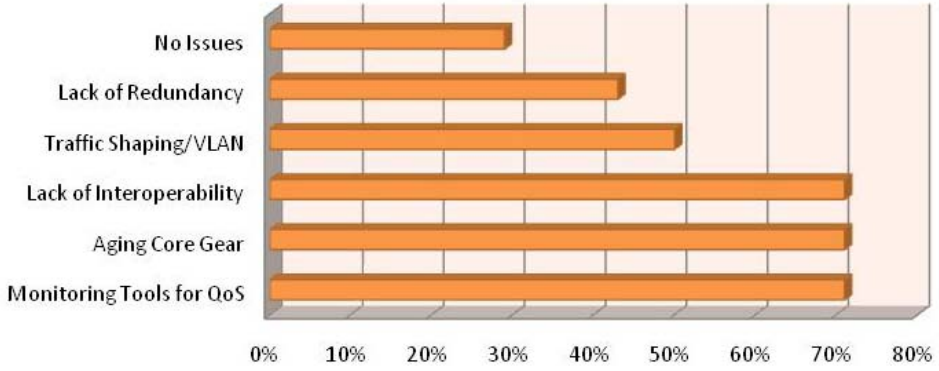
1.No one knew how fast the backbone was, but there was an assumption by all but one respondent that it was 1 Gbps. (One respondent had the speed at 3 Gbps).

2.All respondents thought the minimum backbone speed needs to be 10 Gbps.

3.50% of the respondents had negative transport experiences, but because there is no visibility into BPW network performance (or ability for the customers to monitor performance themselves), they had no way of knowing the root cause of issues. A full 50% of respondents used the term "Black Hole" to describe what happens to their traffic when it hits the Holland BPW network.

1.All parties surveyed had serious concerns with the perceived obsolescence and lack of interoperability of the routers and switches being used by BPW for backbone traffic.

Question #5: Any Physical or Logical Design Issues?



Nearly 30% of respondents had no issues with either the physical or logical design, although none of those represented in this figure were aware of the physical ring structure of the fiber plant itself. All respondents aware of the actual fiber pathways expressed serious concerns over the lack of physical redundancy.

Lack of interoperability, monitoring tools, and the overall age of the core gear were concerns of all respondents that had issues, with nearly 50% of respondents having a variety of traffic shaping, unidentified packet loss, and overall VLAN structure issues. 30% of respondents would like to see burstable bandwidth last mile circuits rather than fixed.

Question #6: Any Security Concerns?

None, except for visibility into network performance metrics and real-time monitoring of traffic as noted in their responses to Questions 4 & 5 above. The monitoring issue as related to security was of particular interest for those carrying traffic subject to HIPAA compliance requirements, and providers using the network to aggregate customer traffic.

Question #7:

Where Should BPW Build More Fiber?

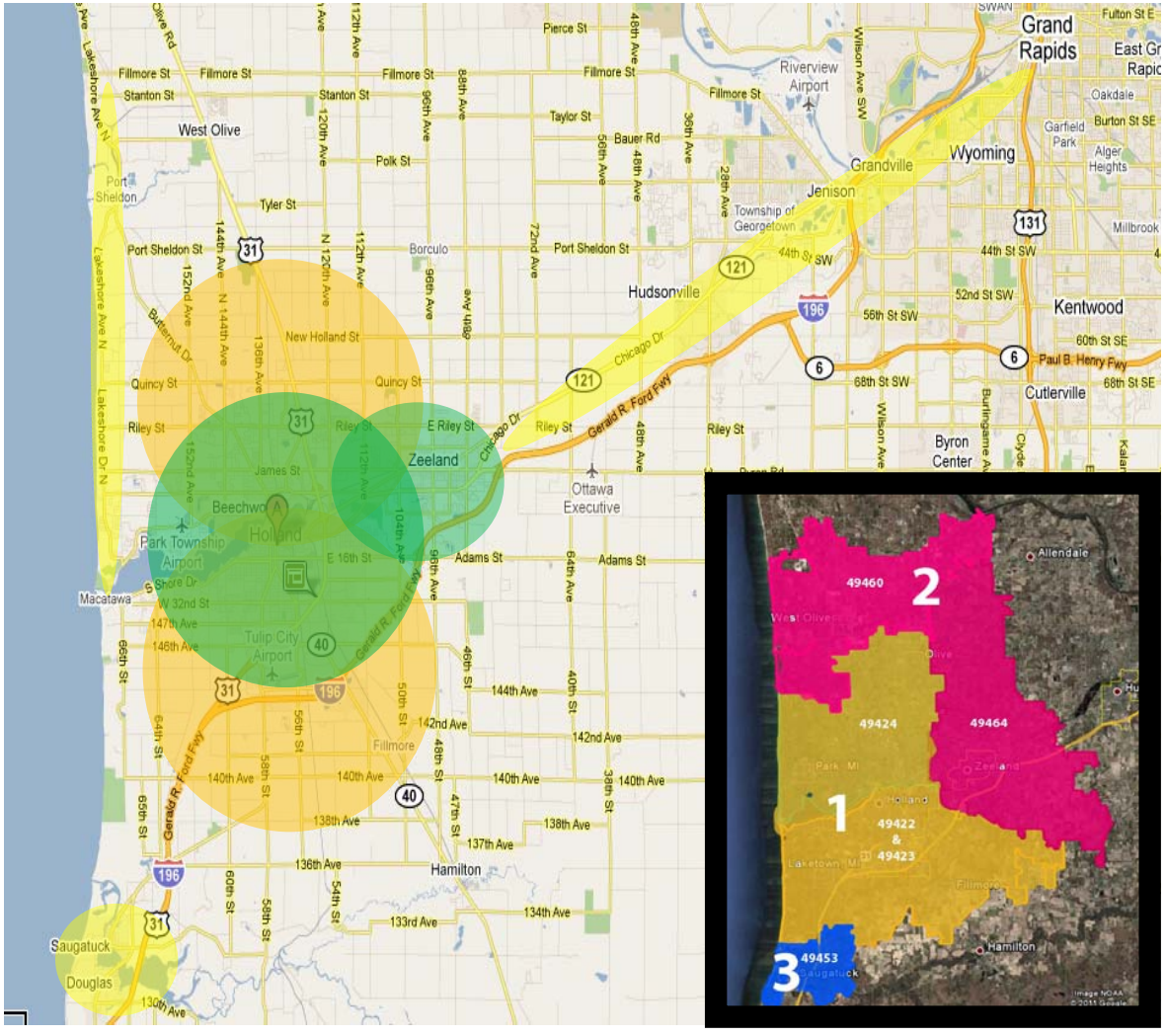
There was a genuine enthusiasm by all respondents for a major fiber expansion of the fiber footprint for the Holland BPW. All respondents viewed it as an essential community asset that could be leveraged in a myriad of ways if expanded.

100% of respondents would like to see a significantly deeper footprint in the Holland - Zeeland metro area. For customers and providers alike, this was viewed as a significant potential asset for further market development and the delivery of services to citizens and businesses.

More densely populated areas immediately to the north and south of the City of Holland proper were viewed as the second most important areas for fiber expansion, as a sizeable percentage of the population served by those surveyed were located in the area.

Saugatuck, the coastal region, and a direct fiber link to a major telecommunications hub (or peering network such as MERIT) in Grand Rapids, were areas of interest for roughly 20% of respondents.

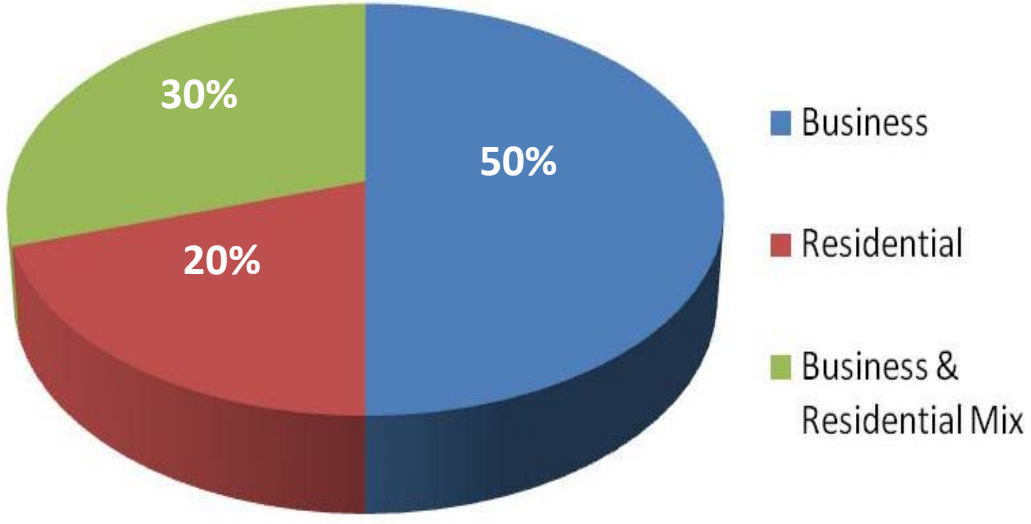
As shown in the inset depicting the potential Service Area Zones, with the exception of the northern area of Zone 2 (which no respondent mentioned), the areas of current customer interest align nicely with the service areas under consideration.



Question #8:

Core Customers for Entities Surveyed

The breakdown of customer types for the BPW customers surveyed revealed that there is a heavy concentration of business customers, particularly at the SBE and MBE level. Most BPW provider customers are slowly abandoning their legacy DSL plant in residential areas, and turning away new residential customer inquiries, as DSL is too slow and those requesting it typically are unable to afford the higher speed cable services (making them high maintenance, high risk customers).



Question #9:

Key Verticals Served

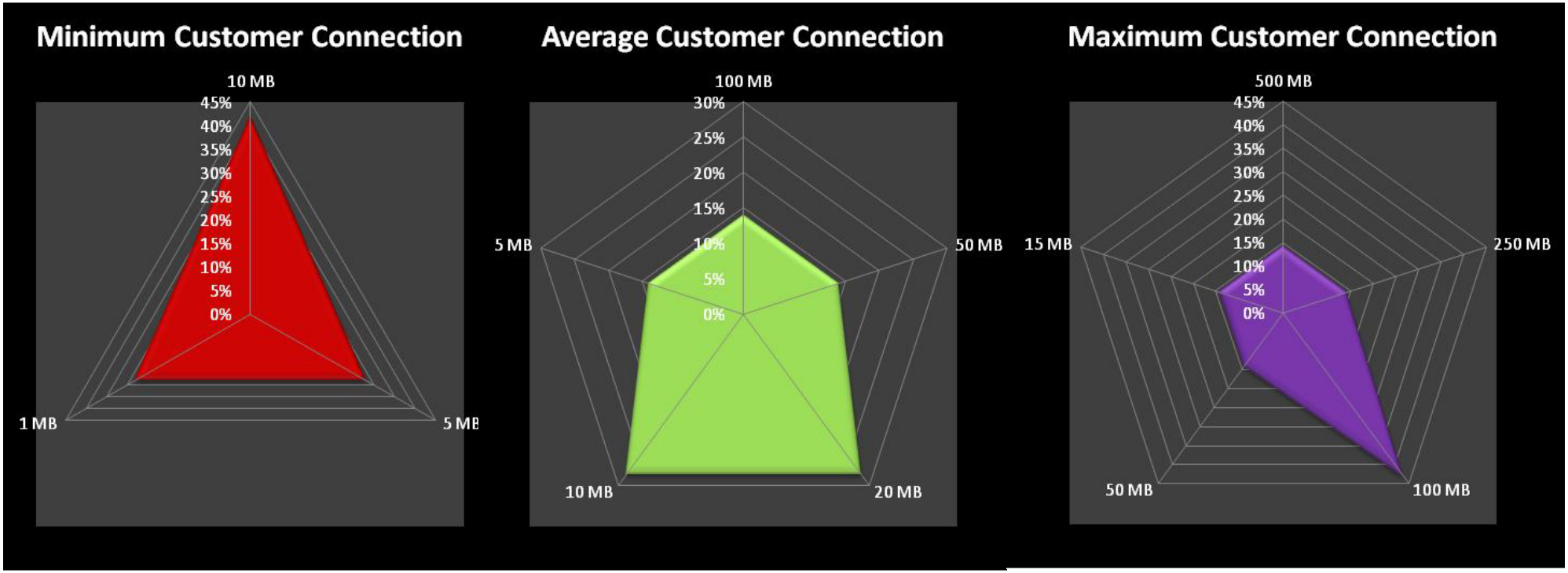
Few customers surveyed had an actual vertical specialty. Most focused on the SBE to MBE enterprise under a 'catch-as-catch can' model. Of note, BPW's plant is rarely used for the SBE space due to the lack of deep fiber penetration in the area and the high cost structure employed for last mile connectivity. All indicated that they were primarily servicing this class of customer through legacy DSL, with a few providers using the backbone to aggregate traffic from the copper plant.

Healthcare – A Game Changer for Residential: Several respondents (including medical facilities on the network) indicated that the residential and institutional marketplaces were about to become very important service delivery targets for them from a remote diagnostics, care and monitoring perspective, if and when fiber becomes available to the home for these high bandwidth applications.

There was also a single provider that specialized primarily in health care, who cited the need for significantly more backbone capacity and interconnectivity with upstream providers and peer networks to service the vertical, as the bandwidth consumption from image transfers , EMR, and need for real time HD video conferencing was becoming a priority. Healthcare has become a significant user of imaging systems along with telemedicine applications requiring real-time replication and disaster recovery. Hospitals and major system typically require up to 1 Gbps for basic services and up to 10 Gbps for replication and disaster recovery services.

Customer Survey Results (Continued)

Questions #10 & 11: Bandwidth



These charts show the Internet bandwidth circuits being sold by the surveyed ISPs, CLECs and other providers, as well as the Internet connectivity purchased by surveyed customers with multiple facilities using BPW fiber for transport.

As illustrated above, the majority of minimum connections are sitting at 10 Mb, with the market rapidly moving to 20 MB on average, and peaking at 100 MB on average for some providers and customers. The majority of maximum connection speeds offered are still in the 100 MB range, but 28% of those surveyed have deployed customers with 250 MB and 500 MB connections.

One customer stated, " I have customers routinely asking now for a Gig, and 1 customer asking for 10 Gigs. Everyone wants more, more, more and we're seeing an exponential rise in consumption. However – the cost of service is too high using the BPW leased circuit model: we have to lease or acquire fiber ourselves to meet customer demand"

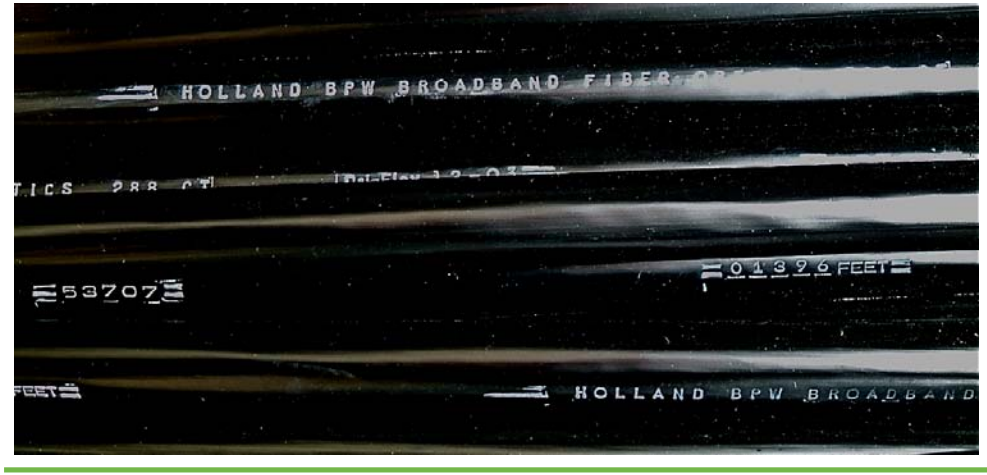
Question #12: Observed Broadband Market Trends?

100% of respondents expressed one theme in different words: "It's all about speed now." All customers surveyed have seen an exponential rise in bandwidth requests and utilization over the past 5 years, a trend they expect to continue over the course of the next decade.

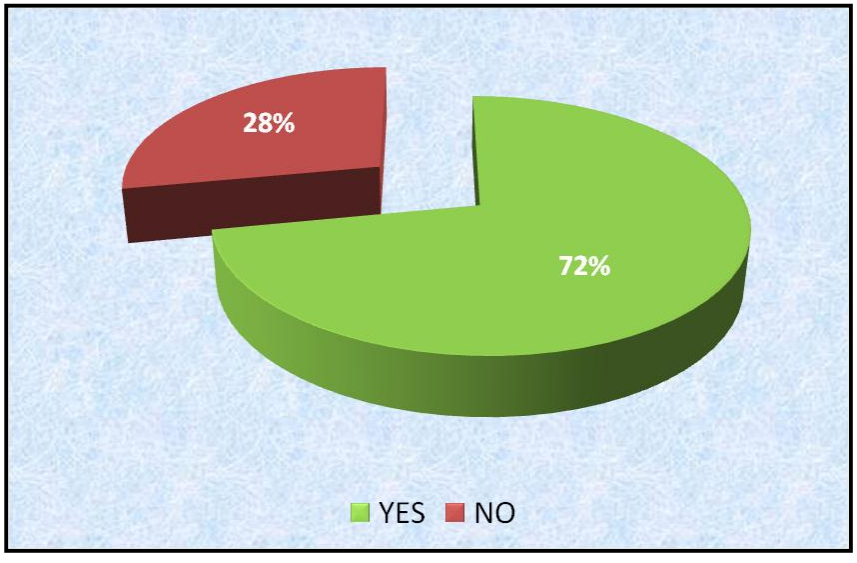
This is largely attributed to the widespread adoption of video and VoIP, and a rapidly growing market interest in cloud computing and advanced data storage and recovery solutions. Predictions varied (largely depending upon customer size), but uniformly all saw a minimum customer demanded Internet speed of 10 MB within 18 months, an average of 25 MB to 50 MB, and a strong market for 100 MB to 1 GB.

The 'always on' and synchronous connectivity aspects of fiber connectivity was stressed by the majority of participants, and seen as a strong competitive advantage over providers using other types of plant. Regional fiber penetration was seen as key for future growth.

Price is an issue in the market, and a force that causes most clients to settle for something less than what they want or need. There was a strong sentiment that if the capacity were available, prices would fall and customers would purchase what they actually wanted to have in the first place. Most surveyed firms are selling customers a product inferior to that which is requested – in most cases driven solely by the excessive cost of providing the customers with what they want.



Question #13: Is FTTH of Interest?



The customers surveyed expressed overwhelming support for a fiber-to-the-home initiative led by the Holland BPW. Providers primarily saw it as a mechanism to break the growing market stranglehold held by the cable franchises on Internet and VoIP services in the residential sectors, creating a more dynamic and competitive marketplace overall.

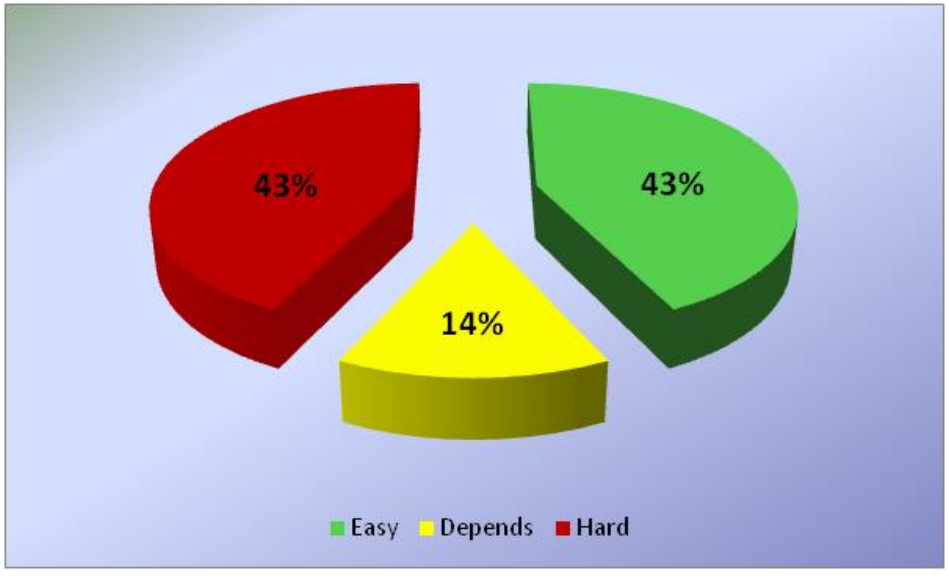
Several customers also revealed plans for citizen-service applications ready for roll-out in Holland in the health care and education spaces if and when FTTH becomes available to handle the synchronous high-bandwidth connectivity requirements.

Almost all customers viewed FTTH, and the Triple Play in particular, as the way of the future – most questioned whether Holland would be a leader or a laggard.

Two customers noted the benefits of FTTH in energy management, telecommuting and small business development, believing there would be significant community benefits.

Customer Survey Results (Continued)

Question #14: How Easy is it to Partner with BPW?



There was an even split between those surveyed regarding how easy it was to partner with the Holland Board of Public Works in the broadband arena. Those expressing that it was easy were raving fans – noting in particular the engineering and outside plant teams' responsiveness, accuracy in the quoting process and overall competency and customer care.

Those expressing that partnering with the BPW was difficult tended to focus on business issues, in particular contracting, last mile amortization model, inability to negotiate custom deals to meet custom customer requirements, lack of any and all sales support, and the intransigence of the business, approval and contracting process.

The overall sentiment, even amongst those that thought partnering with BPW was easy, was that the company needed to decide whether it was in the business or not. There was a recurring refrain of 'they are a great bunch of guys, BUT…" followed with a business rather than a technical issue that made partnering tougher than it need be.

Question #15: Other Final Thoughts?

Notable Customer Responses:

"I really want them to move to an MPLS environment."

"Fix contracting and timelines for approval. BPW needs to invest a couple of million now for more infrastructure and better equipment."

"Take pricing off the web page and brochure. Customers don't understand the difference between transport and services – very confusing for them and often a deal killer."

"We need connectivity in Zeeland now – big customer demand, no supply."

"Provisioning of services needs to have a sound and repeatable process – It's never the same and difficult to set customer expectations."

"Need to decide what business they are in… they can continue down their current nebulous path but if they do they will wither and die."

"QoS, QoS, QoS (referring to network monitoring visibility and fix last mile pricing structure. Other than that, I love working with BPW!"

"Love their spirit, but need to catch up to what the market demands. A 1 MB FTTH pilot? Get real!"

"Get in, or get out. Internet, VoIP, vendor neutral network – these would be transformative in our market."

"Interconnections with MERIT and other provider networks would be great. We're lacking choice in our marketplace and are constantly paying for "bad" past decisions that we had no other alternative to at the time."

"Keep it coming BPW! Business is booming and we need that fiber deployed now!"


PIRELLI

2011 Broadband Strategic Plan

Holland BPW Fiber Business Model Today

Summary of Operations and Product Set

The Holland BPW broadband "division" is an informal one, born out of the commercial value of an asset constructed for internal operating purposes: a fiber optic network deployment interconnecting BPW Electric, Water and Wastewater facilities. The commercial value of the asset came in the form of excess capacity, both in terms of dark fiber (extra strands deployed along network pathways) and data transport over the BPW network itself. As the network was designed and constructed for internal operations, it is essentially an island, unconnected to major upstream providers and/or regional/national networks, except though downstream provider partners (ISPs, CLECs) who have made such arrangements for their own purposes and sell Internet and other upstream services to Holland BPW.

Despite it's small size and lack of interconnection with other regional and national networks, the fact that the greater Holland area lacks significant fiber assets outside of those held by the BPW has allowed the "division" to continue to generate revenues and positive cash flows through the sale of excess capacity for over a decade. From the initial 16.8 mile ,48-strand single mode fiber ring encircling downtown Holland constructed in 1992, the network has grown to nearly 76 route miles featuring fiber counts of up to 288 strands. This deepening of the footprint within the greater Holland metropolitan area opened new market opportunities for excess capacity sales to multiple vertical sectors, including government, health care, education, telecommunications providers and traditional commercial businesses.

Sales efforts have been opportunistic, as opposed to concerted, and there are no active sales personnel within BPW actively marketing broadband connectivity services to the community at large. Instead, BPW has opted to use channel sales partners as its marketing arm, building relationships with local ISPs, CLECs and technology consultants to sell connectivity to businesses within the greater Holland area.

Structurally, the broadband "division" is a part of the Electric Utility, with all capital and operating costs charged to their P&L . It is not operated as a full division with a separate P&L, and its staff of four (4) are part-time, doubling as core internal network operations personnel for the Electric Utility LAN. The team is seasoned and knowledgeable, and is maintaining 'steady state' network operations and fiber footprint expansion with few incidents or issues of note. The engineers and outside plant personnel double as Level 1, 2 & 3 help desk personnel, handling any and all incoming customer service issues. All major business issues and decisions are handled by a single manager overseeing the group.

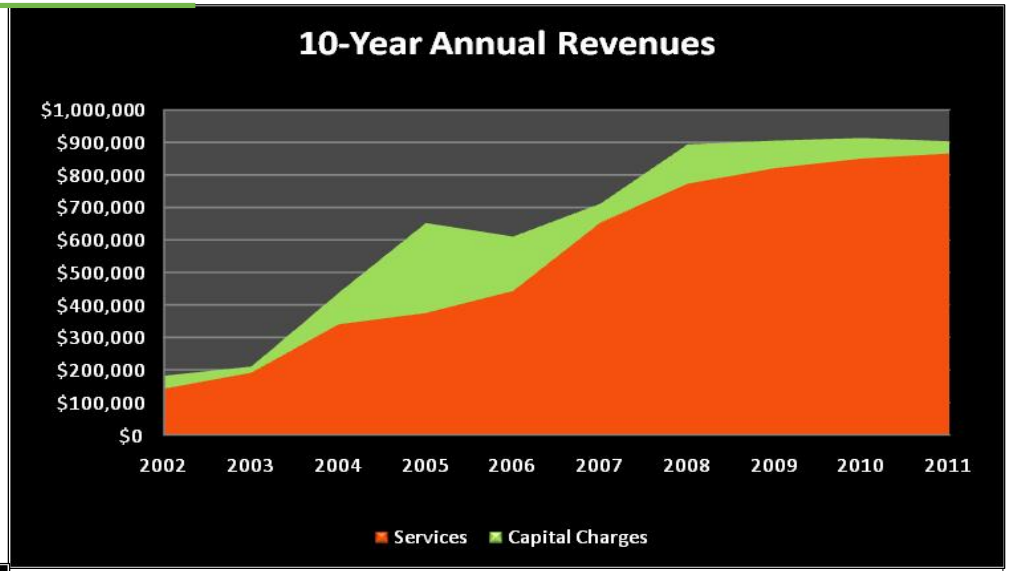
Holland's current product set is designed around the provisioning of Layer 1 (dark fiber) and Layer 2 (active transport) Ethernet services. In layman's terms, BPW provides consumers with the ability to purchase strands of unlit fiber for their own use or connect to their network to transport data to a 3rd party provider or location through a virtual local area network (private VLAN) connection. One network product set characteristic of particular interest is that the Holland BPW is one of the few municipal networks in the country with a long history of operating as an open and provider-neutral network, an important distinction given the direction of the federal public policy and funding regulations regarding network infrastructure operations. BPW currently facilitates traffic for Tier 1, local ISPs, CLECs and wireless providers, acting as a traffic aggregator for businesses and residents across the greater Holland metropolitan area.

Network operations and product set, however, are perhaps most aptly characterized by what BPW does not provide, namely any value-added services (Internet, VoIP, Video) or interconnection to regional/national networks. All functional uses for the fiber by BPW customers must be provided by 3rd parties.

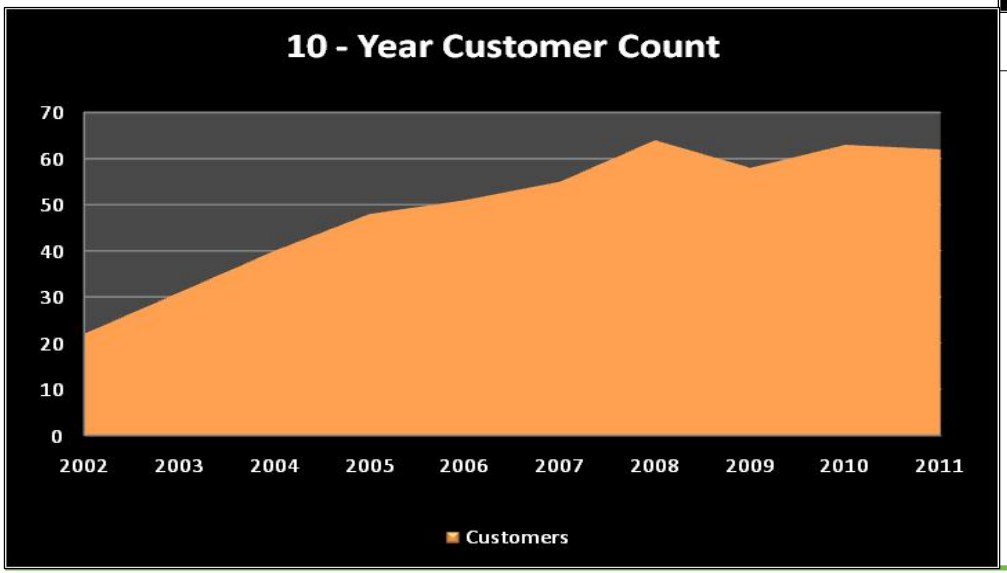
Revenues and Go-to-Market Strategy

As noted in the chart to the right, revenues have been flat for the past four years, holding steady at around $900,000 per year. 96% of all revenues in 2011 come from dark fiber leases and customer nodes, with only 4% of revenues coming from capital builds. The two are closely interrelated: if fiber isn't being laid to connect new customers, then service revenues will not increase, especially without any value added services or direct marketing efforts directly provided by the Holland BPW. As the vast majority of capital charges revenue is cost recapture for last mile or specifically commissioned route construction costs, it is noteworthy how small a percentage of the overall revenue percentage this line item represents vs. the total recurring revenue generated through the provisioning of the services themselves.

There are many underlying causes for the flat revenue stream over the past four years. BPW currently relies on channel partners for driving sales, all but one of which are a local ISP or CLEC. The customer survey results in the demographics section captured the sentiments of these channel sales partners regarding using BPW as the preferred provider of services: BPW is NOT the first choice for any of them. They also noted significant barriers to that status improving, most notably a more favorable handling (at a minimum, an extended amortization schedule) for last mile construction costs for connecting customers. There were also concerns over business practices, the aging infrastructure, and an inability to provide QoS over BPW fiber.



Note: Artificial revenue bump in 2007 of $383,023.77 due to under billings adjusted and revenue re-allocated to proper years (2003 – 2006). 2011 revenue figures based on 7 mos. actual billings and 5 mos. projected billings.

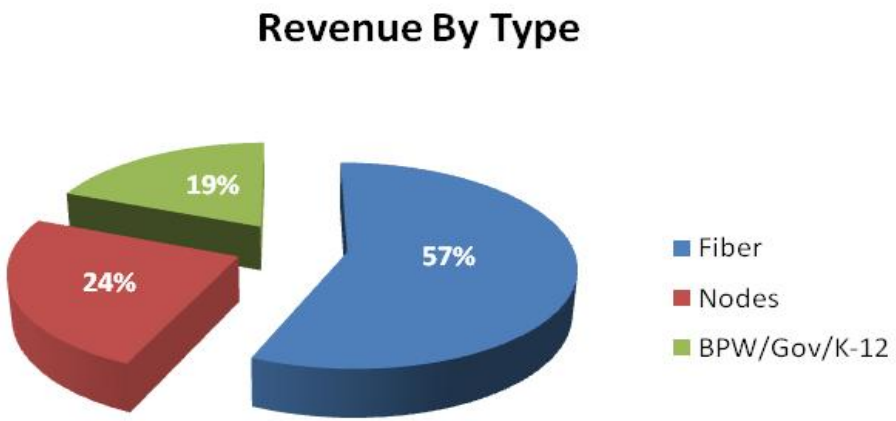


Using channel sales partners as the sole 'Go-to-Market' strategy has not produced the hoped for results in terms of newly acquired customers. As the chart on the left illustrates, customer count peaked in 2008, and has remained flat ever since, currently sitting at 62.

There is another, perhaps more important reason, that customer count has been flat for the past five years. As Holland BPW offers only Layer 1 and Layer 2 services (dark fiber and AE transport), the value of the base fiber service offering is almost entirely in the hands of 3rd parties – namely the ISPs and CLECs who are providing Internet, VoIP and video services. A careful look at the average node speeds being sold is a good indication of what BPW can expect as net results – circuits are being sold at speeds comparable to ADSL in most cases, with "high-end" circuits in the 5 MB – 10 MB range: significantly slower than cable modem and the equivalent of buying a Ferrari to sit idling in NY city traffic.

The true community and economic value of the BPW fiber asset lies in speed, and the channel sales partners are not using BPW fiber to sell 50 MB, 100 MB, 250 MB nodes to customers. It's clear that the current strategy will need to be revisited if this line-of-business is to grow.

Current Revenue Summary



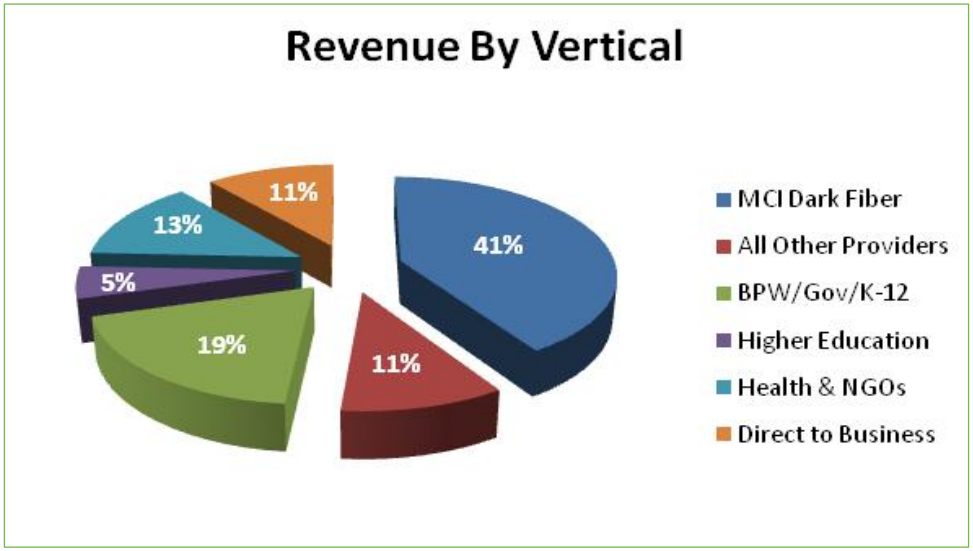
The breakdown of revenue by type above shows that 57% of all revenues are dark fiber IRUs, and a full 19% of remaining revenues are internal BPW, government and K-12 school service connections. This further illustrates how ineffective the 'Go-to-Market' channel sales partner strategy has been: at best case less than ¼ of all revenues have been obtained through this channel, and further analysis will demonstrate that it is far less. The model simply isn't working.

Of perhaps greater concern is the lack of community penetration, which, when combined with the pervasively low speeds being sold, means that the citizens of Holland are benefiting from this valuable community asset. It's literally "Water, water everywhere, and not a drop to drink." The current customer survey illustrates this clearly – two of the highest groups of bandwidth consumers (healthcare and education) are currently, or will be shortly, receiving the bulk of their services from the MERIT network, because the network is the only one that can provide the enhanced services they require at a reasonable price point.

Services revenues will decline as these groups sunset their BPW nodes in favor of either lower cost dark fiber leases or direct transfers to MERIT fiber (MERIT is currently building a backbone line through Zeeland as part of an ARRA awarded project). This is a troubling sign for the future of the current business model, as they are the largest single market segment by revenue for BPW.

At first glance, the revenue by vertical breakdown below looks like healthy market diversification. A closer examination, however, further illustrates the issues with the current sales and business model. A full 41% of all revenues stem from a single dark fiber agreement with MCI, initially executed over a decade ago. If internal BPW, government and K-12 revenues are added, the total jumps to 60%. Once health care and higher education are added (both currently under threat from the MERIT incursion into the greater Holland area), the total rises to an astounding 78% of all revenues. Of the remaining 22%, 11% is through sales to providers (primarily dark fiber), leaving only 11% of all revenues as direct sales to business (50% of which is once again dark fiber leases to larger companies like Herman Miller).

If the Holland BPW's current business model is to succeed in the long term as anything other than an opportunistic source of ad hoc capital, a re-examination of the 'go-to-market' strategy will have to take place. This must include more aggressive marketing efforts, closer partnership with upstream and downstream providers, crafting of closely integrated service offerings with existing partners, and the creation of strong value propositions for the citizens, businesses and institutions within the greater Holland area. Sizeable market penetration and dramatic revenue growth will require a revisiting and transformation of the core business model itself.



SWOT Analysis – Existing Business Model

SWOT Analysis: Existing Business Model

Strengths

- ✓ Experts in fiber outside plant (OSP) construction & maintenance
- ✓ Own outright or are in possession of rights to poles for aerial deployments
- ✓ Control majority of backbone fiber in region
- ✓ Core base of 62 customers with over 130 sites
- ✓ Strong base of recurring revenue from long-term fiber IRUs
- ✓ Small base of Ethernet transport services with third party providers
- ✓ Well-established provider partner relationships acting as channel sales arm
- ✓ Core operations team with well-established BPW tenure and IP
- ✓ Executive support and commitment to strengthening fiber line-of-business
- ✓ Network used for both internal and multi-provider traffic (Cost Avoidance/ROI)
- ✓ Reputation as a positive force and progressive company within Holland

Opportunities

- ✓ Expansion of Backbone Fiber Penetration: Build reliability and redundancy closer to the premise shortening time-to-market
- ✓ Improve Cost Recovery and Customer Acquisition: Work with channel sales partners to increase ROI through reduction (and restructuring) of last mile construction costs through collaborative core route design and revised amortization of construction
- ✓ Open New Markets: Expansion to emerging high-growth business corridors of Zeeland, Saugatuck and regional/national backbones (Tier 1, FCC RHCPP/MERIT)
- ✓ FTTx: Diversify product portfolio and potential channel partners to offer higher speed transport and service options that drive sales
- ✓ Integrate with Smart Grid Solutions: Accelerate ROI, reduce peak loads and increase customer value proposition through FTTx-enabled energy solutions

Weaknesses

- X No sales force to drive customer acquisition – dependent on sales channels
- X Revenue and customer growth flat for 5-year period
- X Current method of amortizing last mile expense cost-prohibitive for all parties
- X Lack of geographic penetration and physical redundancy in deployed fiber plant limits commercial opportunities
- X Network isolation – no/limited interconnection services with facilities, carriers and upstream service providers
- X Limited customer value proposition – transport only (no services)
- X Inability to provide partners enhanced network services and visibility into network performance and QoS
- X Aging plant and equipment, some questions regarding fiber quality
- X Not run as an independent business unit with associated expectations and managed approaches to CAPX and OPX investment decisions

Threats

- X Competition in core transport by encroaching public and private fiber networks (e.g. Holland hospital, MERIT)
- X Declining price trends regionally and nationally for fiber IRUs, leased transport for last mile circuits
- X Introduction of cost-effective connectivity options to commercial sector by traditional cable companies and Tier 1 carriers (removing need for transport circuits for low-end and mid-range (e.g. 25 MB down, 5 MB up) speeds
- X Key core customers abandoning current multi-circuit VPN structure in favor of fiber IRUs or carrier MPLS services poviding greater control at a reduced cost
- X Future sales/growth/margin entirely dependent on sales channels
- X Dependency on small alternative (and often under-capitalized) providers as sales partners and customer care: what happens if they close shop?

SWOT Analysis – Existing Business Model

Strengths

The broadband "division" of the Holland BPW has a strong base upon which to build a valuable line-of-business. Under it's current business model it has successfully leveraged its strengths in building facilities, underground and aerial infrastructure and turning it into a steady-state operation carrying vital regional voice and data traffic for government, hospitals, citizens and businesses. In-house personnel are experts in OSP construction and maintenance, two traditional areas of weakness for incumbent providers. They also own outright, or are in possession of rights to poles and conduit for deployment purposes. This is a significant competitive advantage whose importance cannot be over-emphasized. As one of the largest recurring cost factors for any regional fiber deployment, it should reduce BPW's long-term operating costs and result in enhanced profitability, as well as the ability to provide the citizens and businesses of the greater Holland region with higher bandwidth services at lower prices than they could receive via any competitor that may choose to invest in regional fiber infrastructure.

BPW is also in control of the majority of local backbone fiber in the greater Holland metropolitan area. This has resulted in a core base of 62 customers for dark fiber and data transport services, providing a strong base of recurring revenue that not only features positive cash flow, but is also long-term in nature. Typical fiber IRUs are 20 years in length (and BPW's are no exception), and despite contractual tenures of typically 3 – 5 years, business customers have a strong tendency to renew with incumbent service providers, resulting in typical contract relationships of 10 years or more. BPW also has well established relationships with the telecommunication providers in the region, enjoying both channel sales partner arrangements and revenue-generating direct contracts for fiber and services. Under the current business model these may be leveraged to generate additional customers and sources of revenue through the expansion of the HBPW fiber optic network plant.

There is also strong executive support and commitment for the broadband line of business from executive management. In addition to the community energy management capabilities that the growing region may leverage through fiber to reduce its dependency on imported energy, management understands the vital role that broadband plays in the lives and economic fortunes of citizens within a region. Seeking to maintain the already established reputation BPW enjoys as a positive force and progressive community within Holland, management has indicated that it desires to deepen the positive impact of its operations from an economic development point-of-view, with an eye to ensuring that generations of Hollanders have ample opportunity to "live, work and play" in Holland.

Opportunities

Under the current business model there are several opportunities to achieve this goal. Through a deepening of the backbone fiber penetration within the greater Holland metro region, BPW would be able to dramatically reduce the last mile connectivity costs associated with joining the subscriber network, extending its benefits to a greater number of institutions, businesses and citizens. The community impact would be exponential if the investment was targeted at fiber-to-the-business (FTTB) or fiber-to-the-home (FTTH) through a subsidized investment strategy, thereby allowing regional telecommunications partners and BPW to offer significantly higher capabilities and services (e.g. big bandwidth, smart grid energy management) for citizen services, the ability to compete in the global economy, and citizen infotainment. Finally, the value of the Holland BPW fiber asset would be significantly increased if it expanded into emerging high growth business corridors (e.g. Zeeland/Saugatuck) and directly interconnected with regional/national backbones.

SWOT Analysis – Existing Business Model

Weaknesses

There's a segment of society that doesn't appreciate the arts, and for that group the Holland BPW network has a number of features from a business perspective that resemble the decorative sign post on River Avenue:

1.It's a nice big showy thing, but the important part is the data (brown circle below the art). If what customers can buy is still essentially the same product (e.g. slow Internet), there's no point. BPW's lack of enhanced services makes it dependent upon small, often under-capitalized ISPs and CLECs for usable service offerings and quality of service. Transport is only as useful as the applications and services that ride atop it.

2.It's pretty, but what's it cost? BPW's current handling of last mile build expenses makes it cost prohibitive, and encourages channel sales partners to look for other solutions to service customers.

3.It would be cool if these were everywhere, like a town identity thing, but just a few? What's the point? Current BPW fiber penetration lacks adequate community depth, even within Holland proper. The network's isolation and lack of physical redundancy leaves it as singular as this sign post.

These weaknesses are reflected in the flat revenue and customer growth over the past 5-year period. There are a number of contributing issues that need immediate attention if the current model is going to resume its original positive trajectory. First, the aging plant and equipment issues need to be addressed. Bandwidth consumption trends nationally are increasing exponentially year-over-year once capacity is available, and state-of-the-art telemedicine, security, supply chain integration, teleconferencing, and infotainment all demand the fiber optic infrastructure that BPW is offering. If, however, the equipment requisite to exploit the physical asset is unavailable, then the asset itself is useless except for dark fiber sales. An immediate upgrade to a routing and switching architecture and equipment set as recommended in the technology section of this report is extremely crucial for retaining current customers and on-boarding new ones.

Creating a business model and value proposition that will resonate with customers is a glaring weakness for BPW currently. The organization's dependency on opportunistic sales and channel partners for revenue generation resulted in its not being run as a formal business unit charged with associated expectations and managed approaches to service offering, CAPX and OPX investment decisions, and customer capture. Even within the channel sales model there are glaring weaknesses, most notably the inability to give the provider partners on whom the entire enterprise depends even basic quality-of-service (QoS) visibility for them to service their clients. This is highly problematic and needs to be corrected in the proposed network upgrade if the channel partner sales strategy is to have any hope of generating community impact and BPW revenues. If Holland BPW is to continue down its current path in terms of its basic business model, it must do everything in its power to become the preferred provider of transport and last mile connectivity for its provider partners and channel sales representatives.

SWOT Analysis – Existing Business Model

Threats

Western society is littered, literally , with useful items tossed in the bin . Although this is lucrative business for the Louis Padnos Iron & Metal Company, it would be a tragedy if Holland BPW fails to address the growing number of threats to its broadband line-of-business and its valuable fiber asset is reduced to scrap. And there are a number of threats on the horizon which have the ability to do just that.

First, although the Holland BPW's broadband "division" has dark fiber contracts with Tier 1 providers, the line-of-business is basically entirely dependent upon small alternative (and often under-capitalized) providers as channel sales partners. This is incredibly problematic when considering a multi-million dollar infrastructure investment. What happens if they close shop? Do they have the ability to compete with Tier 1 carriers for the business customers required by BPW to make their line-of-business relevant and viable for the long-term? On the residential front, do BPW offerings through partners compete with cable?

Second, what a customer can do with the service is king. BPW offers no enhanced services whatsoever (e.g. Internet, VoIP, Video) that would be of actual use to commercial and residential consumers. Essentially, BPW has made a rather cynical bet: no provider will ever consider the region worthy of investment, therefore our future broadband revenues are secured. Unfortunately for the core business model, that is already proving to be not valid.

The MERIT network expansion into Holland BPW's footprint demonstrates not only that investment is coming, but that the investors themselves are savvy enough to offer not only transport, but a full set of bandwidth intensive services that customer can use to create greater efficiencies and services/market expansion for subscribers. As confirmed by the customer survey, key core customers will be abandoning the current multi-circuit VPN structure in favor of fiber IRUs which provide greater control at a reduced cost point to connect to the MERIT network. Alternative On-Net Ethernet services for transport would be considered if expanded service level agreements and QoS could be offered.

Third, traditional cable companies and Tier 1 providers with aging infrastructures are introducing cost-effective connectivity options to the commercial sector whereby SMBEs can receive mid-range speeds (e.g. 25 MB down, 5 MB up) removing the need for BPW transport circuits. Although not ideal for business, and typically having a negative results in customer satisfaction surveys in developed markets, in Holland it will resonate as the ISPs and CLECs acting as channel sales partners are unable to compete in terms of price point or service offering when using BPW's transport services. This is a very real and critical threat for which the Holland BPW requires a pro-active plan of action to counteract.

And finally, the value of the fiber asset, when limited to leased transport and fiber IRUs is declining daily. There is significant negative price pressure on fiber IRUs and transport circuits as fiber becomes more ubiquitous across the country. Even if Holland BPW remains the sole or primary holder of fiber within the service area, the pricing benchmark for provider partners is established nationally and internationally rather than locally. Ultimately, this will have devastating effects on the revenues and profitability of the HBPW in the broadband division if it continues under its current operating and 'Go-to-Market' model. The national and global pricing trends simply don't support it.

In Focus: FTTH Pilot

In 2003, BPW took a seemingly very progressive step in its fiber-to-the-home pilot project conducted in conjunction with IServ and the Bosgraaf Homes. The pilot program connected the homes in this new development with FTTH infrastructure, and provided free Internet services to purchasers of the homes.

This program was met with a "luke-warm" response by residential home owners and has since been discontinued as an offering to new homeowners within the development. There is a base of existing subscribers that still maintain the service, although with each year that number declines.

Is this pilot program any indication of anticipated residential response and take rates within the greater Holland metropolitan area for FTTH? CERTAINLY NOT!!! The pilot program, although well intentioned, was tragically flawed. As a demonstration project, it failed to take advantage of the extraordinary capabilities that fiber offered to the residential consumer by placing advanced services solely in the hands of the channel sales partner. The service offering (or lack thereof) speaks for itself:

•Offered Internet Speeds slower than DSL: With the capacity to provide 100 MB to 1 GB services to residents to test what they would do, owners were instead provided with 1 MB connections, slower than any other service offering commercially available save dial-up.

•No VoIP, video or content services were offered. Aside from Internet (at speeds slower than offered by any other provider), there was nothing owners could do with the technology.

•No AMI/Smart Grid/Energy Management Network Interface Devices (NIDs) and services included – BPW failed to get any customer adoption or utilization data for potential ROI analysis or peak demand management analysis.

The flawed business model for the pilot program renders its results and ultimate failure meaningless. Gigabit Squared recommends 'turning on' the already established pilot with a robust set of services to truly test the market.

Holland: The Great American Main Street

After careful analysis of the market, Holland BPW operational and fiscal considerations, and the welfare and benefit of the greater Holland metro area as a whole, it is the opinion of Gigabit Squared that BPW abandon the current business model in favor of one more advantageous for all parties concerned.

The remainder of this report will document the options we believe to be most viable for the BPW as it pursues both the extension of its fiber optic network and the positive impact that it will have on the lives of its citizens and the economic fortunes of its industries.

In the sections that follow we will examine:

- Models for Fiber Footprint Expansion;
- Business Strategies and Operations;
- Technology Considerations; and
- Regulatory and Political Considerations.

It is our belief that the approaches and recommendations identified will accelerate socio-economic development in the region, and are sound and profitable practices for the benefit of the Holland BPW and its customers.

2011 Broadband Strategic Plan

Model for Fiber Footprint Expansion

Model for Holland BPW Fiber Footprint Expansion

A careful examination of the demographics and commercial/residential densities per mile of deployed fiber in the three (3) larger service areas has led to the identification of a recommended zone for the extension of BPW's fiber plant. The footprint illustrated by the areas contained in white borders on the map to the right depict those areas which will provide both the greatest socio-economic impact for the citizens and businesses of the greater Holland area, as well as the highest level of return-on-investment for Holland BPW. The use of this footprint as a guide for the expansion will enable the creation of a sustainable and profitable line-of-business for the City of Holland's Board of Public Works, whether it chooses to deploy a fiber-to-the-business (FTTB) or fiber-to-the-home (FTTH) strategy.

In summary, the five areas selected for fiber deployment include:

- Holland North
- Holland South
- Zeeland

} One Contiguous Area

- Saugatuck and Douglas City
- Hamilton

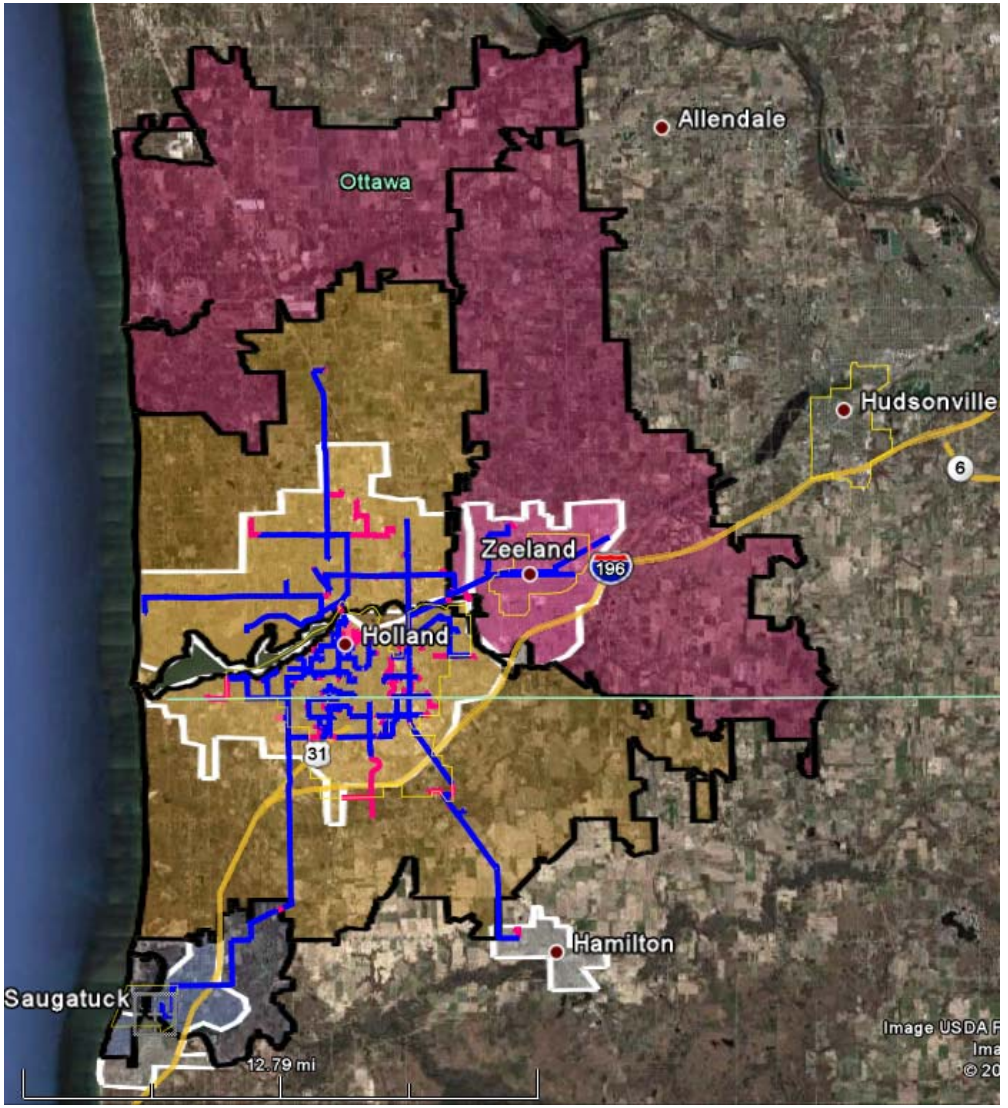
The maps in this section depict existing BPW fiber. Blue lines indicate deployed aerial plant. Pink lines indicate deployed underground plant. Current fiber densities are greatest in the Holland South area, with solid backbone pathways established in Holland North and Zeeland. Saugatuck, Douglas City and Hamilton are almost entirely undeveloped.

The analyses conducted in the remainder of this report are all based upon these five areas selected for fiber deployment. They form the basis of our examination in the Business Strategies and Operational Models, Technical Considerations and Financials & Staffing sections. In those sections 3 primary operational models are actively considered:

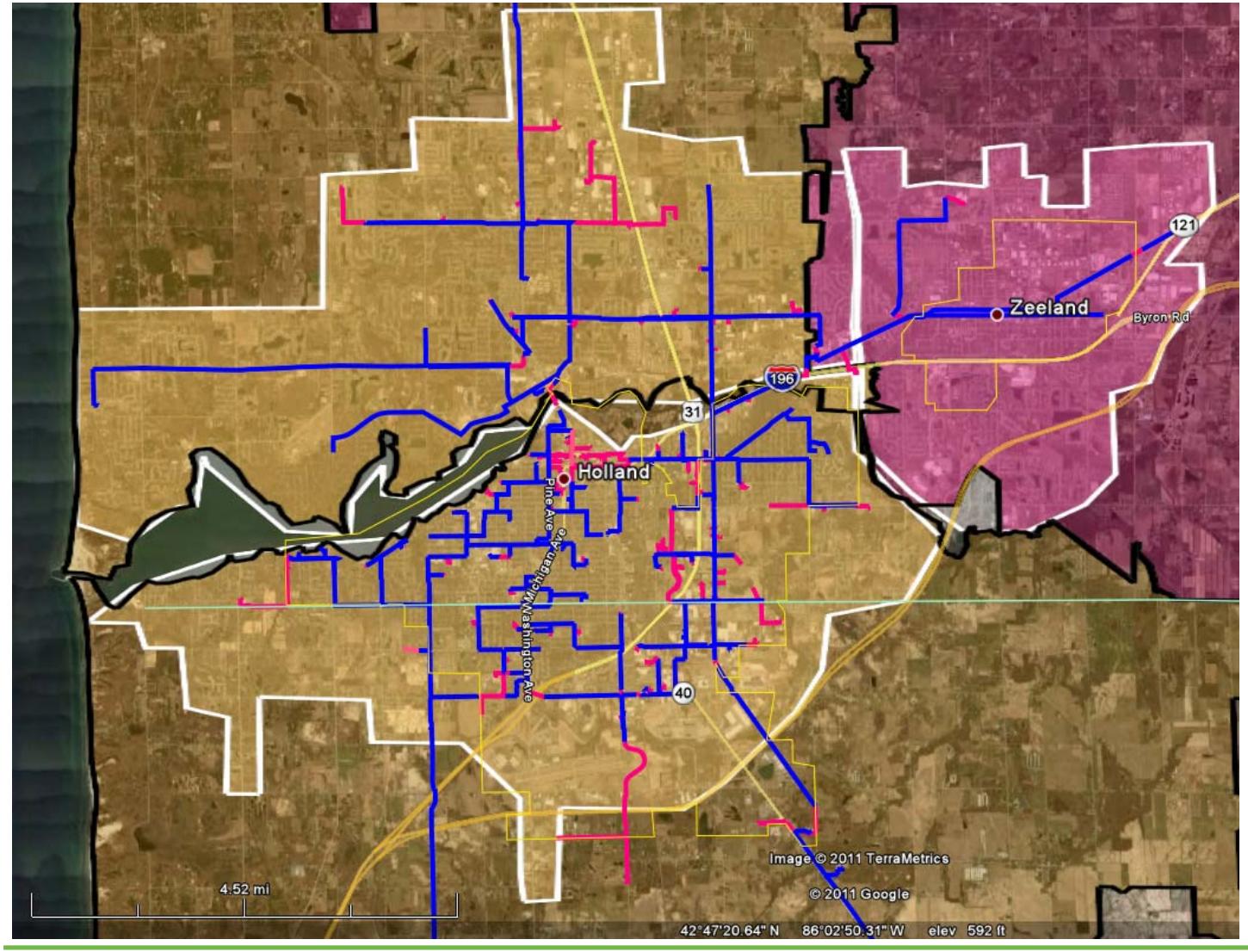
1.Maintenance of current Layer 1 & Layer 2 transport model with a deepening of the fiber footprint within the delineated zones;

2.FTTB with enhanced services offering (Double Play: Internet/VoIP);

3.FTTH with enhanced services offering (Double, Triple & Quadruple Play: Internet/VoIP/ Video/AMI & Energy Management).



Primary Serving Areas



Primary Unified Service Area

The figure to the left provides a closer look at the primary operating footprint recommended for Holland BPW fiber network expansion. As in the previous slide, blue indicates existing aerial plant and pink indicates existing underground plant.

The map shows the density of the commercial and residential footprint within the contiguous area, an area that in total represents:

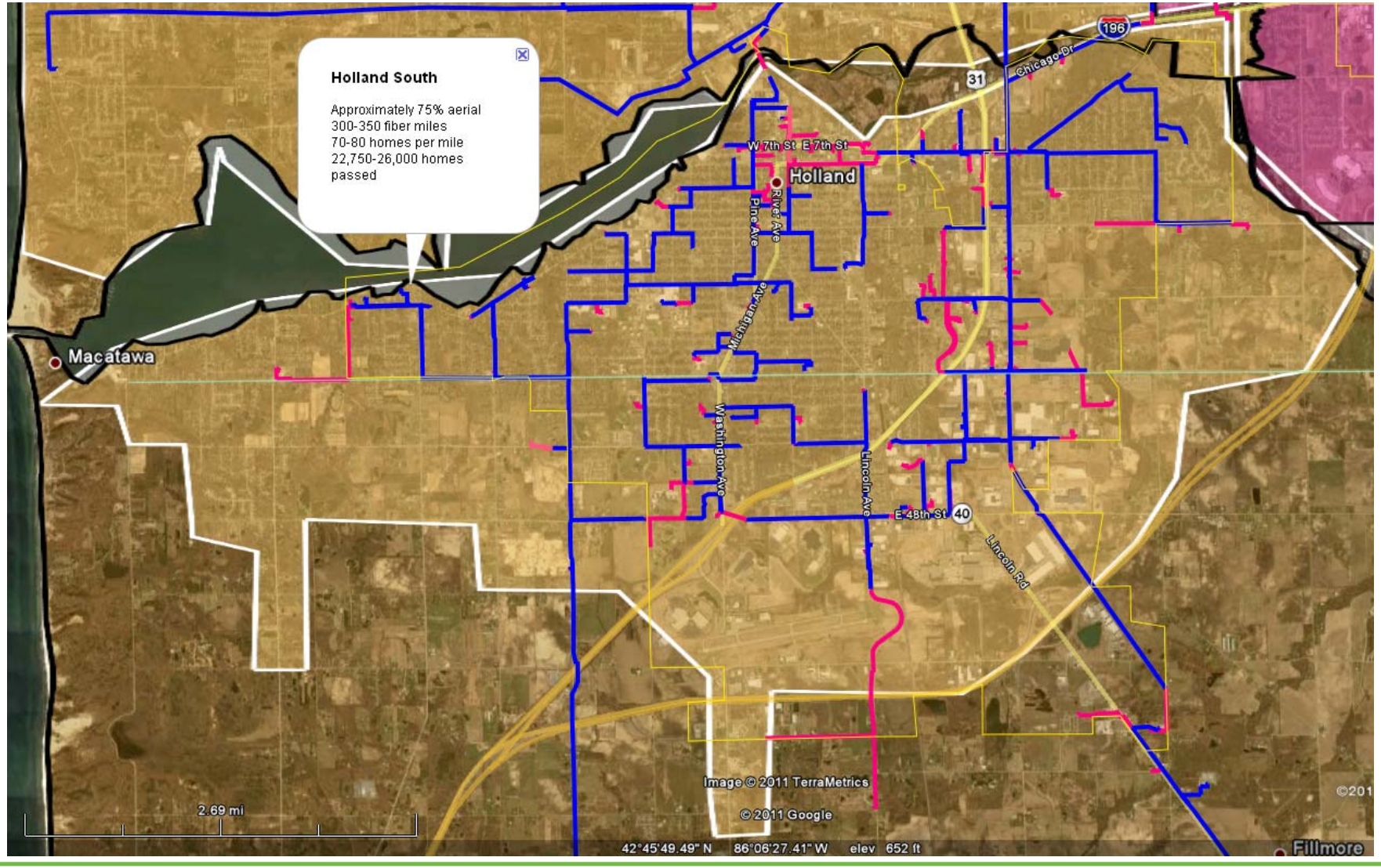
FOR FTTH:

•Roughly 750 fiber miles total (existing and new)
- Approximately 66 homes per mile
- 45,250+ homes passed

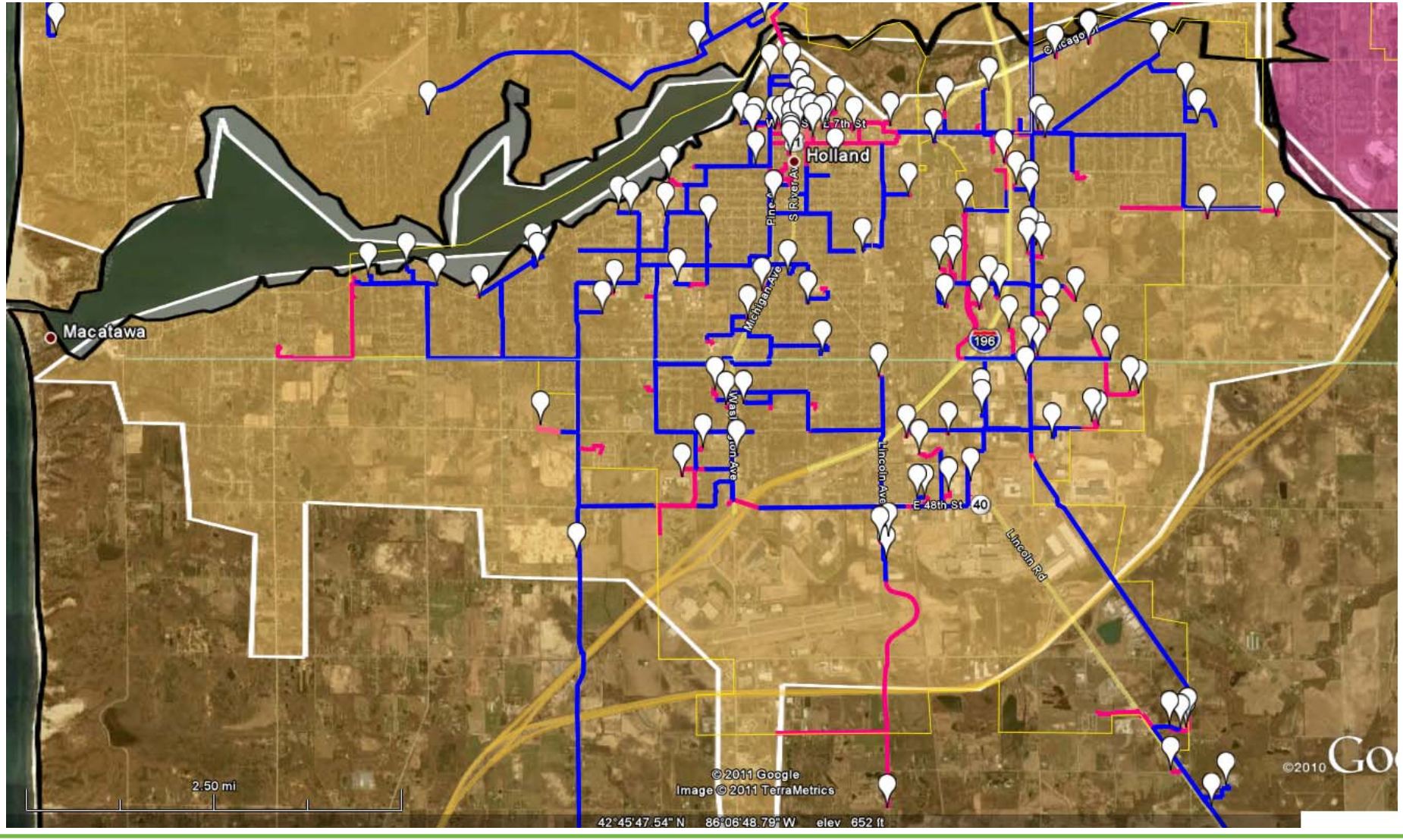
Holland North and Holland South are within the traditional operating footprint of the BPW. Zeeland represents an extension outside of that footprint, but one that makes strong sense based upon demographics, regional economic development considerations and the inter-dependencies of the two communities in terms of employment, healthcare, education and economics. Despite municipal and BPW operational boundaries, these three (3) areas essentially work together to form a single economic development zone.

Closer street level views of each proposed service area are depicted on the pages that immediately follow.

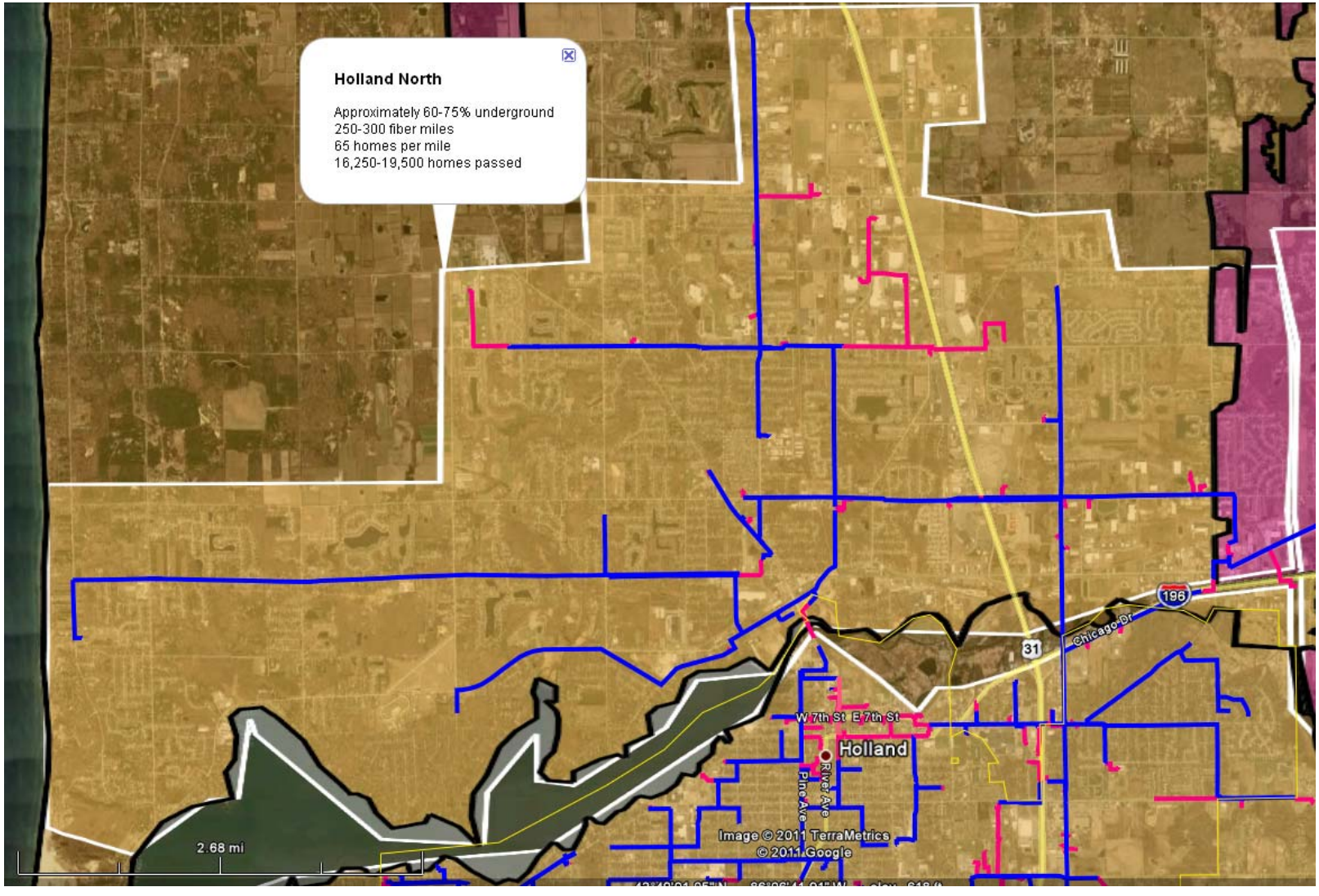
Holland South



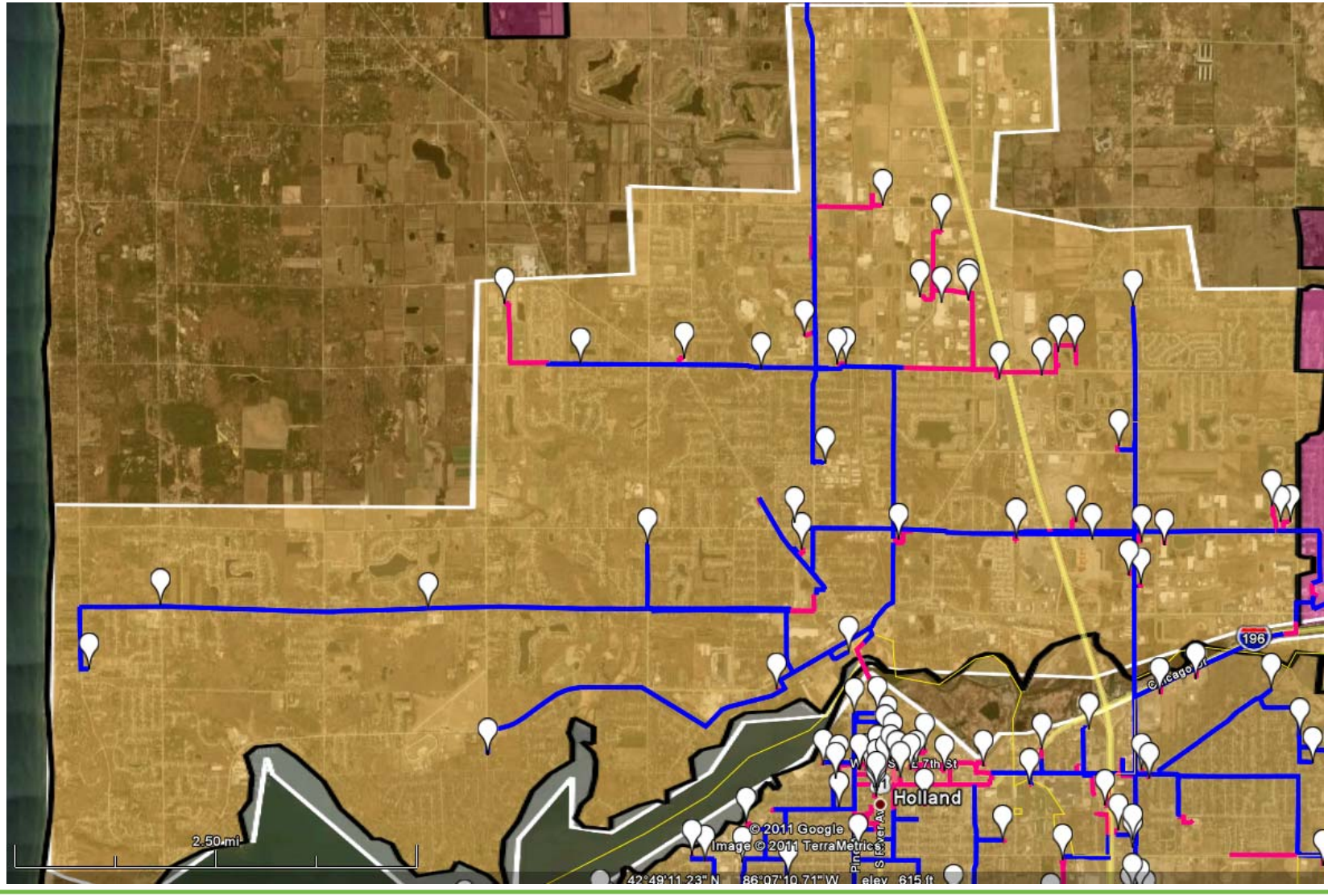
Existing Customer Sites: Holland South



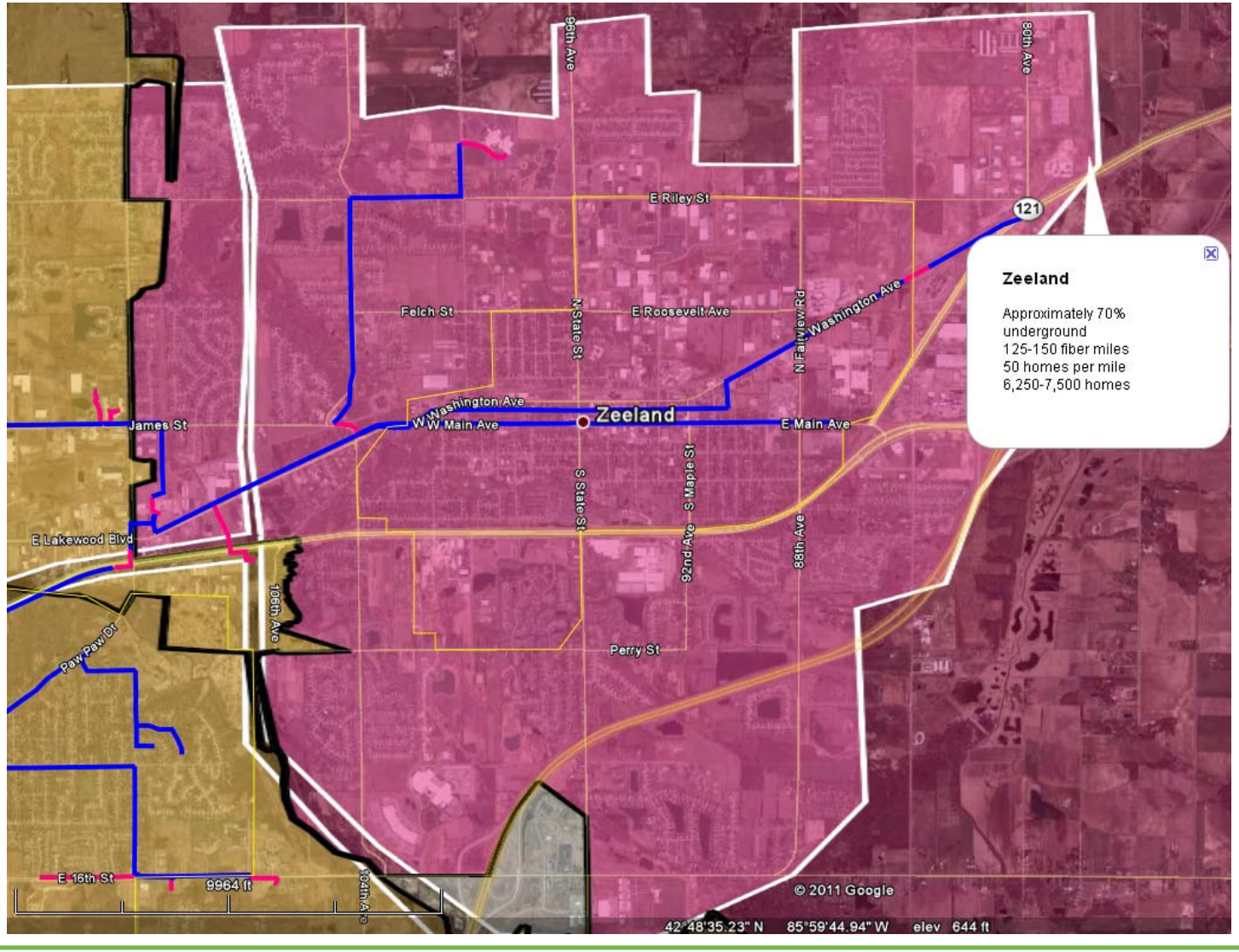
Holland North



Existing Customer Sites: Holland North



Zeeland


Zeeland
Approximately 70% underground
125-150 fiber miles
50 homes per mile
6,250-7,500 homes
96th Ave
80th Ave
E Riley St
121
Felch St
N State St
E Roosevelt Ave
N Fairview Rd
Washington Ave
James St
W Washington Ave
W Main Ave
Zeeland
E Main Ave
S State St
S Maple St
92nd Ave
88th Ave
E Lakewood Blvd
106th Ave
Paw Paw Dr
Perry St
E 16th St
9964 ft
104th Ave
© 2011 Google
42°48'35.23" N 85°59'44.94" W elev 644 ft

Secondary Service Areas

The figures on the previous pages provides a closer look at the secondary operating footprints recommended for Holland BPW fiber network expansion. As in the Primary Service Area section, blue lines indicate existing aerial plant.

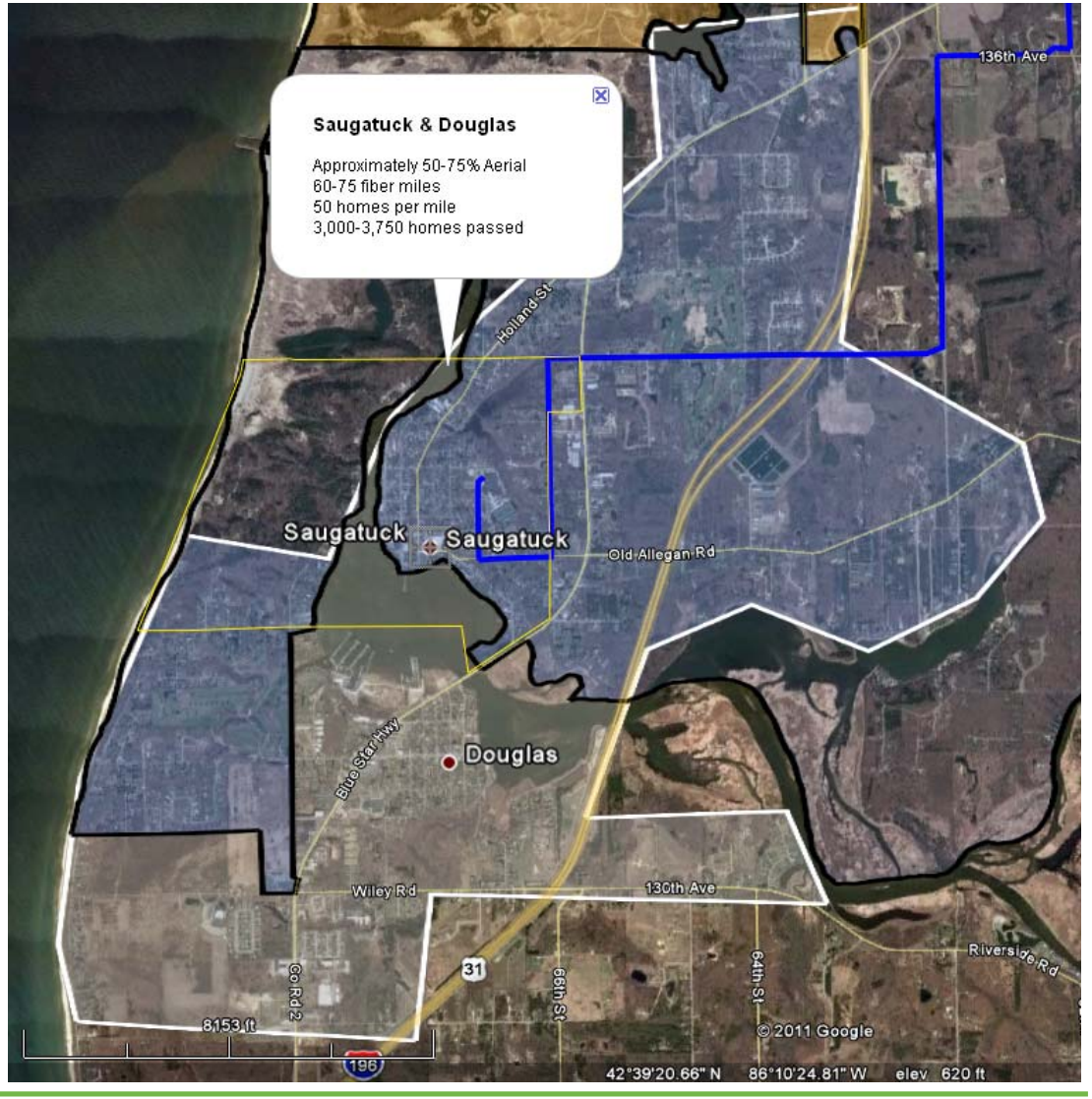
The map shows the density of the commercial and residential footprint within the two separate operating areas (Saugatuck & Douglas and Hamilton). Douglas City was not included in the initially planned Service Area 3 by Zip Code, but has been added due to close proximity, demographics, business characteristics, density of commercial entities and residences, and projected return-on-investment for BPW. The secondary service areas in total represent:

FOR FTTH:

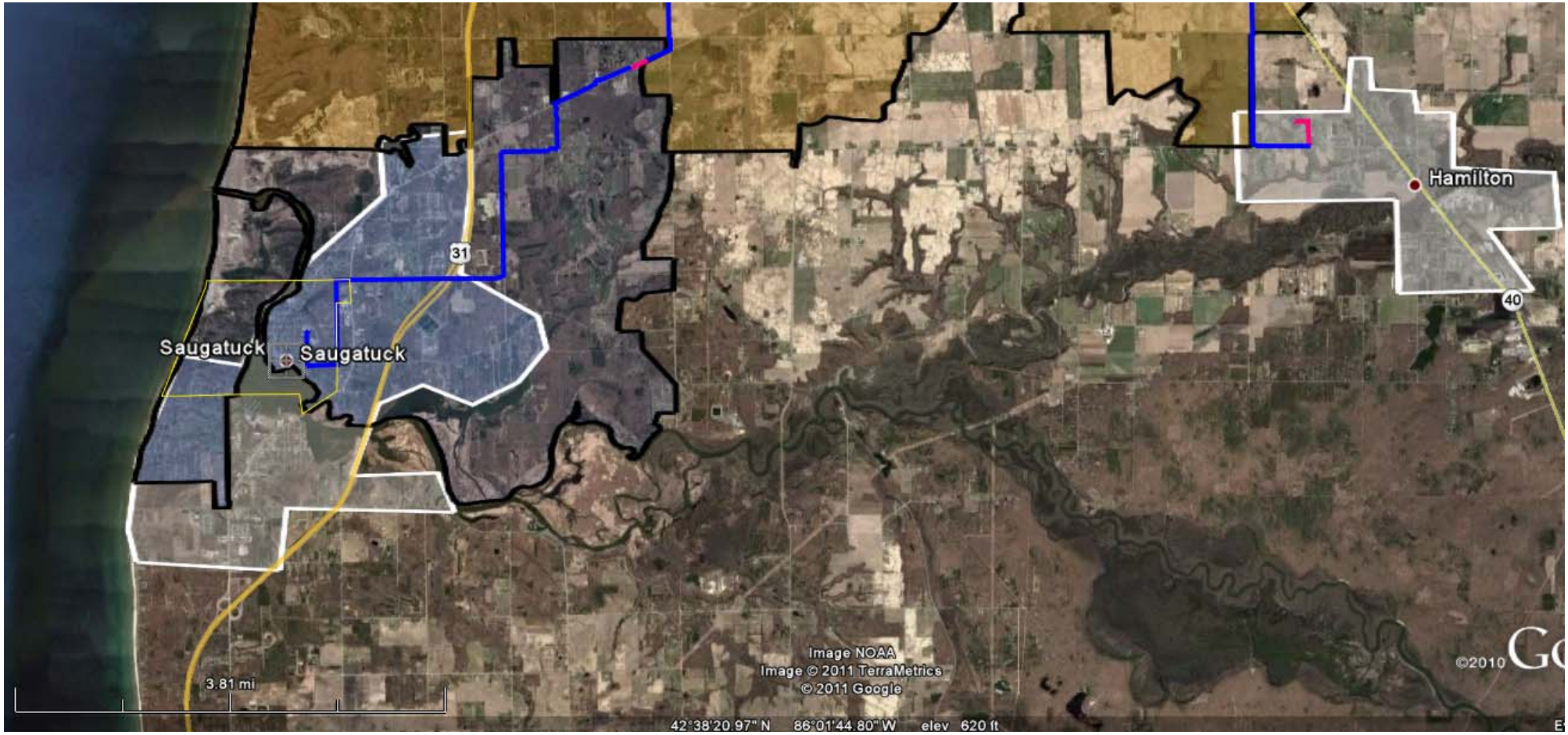
•Roughly 125 fiber miles total (existing and new)
- Approximately 44 homes per mile
- 4,500+ homes passed

Saugatuck and Hamilton currently are connected to main fiber BPW fiber backbones. Access to the Douglas City area would require the construction of a main fiber trunk across the bridge into downtown Douglas. Both secondary service areas make strong economic sense based upon demographics, growth and regional economic development considerations, and essentially provide outer-edge boundaries for future FTTP development to fill in the gaps between the northern and southern most borders of the potential entire region to be developed for FTTH in subsequent phases. The 'gap' areas are low-density regions that could be added in subsequent years during the normal course of steady-state operations under a structured program of capital investment with the ultimate goal of full FTTH penetration for every residence and business within the Holland BPW operating footprint over a 20-year period.

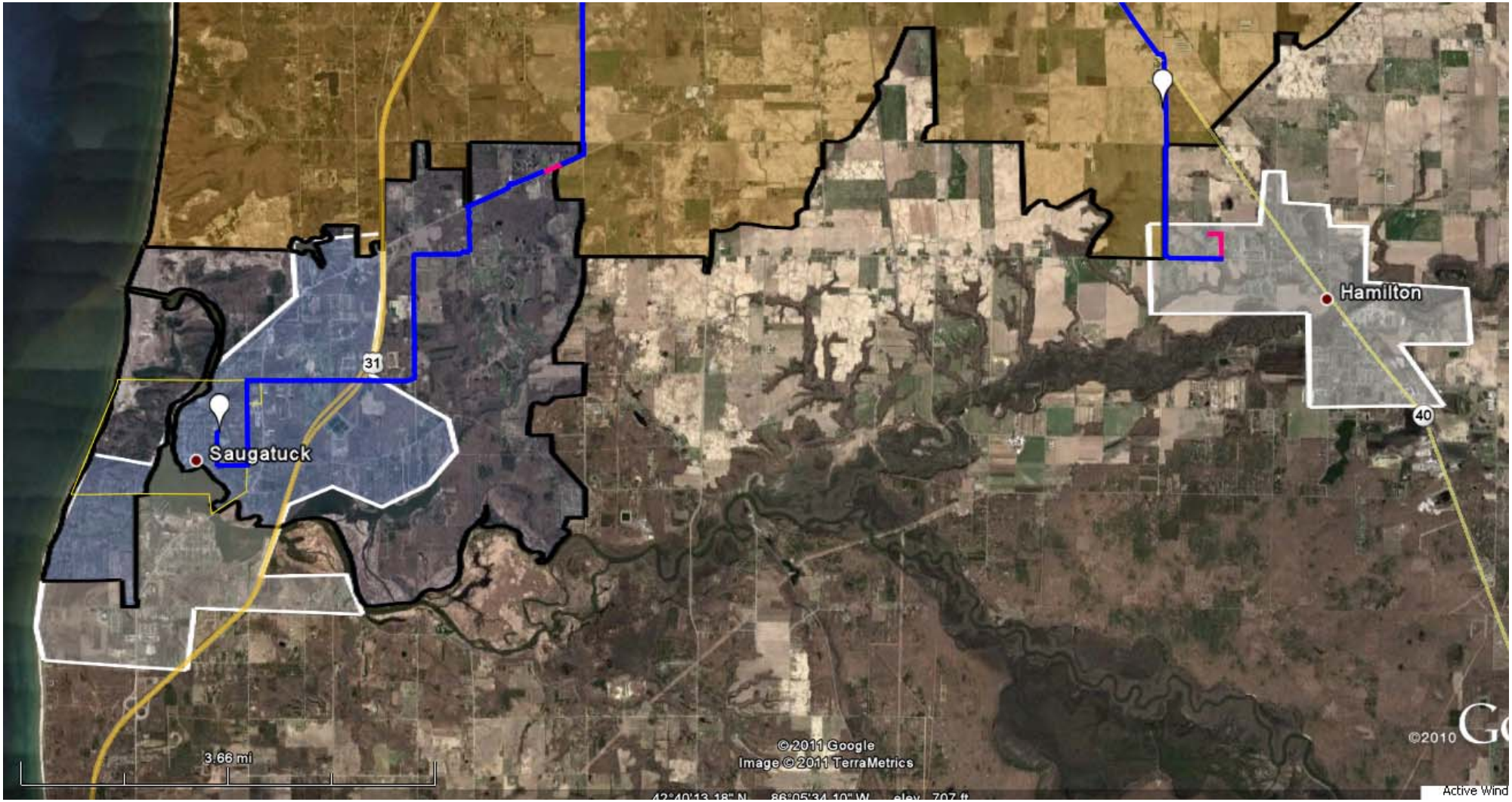
Closer street level views of each proposed secondary service area are depicted to the right and on the page that immediately follows.



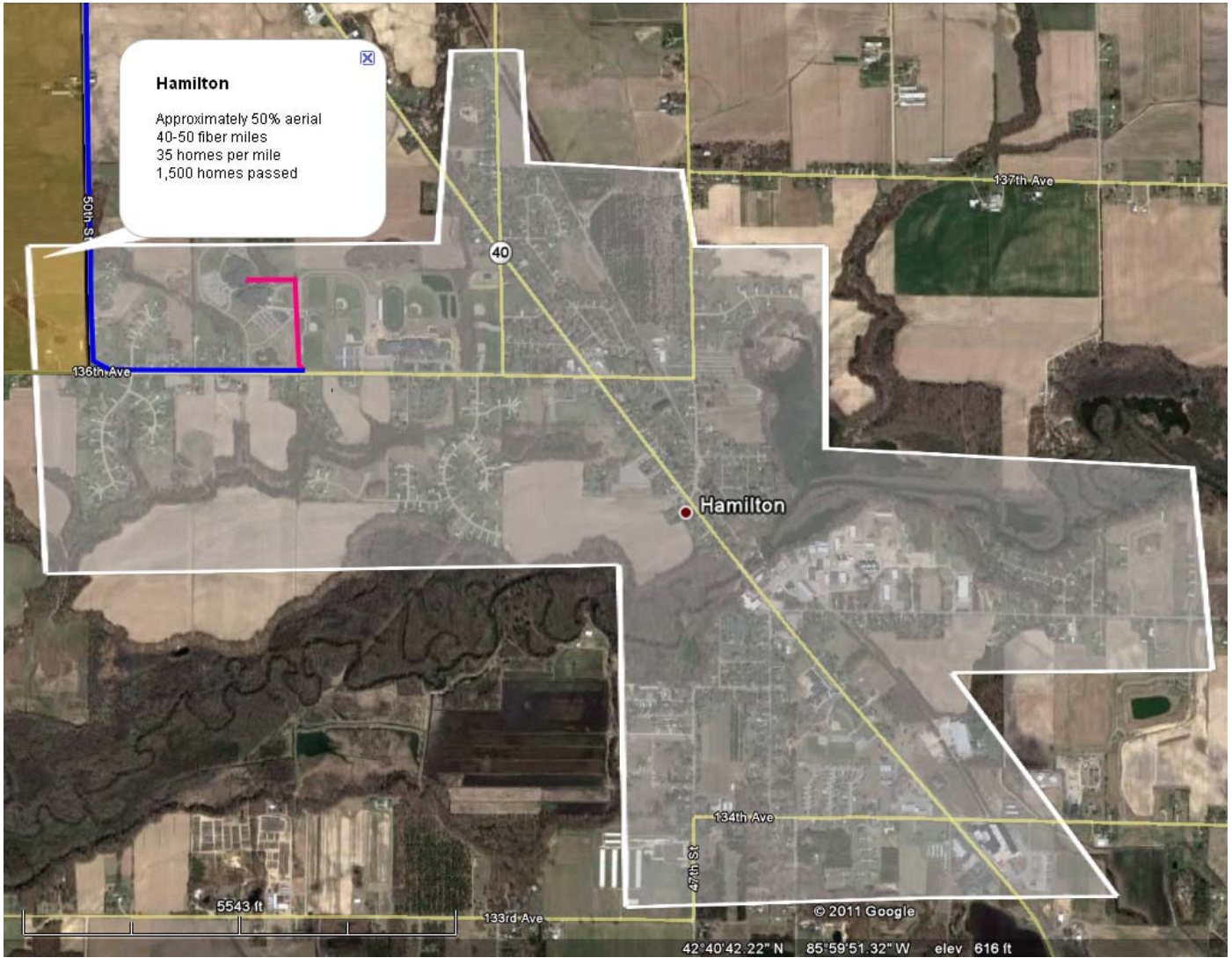
Secondary Service Areas Saugatuck & Hamilton



Existing Customer Sites: Secondary Areas



Hamilton


Hamilton
Approximately 50% aerial
40-50 fiber miles
35 homes per mile
1,500 homes passed
137th Ave
40
136th Ave
Hamilton
134th Ave
47th St
5543 ft
133rd Ave
© 2011 Google
42°40'42.22" N 85°59'51.32" W elev 616 ft


DVT
Electric

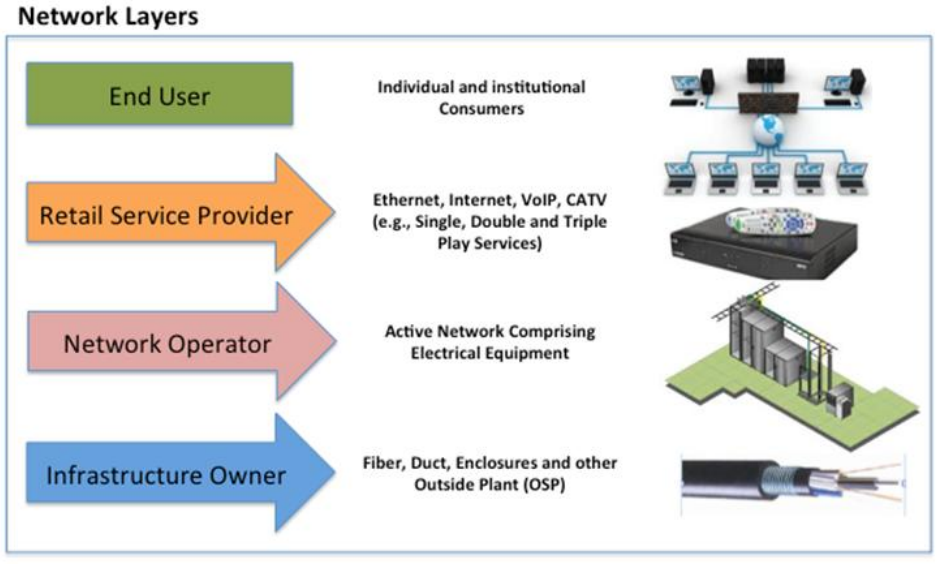
2011 Broadband Strategic Plan

Business Strategies & Operational Models

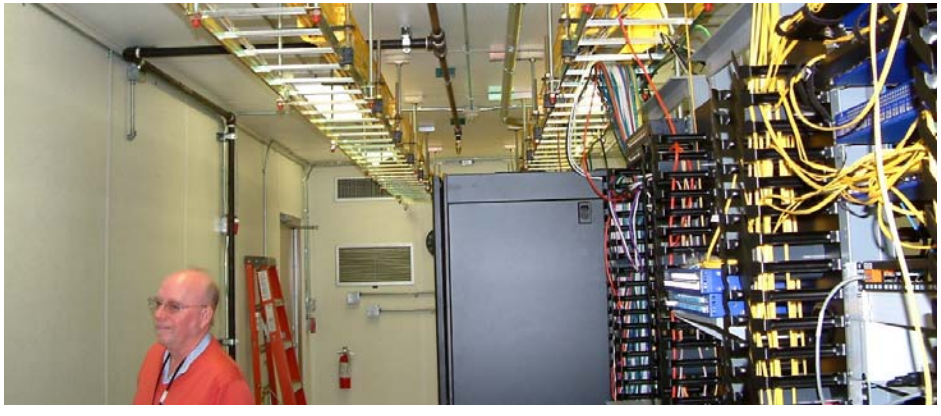
Fiber Network Overview: Network Layers

An FTTH network can be considered to have four layers: the passive infrastructure comprising the fiber, duct, enclosures and other outside plant; the active network comprising the electrical equipment; retail services, which provides connectivity to the services (e.g., Ethernet, internet, VoIP, IPTV, Sensors); and of course the end-users. Some people also visualize an additional layer, the content layer, lying above the retail services layer, which may also be exploited commercially.

This technological structure has implications for the way that a FTTH network is organized and operated.



These technological structures have implications for the way that a FTTH network is organized and operated. Clarity in the overall business model and service offering guides resource and equipment investment decisions, as well as marketing, sales and support activities. The three primary technology structures are:



Passive infrastructure - Infrastructure Owner
The passive infrastructure layer comprises all the physical elements needed to build the fiber network. This includes physical objects such as the optical fiber, the trenches, ducts and poles on which it is deployed, fiber enclosures, optical distribution frames, patch panels, splicing shelves and so on. The organization in charge of this layer will normally be responsible for network route planning, right-of-way negotiations, and the civil works to install the fiber. This is the layer where the network topology is implemented.

Active Network – Network Operator
The active network layer refers to the electronic network equipment needed to bring the passive infrastructure alive, as well as the operational support systems required to commercialize the fiber connectivity. The network operator in charge of this layer will design, build and operate the active equipment part of the network. This is the first layer where active services such as coarse wave or dense wave division multiplexing (C/DWDM), Gigabit Passive Optical Networking (GPON), and Ethernet (Active Ethernet) services are provided.

Retail Services – Retail Service Provider (RSP)
Once the passive and active layers are in place, retail services come into play. This is the layer where the Internet, voice, video or other network service connectivity are packaged as a service for consumers and businesses. Besides enabling those services technically, the company responsible for this layer is also in charge of customer acquisition, go-to-market strategies, and customer service. The retail service provider may also decide to offer premium services from the content layer, such as IPTV.

Fiber Network Overview: Network Layers

Types of FTTH/B Organizations

Each network layer has a corresponding function. The network owner is in charge of the first layer, although they typically outsource construction to a third party. The wholesale provider owns the active equipment, while the retail services are provided by the Internet service provider (ISP). These three functions may be found as departments within the same company, or they may be under the control of different organizations.

In the case of a vertically integrated model, a single player will own all three layers of the network. This is often the case for incumbent operators, like for example Incumbent Local Exchange Carrier (ILEC) such as Verizon or AT&T. On the other end of the spectrum, we see the fully separated ownership of the different layers, as is the case in some municipal and community providers such as Utopia in Utah where Utopia controls the passive infrastructure and providers such as Fibernet, Paetec, and others run and operate the active network. In the active layer these partners provide wholesale access, and various retail service providers package the broadband access with their services and sell directly to the end-users.

Common FTTH/B operating models include:

Vertically Integrated

As mentioned above, the vertically integrated model means that one operator controls all three layers of the network, and consequently, if a second operator wishes to also offer broadband and telephony services in the same area, he will have to build his own infrastructure, operate it, and market it directly to the end-users. This is a clear form of infrastructure competition.

Passive Sharing

While this model can be considered a form of infrastructure competition, it leverages a single passive infrastructure, which is built and maintained by one owner. The active and services layers are owned by a different organization. A second service provider may share the same passive infrastructure with the first service provider, but will still have to invest in active network equipment and operations, as well as the services and go-to-market activities. Typically, this model goes hand-in-hand with regulatory requirements for passive wholesaling. This model typically results in long term capital leasing (5, 10, 15 or 20 years) of fiber and facilities that are often referred to as an Indefeasible Right to Use (IRU).

Active Sharing

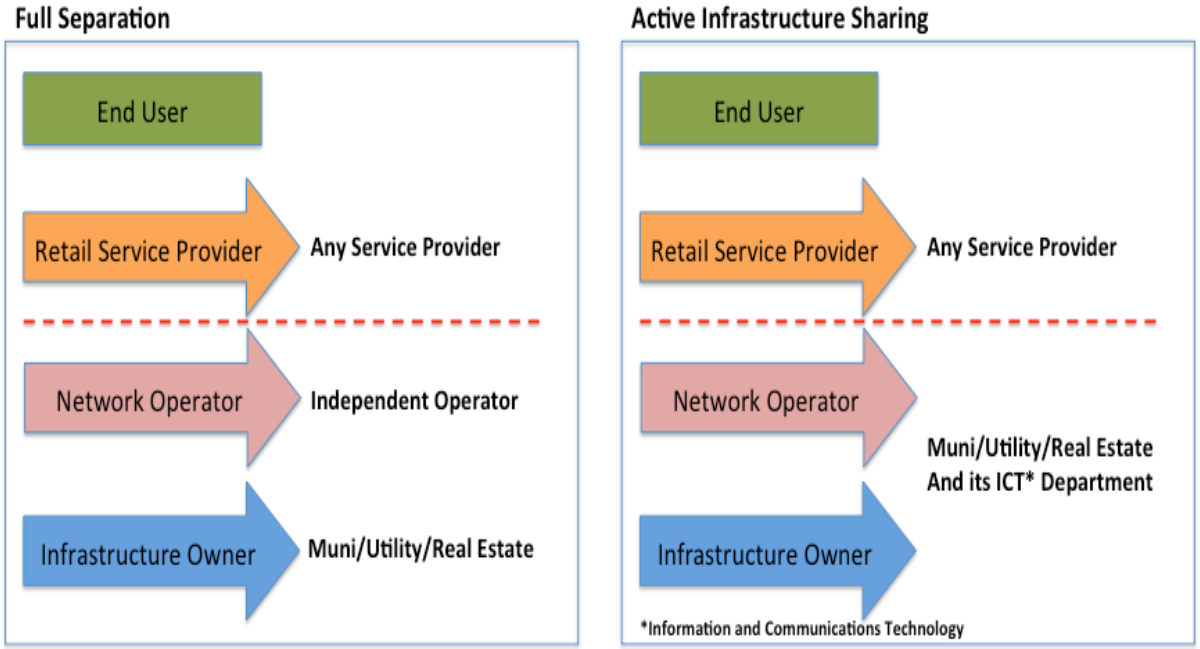
In the active sharing model a single organization owns the passive infrastructure and operates the active network. This vertical infrastructure owner wholesales broadband access to the various retail service providers who will then compete against each other for customers. The regulatory framework associated with this operator model regulates active wholesale specifically, and seeks to encourage service competition.

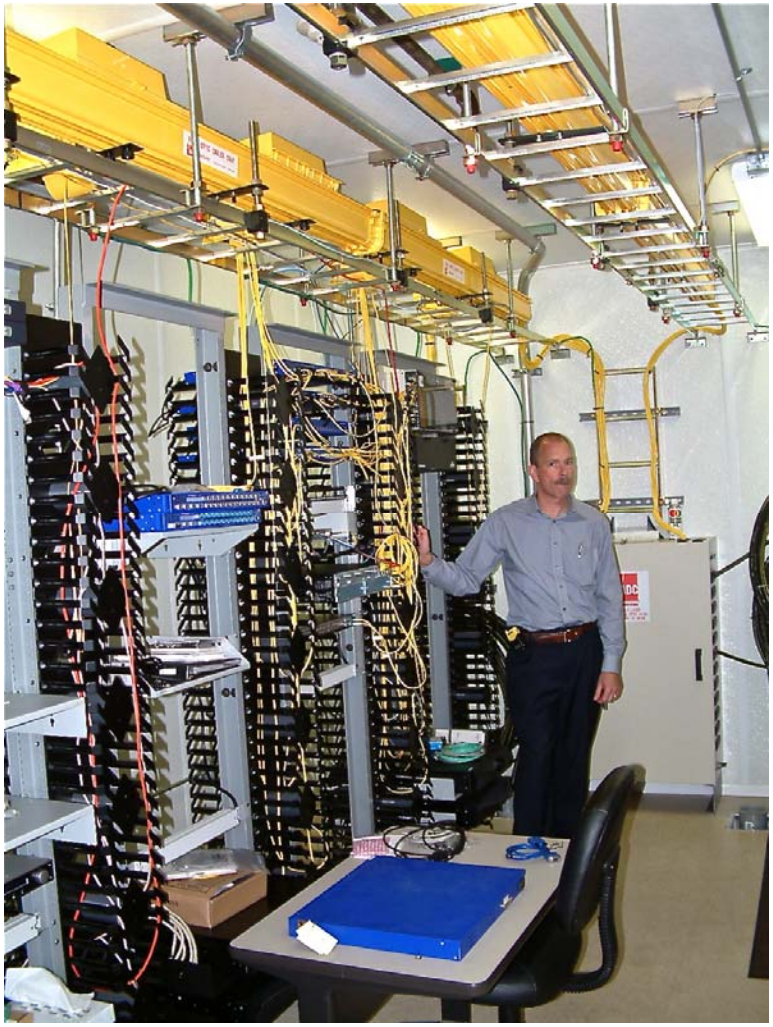
Full Separation

Full separation, as was already mentioned above, partitions the ownership of the different layers. Each layer is owned by a different player, with the infrastructure owner generating income by providing passive infrastructure access to the network operator, who in turn wholesales broadband access to retail service providers. This model stimulates competition at the services level and goes hand in hand with regulatory requirements for passive and active wholesaling.

Structural Separation

Choosing The Right Operating Model





Holland BPW, as the FTTH/B network owner, can limit its interest at any of the three (3) levels in the value chains illustrated above. Indeed, Holland BPW may have different interests in different geographic areas, depending upon local market conditions and the overlap with the existing electric, water or wastewater customer base and operations.

Deciding which operational model to choose is fundamental, as it will determine the business model of BPW's activities and its investment and financial model. This decision, however, is also dependent on the regulatory regime within the operating territory, the competitive environment, and the scope of the planned core business activities and competencies.

Each type of operational model has its own opportunities and challenges, which are summarized in the pages that follow.

SWOT Analysis: Full Separation Business Model

SWOT Analysis: Full Separation Business Model

Strengths

- ✓ Experts in fiber outside plant (OSP) construction & maintenance
- ✓ Own outright or are in possession of rights to poles for aerial deployments
- ✓ Control majority of backbone fiber in region and Fiber Leases
- ✓ Already providing limited first generation Ethernet services
- ✓ Core base of 135 customers provide strong base of recurring revenue from long-term fiber IRUs and Ethernet services
- ✓ Established provider partner relationships acting as channel sales arm
- ✓ Strong core operations team with well-established BPW tenure and IP
- ✓ Reputation as a positive force and progressive company within Holland

Opportunities

- ✓ Invest/build/leverage core fiber infrastructure for internal services (e.g., Cost Center) and create value added services to generate additional revenues in new markets for Fiber-to-the-Home/Business (FTTH/B)
- ✓ New and advanced infrastructure provides BPW with a preeminent position for development of new services with increased margins at nominal cost accelerating ROI
- ✓ Enables HBPW to advance AMI with moderate additional telecommunications costs accelerating ROI for both energy management and FTTH/B
- ✓ Increased customer value proposition with energy management solutions
- ✓ Find value added investment/operating partners that will offset the capital risk and accelerate ROI

Weaknesses

- X No sales force to develop sales channels and drive customer acquisition – dependent on channel sales
- X Existing Incumbents desire to build their own infrastructure creating limited channels to market for infrastructure services
- X Carriers/providers will initially leverage high cost routes but will not be strategic growth partners and have limited upside
- X Limited capital for continued deployments and last mile pricing too high of a hurdle for many potential suppliers/subscribers (e.g., looking for longer capital payback period)
- X Length of time to build requires "build-it and they will come" strategy
- X Network isolation – no interconnection with upstream/national providers, data centers and service provider exchanges
- X Lack of early stage investment partner will increase risk profile

Threats

- X Already providing active sharing through the delivery of Ethernet/VLANs creating competition at the structural level of the network that will threaten/eliminate some potential channel partners
- X Declining price trends regionally and nationally for fiber IRUs, leased transport and mid-range (e.g. 25 MB down, 5 MB up) speeds will erode current and future infrastructure investment margins
- X Limited product differentiation will drive bundled service opportunities to competitors reducing opportunities to increase take rates
- X Dependency on small alternative (and often under-capitalized) providers as channel sales partners and customer care: what happens if they close shop?

Full Separation Model

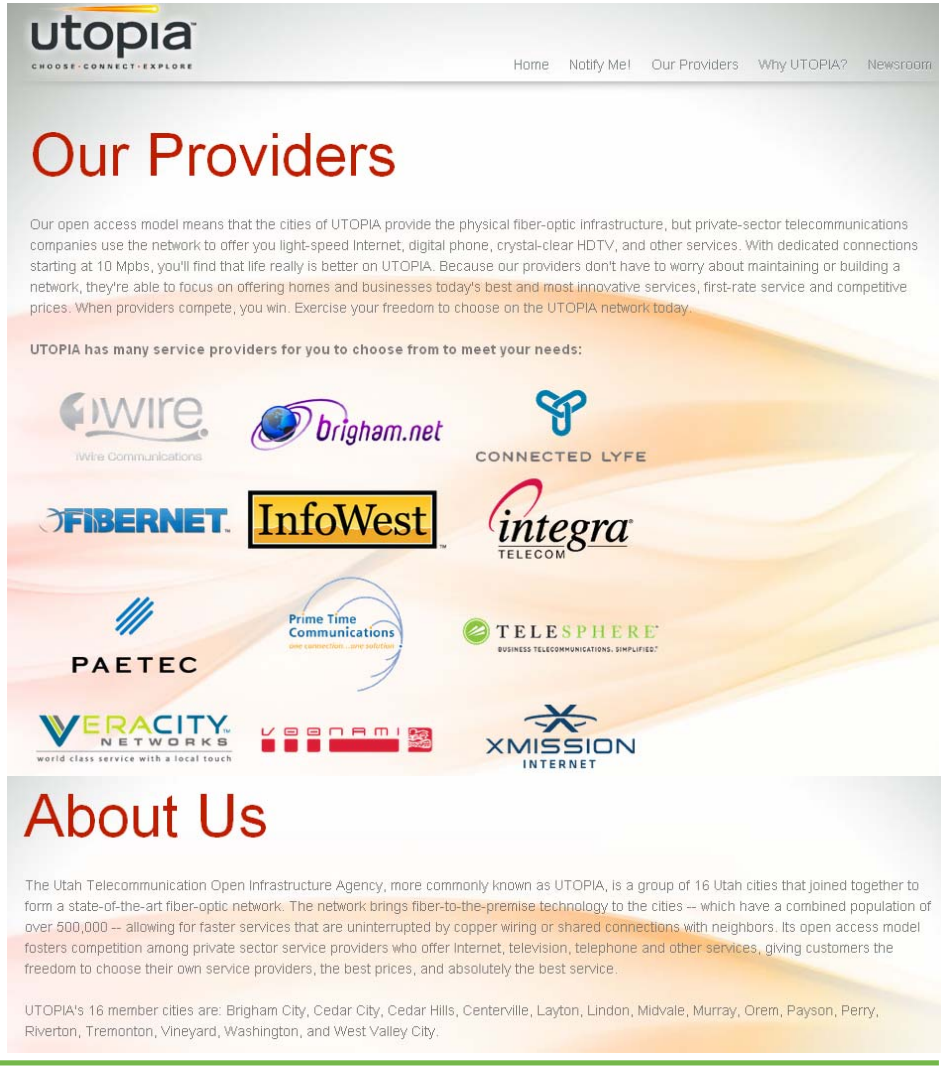
At first glance, it may appear that the full separation model is appealing to the Holland Board of Public Works. Under this model Holland BPW would build out a FTTB/FTTH network and provide wholesale access to 3rd party providers for the operation of the network and delivery of enhanced services (Internet, VoIP, Video). After all, isn't this how the BPW is currently operating its broadband line-of-business?

Fortunately, the answer is, "No, BPW is not operating its broadband business under the full separation model." In fact, BPW's network is actually several rungs up the value-chain already: an Active Sharing Model provisioning directly to businesses and providers. Although the Full Separation Model has enjoyed success in other parts of the world (e.g. Europe and Asia), due to political, regulatory, business and consumer issues, it is a difficult model to fund, build, operate and maintain here in the U.S.

The Utah Telecommunication Open Infrastructure Agency (UTOPIA) is perhaps the most famous example of the full separation model in action domestically. Utopia burst onto the scene with much fanfare in 2004 as a consortium of 16 Utah cities joined together to provide fiber optic infrastructure under an FTTH design to their citizens and residents. Nearly $185 million in bonds were raised for the project, along with additional state and federal monies for construction over the ensuing decade. By the end of fiscal 2010, the network had grown to over 1700 route miles with 56,000 homes and businesses connected.

By charter, UTOPIA could not provide retail services. Instead it intended to provide wholesale access to network operators and providers. As such, and similar to BPW's existing model, all commercial and residential subscriber sales were entirely dependent upon and driven by 3rd party channel sales partners, resulting in the same flat performance. To complicate issues further, the multi-municipality consortium board insisted on equal development across the 16-city footprint in tandem, leaving no room for concentration on markets with potentially high take rates to support early operations.

This "build it and they will come" approach, utterly lacking of a financially viable and sustainable business model, found itself in serious financial difficulties by 2007, a situation that continues to this day. By the end of Fiscal 2010, the Statement of Net Assets showed a negative balance of over $166 million, with nearly $260 million of debt and an operating income of only $3 million. The anticipated wholesale value of the network was grossly over-estimated, and the unfocused nature of their build-out resulted in fewer connected potential subscribers a decade later than expected. Despite all issues, however, take rates have still been in the 20% - 30% range for those connected. The underlying financials and product set are not sustainable, however, and we highly recommend that Holland BPW reject outright the full separation model. We see no situation in which this is a financially viable option for the BPW.



SWOT Analysis: Passive Sharing Business Model

SWOT Analysis: Passive Sharing Business Model

Strengths

- ✓ Experts in fiber outside plant (OSP) construction & maintenance
- ✓ Own outright or are in possession of rights to poles for aerial deployments
- ✓ Control majority of backbone fiber in region
- ✓ Already providing limited first generation Ethernet services and Fiber Leases
- ✓ Core base of 135 customers provide strong base of recurring revenue from long-term fiber IRUs and Ethernet services
- ✓ Well-established provider partner relationships acting as channel sales arm
- ✓ Strong core operations team with well-established BPW tenure and IP

Opportunities

- ✓ Invest/build/leverage core fiber infrastructure for internal services (e.g., Cost Center) and create value added services to generate additional revenues in new markets
- ✓ New and advanced infrastructure provides BPW with a preeminent position for development of new services with increased margins at nominal cost accelerating ROI
- ✓ Enables BPW to advance AMI without additional telecommunications costs accelerating ROI for both energy management and FTTH
- ✓ Increased customer value proposition with additional energy management solutions
- ✓ Find value added investment/operating partners that will offset the capital risk and accelerate ROI

Weaknesses

- X No broadband, double or triple play partner ready to invest in capital to leverage HBPW fiber infrastructure
- X Existing Incumbents desire to build their own infrastructure
- X Carriers/providers leverage high cost routes but are not strategic growth partners and have limited upside
- X No strong channel/resale partners - revenue and customer growth flat for 5-year period
- X Limited capital for continued deployments and last mile pricing too high of a hurdle for many potential subscribers (e.g., looking for longer capital payback period)
- X Lack of physical redundancy in deployed fiber plant
- X Network isolation – no interconnection with upstream/national providers, data centers and service provider exchanges
- X Limited customer value proposition – Physical transport only (no services)

Threats

- X Already providing active sharing through the delivery of Ethernet/VLANs creating competition at the structural level of the network that will threaten/eliminate some potential channel partners
- X Competition in core transport by encroaching fiber networks (e.g. MERIT)
- X Declining price trends regionally and nationally for fiber IRUs, leased transport and mid-range (e.g. 25 MB down, 5 MB up) speeds
- X Key core customers abandoning current multi-circuit VPN structure in favor of fiber IRUs which provide greater control at a reduced cost point but use up valuable fiber assets
- X Market views BPW as a limited partner without a strong commitment to investing and supporting fiber/broadband services
- X Dependency on small alternative (and often under-capitalized) providers as channel sales partners and customer care: what happens if they close shop?

Passive Sharing Model

This is the business model under which BPW began marketing and operating its fiber network, and as noted in the overview of current operations, still accounts for 57% of all recurring revenues annually, although 72% of that amount is under a single MCI contract. Revenue growth has remained flat (and where there is growth it has been at the expense of the services revenue stream) for the past four years. Our SWOT summary on the previous slide highlights the strengths and weaknesses of the model overall, something we will examine further in this section.

Overall, this is the model that BPW would most likely pursue if deciding to abandon the line-of-business altogether as a focused effort, and instead accept ad hoc, opportunistic revenue as the fiber network continued to expand over coming years for BPW's own internal use for the electric, water and wastewater activities.

Laying the Tracks: Strengths and Opportunities

In essence, the passive sharing model can be best understood as owning and building railroad tracks for other operators to use to transport freight. At it's core, it leverages BPW's strength as a 'builder and maintainer of long stringy things' without requiring further investment in the telecommunications infrastructure required to provide direct services to end-users. It's a model that the BPW is already familiar with and adept in from a contractual, operational and service delivery perspective, including the often complicated world of fiber indefeasible rights of use (IRUs), which can generate recurring revenues for 5, 10, 15 and (perhaps most commonly) 20-year periods.

The passive sharing model also leaves BPW with outright ownership and control of the majority of the fiber in the region, and has the potential, through a restructuring of service and operating policies, to continue to generate passive service revenues through well-established relationships with 3rd party providers acting as channel sales partners. BPW also enjoys the cheapest fiber deployment position in the marketplace, as they already own or are in possession of rights to poles for aerial deployments and conduits for underground cable pulls.

The key opportunities for BPW while remaining within the passive sharing model revolve around its ability to advance AMI and potentially locate value-added investment and operating partners without incurring additional telecommunications services costs. This could potentially offset capital risk and accelerate ROI for both network expansion and the deployment of commercial and residential advanced energy management devices and applications. It also allows for a flexible investment and build approach based on the needs and timelines of the electric utility: investment in core fiber infrastructure would primarily be driven by the need for additional internal services and enterprise management solutions to manage peak electrical load demand in the commercial and residential segments. The financial model for return on the investment in AMI is largely outside the scope of this report.

Revenues and return-on-investment under a return by BPW to the passive sharing model will be driven by two (2) factors: 1. The rate and location of fiber deployment in relation to 3rd party telecommunication provider needs, and 2. The ability to locate a provider willing to co-invest in the infrastructure in order to off-set construction costs and make a wider and deeper fiber footprint cost effective. There are different implications for backbone vs. FTTB vs. FTTH fiber plant extension in the greater Holland area.

SWOT Analysis: Passive Sharing Business Model

Weaknesses and Threats

The passive sharing model as a primary strategy for Holland BPW has significant weaknesses and threats which make it less attractive than the Active Sharing and Vertically Integrated Business Models, unless, once again, BPW is choosing to abandon the line-of-business altogether as a formal offering. And, as noted earlier, a return to this operating model would be a step backwards for BPW, as it is already providing services under the Active Sharing Model.

The primary weakness of the model for BPW resides in the small operating footprint of the fiber network itself, its isolation on a regional and national level, and the relatively small size of the marketplace in question. As such, there is no broadband, double or triple play provider partner ready to invest capital to leverage the fiber infrastructure for anything other than aggregating traffic from around town, revenue potential for which BPW has already largely captured on the passive sharing side. Any additional gains in this area would be acquired only through new fiber deployments, and would be ad hoc at best unless a committed and suitable partner is found that is willing to co-invest in order to defray costs and ensure a commitment to use the fiber asset to provide retail services for the benefit of Holland's citizens and businesses.

Wholesale networks, in general, where they have been successful under the passive sharing model, have a large geographic footprint that offers savings through interconnection with other networks, cost-effectively crossing interLATA boundaries, the ability to reach new markets, or the transportation of voice/data traffic over long distances. Unfortunately, the BPW network possesses none of these characteristics. And with the existing Tier 1 incumbents desiring to build their own infrastructure, wholesale arrangements that can be made will be largely limited to small independent ISPs and CLECs who typically lack the capital to be effective strategic growth partners.

This is further complicated by BPW's sales model, lack of physical redundancy, limited customer value proposition, and imminent increased competition by an encroaching network (MERIT) possessing all three for the key BPW customer verticals education and health care, currently accounting for 25% of all broadband revenue. As a physical transport provider only (no services), BPW is completely dependent upon its channel sales partners for customer value, an approach which, to date, has been ineffective. When combined with the declining price trends regionally and nationally for fiber IRUs and leased transport, the barriers to BPW's developing a successful line-of-business based on this model are formidable indeed.

Recommendations – Passive Sharing

We do NOT recommend that the passive sharing model be adopted by Holland BPW. The network as currently operated has already surpassed this stage of development and there is significantly greater opportunity for revenue growth, profitability and community benefit under the Active Sharing and Vertically Integrated Business Models. If, however, BPW should determine that it would prefer to pursue this model, we recommend the following:

Fiber Backbone Extension
✓Extend the fiber backbone to Grand Rapids to interconnect with regional and national networks.
✓Deepen fiber pathways within the greater Holland metropolitan area and Zeeland opportunistically to benefit BPW internal operations and provider partner commissioned routes (cost recovery model).

Fiber-to-the-Business (FTTB)
–If a channel sales partner will co-invest and make a significant market push, a broad FTTB build-out within Holland and Zeeland could drive revenues and improve ROI for commercial AMI solutions.
–Fix the amortization schedule for last mile-builds and work closely with provider partners to drive sales for last mile pathways for commercial customers. (we suggest full contract term or 5 years).

Fiber-to-the-Home (FTTH)
XUnless there is a significant business case for FTTH solely through AMI and managing peak load demand, the timelines for recouping investment are too long;
XThe lack of a well capitalized provider willing to co-invest in a FTTH build-out makes this an unlikely choice for BPW.

SWOT Analysis: Active Sharing Business Model

SWOT Analysis: Active Sharing Business Model

Strengths

- ✓ Experts in fiber outside plant (OSP) construction & maintenance
- ✓ Own outright or are in possession of rights to poles for aerial deployments
- ✓ Control majority of backbone fiber in region
- ✓ Already providing limited first generation Ethernet services and Fiber Leases
- ✓ Core base of 135 customers provide strong base of recurring revenue from long-term fiber IRUs and Ethernet services
- ✓ Well-established provider partner relationships acting as channel sales arm
- ✓ Strong core operations team with well-established BPW tenure and IP
- ✓ Capability to invest in infrastructure to attract value added service providers
- ✓ Capital expense creates barrier to entry for most providers
- ✓ Ability to create financial capitalization necessary to build FTTH infrastructure and services without accelerating payback (Long-term view)

Opportunities

- ✓ HBPW develops active wave, Active Ethernet and MPLS VLAN services
- ✓ Invest/build/leverage core fiber infrastructure for internal services (e.g., Cost Center) and create value added services to generate additional revenues in new markets with increased margins at nominal cost accelerating ROI
- ✓ Enables BPW to advance AMI without additional telecommunications costs accelerating ROI for both energy management and FTTH
- ✓ Ability to create product/service differentiation, increasing take rates and market penetration
- ✓ Value added service providers want better access to households for their own services
- ✓ Invest in network equipment enabling monitoring/management to improve network visibility

Weaknesses

- X No significant broadband, double or triple play partner ready to invest in capital to leverage HBPW fiber infrastructure
- X Existing Incumbents desire to build their own infrastructure
- X Carriers/providers leverage high cost routes but are not strategic growth partners and have limited upside
- X No strong channel/resale partners
- X Limited capital for continued deployments and last mile pricing too high of a hurdle for many potential suppliers/subscribers (e.g., looking for longer capital payback period)
- X Lack of physical redundancy in deployed fiber plant
- X Network isolation – no interconnection with upstream/national providers, data centers and service provider exchanges

Threats

- X Competition in core transport to anchor tenants by encroaching fiber networks (e.g. MERIT)
- X Declining price trends regionally and nationally for fiber IRUs, leased transport and mid-range (e.g. 25 MB down, 5 MB up) speeds
- X Value added service providers pull through additional services to lowest cost transport provider for Internet, VoIP, and CATV requiring HBPW to continue to develop and invest in value added service products and compete on price
- X Dependency on small alternative (and often under-capitalized) providers as channel sales partners and customer care: what happens if they close shop?
- X Incumbents compete on price and packaging including triple play services fragmenting the market opportunities and reducing the impact of HPBWs bandwidth advantage

SWOT Analysis: Active Sharing Business Model

Active Sharing Model

If the passive sharing model was best represented by the analogy of "laying train tracks," the active sharing model is Holland's IT Tulip Trolley. As noted above, BPW is already engaged in active sharing through their operation of an active Ethernet (AE) network and provisioning of direct VLANs for data transport to providers, businesses, government agencies and schools. In BPW's expression of the Active Sharing model it acts as the network operator, driving the Tulip Trolley (filled with wholesale data traffic being transported for providers and other customers), along proscribed routes (BPW's fiber pathways) to customer designated stops along the way (where retail services or upstream connectivity are obtained/dropped off). BPW uses a VLAN structure to securely manage bandwidth and route traffic on an active Ethernet platform.

Strengths and Opportunities

The active sharing model has the ability to become a strong line-of-business for Holland BPW if developed further and managed aggressively. Leveraging BPW's sound foundation in OSP construction and maintenance, control of the majority of backbone fiber in the region and ability to quickly construct new fiber legs and last mile connections, it provides the opportunity to extend the current limited first generation Ethernet service capabilities to drive revenues through providing connectivity to customers with reliability, speeds and price point unavailable elsewhere in the market. BPW also has the significant advantage of being able to take a long-term view towards return-on-investment, providing them with the ability to capitalize on these advantages to garner significant market share without the traditional limitations of a short-term working capital view. This provides a tremendous strength and opportunity when compared to the capital expense issues that create a barrier to entry and market investment in smaller communities such as Holland by most providers.

If BPW leverages the core revenue base from the 62 current customers, it provides the ability to maintain a break-even or even cash positive income statement from an operational point of view during the initial phases of infrastructure expansion. By placing an emphasis on direct sales, marketing, and a tighter partnership with existing and future providers, there is the very real opportunity to drive significant sales as the sole provider of an active infrastructure capable of providing next generation connectivity speeds and services. A focus on the wholesale active sharing model will also enable BPW to advance AMI and energy management solutions with only a slight increase in overall line-of-business costs. This can be done for either the commercial (FTTB) or residential (FTTH) sector.

BPW also has the opportunity to significantly increase the value proposition it has to its direct customers and provider sales channel partners by developing active wave and MPLS VLAN services. The provisioning of these services will not only improve QoS and integration ability, but also reduce the labor and management involved by BPW network operations staff for the addition and maintenance of existing nodes and customer connections. Value-added additions such as this will not only inspire channel sales partners to drive more revenue, but also have nominal cost associated while increasing operating margins.

Finally, take rates and market penetration can be exponentially increased if BPW invests in last mile connectivity at the FTTB and/or FTTH level. All channel sales partners cited the handling of the costs of last mile connectivity as the primary barrier to new sales, and as was demonstrated in the margin examination, it is the smallest component of revenue. By either amortizing fees over a longer period of time, or investing outright in the last mile fiber for FTTB/FTTH, BPW can create a true product/service differentiation that provider partners will be able to take to market and close new accounts. Providers, and even customer groups such as health care and education, have expressed interest in the ability for high bandwidth connectivity to both the commercial and residential sectors, and if carefully planned and carried out in concert with partners, is a potent opportunity.

SWOT Analysis: Active Sharing Business Model

Weaknesses and Threats

The active share business model does have weaknesses and threats, however. The ability to truly succeed under this business model relies on strong sales channel and delivery provider partners to effectively market and manage enhanced services and customer relationships. No significant broadband, double or triple play partner appears ready to invest capital or in capacity upgrades to leverage any meaningful HBPW fiber infrastructure investment. This is partially due to the fact that the existing Tier 1 incumbents and cable providers prefer to build and control their own infrastructure, and the smaller ISPs and CLECs simply lack resources.

Without strong channel sales partners, it will be very difficult for BPW to control its own destiny without providing enhanced services themselves. At a minimum, the core network itself lacks physical redundancy and any interconnections with regional/national upstream providers or peered networks. This weakness in the network architecture and its isolation, even to datacenters for lower cost storage and disaster recovery solutions is a significant weakness for a provider solely engaged in wholesale active sharing.

Customers are increasingly looking for bundled services and single providers, and the active sharing business model makes that difficult to deliver while maintaining an open, vendor-neutral network without a primary delivery partner. Declining price trends regionally and nationally will continue to place downward pressure on IRU sales and the cost of transport VLANs, and the small, geographically limited footprint and market size of the BPW operating footprint make it a niche sale without broad market appeal among carriers. The model itself also creates extra layers of "middle men." when compared with the vertically integrated business model, thereby making it more difficult to compete over time, especially as other fiber options (i.e. MERIT) move into the market place. As the major incumbents compete on price and packaging, including triple play services, they fragment the market opportunities and reduce the impact of HPBW's bandwidth advantage.

Other Considerations

The active sharing model leaves the majority of potential revenues, profits and market impact on the table when compared to the vertically integrated business model. By eschewing the direct provisioning of enhanced services (Internet, VoIP, Video), BPW takes a 'leap of faith' that partners will create the community value on its behalf and drive sales solutions that will leverage the BPW infrastructure. This is an uncomfortable situation – one that can be managed – but one that the Holland BPW executive team is aware of and has pro-active plans to address.

Transparency in pricing (and its publication as required currently by municipal regulations), is actually a negative in the active share model and a positive market differentiator under the vertically integrated business model. This is due to competitive pricing practices, the misconceptions it creates amongst potential end-users, and perhaps most importantly, what it reveals about the pricing practices and mark-ups of the very channel sales partners upon which BPW is dependent.

If BPW took the next step and became a vertically integrated service provider, transparency in pricing actually works to its favor: a refreshing "what you see is what you get" after years of perceived abuse by the marketing ploys and hidden fees of cable, mobile and traditional telephone providers.

Take rates are also a concern under the active sharing model, and requiring active management of partner service offerings, pricing and QoS practices. The only true values of the investment are around superior speed and reliability, and if transport only fiber is being marketed at speeds comparable with that which can be readily purchased via other legacy technologies, then the entire value proposition is squandered. Meaningful fiber speeds need to be agreed upon and appropriately priced to succeed in garnering any measure of business or residential market share.

SWOT Analysis: Active Sharing Business Model

One of BPW's current customers said, "Get in… or get out. Internet, VoIP, vendor neutral network – these would be transformative in our market." We couldn't sum it up any better.

We firmly recommend that BPW alter its business model to become a vertically integrated provider rather than an active sharing network operator. What we mean by this is that the organization needs to begin providing enhanced services – Internet, VoIP, Video and AMI – and take direct control over the community benefits and financial returns of any concerted investment in fiber infrastructure. BPW is leaving far too much money on the table and providing far less community socio-economic impact than it could, given its assets.

That being said, at a minimum, BPW should remain a network operator under the active sharing model and 'step up its game.' The broadband "division" is not currently being run as a true business, and it needs to be: the capital costs are too high when investing in fiber to leave returns to ad hoc opportunities unearthed by semi-committed channel sales partners. Even the architecture of the physical and logical network themselves aren't geared towards success as a business (lack of physical redundancy, network monitoring tools, Session Internet Protocol (SIP) trunking management capabilities and upstream partner/data center interconnects). This needs to be addressed quickly if the current four (4) year trend of flat revenues is going to be broken in favor of a steep rise. Formalization of the business unit to include its own P&L will also drive improved fiber pathways and business practices, as formal performance and growth expectations impact investment and operating practices. If BPW determines that it will not pursue a vertically integrated business model, but instead will continue as an active sharing network operator, then we recommend the following:

Fiber Backbone Extension

✓Extend the fiber backbone to Grand Rapids to interconnect with regional and national networks.

✓Significantly deepen fiber pathways in the BPW operating footprint proactively to benefit provider partners and drive sales by decreasing last mile connectivity costs, increasing physical redundancy, and working in concert with channel sales partners to close customers along construction corridors in tandem with builds.

Fiber-to-the-Business (FTTB)

- ✓ A pro-active, fully-subsidized FTTB build-out in close concert and coordination with the marketing efforts of channel sales partners could be transformative from a customer capture, top-line revenue and economic development impact perspective.
- ✓ At a minimum, current last mile connectivity cost amortizations and charge backs need to be fixed in a fashion which encourages channel sales partners to select BPW as preferred provider and actively market BPW's active sharing transport services (we suggest full contract term or 5 years).
- ✓ BPW must begin running the network "division" as a true business unit if FTTB is to pay dividends.
- ✓ Invest in sales and marketing personnel and 'turn-the-tables' on channel sales partners. Have them compete for your leads – best business proposition wins, and BPW gains a degree of control over the destiny of the broadband division.
- ✓ Establish formal speed packages that showcase the value of fiber, and either market directly or force sales channel partners to use them for incoming customers.
- ✓ Consider directly contracting for Internet and VoIP services *as a wholesaler and market aggregator, providing additional value to sales channel partners and lower cost, higher bandwidth possibilities for subscribers.*

Fiber-to-the-Home (FTTH)

- ± Active sharing is potentially a very good way to increase return-on-investment and mitigate risk for a FTTH AMI deployment. Requires committed and capable partners, however, to compete with the incumbent cable providers (not currently evident).
- ± Strong opportunity for co-investment through a public-private partnership with IPTV and/or triple play providers. This will take effort and extended timelines to close with a viable partner.
- ± BPW has a longer-term view of investment pay-back timelines than traditional carriers. This can be exploited , but the payback cycle will be extended unless BPW offers enhanced services as a vertically integrated provider of Internet, VoIP, Video and AMI.

SWOT Analysis: Vertically Integrated Business Model

SWOT Analysis: Vertically Integrated Business Model

Strengths

- ✓ Experts in fiber outside plant (OSP) construction & maintenance
- ✓ Own outright or are in possession of rights to poles for aerial deployments
- ✓ Recognized as a reliable community partner/service organization
- ✓ First line of access to customer service changes (e.g., water, electric)
- ✓ Strong core operations team with well-established BPW tenure and IP
- ✓ Network already used for both internal and external customer services
- ✓ Capital expense creates barrier to entry for most providers and limits potential future competition
- ✓ Combination of network and bundled services reduces the competitive threats to BPWs existing network services and mitigates impact of vertical product price erosion
- ✓ Ability to create financial capitalization necessary to build FTTH infrastructure and services without accelerating payback (Long-term view)

Opportunities

- ✓ Invest/build/leverage core fiber infrastructure for internal services (e.g., Cost Center) and create value added services to generate additional revenues in new markets
- ✓ New and advanced infrastructure provides BPW with a preeminent position for development of new services with increased margins at nominal cost accelerating ROI
- ✓ Enables BPW to advance AMI without additional telecommunications costs accelerating ROI for both energy management and FTTH
- ✓ Ability to create product/service differentiation, increasing take rates and market penetration
- ✓ Increased customer value proposition with additional services
- ✓ Build internal capacity to support internal and new product communications technology enabled services
- ✓ Anchor tenants want better access to households for their own services

Weaknesses

- X Lack of sales experience in broadband services market – current dependency on channel sales
- X No experience in supporting complexity of diverse product offerings or providing enhanced network services, retail broadband and value added Internet, VoIP, CATV
- X Not currently considered a real/separate line of business with associated expectations and managed approaches to CAPX and OPX investment decisions
- X Not currently providing an open service exchange with upstream capacity
- X No experience in negotiating interconnect and content/distribution agreements

Threats

- X Established Single/Double/Triple Play Providers
- X Value added service providers pull through additional services such as Internet, VoIP, and CATV requiring BPW to continue to develop and invest in value added service products
- X Declining price trends regionally and nationally for fiber IRUs, leased transport and mid-range (e.g. 25 MB down, 5 MB up) speeds
- X Competition in core transport and broadband vertical to anchor tenants by encroaching fiber networks (e.g. MERIT)
- X Dependency on small alternative (and often under-capitalized) providers as channel sales partners and customer care: what happens if they close shop?

SWOT Analysis: Vertically Integrated Business Model

Duet, Trio, Quartet even Quintet – the possibilities of the vertically integrated model should be music to Holland BPW's ears. In the model the broadband division would take control of its destiny and exploit the opportunity to maximize community socio-economic benefits, revenues and profitability from the broadband line-of business. While still operating under an open and vendor neutral model, BPW would introduce any combination of Internet, VoIP, Video (including TV), AMI and other services (e.g. advanced data storage/data recovery solutions) directly to the marketplace as retail services.

To be clear, this does not preclude the continued provision of wholesale services as currently delivered under BPW's active share model. BPW will still maintain revenue streams from fiber IRUs, wave service IRUs and last mile nodes on behalf of other providers within the Holland market place. BPW will, however, enter the market as a direct competitor (with transparent and published pricing) that will transform the service, pricing and competitive landscape within the greater Holland metropolitan area.

There are several vertical markets that BPW could focus on in its adoption of the vertically integrated model. Traditionally, these would include:

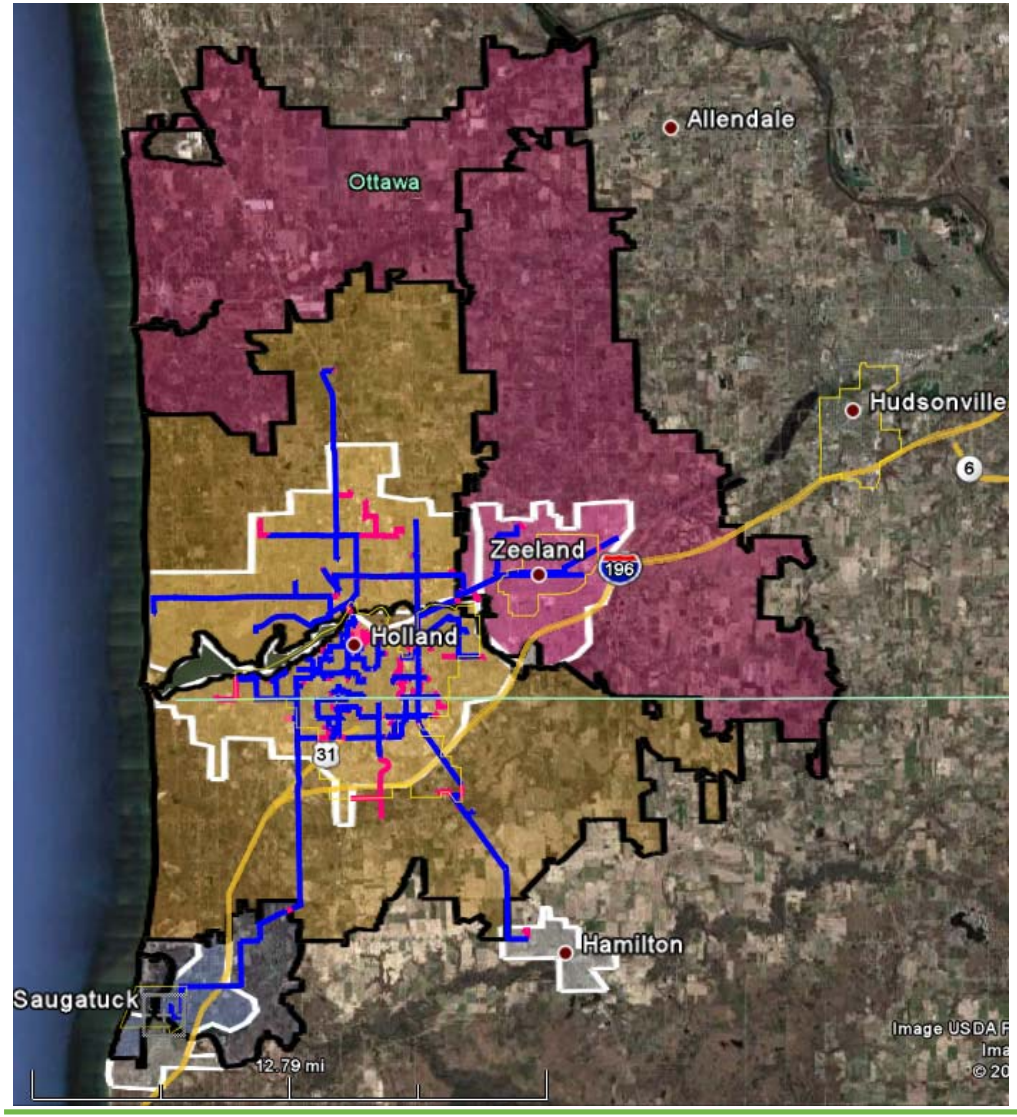
1.Community Anchor Institutions (this would include government, education, health care and NGOs);

2.Commercial (FTTB including Community Anchor Institutions and business establishments);

3.Residential (FTTH providing enhanced services to citizens in their homes.).

Each municipal /utility broadband network operates under unique market conditions that influence the targeted vertical. Given the utter lack of fiber in the greater Holland footprint, and the imminent incursion of MERIT into BPW's operating footprint, we highly recommend an "all-of-the above" approach for reasons examined in the pages that follow.

SWOT Analysis: Vertically Integrated Business Model



Strengths and Opportunities

The vertically integrated business model offers Holland BPW with the greatest flexibility and opportunities for scalability, profitability and community impact if its development is managed in a structured and aggressive fashion. Given the lack of fiber in the greater Holland region, and existing consumer tendencies and comparative network take rates, BPW has the opportunity to grow its broadband line-of-business to a level that represents equivalent profits from the Electric Utility, two (2) times the revenue of the Water and Waste Water Utilities combined within a 5-year time period. The significance of this opportunity given the current market conditions, strengths of the BPW existing operating model and the power of HBPW's long-term view of infrastructure investment cannot be understated. There is a very real opportunity to capture 50% or more of the entire market detailed in our recommended fiber footprint (white area on figure to the left) in both FTTB and FTTH categories based on comparative service offerings/capabilities and the operating history of municipal/utility networks across the country offering double and triple play services.

If that statement gives BPW pause, and it should, the overall demographics and market size of the greater Holland region need to be taken into account. Holland, Zeeland, Saugatuck and Hamilton combined represent a very, very small market for Tier 1 providers and major cable companies. The region is not even on the radar for an infrastructure upgrade to fiber by any major incumbent, and won't be for the immediate or even distant future. As long as the legacy copper and coaxial infrastructure provides a competitive service offering in terms of speed, reliability and quality of service (QoS), there is no business case to be made for investment in FTTB or FTTH infrastructure by any major incumbent. This opens the door to providers like the Holland BPW, and it is a story that is borne out by over 100 non-Regional Bell Operating Companies (RBOC) across the country.

As not only the primary holder of fiber optic network infrastructure in the region, but also the party with the least amount of associated build and on-going operational costs, the Holland BPW has a clear take rate advantage should it choose to chart a bold course and construct its enhanced service offerings in a structured, well designed and competitive fashion. And by competitive we mean – offer connectivity speeds and quality of service packages that literally cannot be met for technical reasons by any current providers in the region at the same price point they offer inferior products. The strengths of Holland BPW's current assets, capitalization methods, capacity, existing Electric Utility customer relationships, and potential enhanced services bundling make this opportunity timely, of community benefit and financially rewarding. Done properly, there is no viable competition.

SWOT Analysis: Vertically Integrated Business Model

Strengths and Opportunities (continued)

The operational strengths around OSP, fiber holdings, pole/conduit control, and familiarity with active sharing all hold true as significant positives in the vertically integrated model. There are other major strengths in the existing operation that bode well for a vertically integrated service offering for Holland BPW. These include:

✓First line of access to customers (already captured market) and customer service changes through electric, water and wastewater utilities;

✓Capital expense barrier for most incumbent providers mitigated by reduced construction and operational costs and the fact that the greater Holland area is the primary and only market concern for HBPW;

✓Incremental cost of adding new services to existing active Ethernet platform is negligible when compared to even worst case scenario take rates (UTOPIA's 20% - 30% for wholesale Layer 1 services only;

✓Ability to create financial capitalization necessary to build FTTB/FTTH infrastructures without accelerating payback (long-term view);

✓ Recognized position as both a reliable community partner/service organization, and a local community provider/service organization whose primary concern is for the welfare of the citizens and businesses of Holland;

This provides BPW with the opportunity to invest, build and leverage core fiber infrastructure to create value-added services which not only generate additional revenues in new markets, but which cannot be met by any other competing provider if the service offerings are planned, crafted, marketed and executed correctly. Though the bundling of double play (Internet, VoIP), triple play (Internet, VoIP & Video (television), and quadruple play (Internet, VoIP, Video and AMI) services, under transparent and clearly published pricing schemes, the value proposition for commercial and residential customers will be undeniable. Through the introduction of base tiers at a higher bandwidth (but same price point) as incumbent providers, BPW's superior infrastructure capabilities find their rightful expression in services rendered to the greater Holland constituency. And ROI is further accelerated through the introduction of AMI to the triple play, allowing a reduction in peak demand load costs through programs that will simultaneously provide savings for commercial and residential consumers themselves while increasing profitability for the Electric Utility.

Weaknesses and Threats

Moving to a vertically integrated model is not without its challenges. To begin with, as noted in the Active Sharing section above, the BPW broadband "division" is not truly operated as a functional and disciplined business unit, with separate P&L and requisite authorities and responsibilities. Although it is highly desirable that this change under the active sharing model, it is absolutely imperative that this be rectified should the vertically integrated model be adopted. Not only are the stakes too high for the current line-of-business management and decision-making paradigm to continue, but basic QoS demands require absolute standardization of all processes and procedures regarding OSP, ISP, help desk, service offering standardization, pricing and operating standards, procedures and policies. The scaling of a customer base from 62 into the tens of thousands absolutely mandates that this take place. Continuity and quality of service can no longer be dependent upon 'the grey matter wielded by key personnel,' but must be assured regardless of personnel retention.

The lack of sales experience in the broadband services market due to current dependency on channel sale partners will have to end. To succeed in the FTTB/FTTH marketplace as a provider of enhanced services, anything but direct sales is not an option. The existing operations team also lacks experience in supporting the complexity and demands of a diverse product offering or providing wholesale or retail enhanced services. Since they are also not currently providing an open service exchange with upstream capacity, nor have they any experience negotiating interconnect and/or content/distribution agreements, additional subject-matter-expertise will most likely have to be added to staff in order for the endeavor to reach its full potential.

It should also be noted and emphasized that should Holland BPW take on the opportunity and responsibilities of being an enhanced services provider for the commercial and/or residential sectors, it will be competing head-to-head not only with established single/double/triple play providers, but also with its current channel sales partners. By maintaining its current vendor-neutral operating stance, and allowing active sharing of fiber, wave and last mile connectivity resources, this threat (both political and take-rate related) can be greatly mitigated, particularly if BPW establishes and operates under processes and procedures that are simultaneously transparent and fair to all providers. After all, although top line revenue and overall profit will be reduced by wholesale sales that benefit other providers, 'a dollar earned is a dollar earned,' and wholesale transport revenues enjoy high margins (80% on average over life-of-contract).

SWOT Analysis: Vertically Integrated Business Model

Recommendations: Vertically Integrated Model

Fiber Backbone Extension

- ✓ Extend the fiber backbone to Grand Rapids to interconnect with regional and national networks and major data centers.
- ✓ Significantly deepen fiber pathways in the BPW operating footprint proactively to drive sales by decreasing last mile connectivity costs, increasing physical redundancy, and marketing new value-added capabilities to constituents along the pathways of every new build.
- ✓ Pass a council resolution requiring FTTP/FTTH of every new development and/or commercial rehabilitation project.

Fiber-to-the-Business (FTTB)

- ✓ A pro-active, fully- or partially-subsidized FTTB build-out for customer capture, top-line revenue and economic development. Offer Internet, VoIP, AMI and advanced data storage/disaster recovery at a minimum.
- ✓ If taking FTTB to the curb, fix amortization schedule for last mile connectivity (we suggest full contract term or 5 years).
- ✓ Design connectivity/enhanced service offerings around synchronous Internet connectivity speeds that have a minimum speed of 10 Mbps. Scale in measured increments (e.g. 10 MB, 25 MB, 50 MB , 100 MB 250 MB, 500 MB, 1 GB).
- ✓ Invest in sales and marketing personnel to aggressively chase market share.
- ✓ Continue to offer wholesale services as well as an open, vendor-neutral stance that provides business customers with choice when transporting traffic over the BPW fiber network.

Fiber-to-the-Home (FTTH)

- ± A pro-active, fully subsidized FTTH build-out in the recommended service areas for customer capture, and socio-economic development. Offer Internet, VoIP, Video (full channel line-up including premiums and video on demand) and AMI.
- ± Leverage a channel aggregation service or established IPTV provider for provisioning of video line-ups.
- ± Leverage existing Electric Utility customer base and contact information in direct sales efforts.
- ± Don't be afraid to go head-to-head with cable providers: they can't match service offering or price point if architected properly from design phase.

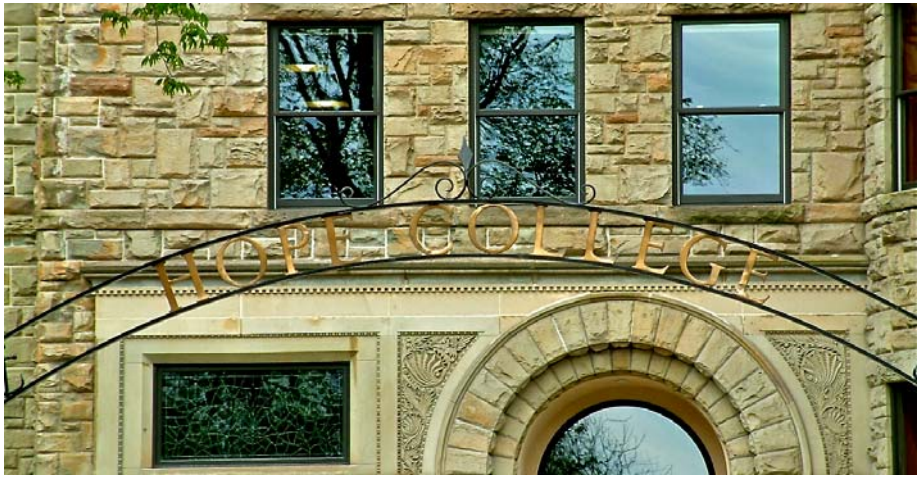
Summary of Findings

Complete Separation Model

This "build it and they will come" approach, lacks underlying financials and product sets that are sustainable. We highly recommend that Holland BPW reject outright the full separation model. We see no situation in which this is financially viable in the current political, regulatory and market dynamic.

Passive Sharing Model

Overall, this is the model that BPW would pursue if deciding to abandon the line-of-business altogether as a focused effort, and instead accept ad hoc, opportunistic revenue as the fiber network continued to expand over coming years for BPW's own internal use for the electric, water and wastewater activities.



Active Sharing Model

We firmly recommend that BPW alter its business model to become a vertically integrated provider rather than an active sharing network operator. BPW is leaving far too much money on the table by adopting the active sharing model, and providing far less community socio-economic impact than it could given its assets.

At a minimum, BPW should remain a network operator under the active sharing model and 'step up its game.' The broadband "division" is not currently being run as a true business, and it needs to be. This is a viable and profitable operating model if managed correctly.

Vertically Integrated Model

The vertically integrated model is the model we recommend for Holland BPW. In the model the broadband division would take control of its destiny and exploit the opportunity to maximize community socio-economic benefits, revenues and profitability from the broadband line-of business. While still operating under an open and vendor neutral model, BPW would introduce any combination of Internet, VoIP, Video (including TV), AMI and other services directly to the marketplace as retail services.

This does not preclude the continued provision of wholesale services as currently provided. BPW will, however, enter the market as a direct competitor (with transparent and published pricing) in enhanced services that will transform the service, pricing and competitive landscape within the greater Holland metropolitan area. We highly recommend entry into both the commercial (FTTB) and residential (FTTH) markets for BPW.

2011 Broadband Strategic Plan

Technology Considerations

Fiber-to-the-Home/Business (FTTH/B) Technology Deployment Overview

There are two basic kinds of fiber networks with different characteristics and strengths. Both dispense with the legacy networks and build upon the strengths of fiber. Limitations are therefore based only on the chosen networking technology and network designs, which in turn, may be limited by business model considerations and budgetary constraints. The main two competing systems, especially in the FTTH-market, are Ethernet Point-to-Point networks and Passive Optical Networks.

The cost of an FTTH-network (that averages between 50-80 passing per mile) is normally somewhere between $600 and $2,000 per household connection depending upon various localized conditions. In some cases costs may be lower: if, for example, ducts are widely available, or the permitting and make ready costs for aerial fiber can be managed and controlled by the owner of the rights-of-way and the poles.

Build-outs of a fiber network include investments in the following components:

•**Fiber and Infrastructure (aerial/underground):** The investment in the aerial plants (fiber strung over poles), the trenches, the locations for Points of Presence (POPS), and other physical infrastructure often account for 30-80% of investment costs and will last for at least 30 years or more, although they are often economically written off in 15 to 20 years.

•**Active Network Components**: Active components are all the optical and electronic systems that facilitate the transmission network and send/receive signals, such as coarse/dense wave division multiplexor's (C/DWDM), repeaters, amplifiers, switches, routers, etc.

These need replacing every 5-8 years, however core back bone and distribution equipment responsible for aggregation and transmission can be leveraged for longer life through component upgrades.

•**Customer Premise Equipment:** Equipment like modems, optical network terminals (ONT) and, if offered, decoders for IPTV/digital TV.

•**Personnel/Operating Charges:** Management, network administration, billing, repair crews, customer support etc.

The largest share of the investment is in capital expenditure in infrastructure and optic equipment required to deliver signals to the customers, and the engineering work required before the network is functional and operational. Engineering normally represents 10-15% of total network cost. The design and roll-out of the network will take into account that customers will connect after the network is built by pre-installing hand holes, extra fiber, expandable cabinets, advanced fiber management practices, etc. The total cost of the project will only rise marginally with extra residential/business subscribers connecting if the design and outside plant construction phases are managed properly.

The total amount of this investment is influenced by several factors that need to be taken into account:

•Size of the area that needs to be rolled out (without parks, lakes etc.).
•Distribution of houses in that area (x houses/mile).
•Choice between underground and aerial plant and the availability of existing infrastructure (e.g. pole ownership/conduits).
•Type of buildings: High-rise buildings are cheaper than medium rise and suburban housing.
•Costs of rights of way and access to buildings.
•Municipal charges (e.g. cost of repaving, access to sewers, administrative charges, taxes etc.).
•Type of area, soil etc. (mountainous vs. flat, rocks vs. sand etc.).
•Need for special works to cross roads, highways, waterways etc.

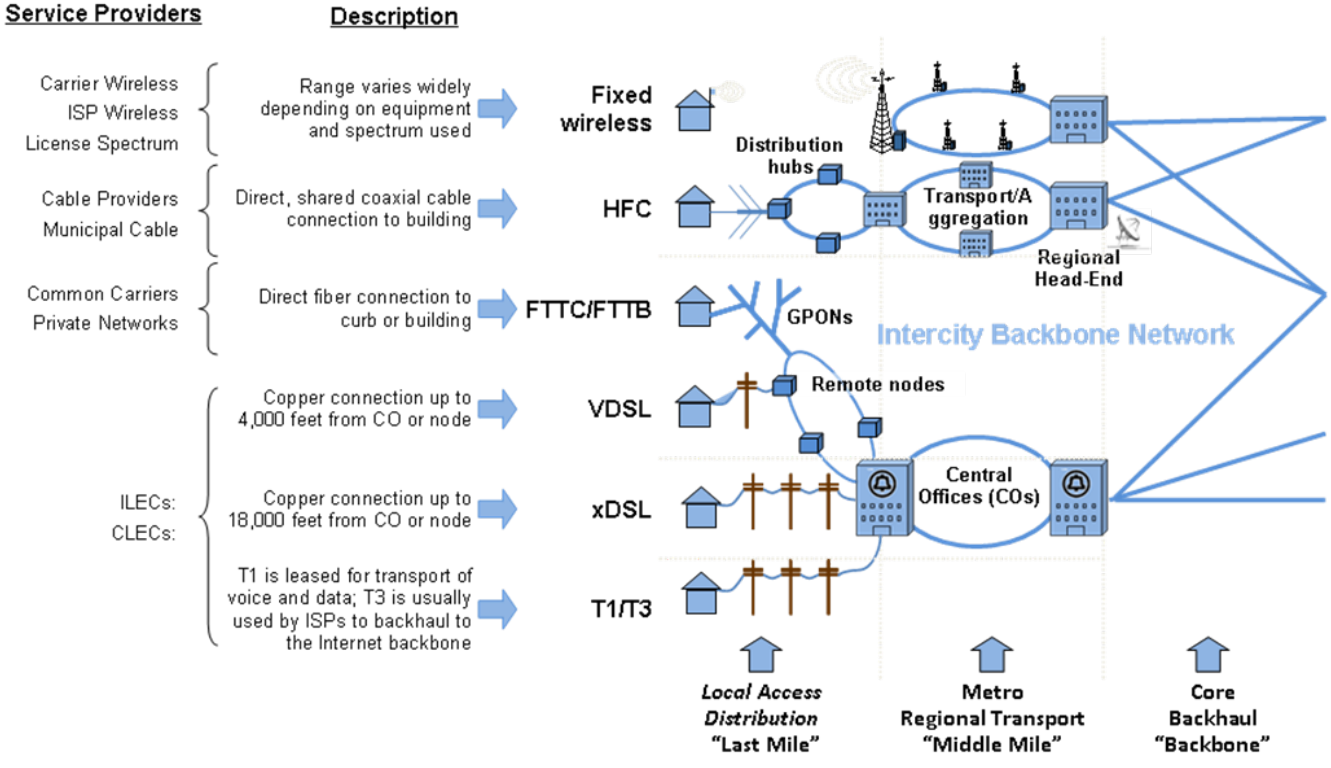
These costs can make or break a business model because they are sunk costs and are relatively fixed for an area regardless of the number of customers signing up.

The way passive networks are rolled out is dependent upon local factors. It is sometimes said that the telecommunications industry would have liked to give up some of the revolutionary advances in fiber technology for a similarly dramatic step in civil engineering technology. New materials are continuously being developed to make aerial, underground and in home or business installation easier and less costly. However, the largest part of fiber deployment is still in the labor.

Service Provider and Network Topology

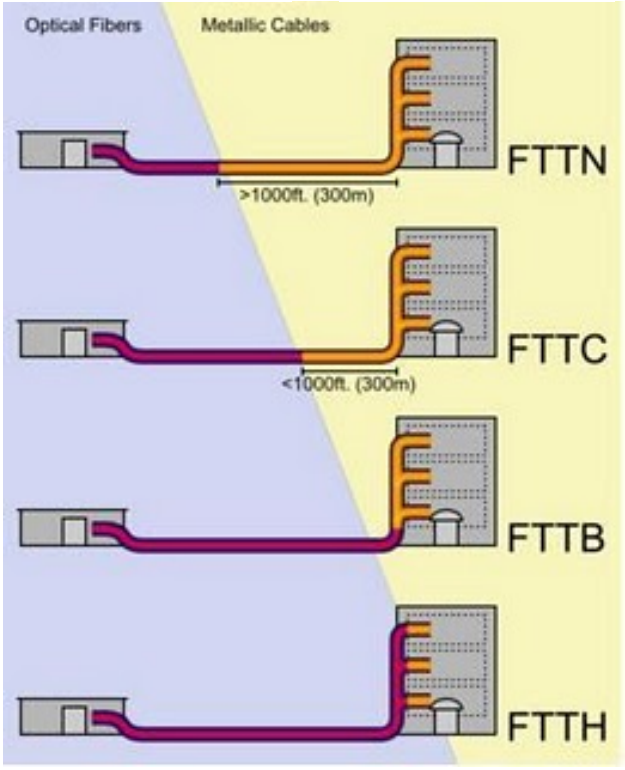
There is an ongoing debate on what solution is best to connect end-users to high bandwidth networks. The different solutions also have different regulatory implications in that existing regulatory tools, in particular local loop unbundling, may not be effective under certain network configurations. This means that incumbents may regain market power in local loops by investing in a specific configuration. The main demands that future users will have towards broadband networks will be seamless operation and user experience from one medium to the other, low cost and non-limiting towards future uses.

Competitive Landscape



GPON

Point-to-Point



Service Provider and Network Topology

Wireless Networks

These networks have some good characteristics with respect to cost for the last mile connectivity, mobility and flexibility. They are, in general, not capable of sending large amounts of data over sizeable geographic footprints, and have scaling difficulties with the provisioning of services to many users simultaneously. These limitations are for the most part inherent to wireless technologies. Wireless networks are mainly used in and around the end users premises to bridge the last mile from the device to the physical network or for users who do not want or need access to high bandwidth. They are also used for mobile applications.

As a primary network technology, wireless cannot compete with hybrid fiber networks on either bandwidth or cost. However, wireless may be the only viable choice for the primary network in certain geographical situations where populations are extremely dispersed, remote and where spectrum scarcity and sharing does not pose problems. The operating footprint under consideration by Holland BPW does not have characteristics that mandate wireless as a first choice technology, although the deployment of a supporting wireless network could be of great benefit for mobile applications in the government, health care, social service, education, tourism and energy management sectors.

Hybrid Networks

Hybrid networks are a combination of existing technology and new technology allowing a lower capital expenditure compared to full fiber networks. Leveraging the fiber to support front haul and backhaul to multipoint wireless facilitates higher bandwidth as well as a more reliable wireless deployment. Nearly all-wireless providers are implementing this approach. Power line communications will most likely remain a niche technology, because of the interference problems and the fact that the current technology is not competitive compared with DSL and cable networks.

ADSL technology is limited in its downstream and upstream capabilities and will not be able to deliver bandwidth needs for the coming 5-10 years based on the current trend of bandwidth increasing 60% to 80% a year. With VDSL2 bandwidth is increased by moving the copper connection close to the end-users, achieving bandwidths of up to 150 Mbps over relatively short distances. It allows end-users to sustain multiple high bandwidth streams, and uses fiber for customer aggregation and back-haul.

Cable (TV) Networks

Cable networks are capable of even higher up and download speeds than VDSL. Cable is a broadcast network for shared use of both upstream and downstream bandwidth. Its capabilities in sustaining multiple on-demand streams is limited by the amount of and bandwidth usage of users. Both cable (TV) and VDSL will have trouble meeting the bandwidth requirements in the next 5 to 10 years required to sustain the bandwidth intensive video and Internet services that the average user will demand.

FTTH Networks

Fiber optic networks provide the most bandwidth and the highest sustainable rates per end user. FTTH at present is the network that is the most 'future-proof' because it can handle the most new bandwidth-intensive applications. The choice between end-to-end (point-to-point) and PON is based on various operator preferences, and both technologies are effectively used to reach large numbers and categories of end-users. The network topology chosen may have an impact upon regulatory, service and long-term operational options.

Service Provider and Network Topology

BPW used a star topology in the City of Holland FTTH Pilot Program

Point-to-Point Networks

A point-to-point (or star) network uses dedicated fiber is run to every end-user. This is the same design as is currently used for the public switched telephone network, and for connecting large corporate or government installations with fiber to backhaul networks. The primary data link layer protocol used today for point-to-point networks is Ethernet, the emerging standard for metro and wide area networks (MAN/WAN), replacing ATM and SONET/SDH based protocols. :

The main advantages of point-to-point networks compared to passive optical networks (PON) are:

•Reliability and throughput: Every user has a dedicated connection. There is no influence from other users on download or upload speeds.
•Easy upgrade paths: An individual connection can be upgraded by changing the lasers at both ends. If an end-user has a 100 Mbps connection and wants to upgrade, it is possible to change the lasers on both ends to 1 Gbps or 10 Gbps. Operators may also include WDM and DWDM technologies as desired, adding different link layer protocols.
•Simple and cheap switches in the middle. There is no need for high-speed encryption in the switches to separate the traffic of different users.
•Easy Integration: Ethernet is the same data link layer protocol that is used for Local Area Networks, allowing for easy integration to end-user networks.

There are also some disadvantages to the use of point-to-point networks:

•They require central switches with a dedicated port per customer. This adds to the price for both switching locations and for switches.
•More fiber is necessary for rollouts when compared to a ring topology, adding to overall network cost.
•Integration of an analogue TV-channel on the same fiber is often required to support legacy systems. Some rollouts therefore opt for a dedicated separate fiber to allow analogue TV in the same fiber bundle. This adds to the cost per subscriber. However, some EPON, GPON and 10 GPON and the 10 G EPO all have frequency allocations that facilitate RF transmission downstream at 1550NM and upstream at 1310NM and alternately at 1610NM.

Service Provider and Network Topology

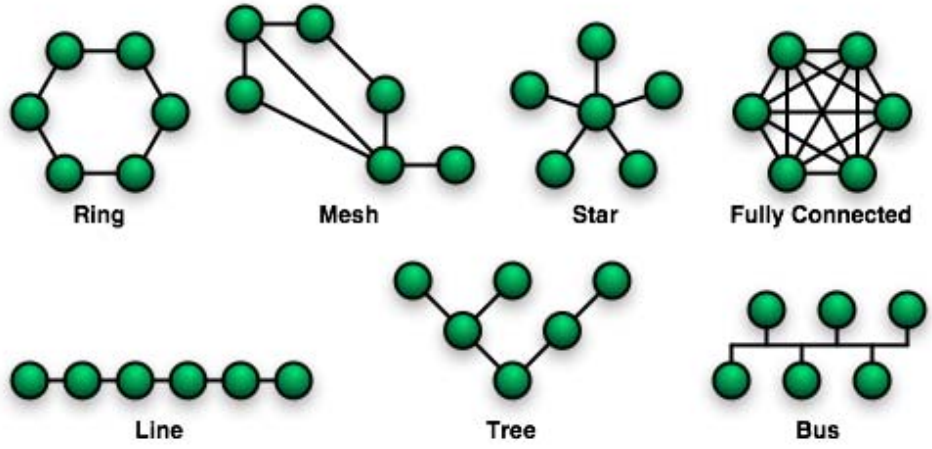
Passive Optical Networks

Passive optical networks (PON) are fundamentally different from point-to-point networks in that PON does not use a fiber for every end node, but uses one fiber to connect multiple end-nodes. This is achieved by using a ring, bus or tree topology. Each topology has its own technical and financial benefits, but the differences are limited. The main characteristic of a PON-network is that the various users share the fiber in the network. It is therefore a fiber-lean solution. For downstream communication it uses one laser sending the data and passive optical splitters to split the data towards the individual end users. The return path is the user sending their data back and the splitters integrating the data on the fiber.

There are also systems available for coarse wavelength division multiplexing to allow for multiple spectrum colors to groups of end-users, so one group of end-users will communicate at one set of two colors and another group at a different set of two colors. Much like cable, the infrastructure is a shared medium, where the users need to share the available bandwidth. However PON-networks are shared between fewer people than an HFC-network. This so-called split ratio is generally 32-64 for PON networks whereas on an HFC-network available bandwidth is split between (100-1000) users.

The main advantages of a PON network are:
•Fiber "lean," requiring less investment for the outlay of the network.
•A variant exists whereby an optical splitter is used at the central switching location to allow for PON using point-to-point fiber. This model is not lean on fiber, but does allow one optical port to be used to reach 16 to 64 customers.
•One optical port at the central office, allowing for cheaper transmission hardware and less maintenance.
•Smaller footprints for the central equipment than point-to-point networks.
•It is possible to split the fiber later on to add new subscribers.
•Long-distance transmissions for up to 60 km to reach up to 64 customers.

There are also some disadvantages to PON networks:
•Shared bandwidth, which means that usage from one user can influence other users. This is known as split-ratio.
•Hard to upgrade individual end-users to higher bandwidth. Users need to be upgraded all at once.
•Central switches require more logic and encryption to integrate and separate customer streams.



Many PON network operators use a three-color system where two colors are used downstream, one for Internet data, one for broadcast television (analogue and digital) and one for upstream Internet data.

There are two commercially viable competing standards for PON networks:

•GPON (ITU G.984): GPON allows for 2.5 Gbps downstream and typically 1.25 Gbps upstream, though 2.5 Gbps upstream is also possible. It allows for an 8, 16, 32, 64, 128 way splits. GPON typically uses Ethernet as a link layer protocol and can reach up to 40 miles. There is currently work on the 10 Gbps version of GPON with estimated releases late 2011/2012. This technology will quadruple the available bandwidth for existing GPON deployments. Verizon uses GPON for its FiOS network.

•EPON (IEEE 802.3ah): The IEEE finalized this standard in 2004. It differs from the previous two standards by using Ethernet only as the link layer protocol. It allows for symmetrical speeds of 1.25 Gbps and has a maximum reach of 12 miles, although equipment manufacturers have recently developed optics that extend customer reach to 17 miles without signal degradation.

Service Provider and Network Topology

Both GPON and EPON networks are common, well established, and actively used in networks across the globe. The way in which PON networks are designed and deployed heavily influences their ability to be open to use by multiple service providers. There are three basic ways to build a PON-network:

1.Fiber Split Close to the Home: One fiber is used to pass a group of homes. At each home a separate splitter is installed to divert the signal to and from the home. This is the most fiber lean solution, but makes it hard for other operators to share the infrastructure through local loop unbundling. If the network is shared this needs to be done through wholesale broadband access.

2.Fiber Split Halfway: A small bundle of fibers are brought to a street cabinet. In the street cabinet the optical signal is split and from the street cabinet the connection branches out using a point-to-point connection where every household has its own fiber. Switching providers is as easy as switching fibers from one provider's splitter to another's, although this does require a truck roll to the splitter, introducing costs for switching.

3.Point-to-Point with PON: The network is built as a point-to-point network, but can be used as both a PON and P2P-network with the splitter at the local exchange.

Defining the Network Purpose Early On

The choice facing the Holland BPW in the design and deployment of the fiber network revolves around network purpose. If the purpose is to develop a line-of-business through facilities-based competition without any sharing of network capacity, then the primary implications of different topologies will be limited to the speeds that can be offered and the cost of providing service. This may impact the relative ability of HBP's fiber network to compete with other technologies and companies that can or will offer similar services.

If, however, BPW chooses to allow network sharing and unbundling as part of their policy framework to foster competition and increase the provider choices available to citizens, then the network topology has significant implications for the ease with which it is possible to let providers share the network asset (e.g., to facilitate wholesale broadband access and local loop unbundling). A network so designed will enhance local competition by reducing the entry costs for new market entrants, and extending the reach of incumbent providers to new customer groups through wholesale access to the PON.

Network unbundling can occur at four (4) levels:

1.Conduit/Collocation Facilities Layer;

2.Physical Layer: Sub-loop unbundling for DSL networks or dark fiber leasing in FTTH networks, or Optical Layer unbundling (CWDM or DWDM in PON);

3.Data Link Layer: Dark fiber and link-layer electronics at each end (e.g., Ethernet-based VLAN as Wholesale Broadband Access);

4.Network Layer: Basic network service provided. For example, IP Layer 3 services using policy-based routing to multiple ISPs.

The shared nature of cable and PON networks makes it difficult to implement local loop unbundling. In cable it is near impossible, because it would require giving every user their own connection instead of using a shared network connection. A point-to-point network is not often used for hybrid fiber-coaxial (HFC)-networks. In a PON-network local loop unbundling is only possible if Link Layer Unbundling (LLU) has been taken into account right from the start of the network design process, and competing networks can access splitters in street-cabinets or local exchanges. LLU is possible with DSL, ADSL and point-to-point fiber networks.

Wholesale Broadband Access

Although implementing wholesale broadband access is possible on all networks, there are challenges that must be recognized and addressed during the design phase to ensure that the Holland BPW fiber plant extension suits its specific network purpose:

•On shared network infrastructures (PON-networks) it is more difficult to implement wholesale broadband access, since it is hard to guarantee all the service providers the same Quality of Service (QoS) and maximize the usage of available bandwidth at any given moment.

•Downstream broadcast television on cable and other operators cannot share PON-networks without limiting the amount of possible channels, or by using a different color on a PON-based network. Implementing wholesale broadband access will then require either the resale of the television signal or integrating IPTV in the data-channel, leaving less bandwidth available for other data applications.

•When integrating with legacy networks through wholesale access, IPTV will have to compete with the other data on a traditional DSL-connection. In order to guarantee that there is enough bandwidth available for IPTV the ISP responsible for end-user connection will have to reserve bandwidth for IPTV. This makes it more likely that the IPTV-provider and the ISP will need to work together and cannot operate independently.

•A point-to-point fiber solution without a separate channel for television will face the same situation as with DSL and IPTV, though the larger amount of bandwidth might allow the delivery of IPTV without the involvement of the ISP.

•When IPTV is delivered over a separate fiber, the point-to-point solution allows LLU on both the television as well as the data line, and the consumer the choice of a provider and the way of delivering the signal (over IP or IPTV).

Looking Ahead

Although it is difficult to predict where the market in the U.S. will ultimately end up, the long life of the fiber asset (30 – 50 years if installed properly) means that what the future may hold needs to be considered. One very likely possibility is that there will be a convergence of networks. A user may subscribe to a single service provider yet have access to a wide variety of networks. For example, the service provider may offer a bundle of networks (e.g. FTTH combined with wireless technologies GSM, 3G, 4G, WiFi and WiMAX) and access to a variety of digital video broadcast (DVB) content provider options. End-user devices and content preferences will select whatever network is available and best suited for purpose.

The technical choices made early in the design phase determine the possibilities of the network, as well as the business models and regulatory options available. Fiber-based networks offer all capabilities that are desired by households and businesses. The commercial sector will have a strong preference for point-to-point networks, while for the residential sector there seems to be little difference between PON and point-to-point networks. Both will see continued development, which will enable new possibilities. From a regulatory, future-proofing, and operating model perspective a point-to-point network offers more possibilities for Local Loop Unbundling and Wholesale Broadband Access.

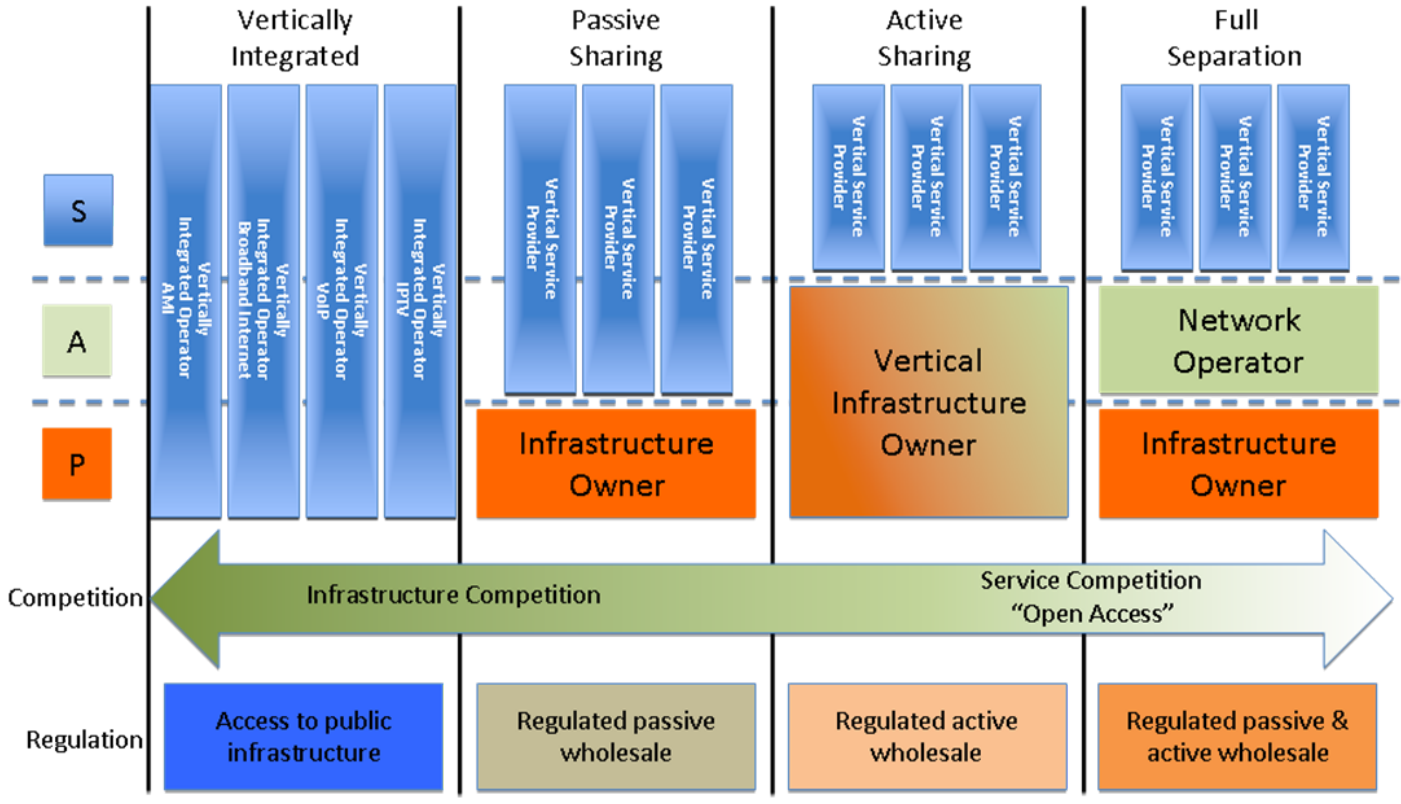
Holland BPW Approach to FTTH and FTTB

Holland's current business approach is to provide access to leased fiber and opportunistically provide FTTB Layer 2 Ethernet services. This hybrid approach has led HBPW to act like an infrastructure owner and a vertical infrastructure provider. However, HBPW has not designed long-term asset development, business, operating or services plans for either FTTH or FTTB. This means that that there is a lack of a strategic design and/or investment strategy to maximize future revenue opportunities and line-of-business profitability. In fact, the opportunistic nature that HBPW has taken will eventually place its future revenue opportunities at risk as other providers deploy selective fiber assets across the city and cherry pick HBPWs current and future clients.

We highly recommend that HBPW take a more proactive approach to investing in FTTB and consider FTTH as an extended go-to-market strategy. This approach will enable HBPW to strategically position assets that would enable growth, increase the marketability of its assets and ensure the long-term integrity and sustainability of its fiber plant.

The architectural approach to the right provides HBPW with the flexibility to change and adapt its business strategies without compromising the integrity of its fiber plant and network services. This approach will allow HBPW to continue its current business model while improving the viability and value of its current assets within the marketplace, and/or selectively choosing to enter into new vertically integrated markets to improve revenue and ROI opportunities for the fiber plant. This business strategy provides HBPW with the ability to provide flexible and cost effective service delivery through FTTH/B infrastructure, switching and routing services, making its infrastructure more adaptive to multi-service providers through the framework of a neutral service exchange. The Business Models Section of this report provides the business/market overview for the integrated model - this section will focus on the HBPW architectural considerations.

HBPW Business Drivers Define Architectural Approach



Recommended Holland BPW FTTH/B Open Network Framework

	Holland BPW FTTH/B Open Network Framework
Technologies	• Technology Agnostic – No technology preferences from the vendors perspective • Support a mix of point-to-point, active Ethernet and GPON technologies • Support Integration of Wireline and Wireless Technologies
Architecture	• Service-oriented Ethernet/IP/MPLS Infrastructure • Converged for residential triple play ubiquitous high definition content and enterprise (carrier-grade features) services • Scalable high quality smart, IP based, high-quality delivery • Resilient, delivering non-stop routing and non-stop services
Operations & Management	• All-in-one open business, customer and operations support platform • Flow through Provisioning and customer service • Customer self-service portal
Openness	• Vertical Infrastructure Owner capable of providing both wholesale and retail services. Provide infrastructure and active Ethernet/IP services as a wholesale provider enabling vertical service providers to deliver independent broadband, internet, VoIP, and IPTV services. • Enable vertically integrated services including energy management through active separation • May temporarily provide service, but with the intention of withdrawing from selective markets if third-party service providers can be established on the network
Product Grade	• Carrier-grade • High availability and environmental hardening • Redundant

As a vertical infrastructure owner, HBPW's network architecture should be designed to segment the physical network at the hubs and logical services at the head-end, aggregation/transport, and distribution hubs. This approach will maximize the flexibility to either provide wholesale and retail services in a multi-service environment, or to physically isolate services if that is the ultimate business arrangement HBPW decides to implement. This flexibility will have minimal impact on the overall cost of the network, but tremendous forward-looking implications as BPW explores how best to use its fiber optic asset for its own purposes and those of the citizens and businesses of Holland.

This business/architectural model also allows HBPW to selectively enter into the service market (e.g., Internet, VoIP, IPTV, AMI) with minimal additional hardware and software as a service investment. The vertically integrated operating model provides certain advantages to managing and controlling the quality of the product in the market and drives competitors to compete on value and Quality of Service (QoS), thereby mitigating the affect of price-only competition in selective product categories. This architectural approach enables both wholesale and retail services in a multi-service environment, maximizing the opportunities to increase subscriber take rate and service choice.

Service providers will have the opportunity to compete directly with HBPW on the logical service framework enabling HBPW to maximize its return on the physical infrastructure whether HBPW or a third party service provider provisions services. This framework should serve as the basis for HBPWs architectural approach, and the decisions for selecting infrastructure design and the technology providers that will enable HBPW to eventually become a fully integrated vertical infrastructure owner/provider.

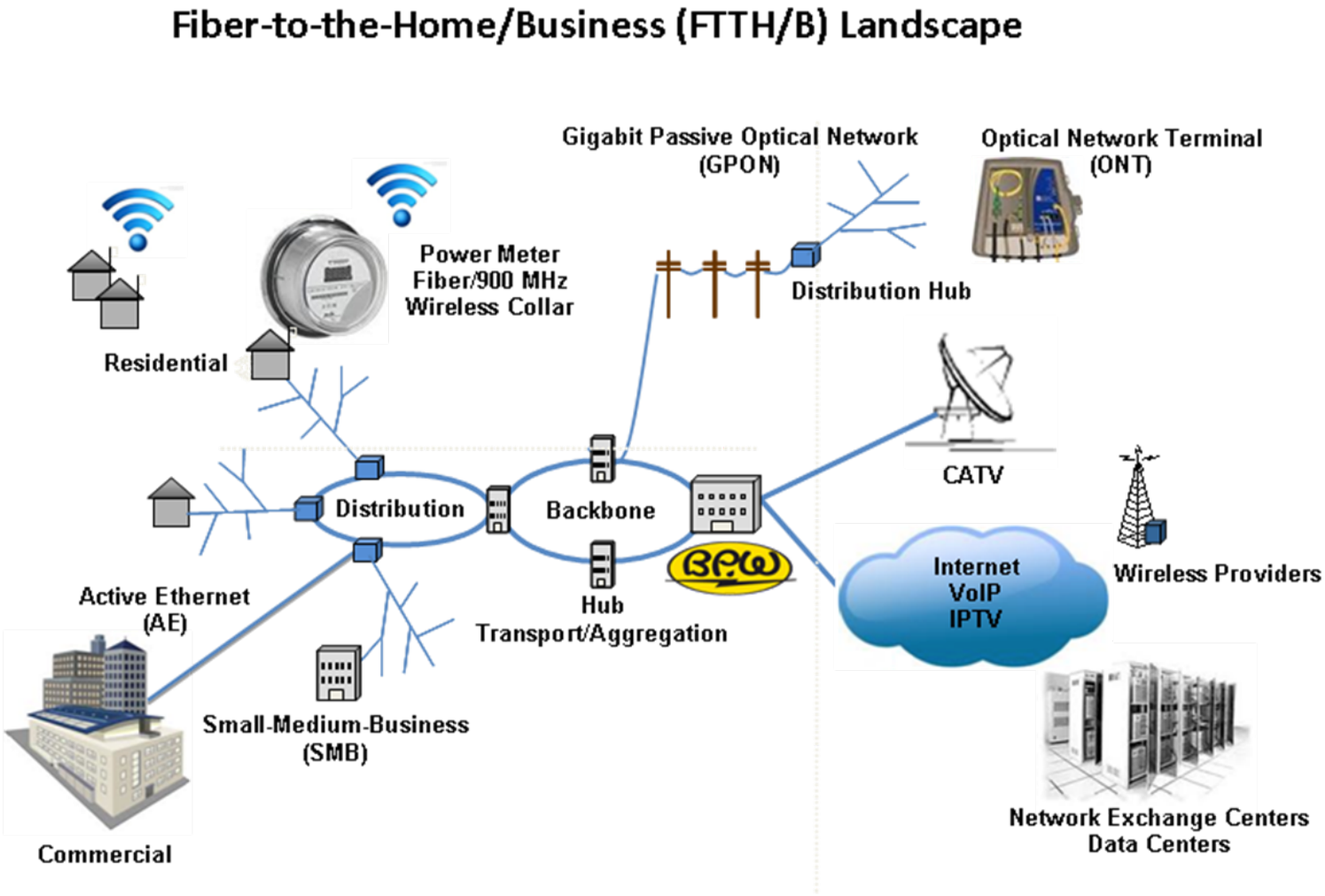
The FTTH/B Open Network Framework in Action

HBPW has decades of OSP experience and understands the value of fiber infrastructure. The in-house team has the technology and operational background to continue to build and scale additional fiber plant for its core FTTB strategy. They are also capable, given access to additional resources, to manage the design, deployment and operations of a much larger and more impactful fiber distribution system in support of FTTH services.

The challenge HBPW will face is not in the physical infrastructure, but instead in developing and scaling the logical and enhanced network services that are needed to stay current in the vertical infrastructure space. There is a need to both upgrade current skills through training and develop consistent commercial practices that will enable HBPW to service any carrier-class environment or enterprise.

HBPW will also need to consider staffing additional resources to manage the diversity and scale, or else outsource services to a capable network services organization with the level of skills and experience requisite for operating carrier class networks.

The FTTH/B Landscape diagram to the right provides an illustration of the interconnected framework that HBPW will need to manage if it intends to effectively grow/compete in the vertical infrastructure space.



Fiber Plant

The fiber landscape is constructed to provide interconnection services that increase the value of HBPWs fiber plant and facilities.

Backhaul Fiber (Connecting Facilities & Service Partners)

The backhaul fiber is intended to provide extension to facilities-based providers that subscribers of the network would want access to for services. This is accomplished in one of several ways:

1.Extend fiber to carrier hotels, central offices, fiber interconnect points;
2.Extend services to major content providers, service exchanges and data centers;
3.Extend fiber to major wireless carrier location for aggregation and transport services.

This level of aggregation to HBPWs head-end will increase the value proposition of its core fiber plant and increase the opportunity to extend HBPWs fiber plant to other points of egress. There are a number of local third party providers looking to invest in data center properties and there is a need for backhaul to key locations in Grand Rapids, enabling HBPW to act as a facilities, customer and service aggregator. It is recommended that HBPW incorporate backhaul fiber services into its investment strategy for facilities and potential service partners.

Backbone and Distribution Fiber Rings (Redundancy & Protection)

HBPWs current fiber plant has limited physical redundancy and protection, and is not designed for scale. The fiber plant is perfectly sufficient for enterprise grade services but in the era of 'always on' is potentially risky for continued expansion. It is recommended that HBPW look at creating additional fiber rings to aggregate smaller serving areas throughout the region. The objective of this design is to simplify the core fiber and separate it from the active distribution system. This approach will reduce the potential impact of fiber cuts/damage and improve the facilities and fiber management capacity for bringing on new subscribers and vertical service providers.

Backbone and Distribution Fiber Rings (continued))

This architecture will also leverage the current and future hubs/cabinets while creating more manageable distribution solutions for extended Layer 2 Ethernet Services. This approach will reduce the cost of fiber distribution and maximize the use/replacement core fiber already in place. In addition, it will enable HBPW to gracefully upgrade/scale future fiber plant and network services as customer demands and technology continues to advance.

Distribution Fiber/Hub Facilities

It is recommended that HBPW use the current hub facilities for aggregation of backbone traffic, and continue with the further extension of distribution hubs into the communities. We also recommend additional hub locations to serve 500 and 1000 household configurations for electronic service aggregation. This configuration will help to manage the cost of fiber between local distribution and the HBPW.

It is recommended that the fiber distribution plant take into consideration a maximum of a 32 way split for GPON for home/SMB applications and direct 1:1 fiber for commercial active Ethernet. To protect against obsolescence, HBPW may want to expend additional capital (see financial considerations in Financials and Staffing section for further detail) to provide 1:1 fiber for residential and commercial applications. However, the rapid deployment of 10 Gbps and the eventual growth of new C/DWDM, offer additional protection and the ability to gracefully upgrade sections of the fiber network over time as bandwidth and service requirements dictate through market demand.

This design will enable HBPW to aggregate and distribute services using electronics from the head-end out through the distribution hubs if necessary. The approach also enables HBPW to either wholesale or retail residential/business access services at the fiber distribution point. The development of C/DWDM solutions in the same chassis would enable additional wholesale distribution to the household level.

Network Services

HBPW currently offers some level of network services using the World Wide Packet Ethernet switches. These switches are end-of-life and need to be replaced. The architectural design of the network should enable HBPW to upgrade the backbone and current Ethernet subscribers while providing the option to extend FTTB or fully deploy FTTH in the future. Active electronics in the distribution hubs will provide the flexibility for upgraded switches or to build an overlay network with new equipment to service the residential marketplace.

GPON

It is recommended that HBPW select GPON as the architecture of choice to deliver cost effective residential services. This architecture is the most future-proof solution for HBPW, creating a strong and flexible network that requires only the reintroduction of new technology every 8 to 10 years due to end-of-life considerations, rather than a network redesign when higher capacity technologies emerge. The 32-way split enables HBPW to manage small clusters of services throughout residential areas using a current GPON (2.5 Gbps downstream and up to 1.25 Gbps upstream) configuration. The industry is rapidly moving to 10 Gbps GPON technology and active demonstrations are being deployed in pilot configurations. It is anticipated that 10 G/GPON will be available last quarter 2011/early 2012. This will quadruple the available bandwidth for the 32 way split and enable a greater degree of flexibility. By the time HBPW commits to the potential financing and deployment of its network, 10 G/GPON should be strongly considered.

Active Ethernet (AE)

It is recommended that HBPW select AE as its commercial service strategy. This technology is implemented in the same fashion as GPON through the distribution hubs. The difference lies in the physical/logical separation of services to commercial subscribers, offering them dedicated connectivity. Most SMBs can be serviced via GPON, but the larger commercial operators, regional corporate organizations who don't like cable may prefer an AE style of connection. The electronics are similar and compatible to the standard Ethernet switching that would serve HBPWs backbone.

Many of the FTTH/B AE vendors support the rapid spanning tree protocol (RSTP) for protected port services and Ethernet ring protection switching (ERPS) for enhanced protected ring services. Many of the more elaborate vendors support additional Multiprotocol Label Switching (MPLS) that offers universal QoS management. These enhanced services augment the management and QoS of VPLS VLANs. Given the multi-service nature of maintaining a FTTH/B Open Network Framework, we highly recommend that HBPW look at deploying MPLS at either the Layer 2 or Layer 3 service plane.

Integrated Layer 2 Transport

Many of the GPON manufacturers have gone to either integrated chassis with GPON/AE configurations or integrated ports that support both GPON and AE. The integration of these two technology platforms makes the delivery of GPON/AE the logical choice for service both residential and commercial users of HBPW's network.

In addition, the VLAN architecture supported by these vendors provides HBPW the ability to provide both wholesale and retail Layer 2 network services to upstream Ethernet Vertical Service Providers.

Network Services

Integrated Layer 3 Transport

Today HBPW does not provide Layer 3 services, but instead offers ISPs Layer 2 network services to its subscribers. We believe this will be problematic over time and adds a degree of management beyond what is currently being provided by HBPW for multi-service residential Internet, VoIP and IPTV services. We are recommending that HBPW extend its transport services to IP and develop an Internet service exchange for ISPs and Enhanced Vertical Service Providers. By providing IP transport to both residential and commercial clients, HBPW will be able to register for IPV4/6 Internet addresses, manage the domain name services, and provide a quality and consistency of IP transport across all ISPs and Enhanced Vertical Service Providers.

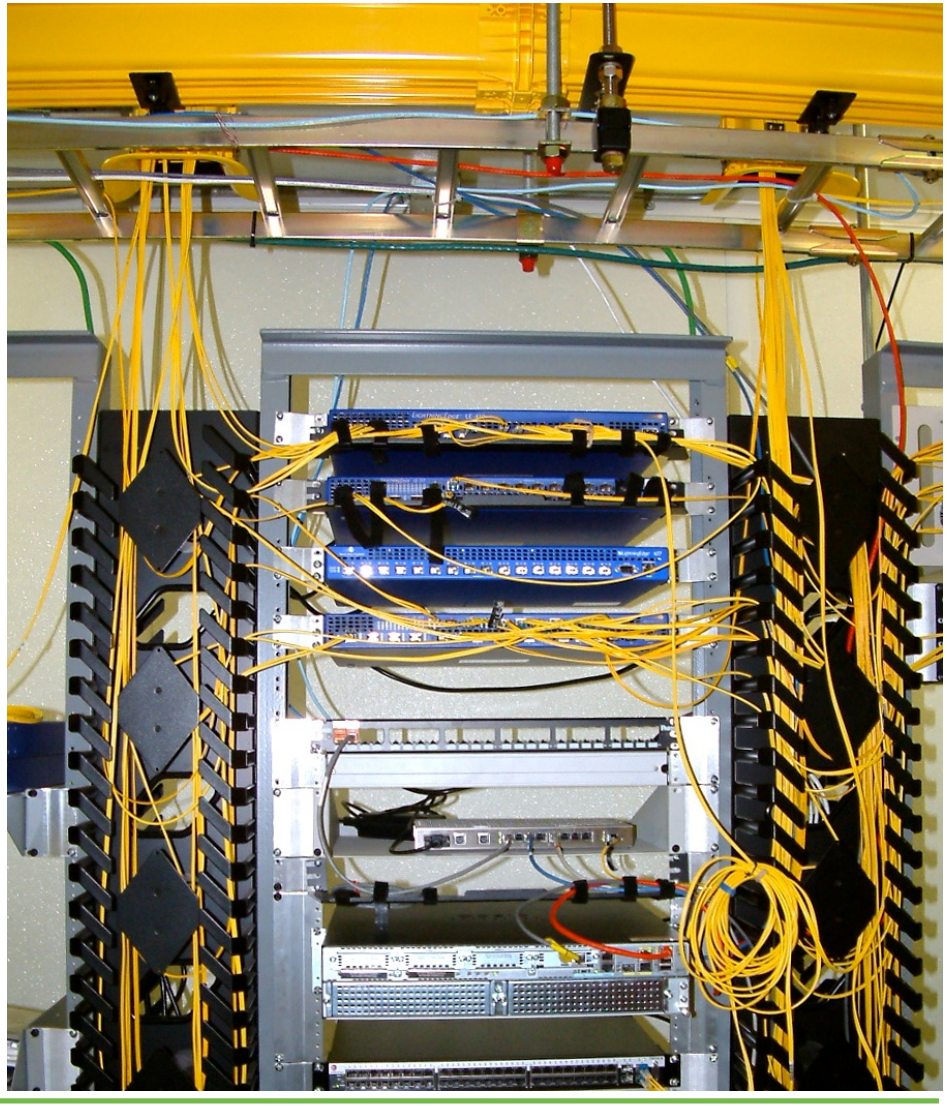
This will also provide the subscribers of HBPW transport service the ability to subscribe to any of HBPW or any 3rd party content service. The ability to choose these services could then be provisioned in real-time through a flow through provisioning service to any ISPs and Enhanced Vertical Service Provider connected to HBPW. This creates a value added service offering for wholesale/retail service partners that will allow them to compete with any Tier-One network service provider.

This adds a degree of complexity to the initial design/architecture of the Layer 3 services but in the long run will create significant pull-through for enhanced services and provide the needed layer for HBPW to provide Internet related services.

Subscriber DMARC

Residential DMARC Extension – Many residential subscribers will need help with premise wiring. Home Area Networks (HANs) have come a long way, and using existing infrastructure for most services provides numerous options. For residential services HBPW will want to make use of the internal infrastructure as much as possible, and look at CPE and wireless alternatives for in-building services extension. With VoIP, HBPW will want to look for equipment providers that integrate HAN translation for copper/coax. Optionally some providers are also providing HomePlug Powerline Alliance (HPA) features for powerline home network distribution. In some cases HBPW will need to run service extensions into the home to network connectivity.

Commercial DMARC Extension – Many commercial subscribers will need DMARC extensions from the telecommunications closet to their respective offices where the services are being provided. Though some solutions can make use of existing HAN technology for SMB services, most commercial deployments will require in building fiber extension and splicing.



Enhanced Services

Internet

Basic Internet services are essentially the most significant driver to selling more bandwidth. With the advent and growth of over-the-top video and rich media applications, the residential consumers are requiring even greater access to services. Residential and commercial over-subscription practices allow ISPs to aggregate large groups of subscribers and effectively manage the cost of upstream bandwidth provisioning. Typical over-subscription and time-of-day capacity management between commercial and residential users will enable HBPW to handle a significantly larger base of Internet subscribers with moderate growth in Internet capacity.

Typical over-subscription rates for residential can vary between 30 to 60, and even 100 multiples while SMBE commercial subscribers can reach multiples of 10 to 25. Large commercial enterprises and intensive bandwidth users such as hospitals and universities approach 1:1 or 1:2. Overall, this equates to purchasing 1 Mbps from upstream Internet Providers for every 30 to 60 Mbps of subscriber access purchased. Aggregating ISP providers does not have the same effect, since they have already performed local aggregation, and are typically already managing capacity for peak and peak average loads.

In addition, aggregated Internet costs have come down significantly over the last few years for larger local providers. Typical bandwidth costs for the larger aggregators can be between $4 and $10 per Mbps for commitments of 1 to 2 Gbps, equating to a recurring cost between $8,000 to $15,000 a month.

We recommend that HBPW create an Internet Service Exchange. Given the residential and business aggregation possibilities, HBPW may want to develop a wholesale IP strategy and help aggregate Internet services through a community Internet Service Exchange. In this way HBPW can help lower the cost of Internet services for both retail and wholesale clients.

The development of an Internet service exchange would require HBPW to create or collocate in a common facility where both upstream and downstream ISPs can collocate equipment and interconnect at an extremely low cost. The exchange will create and aggregate service providers in the region, and helps to drive down the costs associated with delivering Internet services. For this reason HBPW may want to extend the leg of its fiber plant that reaches from Holland halfway to Grand Rapids to terminate in a primary telecommunications collocation space where it can interconnect with Tier 1 ISPs. This will allow HBPW to interconnect with a variety of ISPs, Vertical Service Providers and content providers. This will also add value to HBPW commercial transport services and provide multi-service carrier interconnect to all the Tier 1 Carriers.

The opportunity created by developing an exchange for HBPW is the development of reseller channels that will create and execute sales in the market leveraging HBPWs low cost core transport infrastructure. In addition, this helps create a stronger ISP reseller market where ISPs can focus on value added services.

HBPW should strongly consider offering Internet to its portfolio of enhanced services, as it will open both wholesale and retail possibilities while enhancing the quality of services available for the citizens of Holland.

Voice over IP (VoIP)

There are a host of issues related to developing and managing a telephony service. Subscribers, however, have come to respect and widely adopt Voice over IP (VoIP) as an alternative to traditional telephone services. Most carriers have a VoIP service offering, and at a minimum, backhaul voice traffic over VoIP Session Initiation Protocol (SIP) trunks. Commercial consumers have been transitioning to VoIP private branch exchange (PBX) for their corporate systems and the average consumer is now aware of the cost savings through the use of Magic Jack and VoIP providers such as Vonage. The challenge most VoIP providers have is that the IP Transport provided by most ISPs is inconsistent because of bandwidth throttling or first/last mile bandwidth limitations.

With the deployment of FTTH/B, HBPW will have the infrastructure to provide high quality local VoIP services. In conjunction with providing IP Transport, HBPW can easily deploy the infrastructure necessary to provide VoIP to its residential and commercial subscribers. The evolution of Class 5 soft switch servers allows providers to deliver high quality residential and commercial services capable of starting with a relatively minor investment and scaling as subscribers are added to the network.

The recent changes to number portability have created a new class of DID provider that enables virtual VoIP carriers to instantly purchase local and foreign exchange numbers. With the advent of self-service customer portals, subscribers can in real-time opt into a VoIP service, receive a number and prepay for services on-line. This capability provides new entrants such as HBPW the ability to deliver carrier class services without the significant overhead of traditional voice carriers once fiber has been deployed.

Regulatory Considerations for VoIP

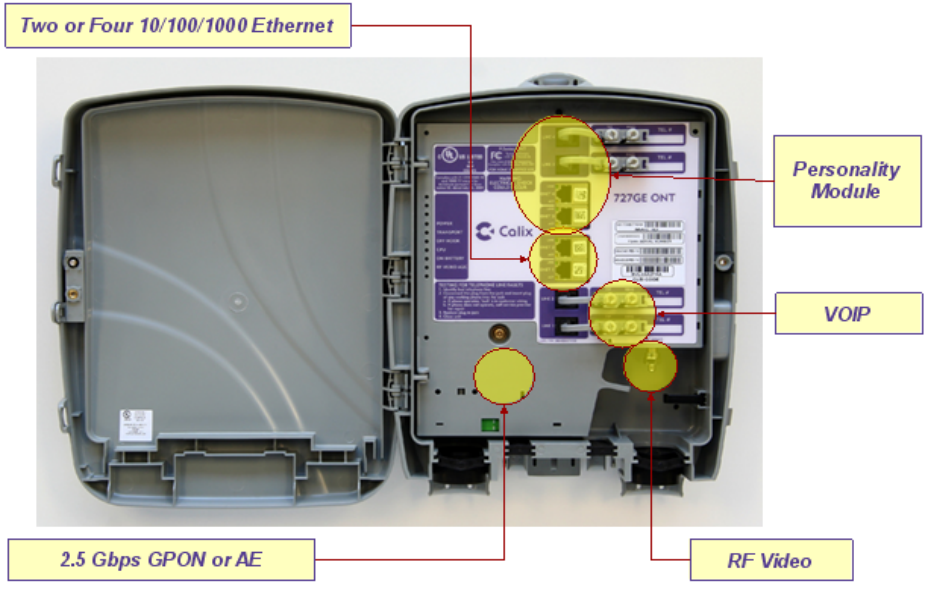
Because of the interconnection requirements with other local network providers, HBPW will want to register as Competitive Local Exchange Carrier (CLEC). This will enable HBPW to collocate in the Incumbent LEC (ILEC) central office's for Holland's numbering plan areas (NPA) and interconnect with the ILECs local/Long Distance service exchange.

Once registered, VoIP as an enhanced service is a logical extension for providers delivering Internet services over fiber infrastructure. HBPW should consider offering VoIP commercial and residential services to its portfolio of enhanced services.

SIP Trunking Considerations

In providing telephone service through VoIP, HBPW will need to select one or more SIP trunk providers to enable local/long distance service. Traditionally that has been done through the ILECs, however, many long haul providers, such as Level 3, Global Crossing and numerous others have extended NPA access and can offer both local and long distance SIP trunking services. The cost for telephone calls has dropped dramatically and with the ability to over-subscribe trunks for average and peak calling periods, providers have greatly reduced the cost of these services. SIP trunks can vary greatly in price based on the features, in-bound and out-bound calling requirements, and flat rate (local/long distance) or usage based services. Typical cost range from $8 to $15 for inbound calling, to as high as $65 for unlimited outbound calling. The mix of trunking and managing the average and peak demands for selecting the number of trunks to be used will determine the effective margin for providing VoIP services to residential and commercial subscribers.

Extending the fiber connection to Grand Rapids will enable HBPW to directly interconnect to one or more SIP providers and negotiate the most effective pricing options.



Enhanced Services

Other Service Considerations for VoIP

•E911 – With the advent of VoIP and wireless mobile E911 services have become an issue for many carriers. With the fixed nature of FTTH and IP addressing HBPW would have to provide reverse mapping to the address for emergency services. In addition, the always-on nature of traditional telephone should be considered in the FTTH design. Many of the FTTH equipment suppliers provide traditional copper ports and remote power supply battery backup within their Network Interface Devices (NIDs).

•E411 – Information service providers provide value added information and voice subscriber services. Traditional wireline and wireless carriers provide 411 access services. This can be accomplished through partner relationships with a value added service partner.

•Commercial PBX (Centrex) – Commercial PBX, unlike residential VoIP, will require additional engineering, planning and customer support. This service requires more significant product development and on-staff or consulting partner(s) to sell, manage and support commercial clients. The new Class 5 soft switches enable enhanced calling features including PBX services with only incremental cost in licensing.

•Customer Support – The addition of VoIP will inherently bring with it additional customer service requirements. As HBPW considers additional enhanced services it will need to consider whether building an internal call center or outsourcing customer service to a third party is more cost effective. With the development of flow through provisioning and the ability to use the Class 5 IVR features, HBPW can easily automate much of the functionality including reporting problems, how-to instructions, Level 1 technical customer support and billing services. This approach will reduce the number of Level 2/3 calls and the cost of outsourcing call center customer services if HBPW selects to move forward with that approach.

•Hardware (CPE) – Customers connecting to HBPWs VoIP service will require Internet access and a local router capable of connecting to the subscribers internal HAN via wireline (copper) and/or wireless WiFi connectivity. Typical implementations can be provided through the use of the NID and household copper, however, an additional customer premise router will be needed for Internet connectivity. For the purpose of managing customer connectivity HBPW will want to provide a vendor-specific router based on its Internet router product selection.

"All work and no play makes Jack a dull boy"

IPTV

Today's digital infotainment and mobile TV solutions will eventually become the foundation of an integrated, multi-screen entertainment experience. IPTV is the first step most network providers take towards a full suite of multi-screen services. But the available IPTV platforms have made it difficult for small network providers to introduce IPTV in their markets. The capital expenditures (CAPEX) and complexity level of those solutions have been higher than these organizations were capable of meeting. In addition, smaller providers do not have the same level of resources as larger providers that can be applied to address and overcome the main challenges and ensure success.

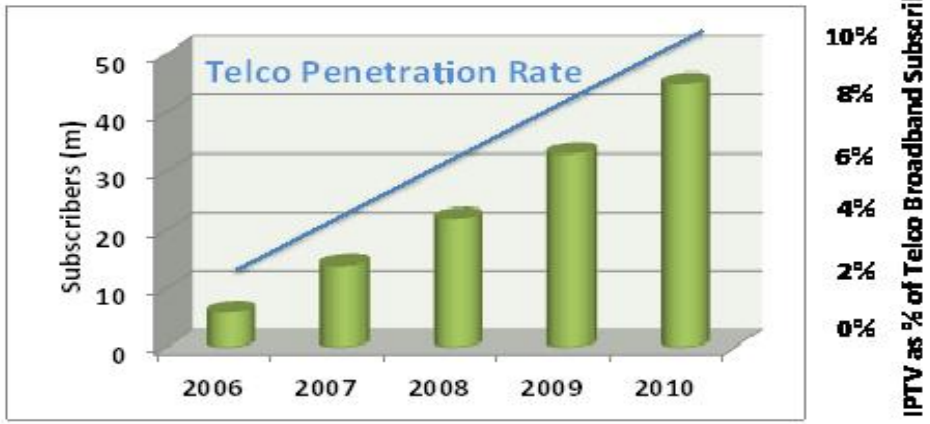
Fortunately for network providers such as Holland BPW, solutions have emerged which provide end-to-end platforms specifically designed for smaller market deployments. These innovations have made it possible for smaller networks to not only provide IPTV services effectively, but also profitably, making the Triple Play a reality for small markets.

Enhanced Services

The IPTV market has made a fundamental shift over the last year and is moving towards the promise of applications enablement rather than just Cable TV. The old ways that cable providers brought services into the living room or simply to televisions has quickly morphed into multi-platform services with a rich and robust layer of control providing an application delivery framework. This trend promises to be a game changer on how media is collected, distributed and used by consumers.

Earlier this year HBO GO deployed their new application that enabled consumers to access their content from any platform (e.g., TV, PC, Tablet, Smart Phone) if they subscribed to HBO with an authorized service provider. Microsoft's Mediaroom architecture opened up the door for small operators to develop fully scalable ecosystems for the management and delivery of content/application services. Content providers and aggregators are developing the capability and resources to enable smaller Tier 2/3 providers to have the same look and feel as their Tier 1 counterparts providing:

1.The flexibility to service mainstream innovative applications;
2.Tier2 and 3 providers with the ability to develop customized applications matching specific operator environment and needs; and
3.Support for Third Party programs ecosystem that enables Tier 2/3 providers quickly manage and incorporate applications developers and content providers with offered services into their programming line up.



Source: TeleGeography Research

IPTV Market Growth

IPTV services are starting to show significant penetration into the broadband market place.

- 10 % Penetration Globally
- 45 Million Subscribers Worldwide
- North America has 16% of global IPTV Subscribers

These trends suggest that IPTV is beginning to take significant hold amongst broadband subscribers and should be considered by FTTH providers if they are looking to increase take rates for broadband services or compete with other triple play providers. This growing demand for digital video and entertainment is not expected to decrease any time soon. The Multimedia Research Group estimates there were 41.2 million IPTV users at the beginning of 2010 and projects growth to 101.7 million users by 2014, a 25.3 percent compounded annual growth rate (CAGR). Based on these and other reports, it is expected that video will account for 90 percent of global network traffic by 2014.

AT&T's U-verse service and Verizon's FIOS service rank number one in their respective regions for overall customer satisfaction with TV services. Triple play operators offerings (voice, data, and video) have seen reduced subscriber churn and as much as 50 percent year-over-year improvement in some cases. In addition as much as 50% of the new revenues coming from operators IPTV customers are coming from using paid video on demand (VoD) services.

The key issues still facing IPTV providers in the marketplace include;

- Managing system integration to ensure a quality product
- Access to affordable content
- Understanding threats/opportunities of over-the-top (OTT) video
- How can small providers participate in growing TV everywhere initiatives?

Each of these issues have solutions that work in favor of Holland BPW adopting IPTV as an enhanced service offering. Each of these issues (and their solutions) are examined in the pages that follow.

Managing System Integration

The key to managing IPTV deployments is the level of system integration required to ensure end-to-end performance. Network requirements dependent on the features deployed include:

Live TV
•Multicast,
•Instant Channel Change (ICC),
•Reliable UDP (RUDP)
•Restart Anytime (time shift)

Video-On-Demand (VOD)
RTP VOD Streaming
RTP VOD Download & Play (D&P)
Multi-BitRate (MBR) VOD streaming (OTT)

Home Media Sharing
•Whole-Home-DVR (WH-DVR)
•DLNA/UPnP

Client facing network systems that are needed to be provided by the operator include:
•DNS
•DHCP
•NTP

These features drive the flexibility of the service offerings that are still subject to bandwidth utilization/limitations from a network integration perspective. For multicast live TV, ICC/RUDP and RTP VOD streaming, downstream traffic must be prioritized over non-VoIP traffic on bandwidth constrained links. Any link can be constrained by peak traffic and must be managed to ensure smooth streaming. As an IPTV provider the operator must consider the available minimum bandwidth guaranteed to each subscriber for a host of potential services that will be made available based on the service mix. In a 2.5 Gbps GPON configuration the 32-way split would provide a minimum guarantee of approximately 80 Mbps with the ability to peak in an unconstrained usage environment up to the maximum available bandwidth that is still subject to the limitations of the home network (e.g., 54 to 300 Mbps).

As 10 Gbps GPON becomes available the 32-way split will increase the minimum guarantee to approximately 320 Mbps. Typically the operator would plan its services around the following variables and number of live streams based on the delivery format and Mbps stream services which vary by provider head-end and format/bandwidth of the standard and high definition streams (e.g., MPEG-2 or MPEG-4). The following examples demonstrate the calculations that HBPW would have to evaluate against the line-up of services that would be provided under and IPTV offering

- Standard Def (SD) Streams * MAX SD Bandwidth * Burst overhead, VOD Max SD Burst
- High Def (HD) Streams * MAX HD Bandwidth * Burst overhead, VOD Max HD Burst
- Max Concurrent Picture-In-Picture (PIP)*Burst Overhead
- Non – A/V Traffic

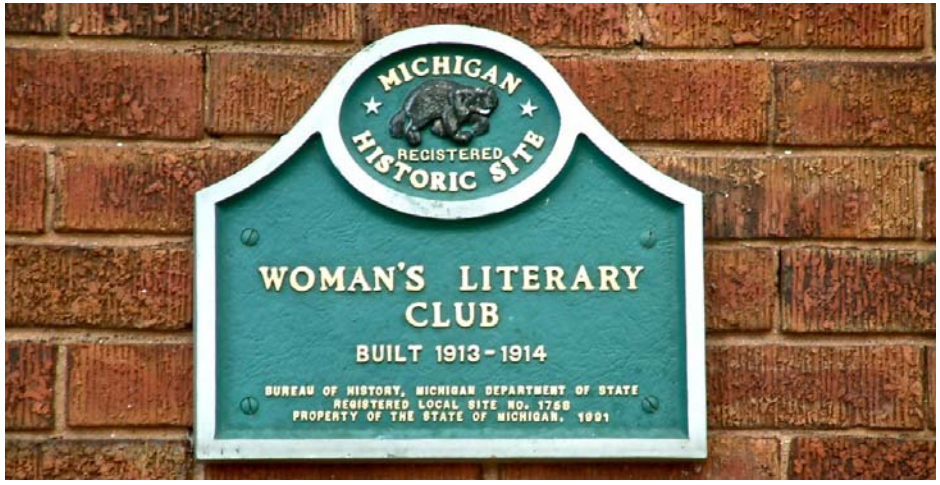
Enhanced Services

In addition to the basic network considerations, HBPW must consider the media management platform for the integration of the desired features that will be available through the platform selected. Given the trending towards application flexibility and ease of integration with other platforms and services, it would be recommended that HBPW take a more aggressive route towards building feature-rich services rather than providing a 'me-too' IPTV competitive package. This will require a greater upfront investment but provide HBPW with the tools necessary to compete in the changing and ever-evolving landscape of media services. In addition, this would enable HBPW to develop customized service applications with its anchor community partners, (e.g., Municipal, County, Health, Education, Smart Grid).

The Core IPTV Features needed include (example: Microsoft Mediaroom):

•On-screen guide – Intuitive on-screen Guide and user interface
•Instant channel change – Change channels in a blink of an eye
•Digital video recorder – Record, play, pause, rewind and fast-forward
•Video on Demand – Find movies and videos to watch—right now
•Remote record – Program your DVR from your PC or mobile phone
•Parental Controls – Control your shows your family members can watch
•Multiview – View multiple screens at one time on your television
•Media sharing – Connect your TV to your PC for instant access to personal media
o Multi-screen services
- Set-Top-Box (STB)
- Clients (e.g., Xbox 360, Browser and Phone OS Services)
- 3rd party clients

The trend in the industry is to support multiple video formats for large screen and small screen devices. The IPTV services are becoming more independent of viewer/device selection, requiring media sharing, while at the same time ensuring distribution rights and managing authentication. This requires that the IPTV platform incorporate both device independence, support 3rd party clients, and incorporate an integrated back office system. The back office system must be capable of supporting client services, identity management and content acquisition. The newer systems provide for sharing head-end facilities, aggregation of licensing, customized brand, skin, billing and management. Given the advanced nature and expense of these applications there are opportunities to build partnerships that both reduce the cost and the risk of developing and providing IPTV services.



Access to Content

The process of securing content agreements can be simplified by having one entity work with content owners. Aggregators (e.g., Avail & EchoStar), rather than multiple companies duplicating efforts will require a fee per subscriber for a package with a channel line-up that can range significantly by the package mix. They also offer individual channel line-ups ranging in price from a few cents to a few dollars. Though a provider can develop different channel line-ups than its competitors, most IPTV providers develop competitive packages and offer value added enhanced service packages. In addition to working out content agreements, aggregators will offer operators the option to deliver content to their networks rather than the operator investing in expensive head-end facilities. This kind of arrangement can reduce the head-end cost significantly but also increases the subscriber cost from anywhere around $3.50 to $5.00 per subscriber.

Building the head-end offers the operator the ability to effectively control the access and manage the distribution of channels at a fixed cost, enabling the operator to slightly increase its operating margin from subscriber distribution. Operators will front 30 to 40% more in up front capital but also see a 50% to 70% cost savings for content acquisition and distribution. This does not have any impact on the content packaging/pricing but helps to improve operating margins for content services.

Threat of Over-the-Top (OTT)

OTT is a general term for service that you utilize over a network that is not offered by that network operator. It's often referred to as "over-the-top" because these services ride on top of the service you already get and don't require any business or technology affiliations with a network operator. Sprint is an "over-the-top long distance" service as they primarily offer long distance over other phone company's phone lines. Often there are similarities to the service your local network operator offers and the services offered by the OTT provider.

Today there are a large number of OTT providers, (e.g., Netflix, Hulu, YouTube, Roku, Sezmi, iTunes) and more emerge everyday. These services are still in their infancy and have some time before they mature. The OTT business model breaks down traditional boundaries for commercial TV services relative to the licensing, payment processing and distribution by simply leveraging the availability of broadband. Most of the OTT 3rd party service providers are developing mass customization intended to offer subscribers/users flexibility and choice around the use of their content. OTT service models are adapting and will ultimately create opportunities, alliances, distribution of their services through reseller arrangements, bundling and distribution channel partnerships as the market for their services becomes more crowded. In addition we see OTT providers like Sezmi creating lightweight service options tailored to alternative ISPs/carriers.

Participation in TV Everywhere

The proliferation and widespread adoption of advanced end user devices that support Internet-based video streaming has created an insatiable appetite for video-based infotainment and personalized, interactive content on any device, at any time, with a high quality of experience (QoE). The latest reports from the U.S., for example, show that high-speed Internet has enabled a better online TV experience in 63.5 percent of U.S. households. Almost a quarter of households have smart phones that allow them to watch video wherever they are. And year-over-year growth of mobile online video viewing has reached 51.2 percent.

Any IPTV operator should consider enabling subscribers to access the content through whatever device they would like. New commercially available media management platforms have the ability to manage the remote identity management and authentication process as required by content owners (e.g. HBO). The flexibility provided helps to create operator loyalty and creates stickiness that helps to reduce churn rates.

AMR/AMI/Smart Metering

Utility service management has come a long way in the last few years, and through the deployment of smart meters can provide significantly greater capabilities over AMR/AMI solutions. Of significance is the ability to provide integrated communications, switching, real-time power quality data and programmable features for future upgrades with Home Area Networks gateways and web-based applications. Many of the AMI/Smart Meter vendors have developed fiber and wireless network solutions that leverage FTTH and LTE configurations. A few vendors have added 900 MHz wireless to enable hybrid networks with fiber access to remotely connect to homes/meters that do not subscribe to fiber, allowing utility companies to maximize their ability to connect clusters of homes through a single fiber connection. These additional features enable utility service providers to cost effectively connect homes and over time add additional value added services such as water heater control, water service metering/switching, and environmental sensor/management control for consumers. With the addition of web services, providers can develop new services around demand response, pre-payment options, load-control and revenue protection.

Enhanced Services

Energy Industry Drivers		FTTH-Enabled Solution
Increasing consumer demand for energy	• Bigger houses • More electronics • Want detailed usage info	• *"Always on" component of fiber enables true real-time energy profiling, modeling, and intelligent management.*
Decreased energy reserves	• Need real load management solutions now	• *Managing real-time usage data alone can impact load significantly and almost immediately.* • *Interim step towards alternative sources.*
Aging electric grid	• Pushing more and more info over decades old infrastructure	• *FTTH lends itself to expanding bandwidth growth.* • *Fiber itself is sustainable –no need to replace cable as technology advances.*
Increasing legislation pushing efficiency, real-time information	• EPAct 2005 • PURPA • DOE	• *Federally mandated programs are based on real-time information delivery to consumers.* • *Information efficiency leads to energy efficiency.*

With the deployment of FTTH, HBPW can easily offer utility energy management services to homes that connect for other network services. With a fiber attachment, an electronic meter collar can be added and directly connected to the physical network. This can then be connected to a private VLAN for HBPW energy service management. HBPW would then have access to real-time, always-on, access to residences and commercial buildings with fiber. Alternatively HBPW could use wireless systems such as LTE or 900 MHz options for facilities not connected to the fiber. However, wireless providers have not developed a cost model that effectively enables utility companies access to low cost bandwidth. Even with a cost *between $10 and $15 per month per subscriber* the use of commercial wireless becomes an expensive proposition for most utility companies. Even at lower rates $1 to $5 per subscriber this is an expensive solution.

Alternatively HBPW could develop and deploy its own wireless system or use emerging 900 MHz technologies (now available with some smart meter suppliers) to cluster homes around areas where fiber connections have been made. As more households and commercial enterprises are added to the fiber, the network reach will become wider and the need for 900 MHz capacity will be reduced, making it an effective migration strategy and an incentive that can be used to market with other HBPW FTTH enhanced service solutions. This type of approach to an energy management solution would provide HBPW with anywhere from $500,000 to $1.5 million in telecom cost avoidance per year (not including energy savings to HBPW & consumers).

Technical Considerations Recommendations Summary

Network Services

•Build-out fiber distribution via backbone/aggregation using distribution hubs to aggregate households and businesses in 500/1000 increments

•Develop a GPON distribution strategy using 32-way splitters with the intent to leverage the 10G/GPON infrastructure coming out over the next 12 to 18 months

•Develop a GPON/AE Architecture that enables both shared and dedicated fiber network services

•Provide Layer 2 & Layer 3 transport developing an MPLS VLAN QoS service model for carrier and ISP services

•Develop an Internet Service Exchange

•Build out backhaul fiber to Grand Rapids to develop an Internet Service Exchange for ISP and Vertical Service Provider Connections

•Connect to central offices, collocation and data center facilities in region to provide commercial service interconnection options

•Optionally consider building or partner to build a small 10,000 square foot Tier 4 data center facility for HBPWs local telecommunications and Internet service exchange operations

Enhanced Services

•Develop an Internet service platform and provide wholesale services to ISPs and retail Internet services to residential subscribers.

•Develop a VoIP residential/commercial offering

o Register as a CLEC

o Interconnect to local Cos and SIP providers in Grand Rapids

•Develop an IPTV residential/commercial offering

•Investigate the deployment of hybrid FTTH Smart Meter solution such as Carina that provide fiber and 900 MHz wireless collar solutions

2011 Broadband Strategic Plan

Regulatory and Political

Regulatory & Political Considerations

There are a myriad of regulatory and political considerations when a municipality is embarking on a course resulting in the direct provisioning of value-added telecommunication services to the commercial and/or residential marketplaces. The leadership team at Gigabit Squared has been leading the development of open, vendor-neutral, public, private and commercial networks for decades. Nonetheless, given the ever-shifting legal and regulatory landscape that is associated with such undertakings, it is our practice to do a thorough legal review of applicable statutes, regulations and potential roadblocks prior to making any recommendations.

We have sought the opinion of one of the premier telecommunication law firms in the country in support of the course of action that we are recommending for the Holland BPW's broadband line-of-business: The Baller-Herbst Law Group. **The opinion rendered by the firm was done under the attorney-client privilege statutes applicable to the relationship of Gigabit Squared (client) and Baller-Herbst Law Group (attorney). We are waiving our right to privilege for the sections quoted directly from the opinion contained herein in our analysis.**

OUR WAIVER OF THIS RIGHT DOES NOT CONSITUTE THIS BEING LEGAL COUNSEL OR OPINION FOR THE CITY OF HOLLAND OR THE HOLLAND BOARD OF PUBLIC WORKS. GIGABIT SQUARED HIGHLY RECOMMENDS THAT BEFORE COMMENCING UPON ANY COURSE OF ACTION WHICH WOULD SIGNIFICANTLY ALTER THE EXISTING BUSINESS MODEL FOR THIS MUNICIPAL NETWORK THAT THE BALLER HERBST GROUP OR ANOTHER REPUTABLE SPECIALIST TELECOMMUNICATIONS PRACTICE BE ENGAGED TO REVIEW THE DETERMINED COURSE OF ACTION FOR POTENTIAL LEGAL OR REGULATORY ISSUES ON THE FEDERAL, STATE, COUNTY AND MUNICIPAL LEVEL.

Now, with that out of the way, here is our analysis of the critical issues governing our recommendations for the City of Holland's Board of Public Works:

Federal law encourages local governments to provide communications services of all kinds, but it does not affirmatively empower them to do so. For such authority, local governments must look to state and local law.

A. Telecommunications Service

With respect to telecommunications services, Section 253(a) of the Telecommunications Act, 47 U.S.C. § 253(a), states:

No state or local statute or regulation or other state or local legal requirement may prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.

Despite the broad sweep of this language, the Supreme Court of the United States held in Jeremiah W. (Jay) Nixon v. Missouri Municipal League, 541 U.S. 125, 541 S.Ct.125 (2004), that the term "any entity" in Section 253(a) does not cover public entities. The Court found that Congress had not expressed its intent clearly enough in Section 253(a) to meet the Court's extraordinarily high standards for finding federal preemption of traditional state powers. The Court stressed, however, that its decision "[did] not turn on the merits of municipal telecommunications services" and that, as a matter of public policy, municipalities have "at the very least a respectable position, that fencing governmental entities out of the telecommunications business flouts the public interest." Nixon, 124 S.Ct. at 1560. The Court also noted that the FCC had "denounced the policy behind the Missouri statute;" that Chairman William Kennard and Commissioner Gloria Tristani had "minced no words in saying that participation of municipal entities in the telecommunications business would 'further the goal of the 1996 Act to bring the benefits of competition to all Americans, particularly those who live in small and rural communities in which municipally-owned electric utilities have great competitive potential.'"

B. Cable Television

Similarly, in the cable area, Section 613(e)(1) of the Communications Act, 47 U.S.C. § 533(e)(1), states that a "franchising authority may hold any ownership interest in any cable system." Since the term "franchising authority" is defined in Section 602(10), 47 U.S.C. § 522(10), as "any governmental entity empowered by Federal, state or local law to grant a franchise," one could reasonably read the Act as authorizing any local government to provide cable television service. The courts, however, have read this language as merely "permissive rather than empowering" – i.e., that Section 602(10) is not a federal grant of authority to provide cable service. See, e.g., Time Warner Communications Inc. v. Borough of Schuylkill Haven, 784 F. Supp. 203, 213 (E.D. Pa. 1992).

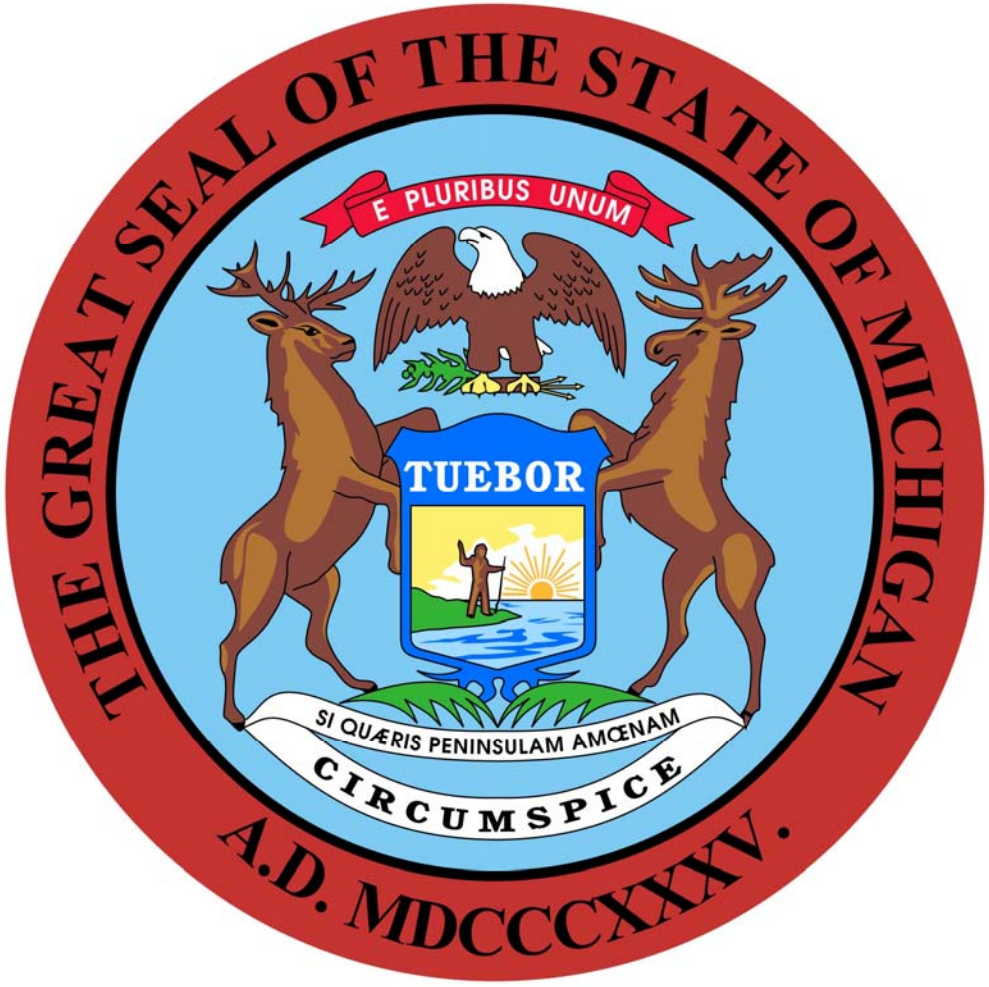
C. Internet Access

There is widespread consensus among the Obama Administration, Congress, the States, local governments, incumbent and new cable and telecommunications providers, and virtually all of other stakeholders, on the point that federal law should be interpreted so as to encourage the deployment of advanced communications services and capabilities nationwide as rapidly as possible. Nevertheless, the broad national consensus on encouraging Internet-based services is suggestive only. As with telecommunications and cable services, no federal law affirmatively authorizes local governments to provide high-speed Internet access service. Indeed, in its 2010, National Broadband Plan, the Federal Communications Commission ("FCC") called upon Congress to pass legislation prohibiting States from imposing limitations on the ability of local governmental entities from providing broadband services.

Accordingly, any analysis of the ability of HBPW to provide various communications services must begin with a review of the underlying authority of HBPW to provide communications services under its State and local laws, including applicable charters and ordinances, and any restrictions contained within the grant of such authority.

Local governments are generally deemed to have only such powers as their states give them, either explicitly or implicitly, in the state constitution or in acts of the state legislature. Grants or denials of powers are said to be explicit when they expressly name the power in question. They are said to be implicit when a power is not named but can reasonably be inferred from an explicit grant or denial of a different power from the one in question. A starting point therefore is a review of whether Michigan has authorized or prohibited governmental entities from offering particular types of communications services

State of Michigan Landscape



1. Telecommunications Service – Michigan Law Expressly Authorizes Municipal Provision Under Certain Conditions

1. Requirement to seek competing bids to provide service

Michigan law expressly authorizes cities to provide "telecommunications services" if the municipality first seeks requests for third parties to provide the proposed services and the municipality does not receive at least three qualified bids. Specifically, Section 484.2252 of the Michigan Compiled Laws provides in pertinent part, with our emphasis added, 484.2252 Telecommunication services offered by public entity.

(1) A public entity may provide telecommunication services within its boundaries if the public entity has complied with the requirements of section 14 of the metropolitan extension telecommunications right-of-way oversight act, 2002 PA 48, MCL 484.3114, and all of the following apply:

(a) The public entity has issued a request for competitive sealed bids to provide telecommunication services.

(b) The public entity has received less than 3 qualified bids from private providers.

(c) It is more than 60 days from the date the request for bids was issued.

(d) The public entity is providing the telecommunication services under the same terms and conditions as required under the request for bids issued pursuant to subdivision (a).

The statute defines the term "public entity" as a county, city, village, township, or any agency or subdivision of the public entity. Thus, HBPW has the authority to provide "telecommunications services," if it: (1) complies with the with the requirements of section 14 of the metropolitan extension telecommunications right-of-way oversight act, 2002 PA 48, MCL 484.3114; and (2) either does not receive at least three qualified bids to provide the proposed services or, as discussed below, is otherwise exempt from the public bid requirement.

Exceptions to Qualified Bid Requirements

There are several exceptions to the requirement that a municipality seeking to provide telecommunications services may only do so if it does not receive at least three qualified bids from private providers to offer the proposed service. Specifically, § 484.2252(5) indicates that the requirement to first seek competitive bids for the proposed services does not apply to the following:

(a) Public safety systems.

(b) Systems used only for the internal use of the public entity or for the sharing of information between the public entity and another public entity.

(c) A public entity that is currently providing telecommunication services or that has held a public hearing by November 1, 2005 on a proposal to provide telecommunication services, or has issued a request for bids by November 1, 2005 to provide telecommunication services, or has an enforceable contract to begin construction of a telecommunication system by November 1, 2005.

(d) A public entity that is currently providing service in another public entity's boundaries.

(e) Services offered by a public entity to the public within a facility owned and operated by the public entity.

(f) Systems or services used or offered by 1 or more public entities or consortiums to advance or promote the public health, safety, and provision of e-government services

Among these exceptions, subsection 484.2252(5)(c) is particularly significant, as it exempts cities that have been engaged in the provision of "telecommunications services" prior to November 1, 2005, from having to comply with the competitive bidding requirements. Moreover, the exemption does not appear to require that prior existing telecommunications services be of the same type or caliber as what a city may choose to offer in the future, but rather the prior existing services at issue need only satisfy the definition of telecommunications services as defined under applicable Michigan law.

Section 484.2252 is part of the Michigan Telecommunications Act ("MTA")(codified at MCL 484.2103 et seq.), and therefore the MTA's definitions are applicable to municipal networks.

The term "telecommunications service" is defined broadly in the MTA as: follows: "Telecommunication services" or "services" includes regulated and unregulated services offered to customers for the transmission of 2-way interactive communication and associated usage. A telecommunication service is not a public utility service.

This State statutory definition is considerably broader than the federal definition of telecommunications services, and encompasses the provision of virtually all two-way communications transmission services, including broadband access service. MCL § 484.2102(gg).

Application of Law to City

In its Charter, the City has reserved to itself all powers granted to cities by the constitution and the general laws of Michigan to own, construct and operate public utilities.

Specifically, Section 12.3 of the City Charter provides:

Sec. 12.3. General powers relative to municipal utilities and services.
The city shall possess and hereby reserves to itself all powers granted to cities by the constitution and general laws of the State of Michigan to acquire, by purchase or condemnation, the franchises, if any exist, and the property used in the operation of companies or individuals engaged in the electric, light, gas, heat, water and power business and for the purchase and condemnation of private property for any public use or purpose within the scope of the powers specified herein, to construct, own, operate, improve, enlarge, extend, repair and maintain, either within or without its corporate limits, airports, landing fields and aeronautical facilities, hospitals and public utilities, including, but not by the way of limitation, public utilities for treating and supplying water, and for supplying light, heat, power, gas, sewage treatment and garbage disposal facilities, or any of them, to the city and its inhabitants; and also to sell and deliver water, light, heat, power, gas and other public utility services, without its corporate limits to an amount not exceeding the limitations set by the state constitution. The power to supply, as herein possessed and reserved, shall include the power to extract and process water, electricity or gas from natural resources, to manufacture the same or to purchase the same from others.

While the operation of telecommunications utilities is not specifically enumerated among the type of utilities authorized, the broad scope of this language and reservation of rights, coupled with the specific authorization under Section 484.2252 (and Section 484.3114 discussed below) provide authority for the City to provide telecommunications services if it complies with the procedural requirements of these laws.

We understand that the City, acting through the HBPW, currently offers what it calls "commercial bandwidth" service over its existing fiber network to schools, small and large businesses, municipal offices, medical offices and community service organizations.

The HBPW website describes the commercial bandwidth service as follows:

Commercial Bandwidth Option
This service provides an Ethernet interface, at bandwidths from 0.5 to 1000 Mbps. Point to point Ethernet can replace local T-1 circuits or dial-up networks. Additional nodes are available at discounted rates. We can also provide point to point bandwidth service from your building to one of our connected ISPs. Installation estimates, setup fees, and bandwidth rates are available upon request.

This bandwidth service offering would appear to fit easily within the MTA's expansive definition of "telecommunications service." Accordingly, if the HBPW offered this service, or similar services, prior to November 1, 2005, HBPW would arguably not have to comply with the competitive bidding requirements of Section 484.2252. HBPW may, however, find it advisable to comply with the competitive bidding requirement irrespective of whether it is technically exempt or not. First, the development of a FTTH network and the provision of a substantially broader range of services over it is arguably a different undertaking than HBPW's existing services, both in the nature and scope of the services in question. If HBPW avoids the bidding requirements, it may therefore be challenged by the established communications carriers. Furthermore, as a practical matter, the bidding requirements should not be difficult to satisfy, as it is highly unlikely that HBPW would get three separate bona fide proposals from private sector entities to build FTTH networks, and otherwise meet HBPW's requirements for an advanced network.

4. Compliance with the Metropolitan Extension Telecommunications Right-of-Way Oversight Act

To provide telecommunications services, a public entity must comply with the requirements of Section 14 of the Metropolitan Extension Telecommunications Right-of-Way Oversight Act ("Metro Act"), 2002 PA 48, MCL 484.3114. Under this law a municipality must comply with a number of procedural requirements in order to "construct telecommunication facilities or provide a telecommunication or cable modem service provided through a broadband internet access transport service." These requirements include the following:

(a) Prior to adopting an ordinance or resolution authorizing the construction of facilities the municipality must conduct at least 1 public hearing. A notice of the public hearing shall be provided as required by law.

Application of Law to City

(b) Not less than 30 days before the public hearing the municipality prepare reasonable projections of at least a 3-year cost-benefit analysis. This analysis shall identify and disclose the total projected direct costs of and the revenues to be derived from constructing the telecommunication facilities and providing the telecommunication or cable modem service through a broadband internet access transport service. The costs shall be determined by using accounting standards developed under the uniform budgeting and accounting act, 1968 PA 2, MCL 141.421 to 141.440a.

(c) Prepare and maintain accounting records in accordance with accounting standards developed under the uniform budgeting and accounting act, 1968 PA 2, MCL 141.421 to 141.440a. The accounting records required under this subdivision are subject to the freedom of information act, 1976 PA 442, MCL 15.231 to 15.246.

Charges for telecommunication service and cable modem services provided through a broadband internet access transport service shall include all of the following:

(i) All capital costs attributable to the provision of the service.

(ii) All costs attributable to the provision of the service that would be eliminated if the service was discontinued.

(iii) The proportionate share of costs identified with the provision of 2 or more municipal services including telecommunication services.

(e) The municipality may not adopt an ordinance or a policy that unduly discriminates against another person providing the same service. Subject to other requirements of this section, this subsection shall not be construed as precluding a county or municipality from establishing rates different from those of another person providing the same service.

(f) The municipality may not employ terms more favorable or less burdensome than those imposed by the municipality upon other providers of the same service within its jurisdiction concerning access to public rights-of-ways.

(g) The municipality may not impose or enforce against a provider any local regulation with respect to public rights-of-way that is not also applicable to the municipality in its provision of a telecommunication or cable modem service provided through a broadband internet access transport service.

(h) The municipality may not employ terms more favorable or less burdensome than those imposed by the municipality upon other providers of the same service within its jurisdiction concerning access to and rates for pole attachments.

As with Section 484.2252, there are several broad exceptions to the requirements of Sections 484.3114(1)(a)-(h). Of potential relevance to HBPW is Section 484.3114(2)(b) which indicates that the above requirements do not apply to:

Telecommunication facilities that are owned or operated by a county, municipality, or an affiliate for compensation, and that are located within the territory served by the county, municipality or its affiliate that provided a telecommunications service or a cable modem service provided through broadband internet access transport service before December 31, 2001 or that allowed any third party to use the county's or municipality's telecommunication facilities for compensation before December 31, 2001, to provide such a service.

As can be seen, the above provision essentially grandfathers municipal telecommunications facilities that were used to provide commercial service before December 2001, and insulates them from the requirements of 484.3114(1).

The above exemption may, however, be only of limited practical value to HBPW's efforts at building a FTTH network, as it only applies to those facilities that were in place and used commercially as of December 31, 2001, and therefore would not apply to newer facilities, let alone portions of the FTTH network yet to be constructed.

As indicated, to the extent that the City's proposed expansion plans are not grandfathered, the City will have to conduct at least one public hearing prior to adopting an ordinance or resolution authorizing the construction of new facilities. According to the Legal Opinion, the City's Charter provides for such a hearing to be conducted by either the City Council or the Board of Public Works.

This decision will likely turn, in part, on whether the City elects to create a new department for the operation of the FTTH or to place it within the HDPW as either a new division or a subdivision of the electric utility. The Legal Opinion observes that this is largely a policy choice under Section 12.15 of the City Charter.

Sec. 12.15. Other city utility services.
The council shall be charged with the responsibility for constructing, maintaining, improving and extending the sewage disposal facilities, the fire alarm system, and such other utilities of the city as existed on the date this Charter became law or which may thereafter have been acquired by the city. Such facilities shall constitute one (1) or more separate departments of the city government or may be assigned by resolution of the council to an appropriate department or division of the city government, or shall be under the administrative charge and responsibility of the city manager as the council shall determine.

We understand that the communications services that the City currently provides are offered through the HBPW, but we do not know whether HBPW does so through a separate division or as part of the electric utility. As the Legal Opinion observes, if the new communications services are made part of the electric utility, the City will have to observe strict separate accounting requirements.

5.Michigan Public Service Commission Authority

As a general matter the Michigan Public Service Commission does not have regulatory authority over municipal telecommunications systems. This is confirmed in Section 484.2401 which lists (with our emphasis) the categories of services over which the MPSC does not have authority, unless otherwise specified.

Unregulated services generally.
Except as otherwise provided by law or preempted by federal law, the commission shall not have authority over enhanced services, paging, cellular, mobile, answering services, retail broadband service, video, cable service, pay-per-view, shared tenant, private networks, financial services networks, radio and television, WATS, personal communication networks, municipally owned telecommunication system, 800 prefix services, burglar and fire alarm services, energy management services, except for state institutions of higher education the reselling of centrex or its equivalent, payphone services, and the reselling of an unlicensed telecommunication service. The foregoing services shall not be considered part of basic local exchange service.

The Metropolitan Extension Telecommunications Right-of-Way Oversight Act, however, vests the MPSC with limited authority over municipal systems to hear complaints alleging a violation of Section 484.3114 with respect to discriminatory treatment.

6. Authority to own, operate, and finance public works

Apart from granting municipalities authority to provide telecommunications services and operate telecommunications plant under Sections 484.2252 and 484.3114, the Michigan Code also provides municipalities broad authority to own and operate public works. Specifically, Section 117.4(e) of the Michigan Compiled Laws provides:

117.4e Public property; condemnation of private property; permissible charter provisions.
Each city may in its charter provide:

Application of Law to City

(1) For the acquisition by purchase, gift, condemnation, lease, construction or otherwise, either within or without its corporate limits and either within or without the corporate limits of the county in which it is located, of the following improvements including the necessary lands therefore, viz.: City hall, police stations, fire stations, boulevards, streets, alleys, public parks, recreation grounds, municipal camps, public grounds, zoological gardens, museums, libraries, airports, cemeteries, public wharves and landings upon navigable waters, levees and embankments, watch-houses, city prisons and work houses, penal farms, institutions, hospitals, quarantine grounds, electric light and power plants and systems, gas plants and systems, waterworks plants and systems, sewage disposal plants and systems, market houses and market places, office buildings for city officers and employees, public works, and public buildings of all kinds; and for the costs and expenses thereof;

Section 141.104 provides:

141.104 Municipal public improvements; limitations; bonds; acquiring utility for supplying light, heat or power; referendum; powers exercised.

Any public corporation is authorized to purchase, acquire, construct, improve, enlarge, extend or repair 1 or more public improvements and to own, operate and maintain the same, within or without its corporate limits, and to furnish the services, facilities and commodities of any such public improvement to users within or without its corporate limits. The exercise by any public corporation of such powers outside its corporate limits shall be subject to the legal rights of the political subdivision within which such powers are to be exercised and shall also be subject to any and all constitutional and statutory provisions relating thereto. The authority herein granted shall be further limited as follows:

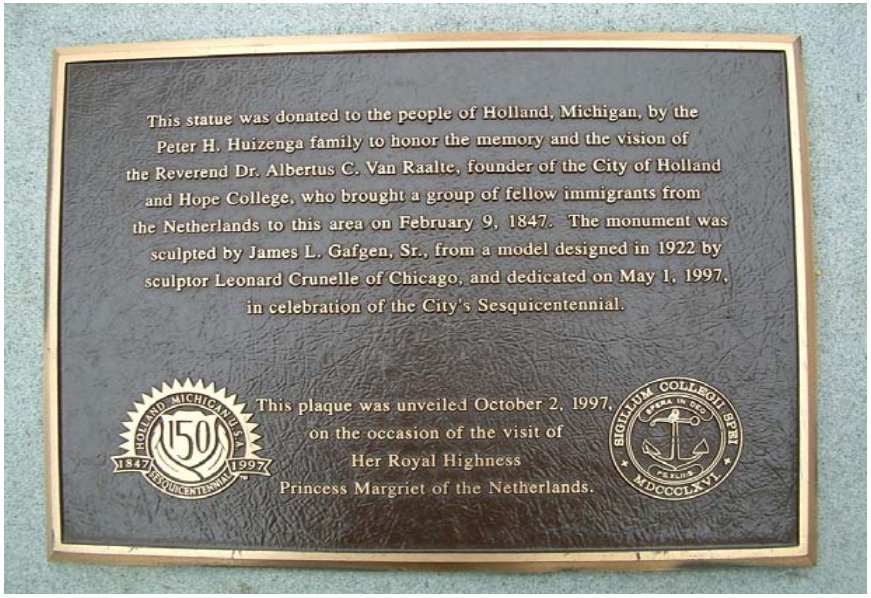
***

(e) No public corporation may acquire a utility for the supplying of light, heat or power unless such proposition shall have first received the affirmative vote of 3/5 of the electors of such public corporation voting thereon at a regular or special municipal election.

The powers in this act granted may be exercised notwithstanding that no bonds are issued hereunder.

In specifying the kinds of "public improvements" that municipalities can provide, Section 141.103(b) includes in the definition of that term "…; utility systems for supplying light, heat, or power, including plants, works, instrumentalities, and properties used or useful in connection with those systems; approved cable television systems, approved cable communication systems, or telephone systems, including plants, works, instrumentalities, and properties used or useful in connection with those systems; …." The fact that the Michigan legislature expressly included communications utilities in the definition of "public improvements" immediately after heat, light, and power utilities but then made only the latter subject to a referendum requirement in Section 141.104(e) strongly suggests that the Legislature did not intend to require municipalities to conduct a referendum before acquiring a communications utility.

This broad authority to operate public works when coupled with the specific statutory authority to own, operate and maintain telecommunications facilities and provide services, provides the City ample authority to provide telecommunications services.



B. Cable Services

Michigan law authorizes all providers of telecommunications service to offer cable service if the provider obtains a cable franchise agreement from the applicable local cable franchising authority. A provider of telecommunication service, including, basic local exchange service, may provide cable service if the provider has received a franchise agreement from the local unit of government to provide cable service.

As discussed above in Section II.A, Michigan law authorizes all local governmental entities to provide telecommunications services, provided that they comply with the applicable competitive bidding requirements of Section 484.2252. Accordingly, if HBPW is a telecommunications service provider it is eligible to provide cable service so long as it also receives a cable franchise from HBPW or applicable local cable franchising authority.

Cable franchising in Michigan is accomplished at the local level, however, all such franchises are required to be consistent with the general provisions of the Uniform Video Service Local Franchise Act. Under the Franchise Act the MPSC developed a standardized streamlined form for the uniform video service local franchise agreement to be used by each franchising entity in this State, and includes standardized provisions on such matters as franchise fees, public, education and government access channels and consumer complaints.

C. Internet Access

As indicated above, a condition on the authority of a public entity to provide telecommunications services is that the public entity comply with the requirements of section 14 of the Metropolitan Extension Telecommunications Right-of-Way Oversight Act, 2002 PA 48, MCL 484.3114. This same law also addresses the ability of governmental entities to provide Internet access.

The same requirements for a public hearing, a three-year cost benefit analysis, accounting safeguards and non-discrimination provisions that are applicable to a municipality's construction of telecommunications services (discussed in II.A.4 above) also apply to the construction of facilities for the provision of cable modem or Internet access transport services.

Also, because the ability to use telecommunications or cable facilities to provide Internet access service is subject to the underlying authority to provide telecommunication service, the authority to provide Internet access service is necessarily contingent on HBPW having authority to provide telecommunications services under Section 484.2252.

III. CONCLUSION

Based on all of the above, we believe that municipalities in Michigan, such as HBPW, have express authority to provide voice, video and data services, provided that they comply with the applicable statutory procedural requirements described herein.

Public Private Partnerships & Funding

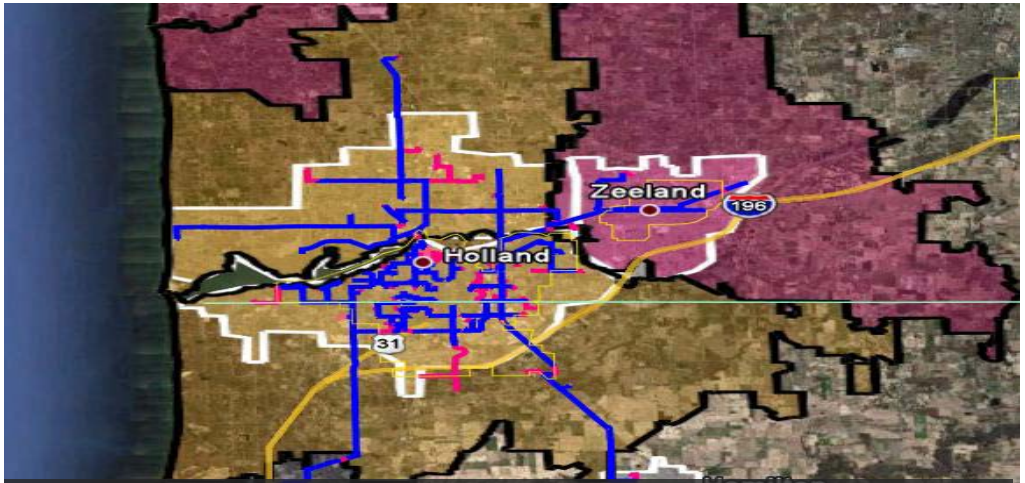
Broadband infrastructure is a wonderful tool for the brokering of public private partnerships that can subsidize build, last mile connectivity, on-going operational and customer acquisition costs. If HBPW takes a trans-sector approach to the planning, capitalization and implementation phases of its FTTH initiative it has the opportunity to generate new multipliers for funding, impact, services and competitiveness. How does it work? In theory, it's really quite simple: Map the potential beneficiaries of any proposed project and join forces.

This sounds easy, but it requires methodological structure and discipline to obtain optimal results. For success in brokering public-private partnerships HBPW must:

1. Think 'outside its operational and quasi-governmental silo'
2. Map potential beneficiaries
3. Sell co-investment ROI
4. Establish governance
5. Manage the partnership(s)
6.Design and execute across institutional boundaries

The beautiful thing about an FTTH investment is that it crosses departmental and institutional boundaries when conceived, designed, constructed and implemented effectively. This has been already well-documented in HBPW's existing revenue breakdowns: 19% of existing revenues stem from internal operations, government and K-12 contracts. If HBPW expands its thinking regarding the broadband service offering to the same level of impact that the electrical grid or highway system has on any community, the pathways to successful partnership become clearer. Who are the beneficiaries? It turns out to be simpler to ask who isn't a beneficiary, because the list of beneficiaries crosses all sectors (is 'trans-sector') within society:

- Government
- Health Care
- Education
- Manufacturing
- Distribution
- Food and Retail
- Small Business Enterprises
- Large Business Concerns
- Financial Institutions
- Social Service Organizations
- Arts and Cultural Institutions
- National/Global Supply Chain
- National/Global Retailers
- People: Residents & Tourists



Co-Investment Opportunities for FTTH Deployment

Stakeholder mapping (e.g. current and potential HBPW customers) reveals alternative capital, revenue stream, market and product launch potential

Co-Investment opportunities identified through structured trans-sector stakeholder mapping is the first step to achieving HBPW's public-private partnership goals. All too often communities and enterprises determine it wise through traditional return-on-investment analysis to settle for an Edsel, when the market, our partners, stakeholders and constituents require a Ferrari. Actively pursued and carefully managed collaboration is the key.

The map above is representative of the leap to a trans-sector approach to broadband infrastructure investment – potential partners, co-investors and champions become clear. And a roadmap to success emerges that is repeatable, sustainable and actionable.

The challenge is understanding how to position and craft true 'win-win' value propositions that overcome the traditional ownership, control and motive issues that undermine and ultimately doom most partnering and co-investment efforts. This is not a trivial undertaking, and the stakes are high. If a partner's functional objective can be achieved for a fraction of the cost through collaboration – that's what matters . It's the basis for 'win-win' co-investment: quantifiable impact vs. stand-alone TCO. Given the high cost of entry to a FTTH world, the value proposition for commercial, civic, state and federal partners is clear.

'Low Hanging Fruit'

The number of public-private partnership opportunities spurred by an investment in FTTH by HBPW are numerous – all of which have significant cost-avoidance, customer acquisition and/or revenue generation value. But the benefit is mutual to the organizations that partner and co-invest with HBPW: it enables an extension of their enterprise, service delivery or mission-driven objective not possible without a core investment in FTTH infrastructure that creates real-time interconnectivity with their key stakeholders.

Sample opportunities, requiring attention by HBPW in order to generate results, include:

•Healthcare
Both interviews with current HBPW healthcare customers and the trajectory of HIPAA regulations and Medicare/Medicaid reimbursement policies indicate that primary institutions like Holland Hospital are potential co-investors in an FTTH program. The extension of advanced telehealth, telemedicine and home health monitoring solutions, including those currently being subsidized at the federal level in pilot programs across the country to study the impact of the avoidance of institutionalization for the chronically infirm and elderly make these institutions obvious partners for targeted neighborhood/institutional builds, last mile subsidies and in-home equipment costs.

•Municipal, Township and County Government
FTTP/FTTH solutions, if offered in conjunction with enhanced services (i.e. Triple Play) and big bandwidth (e.g. 100 MB+) provide government with the opportunity to create dramatic efficiencies while extending, enhancing and deepening citizen services. From public safety and intelligent surveillance solutions to advanced traffic management, video arraignment and shared platforms, the business case for co-investment and anchor tenancy is strong.

•Medium and Large Commercial Enterprises
Information communication technologies (ICT) and business are so intertwined today as to be inseparable. From employee attraction and retention via flexible work times and telecommuting arrangements to the 24x7x365 demands of the global economy, employers are looking for ways to extend the workplace into the places where their employees are 'after hours.' The ability to create employee benefit subsidy packages for last mile connectivity, equipment and Internet/VoIP connectivity (much like bus pass and cell phone subsidies) is an obvious public-private partnership initiative.

- Higher Education, K-12 and Social Service Agencies
  By definition, all three of these groups have a vested interest in their constituents being connected via high speed options. From distance learning, to advanced research and collaboration, to parent engagement and client tracking, services delivery and interaction, intercommunication is core to the missions of all three groups. This is a key opportunity for collaboration once value-added services are offered, as the direct benefits to their stakeholders are tremendous and funds largely come from state and federal sources.

- Providers and 3rd Party Operators
  There is the opportunity to partner with both providers and 3rd party operators for both capital and on-going operational costs associated with an FTTH deployment. IPTV and cellular operators, such as Microsoft MediaRoom, AT&T, Verizon, Sprint and others may subsidize a build if given rights and co-branding for the delivery of content over the network (a pennies on the dollar investment for them as compared to the cost of a fiber deployment) or if connecting cell towers with fiber for LTE services.

  3rd party operators are also very viable potential partners for an FTTH build-out should HBPW decide to take a wholesale or active sharing approach to the commercial and/or residential sectors. If, for business, political or other reasons HBPW decides to eschew the delivery of enhanced services to either of these sectors, there may be 3rd party providers willing to directly invest CAPX and OPX capital in exchange for on-going rights to use fiber or wave IRUs for commercial purposes. As an example, Gigabit Squared offers a Build-Operate-Operate model in which we provide significant capital investment in exchange for commercial rights.

Other Funding Sources

Discussions with HBPW staff indicated that the primary mechanisms for funding this initiative would most likely be an internal loan from the Electric Utility for equipment (due to its shorter term depreciation schedule) and a municipal bond for actual FTTH network construction. It should be noted that the financial models generated through this analysis indicate the ability to obtain both state and federal bonds in support of the project. It is also very important, in relation to public-private partnership opportunities, that HBPW recognizes its significant on-going advantage in ANY federal bid using broadband for energy management, smart grid, healthcare, education, economic development, etc. The largest barrier to program funding on the federal level is the lack of a functional infrastructure and the ability to demonstrate match via investment (i.e. FTTH build costs).

2011 Broadband Strategic Plan

Financials & Staffing

Financial Scenarios

Our team reviewed four (4) financial scenarios based on HBPWs interest in evaluating wholesale versus retail services, and their potential impact on its proposed FTTH/B investment. The four scenarios are listed by their overall contribution and impact on debt services. The most favorable model for HBPWs investment turns out to be a combination of wholesale/retail services providing the triple play to residential/commercial subscribers as identified in Scenario 1. The following financial summary is broken up into the following four scenarios.

Scenario 1 – Triple Play (Broadband Internet, VoIP, IPTV)
Scenario 2 – Double Play (Broadband Internet, VoIP)
Scenario 3 – Single Play (Broadband Internet)
Scenario 4 – Wholesale Residential/Retail Commercial Ethernet

The high capital hurdle required to deploy FTTH/B introduces a significant barrier for most providers. Greater Holland represents a Tier 3 city based on market size and demographics. Gigabit Squared knows of no incumbent that has invested in FTTH overbuild once an alternative provider has entered the market.

The financial models are affected by a number of factors including; capital requirements & cost, method of deployment & operating expenses, and sufficient working capital to support the business until it can reach sustainability. In addition, the product/pricing mix is a critical factor in driving residential/commercial clients to a new provider. Take rate is the method used to describe the addition of subscriber connections and the addition of new services. The longer the take rate the more capital is needed to support the business to sustainability. The lower the take rate the higher the product/pricing mix needs to be to cover expenses. Two common mistakes made by providers are: 1. Developing products/pricing scenarios that produce lower take rates and drive prices higher and, 2. Greatly underestimating the capital needs for generating a sustainable business model.

Our approach in developing the four scenarios was to build a fair and moderate product/pricing mix that would be competitive in the marketplace and to ensure that HBPW clearly understands the capital needed to support a 50% take rate. The models include both a revenue bond for long-term fiber and internal HBPW loans for electronics. The financing model covers the capital needs for the first three (3) years for both fiber and electronics. Financing future capital needs is handled as a cash management expense in Year 4 and beyond.

Product/Pricing Mix

The product pricing detail in the financial model was designed to provide average subscriber revenues consistent with the residential/small business marketplace. Although HBPW may acquire some larger subscribers on the commercial side of the business, it is anticipated that the average revenue per customer for its services will be relatively modest, reflecting the small to medium business market trends evident in the serving area. Although this average is expected to grow, it remains relatively modest overall. Two key factors were used in developing the model pricing and average product/revenue mix.

The first is the current retail services pricing range for similar products. Our market pricing assessment reflects significant market confusion and a wide range of pricing with short term low end pricing followed by more significant pricing after the first six to twelve months. The product pricing mix was developed to reflect the desire of HBPW to provide a valuable community service at a fair and equitable price. The resulting revenue averages per subscriber reflect cost effective pricing across all of the products offered and provide a highly competitive price with enhanced content services.

The second factor is the impact of content costs in the product/pricing mix. The content costs for Internet/SIP are being commoditized and costs are expected to continue their downward trend. In addition, Internet/SIP Trunks can be oversubscribed as a service and enable HBPW to manage the content cost by monitoring usage trends and managing the capacity purchased to either decrease pricing or increase margin opportunities.

The following two tables provide the average product/service revenue, content costs and margin per subscriber used to generate the financials for Scenarios 1 through 4.

RESIDENTIAL MARKET SUMMARY

	Year 1			Year 5		
	Average Revenue per Subscriber	Average Content Fees per Subscriber	Average Contribution Margin per Subscriber	Average Revenue per Subscriber	Average Content Fees per Subscriber	Average Contribution Margin per Subscriber
IPTV Only	$ 57.36	$ 36.07	$ 21.29	$ 57.36	$ 36.07	$ 21.29
Internet Only	$ 43.16	$ 11.03	$ 32.13	$ 72.98	$ 33.10	$ 39.88
IPTV & Telephone	$ 81.74	$ 45.50	$ 36.24	$ 81.74	$ 45.88	$ 35.86
IPTV & Internet	$ 100.52	$ 47.10	$ 53.42	$ 130.34	$ 69.17	$ 61.17
Telephone & Internet	$ 67.54	$ 20.46	$ 47.08	$ 97.36	$ 42.91	$ 54.45
IPTV, Telephone & Internet	$ 124.90	$ 56.53	$ 68.37	$ 154.72	$ 78.98	$ 75.74

Subscriber Revenue is shown on a per month basis. In the following models it is annualized.

COMMERCIAL MARKET SUMMARY

	Year 1			Year 5		
	Average Revenue per Subscriber	Average Content Fees per Subscriber	Average Contribution Margin per Subscriber	Average Revenue per Subscriber	Average Content Fees per Subscriber	Average Contribution Margin per Subscriber
Telephone Only	$ 24.20	$ 10.00	$ 14.20	$ 24.20	$ 10.30	$ 13.90
IPTV Only	$ 30.87	$ 20.42	$ 10.45	$ 30.87	$ 21.24	$ 9.63
Internet Only	$ 46.39	$ 12.60	$ 33.79	$ 505.58	$ 412.94	$ 92.64
IPTV & Telephone	$ 55.07	$ 30.42	$ 24.65	$ 55.07	$ 31.54	$ 23.53
IPTV & Internet	$ 77.26	$ 33.02	$ 44.24	$ 536.45	$ 434.18	$ 102.27
Telephone & Internet	$ 70.59	$ 22.60	$ 47.99	$ 529.78	$ 423.24	$ 106.54
IPTV, Telephone & Internet	$ 101.46	$ 43.02	$ 58.44	$ 560.65	$ 444.48	$ 116.17

Financial Model Scenario 1: Triple Play

The triple play scenario provides HBPW the most flexibility in providing both wholesale and retail services and creates a unique opportunity to drive subscriber take rates higher than possible in a wholesale, or reduced bundled offerings. The marginal impact of increased take rates is magnified by the overall margin growth experienced by providing the full suite of services. The triple play is less vulnerable to product/pricing fluctuations and helps protect against price/margin erosion. The strong cash position generated enables HBPW to provide of combination of effectively priced community service products and still maintain sufficient capital for reinvestment or future product/service upgrades.

Head-end Facilities

•Internet Head-end - The cost for Internet head-ends are relatively fixed with minor adjustments for additional Internet peers. The initial design accommodates peering with the local ISPs and two upstream providers via 1 G and 10 G ports respectively.
•VoIP Head-end – The cost for the VoIP is based on clustering the local VoIP subscribers through a Class 5 switch that handles 1,000 simultaneous subscriber calls. The current configuration is set up to handle roughly simultaneous 8,000 calls. Every 1,000 additional subscribers would require approximately $38,000 in new capital expense.
•IPTV Head-end – The cost can vary greatly for the IPTV head-end based on content acquisition strategy, distribution services, software gateway/service approach. For purposes of this planning effort we choose to build–out a sophisticated high-end service capable of effectively competing and providing advanced digital application services to the subscribers. Head-ends can range from $1 million to over $3 million. The $2.7 million proposed includes satellite capture, software/service gateway (example: MediaRoom), Video–on-Demand (VOD), and real-time streaming capability.

Network Infrastructure

•Fiber Plant - The fiber plant includes all conduit, fiber, splice boxes, cabinets and mounting hardware necessary for fiber deployment to the business/residential curb. Premise entrances are included in the installation costs.
•Network Service Electronics – The network service electronics includes all the optics, switches and routers necessary to provide GPON, Ethernet, and IP service distribution.

Subscriber Electronics

•Network Interface Device (NID) – Serves as the customer premise equipment necessary to attach to the network. Required for every subscriber connection.
•Internet/VoIP Router – Serves as the customer premise equipment required for Internet and VoIP services.
•IPTV Set-Top-Box (STB) – Serves as the customer premise equipment for IPTV capture, in house streaming, DVR and wireless home access and distribution.

Subscriber Installation Services

These are the services required to physically connect subscriber services. These expenses are often partially recovered through subscriber connection fees and as such are typically expensed rather than amortized over the life of the agreement.

Financial Model Scenario 1: Triple Play

	CAPX/Construction					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total (Year 1-5)
Construction Elements						
Headend Facilities						
Internet	$ 560,000	$ -	$ -	$ -	$ -	$ 560,000
VoIP	$ 509,962	$ -	$ -	$ -	$ -	$ 509,962
IPTV	$ 2,676,728	$ -	$ -	$ -	$ -	$ 2,676,728
Network Infrastructure						
Fiber Plant	$ 15,410,483	$ 15,410,483	$ -	$ -	$ -	$ 30,820,965
Network Service Electronics	$ 6,154,236	$ 6,154,236	$ -	$ -	$ -	$ 12,308,471
Subscriber Electronics						
Network Interface Device (NID)	$ 417,776	$ 2,335,308	$ 595,893	$ 665,394	$ 714,267	$ 4,728,638
Internet/VoIP Router	$ 64,859	$ 355,482	$ 91,029	$ 99,769	$ 103,921	$ 715,060
IPTV Set-Top-Box (STB)	$ 322,478	$ 1,345,325	$ 360,138	$ 383,148	$ 380,883	$ 2,791,972
Subscriber Installation Services						
Internet	$ 84,324	$ 699,573	$ 170,209	$ 207,278	$ 249,646	$ 1,411,030
Internet/VoIP	$ 173,622	$ 512,159	$ 144,648	$ 104,596	$ 17,504	$ 952,530
IPTV Set-Top-Box (STB)	$ 173,715	$ 659,525	$ 180,375	$ 219,225	$ 267,140	$ 1,499,980
Total Project Construction Costs (Years 1-5)	**$ 26,548,183**	**$ 27,472,089**	**$ 1,542,292**	**$ 1,679,410**	**$ 1,733,361**	**$ 58,975,336**

The CAPX requirements for the triple play include additional head-end facilities for the Internet, VoIP and IPTV services. Subscriber equipment and projected installation are based on a ramp up to a 50% take rate. The total CAPX cost for the first five years of operation are expected to be close to $59 Million. The fixed cost of CAPX includes the head-end facilities and network Infrastructure for approximately $47.9 Million or 80% of the total capital cost. The subscriber electronics and installation is subject to variables such as take rate.

The preliminary design for HBPW provides approximate 95% coverage for the areas in question with a total passing of over 55,000 residential and commercial buildings. The total cost per passing is expected to be approximately $865 for fiber and electronics for a total cost of approximately $1823 per active subscriber based on a 50% take rate. Increased take rates will require additional capital costs but will also reduce the total cost per active subscriber. These costs are on par with expectations and relatively low due to the household density of Greater Holland.

Financial Model Scenario 1: Triple Play

Capital Cost per Passing/Subscriber (Year 10)

Subscriber Cost	**Passed**	**Subs**
Residences Passed	51,495	25,791
Commercial Buildings Passed	3,803	465
Total Passing's	**55,298**	**26,256**

Network Access	**CAPX**	**Cost/Pass**	**Cost/Subs**
Fiber Plant	$ 30,820,965	$ 557.36	$ 1,173.88
Transport Electronics (GPON/Ethernet)	$ 17,037,110	$ 308.10	$ 648.89
	$ 47,858,075	**$ 865.46**	**$ 1,822.78**

Capital Cost per Passing/Subscriber/Service Year 10)

Service Subscribers	**Residential Subs Served**	**Commercial Subs Served**	**Total Subs Served**
Broadband Internet	22,189	424	22,613
Telephone/VoIP	10,978	182	11,161
IPTV	10,623	159	10,782

Subscriber Services	**CAPX**	**Cost/Pass**	**Cost/Subs**
Broadband Internet	$2,126,090	$ 38.45	$ 94.02
Telephone/VoIP	$1,667,589	$ 30.16	$ 149.41
IPTV	$4,291,952	$ 77.61	$ 398.05

The model depicts Broadband Internet as the predominate service with Telephone/VoIP and IPTV as being relatively equal. With the triple play subscribers would opt into one, two or three services and select the products/price that fits into their optimum service plan. The model evaluates the impact of bundled services and is based on individual service rates for the associated revenue/cost. The take rate for these services is a blended subset of the approximately 26,000 active subscribers. The cost per sub/service is additive to the network costs identified above.

Financial Model Scenario 1: Triple Play 50% Take Rate

Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 2,863,034	$ 13,363,747	$ 15,722,899	$ 21,030,635	$ 27,132,845	$ 41,931,632	$ 46,305,757
Cost of Goods Sold (COGS)	$ 2,740,134	$ 8,886,770	$ 8,772,020	$ 13,102,480	$ 16,730,522	$ 25,544,191	$ 28,274,584
Gross Operating Margin	**$ 122,900**	**$ 4,476,977**	**$ 6,950,880**	**$ 7,928,155**	**$ 10,402,323**	**$ 16,387,441**	**$ 18,031,173**
	4%	34%	44%	38%	38%	39%	39%
Sales, General & Administrative (SG&A)	$ 1,460,330	$ 2,345,612	$ 1,674,623	$ 2,117,038	$ 2,370,845	$ 2,454,195	$ 2,791,916
Income Before Depreciation & Interest	**$ (1,337,430)**	**$ 2,131,366**	**$ 5,276,257**	**$ 5,811,117**	**$ 8,031,478**	**$ 13,933,245**	**$ 15,239,257**
	-47%	16%	34%	28%	30%	33%	33%
Depreciation	$ 2,299,958	$ 4,526,247	$ 4,675,827	$ 4,839,871	$ 5,011,167	$ 3,421,863	$ 4,184,414
Interest	$ 1,232,839	$ 1,251,331	$ 1,679,573	$ 2,003,567	$ 1,878,834	$ 917,787	$ 429,425
Net Income	**$ (4,870,227)**	**$ (3,646,212)**	**$ (1,079,142)**	**$ (1,032,321)**	**$ 1,141,477**	**$ 9,593,595**	**$ 10,625,418**
	-170%	-27%	-7%	-5%	4%	23%	23%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,169,407	$ 30,941,140	$ 30,147,020	$ 20,559,898	$ 7,994,829
Debt Service Balance (Loan)	$ 10,706,039	$ 20,896,389	$ 19,966,824	$ 16,029,719	$ 11,741,814	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 3,341,829	$ 5,412,148	$ 6,319,670	$ 3,302,560	$ 3,170,229
Debt Coverage Ratio	-23.08	-20.18	0.60	0.44	0.70	3.17	3.59
Cash	**$ 12,998,168**	**$ (1,959,939)**	**$ (841,479)**	**$ (2,413,554)**	**$ (2,815,749)**	**$ 13,933,245**	**$ 64,402,129**

At a 50% take rate the with the CAPX and Revenue Bond/HBPW Loan assumptions identified above, HBPW should be able to demonstrate positive income before depreciation and interest trends Year 2 and become income positive in Year 5. Cash flow shortfalls through Year 6 will require some cash management lending from HBPW or through other financial instruments. The existing income of approximately $890,000 from commercial services provides a base of revenue and a pipeline that can be accelerated through active marketing/pricing as the result of reduced costs associated with the additional fiber deployment. New service revenue can be generated as early as 6 months into the construction project. The model assumes only a 3% take rate the first year.

By Year 10 HBPW should see the full effect of the 50% take rate and approximately $9.5 million a year in net income. Because HBPW is a public entity there should not be a significant tax consequence unless laws for telecommunication services change. However there will be utility service fees associated with state and federal regulations and the Universal Service Fund (USF). These are largely pass through to the subscriber and additive to the subscriber invoice. As such they should have no material effect on the overall financials to HBPW and are not addressed in the existing model.

Financial Model Scenario 1: Triple Play 45% Take Rate

Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 2,863,034	$ 12,176,449	$ 13,601,990	$ 18,018,028	$ 21,987,102	$ 38,998,433	$ 44,883,174
Cost of Goods Sold (COGS)	$ 2,867,714	$ 8,507,462	$ 7,843,712	$ 11,747,590	$ 14,129,021	$ 24,069,618	$ 28,046,064
Gross Operating Margin	**$ (4,680)**	**$ 3,668,987**	**$ 5,758,278**	**$ 6,270,438**	**$ 7,858,081**	**$ 14,928,815**	**$ 16,837,110**
	0%	30%	42%	35%	36%	38%	38%
Sales, General & Administrative (SG&A)	$ 1,460,330	$ 2,192,169	$ 1,517,570	$ 1,939,142	$ 2,015,373	$ 2,725,163	$ 2,754,183
Income Before Depreciation & Interest	**$ (1,465,010)**	**$ 1,476,819**	**$ 4,240,708**	**$ 4,331,296**	**$ 5,842,708**	**$ 12,203,653**	**$ 14,082,927**
	-51%	12%	31%	24%	27%	31%	31%
Depreciation	$ 2,299,958	$ 4,437,064	$ 4,534,550	$ 4,647,864	$ 4,746,690	$ 3,180,542	$ 4,061,773
Interest	$ 1,232,839	$ 1,251,331	$ 1,679,573	$ 1,982,085	$ 1,855,303	$ 1,070,186	$ 646,746
Net Income	**$ (4,997,807)**	**$ (4,211,577)**	**$ (1,973,415)**	**$ (2,298,653)**	**$ (759,285)**	**$ 7,952,924**	**$ 9,374,408**
	-175%	-35%	-15%	-13%	-3%	20%	21%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,256,637	$ 31,226,540	$ 30,805,220	$ 24,956,443	$ 13,709,984
Debt Service Balance (Loan)	$ 10,706,039	$ 20,272,112	$ 18,977,889	$ 15,156,042	$ 11,055,332	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 3,254,598	$ 5,102,209	$ 5,771,092	$ 2,868,404	$ 3,105,401
Debt Coverage Ratio	-23.17	-20.13	0.44	0.27	0.51	2.88	3.38
Cash	**$ 12,886,317**	**$ (2,661,370)**	**$ (2,444,255)**	**$ (4,751,354)**	**$ (6,164,096)**	**$ 12,203,653**	**$ 45,783,196**

Impact of a 5% reduction to take rate – at 45% HBPW can expect approximately a $2 million reduction in top line revenue and $1.5 million in net income per year by Year 10. This would reduce cash by approximately $1.7 million and increase the debt service balance by $1 million. This implies that HBPW could effectively run a break even business at approximately 30 to 35% take rate.

The triple play scenario provides HBPW the most flexibility in providing both wholesale and retail services and creates a unique opportunity to drive subscriber take rates higher than possible in a wholesale, or reduced bundle offerings. The marginal impact of increased take rates is magnified by the overall margin growth experienced by providing the full suite of services. The triple play scenario is less vulnerable to product/pricing fluctuations and helps protect against price/margin erosion. The strong cash position generated enables HBPW to provide of combination of effectively priced community service products and still maintain sufficient capital for reinvestment or future product/service upgrades.

Financial Model Scenario 1: Triple Play 55% Take Rate

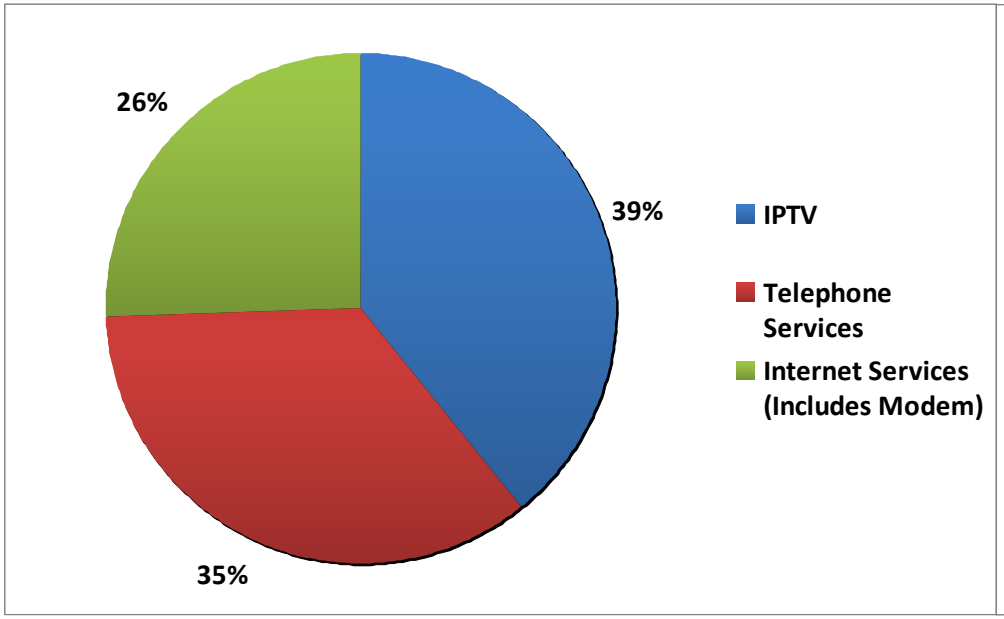
Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 2,863,034	$ 13,383,258	$ 15,757,516	$ 21,558,003	$ 27,983,779	$ 45,939,337	$ 50,725,269
Cost of Goods Sold (COGS)	$ 2,747,287	$ 8,887,860	$ 8,779,669	$ 13,458,157	$ 17,260,461	$ 27,733,721	$ 30,569,020
Gross Operating Margin	**$ 115,747**	**$ 4,495,398**	**$ 6,977,847**	**$ 8,099,846**	**$ 10,723,318**	**$ 18,205,616**	**$ 20,156,250**
	4%	34%	44%	38%	38%	40%	40%
Sales, General & Administrative (SG&A)	$ 1,460,330	$ 2,348,126	$ 1,677,087	$ 2,182,422	$ 2,431,284	$ 2,578,162	$ 2,925,468
Income Before Depreciation & Interest	**$ (1,344,583)**	**$ 2,147,272**	**$ 5,300,760**	**$ 5,917,424**	**$ 8,292,034**	**$ 15,627,454**	**$ 17,230,781**
	-47%	16%	34%	27%	30%	34%	34%
Depreciation	$ 2,299,958	$ 4,527,376	$ 4,677,383	$ 4,859,878	$ 5,047,818	$ 3,583,798	$ 4,256,320
Interest	$ 1,232,839	$ 1,251,331	$ 1,679,573	$ 2,003,763	$ 1,879,405	$ 894,716	$ 317,941
Net Income	**$ (4,877,380)**	**$ (3,631,435)**	**$ (1,056,195)**	**$ (946,217)**	**$ 1,364,811**	**$ 11,148,941**	**$ 12,656,520**
	-170%	-27%	-7%	-4%	5%	24%	25%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,166,409	$ 30,945,967	$ 30,123,482	$ 19,574,732	$ 4,718,855
Debt Service Balance (Loan)	$ 10,706,039	$ 20,904,295	$ 19,977,720	$ 16,039,155	$ 11,749,180	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 3,344,827	$ 5,405,663	$ 6,350,299	$ 3,687,875	$ 3,547,620
Debt Coverage Ratio	-23.08	-20.18	0.61	0.43	0.71	3.27	3.73
Cash	**$ 12,991,897**	**$ (1,953,147)**	**$ (814,241)**	**$ (2,413,076)**	**$ (2,721,251)**	**$ 15,627,454**	**$ 74,602,333**

Impact of a 5% increase to take rate – at 55% HBPW can expect a $3.3 million increase in top line revenue and $1.5 million in net income per year by Year 10. This would increase cash by approximately $1.5 million and reduce the debt service balance by $1 million. This implies that HBPW could effectively see net increase by approximately $9 million over 15 years for a total of approximately $12.45 million in net income per year by Year 15 and accelerate the Revenue Bond pay-off by 3 to 5 years and still maintain a significant cash reserve.

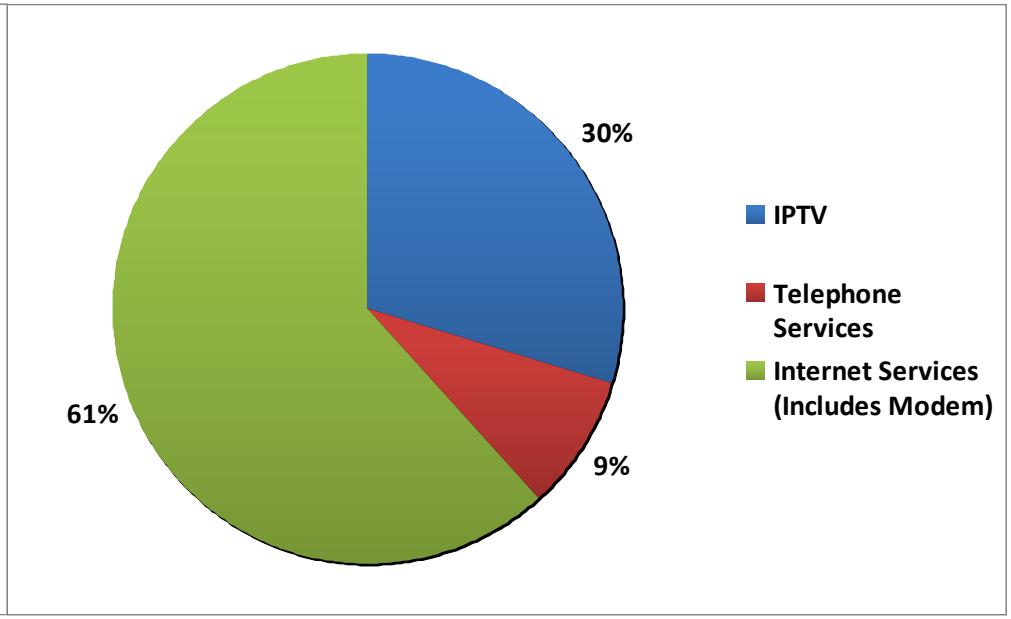
Additional impact of increasing take rate – any significant increase to the take rate has the effect of help to achieve higher revenue goals for content providers and potential reduction of content costs through discounts. This is true for most services. In some cases increase revenues will also trigger additional content and license fees.

Financial Model Scenario 1: Triple Play

Gross Revenue Breakdown Year 1



Gross Revenue Breakdown Year 10



The revenue distribution for Year 1 to Year 10 is expected to adjust as more services and applications are driven through broadband. Advanced application/content providers/aggregators will still play a significant role in the over-the-top (OTT) applications and will likely share revenue with some of the larger aggregators of services. We therefore see strong growth in Broadband Internet services and advanced services from community aggregators that can deliver OTT applications and service through their media gateways and VOD offerings.

Financial Model Scenario 1: Triple Play

Projected Bundled Services Breakdowns

Residential Market Size **51,495**

Residential

Years		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IPTV & Telephone	5.25%	152	624	760	883	967	1,067	1,187	1,332	1,433	1,454
Telephone & Internet/Data	14.00%	382	2,067	2,518	2,952	3,305	3,730	4,244	4,321	4,386	4,451
IPTV, Telephone & Internet	10.50%	384	2,017	2,457	2,906	3,322	3,825	4,434	4,764	4,998	5,073
IPTV Only	13.00%	120	578	704	857	1,044	1,271	1,548	1,886	2,115	2,147
Internet Only	52.00%	396	3,805	4,635	5,645	6,875	8,375	10,200	10,402	10,558	10,716
IPTV & Internet	5.25%	89	617	752	916	1,116	1,359	1,655	1,812	1,920	1,949
Households Served		**1,523**	**9,708**	**11,825**	**14,159**	**16,628**	**19,626**	**23,268**	**24,515**	**25,409**	**25,791**
Percentage of All Households		**3%**	**19%**	**23%**	**27%**	**32%**	**38%**	**45%**	**48%**	**49%**	**50%**

Commercial Market Size **3,803**

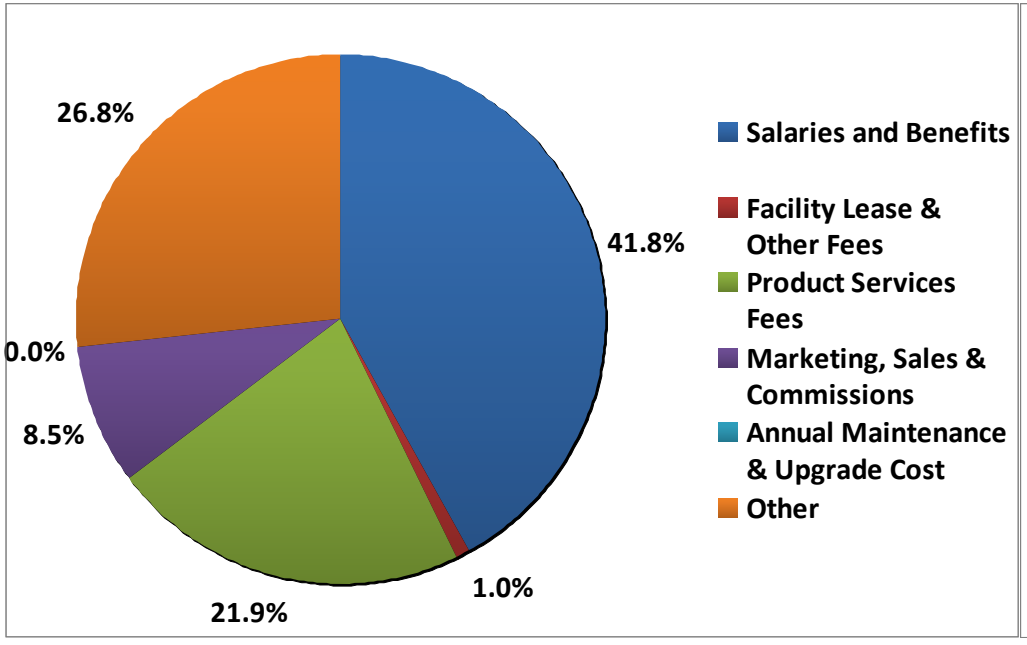
Commercial

Years		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
IPTV & Telephone	7.00%	2	19	21	23	25	26	26	27	27	28
Telephone & Internet/Data	8.75%	5	38	43	48	53	56	60	64	69	73
IPTV, Telephone & Internet	8.75%	7	43	49	55	60	64	67	72	76	81
IPTV Only	15.00%	2	9	10	11	12	12	12	13	13	13
Internet Only	44.00%	21	94	110	130	143	158	174	191	211	232
IPTV & Internet	6.00%	4	16	19	22	24	26	29	31	34	37
Commerical Sites Served		**41**	**219**	**252**	**289**	**318**	**342**	**369**	**398**	**430**	**465**
Percentage of All Commerical		**1.07%**	**5.77%**	**6.63%**	**7.60%**	**8.36%**	**8.99%**	**9.70%**	**10.46%**	**11.30%**	**12.23%**

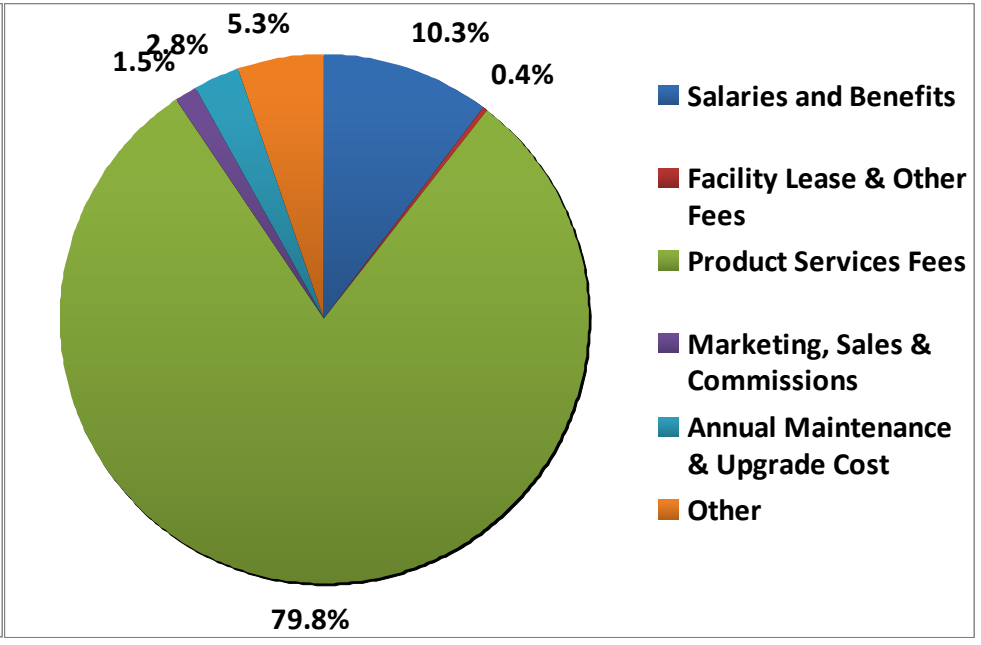
Bundled services will be the theme for HBPWs triple play. The bundling enables HBPW to compete with other providers and pull through subscribers that might otherwise not use HBPWs services. The distribution of services will largely be dependent on the packaging of the individual products and the flexibility of HBPWs Internet, VoIP and IPTV gateway services for both wholesale and retail. The residential take rate of 50% is on par with other alternative FTTH providers, especially with the triple play. The commercial take rate is based on largely small to medium sized business and government. More sophisticated commercial users will likely want more than HBPW can provide, but could use HBPWs network as a secondary service or local business service aggregation.

Financial Model Scenario 1: Triple Play

Operating Expense Year 1

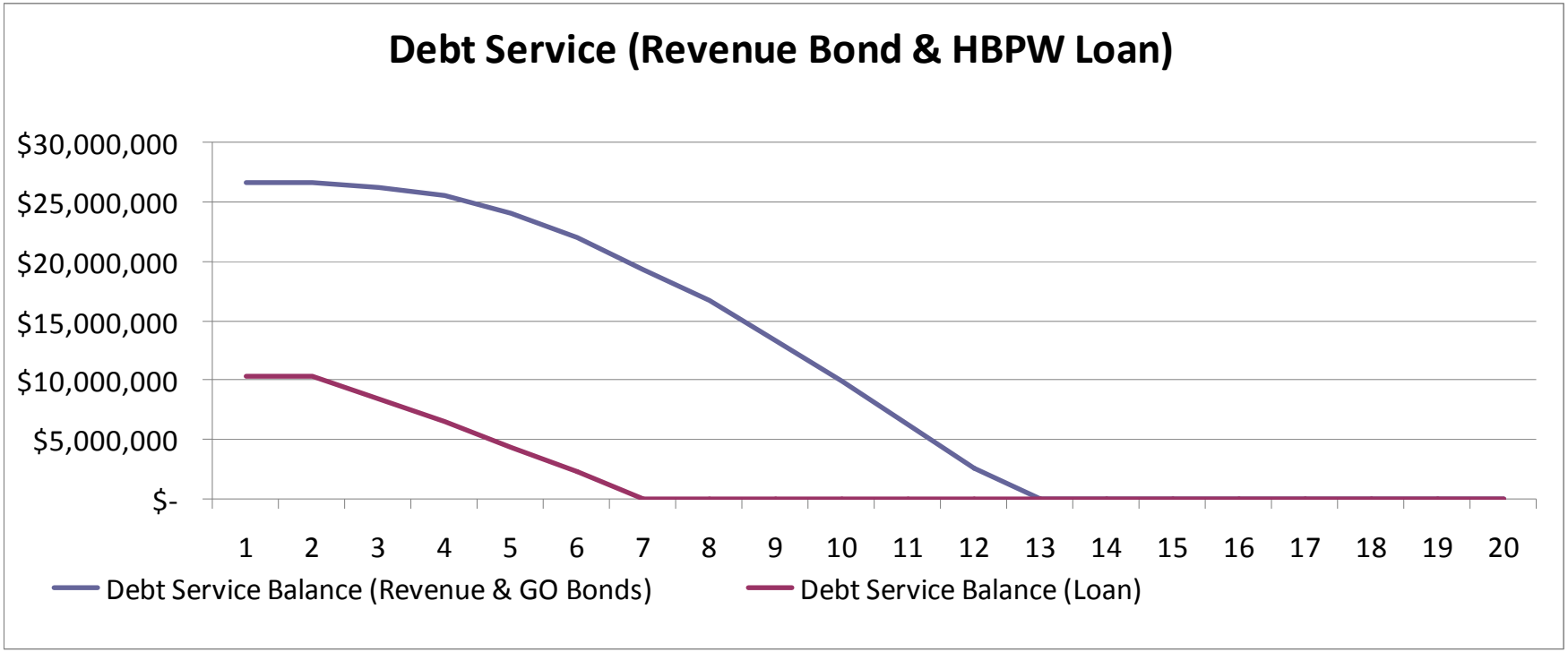


Operating Expense Year 10



Internal operating expenses make up close to 78% of the overall operating expenses for Year 1. The largest driver to future operating expenses will be the product service/content fees, and internal operating expenses will fall dramatically to approximately 22% of the overall operating expenses by Year 10. Salaries make up the second largest line item expense at approximately 10% in Year 10. Depending on the approach HBPW takes to managing operations, there will be several opportunities to reduce overall expenses through outsourcing and potentially insourcing services. Internal customer service, finance and administration are a few areas where there could be significant opportunities for cost sharing and salary reduction.

Financial Model Scenario 1: Triple Play



The debt service approach for internal financing is based on a five-year term for each year's transfer/note. The first three years of operation require the most support for capital deployment and the need for term debt. Post Year 3 requirements are largely based on needs for working capital/cash management. Based on the 50% take rate HBPW should be fully reimbursed for its equipment and cash management financing in Year 8, at which point revenue bond principal payments fully kick in based on Annual Available Net Revenue objectives and payment goals of 35% based on ANR from Year 5 out.

At Year 10 the bond principal would be approximately $20.5 million and the available cash reserve would be approximately $13 million. HBPW could accelerate bond principal payments and pay off the loan significantly earlier than 15 years. HBPW could also consider longer internal payback periods for its loan and prioritize payment of the bond assuming it can maintain its internal covenants for debt service and cash reserves for the organization as a whole.

At a targeted 35 to 50% take rate HBPW would have the financial position to provide sufficient guarantees to partially or fully bond the entire capital portion of the FTTH program.

Scenario 2 – Double Play

	CAPX/Construction					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total (Year 1-5)
Construction Elements						
Headend Facilities						
Internet	$ 560,000	$ -	$ -	$ -	$ -	$ 560,000
VoIP	$ 509,962	$ -	$ -	$ -	$ -	$ 509,962
IPTV	$ -	$ -	$ -	$ -	$ -	$ -
Network Infrastructure						
Fiber Plant	$ 15,410,483	$ 15,410,483	$ -	$ -	$ -	$ 30,820,965
Network Service Electronics	$ 6,154,236	$ 6,154,236	$ -	$ -	$ -	$ 12,308,471
Subscriber Electronics						
Network Interface Device (NID)	$ 337,580	$ 2,030,867	$ 512,799	$ 564,434	$ 591,248	$ 4,036,928
Internet/VoIP Router	$ 55,981	$ 321,776	$ 81,813	$ 88,569	$ 90,272	$ 638,412
IPTV Set-Top-Box (STB)	$ -	$ -	$ -	$ -	$ -	$ -
Subscriber Installation Services						
Internet	$ 84,324	$ 699,573	$ 170,209	$ 207,278	$ 249,646	$ 1,411,030
Internet/VoIP	$ 173,622	$ 512,159	$ 144,648	$ 104,596	$ 17,504	$ 952,530
IPTV Set-Top-Box (STB)	$ -	$ -	$ -	$ -	$ -	$ -
Total Project Construction Costs (Years 1-5)	**$ 23,286,187**	**$ 25,129,093**	**$ 909,470**	**$ 964,877**	**$ 948,671**	**$ 51,238,299**

The CAPX requirements for the double play include additional head end facilities for the Internet and VoIP services. Subscriber equipment and projected installation are based on a ramp up to a 39% take rate. The total CAPX cost for the first five years of operation are expected to be close to $51 million. The fixed cost of CAPX includes the head-end facilities and network Infrastructure for approximately $47.9 million or 93.5% of the total capital cost. The subscriber electronics and installation is subject to variables such as take rate.

The preliminary design for HBPW provides approximate 95% coverage for the areas in question with a total passing of over 55,000 residential and commercial buildings. The total cost per passing is expected to be approximately $852 for fiber and electronics for a total cost of approximately $2,288 per active subscriber based on a 39% take rate. Increased take rates will require additional capital costs but will also reduce the total cost per active subscriber. These costs are on par with expectations and relatively low due to the household density of Greater Holland.

Scenario 2 – Double Play

Capital Cost per Passing/Subscriber (Year 10)

Subscriber Cost	Passed	Subs
Residences Passed	51,495	20,175
Commercial Buildings Passed	3,803	435
Total Passings	**55,298**	**20,610**

Network Access	CAPX	Cost/Pass	Cost/Subs
Fiber Plant	$ 30,820,965	$ 557.36	$ 1,495.44
Transport Electronics (GPON/Ethernet)	$ 16,345,978	$ 295.60	$ 793.11
	$ 47,166,943	**$ 852.96**	**$ 2,288.55**

Capital Cost per Passing/Subscriber/Service Year 10)

Service Subscribers	Residential Subs Served	Commercial Subs Served	Total Subs Served
Broadband Internet	19,588	412	20,000
Telephone/VoIP	8,377	171	8,548
IPTV	0	0	0

Subscriber Services	CAPX	Cost/Pass	Cost/Subs
Broadband Internet	$2,049,530	$ 37.06	$ 102.48
Telephone/VoIP	$1,592,417	$ 28.80	$ 186.29
IPTV	$ -	$ -	$ -

The model depicts Broadband Internet as the predominate service. With the double play subscribers would opt into one or two services and select the products/price that fits into their optimum service plan. The model evaluates the impact of bundled services and is based on individual service rates for the associated revenue/cost. The take rate for these services is a blended subset of the approximately 20,000 active subscribers. The cost per sub/service is additive to the network costs identified above.

Scenario 2 – Financial Summary Double Play 39% Take Rate

Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 2,131,511	$ 9,942,006	$ 11,870,509	$ 16,345,151	$ 21,399,629	$ 30,468,127	$ 33,686,817
Cost of Goods Sold (COGS)	$ 2,207,940	$ 6,460,399	$ 6,163,758	$ 9,790,260	$ 12,664,364	$ 17,141,923	$ 18,306,592
Gross Operating Margin	**$ (76,429)**	**$ 3,481,607**	**$ 5,706,750**	**$ 6,554,891**	**$ 8,735,266**	**$ 13,326,204**	**$ 15,380,225**
	-4%	35%	48%	40%	41%	44%	46%
Sales, General & Administrative (SG&A)	$ 1,367,524	$ 1,982,275	$ 1,516,916	$ 1,894,261	$ 2,095,754	$ 2,095,526	$ 2,376,624
Income Before Depreciation & Interest	**$ (1,443,953)**	**$ 1,499,332**	**$ 4,189,835**	**$ 4,660,630**	**$ 6,639,512**	**$ 11,230,678**	**$ 13,003,600**
	-68%	15%	35%	29%	31%	37%	39%
Depreciation	$ 1,858,775	$ 3,844,568	$ 3,929,539	$ 4,022,857	$ 4,120,254	$ 2,788,625	$ 3,544,282
Interest	$ 1,232,839	$ 1,251,331	$ 1,556,042	$ 1,836,888	$ 1,732,103	$ 969,216	$ 563,928
Net Income	**$ (4,535,567)**	**$ (3,596,567)**	**$ (1,295,746)**	**$ (1,199,115)**	**$ 787,155**	**$ 7,472,837**	**$ 8,895,391**
	-213%	-36%	-11%	-7%	4%	25%	26%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,204,015	$ 31,022,892	$ 30,336,497	$ 22,377,539	$ 11,742,677
Debt Service Balance (Loan)	$ 7,617,759	$ 16,124,637	$ 15,312,990	$ 12,279,687	$ 9,015,236	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 2,737,040	$ 4,462,587	$ 5,191,761	$ 2,822,085	$ 2,919,442
Debt Coverage Ratio	-20.54	-19.13	0.65	0.48	0.77	2.97	3.42
Cash	**$ 12,904,779**	**$ (2,620,575)**	**$ (1,804,196)**	**$ (2,906,148)**	**$ (2,875,339)**	**$ 11,230,678**	**$ 54,141,909**

The transition to a double play service profile has the net effect of reducing the effective take rate by 11% and drops the top line revenue by over 27%. The bottom line impact is a reduction of 22% in net income and 16% in HBPW cash position. Debt service remains higher due to the ANR calculation and extends the overall debt service terms for the Revenue bond. Bond terms will likely extend out to 15 years due to the reduced revenue projections.

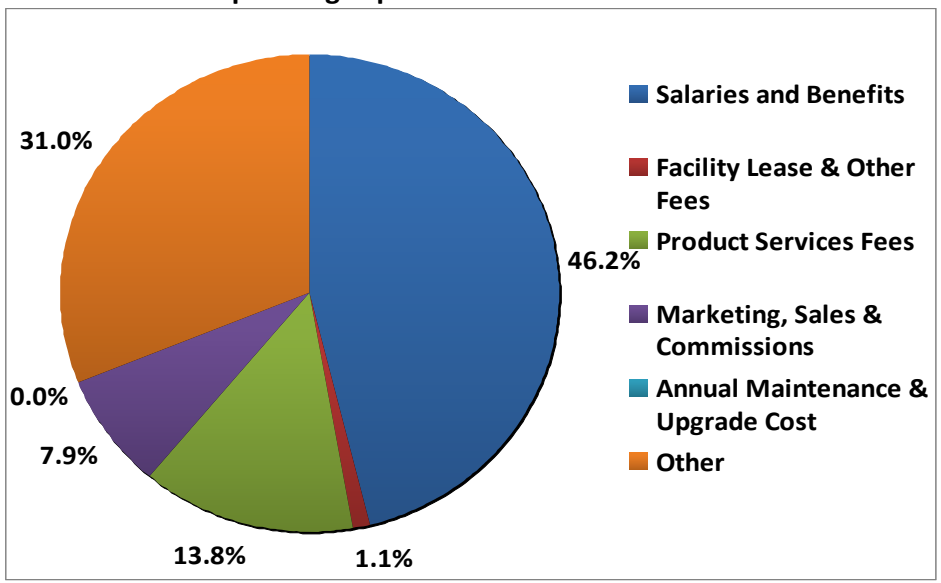
The double play still provides a viable business services strategy but enables HBPW to achieve a strong cash position by Year 15. The double play scenario requires more proactive sales in the absence of a direct video bundle. A 10% negative swing in take rate can have dramatic impact on the net income and places long-term sustainability at risk.

Scenario 2 – Financial Summary Double Play

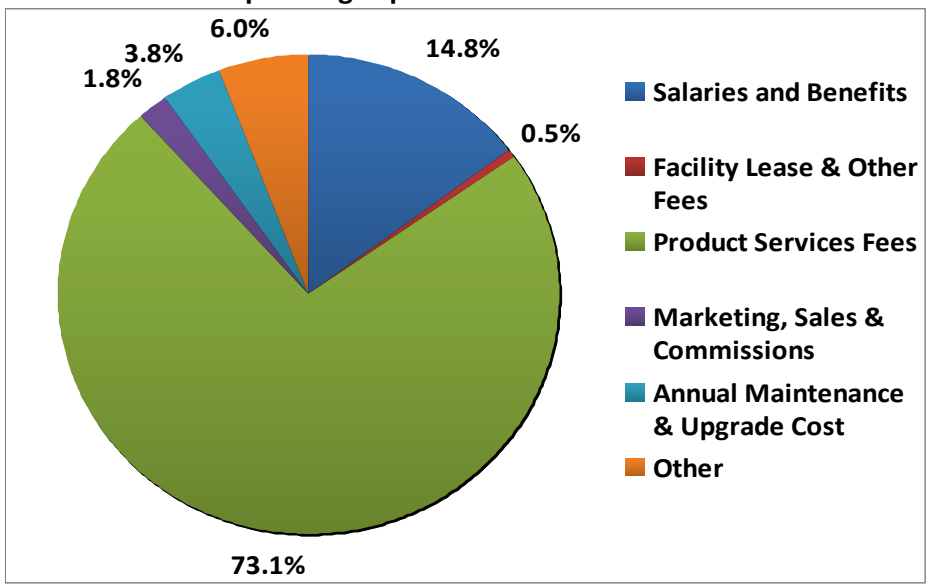
Residential Market Size	51,495									
	Residential									
Years	1	2	3	4	5	6	7	8	9	10
Households Served	1,208	8,198	9,985	11,919	13,899	16,302	19,218	19,583	19,877	20,175
Percentage of All Households	2%	16%	19%	23%	27%	32%	37%	38%	39%	39%

Residential Market Size	51,495									
	Residential									
Years	1	2	3	4	5	6	7	8	9	10
Households Served	1,208	8,198	9,985	11,919	13,899	16,302	19,218	19,583	19,877	20,175
Percentage of All Households	2%	16%	19%	23%	27%	32%	37%	38%	39%	39%

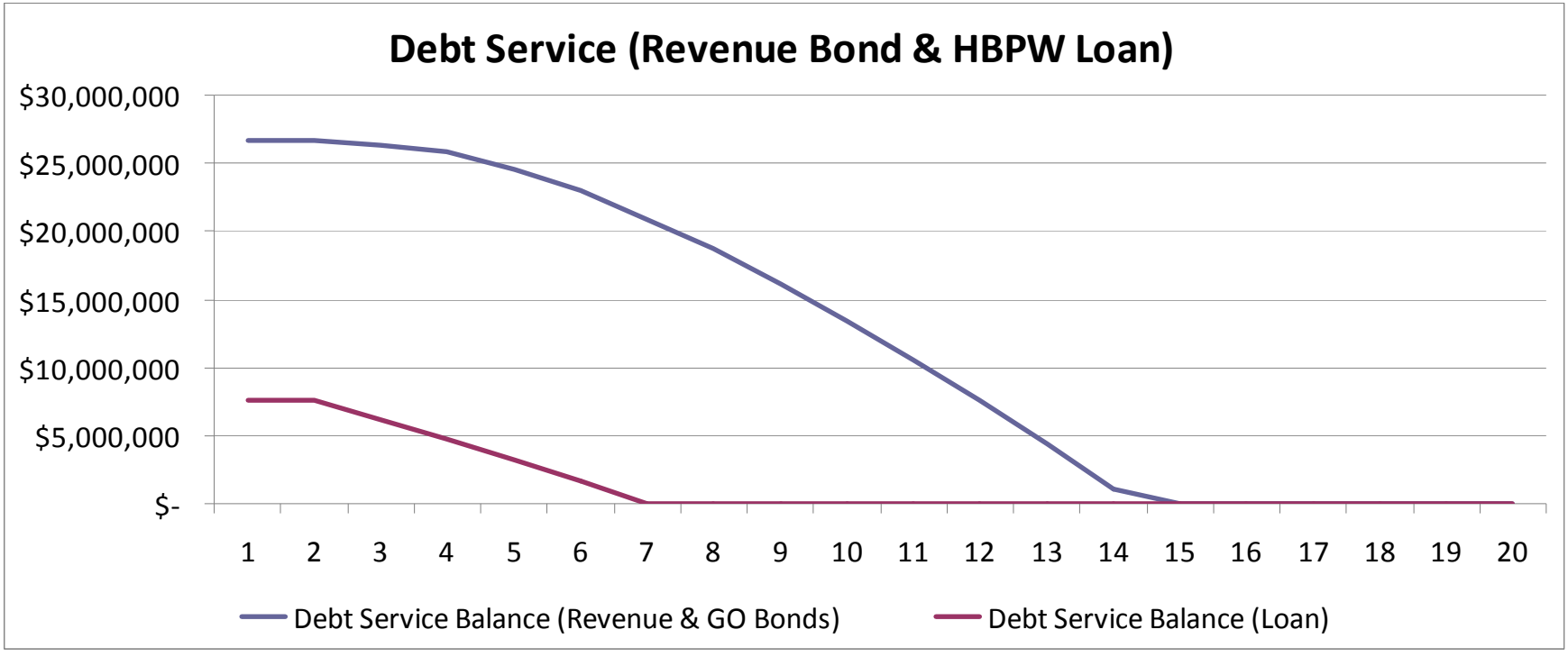
Operating Expense Breakdown Year 1



Operating Expense Breakdown Year 10



Scenario 2 – Financial Summary Double Play



The debt service approach for internal financing is based on a five-year term for each year's transfer/note. The first three years of operation require the most support for capital deployment and the need for term debt. Post Year 3 requirements are largely based on needs for working capital/cash management. Based on the 39% take rate HBPW should be fully reimbursed for its equipment and cash management financing in Year 8, at which point revenue bond principal payments fully kick in based on Annual Available Net Revenue objectives and payment goals of 35% based on ANR from Year 5 out.

At Year 10 the bond principal would be approximately $22.54million and the available cash reserve would be approximately $11.2 million. HBPW could accelerate bond principal payments and pay off the loan significantly earlier than 18 years. HBPW could also consider longer internal payback periods for its loan and prioritize payment of the bond assuming it can maintain its internal covenants for debt service and cash reserves for the organization as a whole.

At a targeted 35 to 44% take rate HBPW would have the financial position to provide sufficient guarantees to partially or fully bond the entire capital portion of the FTTH program.

Scenario 3 – Financial Summary Single Play

	CAPX/Construction					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total (Year 1-5)
Construction Elements						
Headend Facilities						
Internet	$ 560,000	$ -	$ -	$ -	$ -	$ 560,000
VoIP	$ -	$ -	$ -	$ -	$ -	$ -
IPTV	$ -	$ -	$ -	$ -	$ -	$ -
Network Infrastructure						
Fiber Plant	$ 15,410,483	$ 15,410,483	$ -	$ -	$ -	$ 30,820,965
Network Service Electronics	$ 6,154,236	$ 6,154,236	$ -	$ -	$ -	$ 12,308,471
Subscriber Electronics						
Network Interface Device (NID)	$ 193,930	$ 1,618,736	$ 393,693	$ 478,837	$ 578,372	$ 3,263,567
Internet/VoIP Router	$ -	$ -	$ -	$ -	$ -	$ -
IPTV Set-Top-Box (STB)	$ -	$ -	$ -	$ -	$ -	$ -
Subscriber Installation Services						
Internet	$ 84,324	$ 699,573	$ 170,209	$ 207,278	$ 249,646	$ 1,411,030
Internet/VoIP	$ -	$ -	$ -	$ -	$ -	$ -
IPTV Set-Top-Box (STB)	$ -	$ -	$ -	$ -	$ -	$ -
Total Project Construction Costs (Years 1-5)	**$ 22,402,972**	**$ 23,883,027**	**$ 563,902**	**$ 686,115**	**$ 828,018**	**$ 48,364,034**

The CAPX requirements for the double play include additional head end facilities for the Internet and VoIP services. Subscriber equipment and projected installation are based on a ramp up to a 39% take rate. The total CAPX cost for the first five years of operation are expected to be close to $51 million. The fixed cost of CAPX includes the head-end facilities and network Infrastructure for approximately $47.9 million or 93.5% of the total capital cost. The subscriber electronics and installation is subject to variables such as take rate.

The CAPX requirements for the single play include additional head-end facilities for Internet services. Subscriber equipment and projected installation are based on a ramp up to a 33% take rate. The total CAPX cost for the first five years of operation are expected to be close to $48.4 million. The fixed cost of CAPX includes the head-end facilities and network Infrastructure for approximately $47.9 million or 99% of the total capital cost. The subscriber electronics and installation is subject to variables such as take rate.

Scenario 3 – Financial Summary Single Play

Capital Cost per Passing/Subscriber (Year 10)

Subscriber Cost	**Passed**	**Subs**
Residences Passed	51,495	16,847
Commercial Buildings Passed	3,803	356
Total Passings	**55,298**	**17,203**

Network Access	**CAPX**	**Cost/Pass**	**Cost/Subs**
Fiber Plant	$ 30,820,965	$ 557.36	$ 1,791.56
Transport Electronics (GPON/Ethernet)	$ 15,572,039	$ 281.60	$ 905.17
	$ 46,393,004	**$ 838.96**	**$ 2,696.73**

Capital Cost per Passing/Subscriber/Service Year 10)

Service Subscribers	**Residential Subs Served**	**Commercial Subs Served**	**Total Subs Served**
Broadband Internet	16,847	356	17,203
Telephone/VoIP	0	0	0
IPTV	0	0	0

Subscriber Services	**CAPX**	**Cost/Pass**	**Cost/Subs**
Broadband Internet	$ 1,411,030	$ 25.52	$ 82.02
Telephone/VoIP	$ -	$ -	$ -
IPTV	$ -	$ -	$ -

In the single play model Broadband Internet is the only service. With the single play subscribers would opt into Internet services at various speeds, selecting the package/price that fits into their optimum service plan. The model loses the impact of bundled services and is based on individual service rates for Internet revenue and cost.

Scenario 3 – Financial Summary Single Play 33% Take Rate

Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 1,464,263	$ 7,440,984	$ 9,073,339	$ 13,221,545	$ 18,266,559	$ 27,061,889	$ 29,724,666
Cost of Goods Sold (COGS)	$ 1,817,131	$ 5,093,914	$ 4,909,664	$ 8,379,255	$ 11,288,681	$ 15,589,266	$ 16,590,861
Gross Operating Margin	**$ (352,868)**	**$ 2,347,070**	**$ 4,163,675**	**$ 4,842,290**	**$ 6,977,879**	**$ 11,472,624**	**$ 13,133,805**
	-24%	32%	46%	37%	38%	42%	44%
Sales, General & Administrative (SG&A)	$ 1,274,924	$ 1,698,962	$ 1,365,640	$ 1,724,638	$ 1,955,467	$ 1,935,313	$ 2,195,282
Income Before Depreciation & Interest	**$ (1,627,793)**	**$ 648,108**	**$ 2,798,035**	**$ 3,117,652**	**$ 5,022,411**	**$ 9,537,311**	**$ 10,938,523**
	-111%	9%	31%	24%	27%	35%	37%
Depreciation	$ 1,757,405	$ 3,638,354	$ 3,694,595	$ 3,763,001	$ 3,845,625	$ 2,654,812	$ 3,383,318
Interest	$ 1,232,839	$ 1,251,331	$ 1,527,658	$ 1,787,559	$ 1,692,845	$ 1,052,089	$ 736,780
Net Income	**$ (4,618,036)**	**$ (4,241,577)**	**$ (2,424,218)**	**$ (2,432,908)**	**$ (516,059)**	**$ 5,830,410**	**$ 6,818,425**
	-315%	-57%	-27%	-18%	-3%	22%	23%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,283,280	$ 31,283,280	$ 30,942,611	$ 24,842,116	$ 16,581,863
Debt Service Balance (Loan)	$ 6,908,166	$ 14,681,137	$ 13,799,395	$ 11,037,842	$ 8,093,140	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 2,526,766	$ 4,012,885	$ 4,536,701	$ 2,512,189	$ 2,574,416
Debt Coverage Ratio	-20.07	-19.11	0.30	0.23	0.58	2.74	3.14
Cash	**$ 12,743,604**	**$ (3,550,693)**	**$ (3,820,810)**	**$ (5,770,512)**	**$ (6,539,522)**	**$ 9,537,311**	**$ 38,137,811**

The transition to a single play service profile has the net effect of reducing the effective take rate by 17% and drops the top line revenue by over 35%. The bottom line impact is a reduction of 39% in net income and 41% in HBPW cash position. Debt service remains higher due to the ANR calculation and extends the overall debt service terms for the Revenue bond. Bond terms will likely extend out to 20 years due to the reduced revenue projections.

The single play still provides a viable business services strategy and enables HBPW to achieve a strong cash position by Year 15. The single play scenario requires more proactive sales in the absence of a direct VoIP/video bundle. A 5% negative swing in take rate can have dramatic impact on the net income and places long-term sustainability at risk.

Scenario 3 – Financial Summary Single Play

Residential Market Size	51,495

Residential

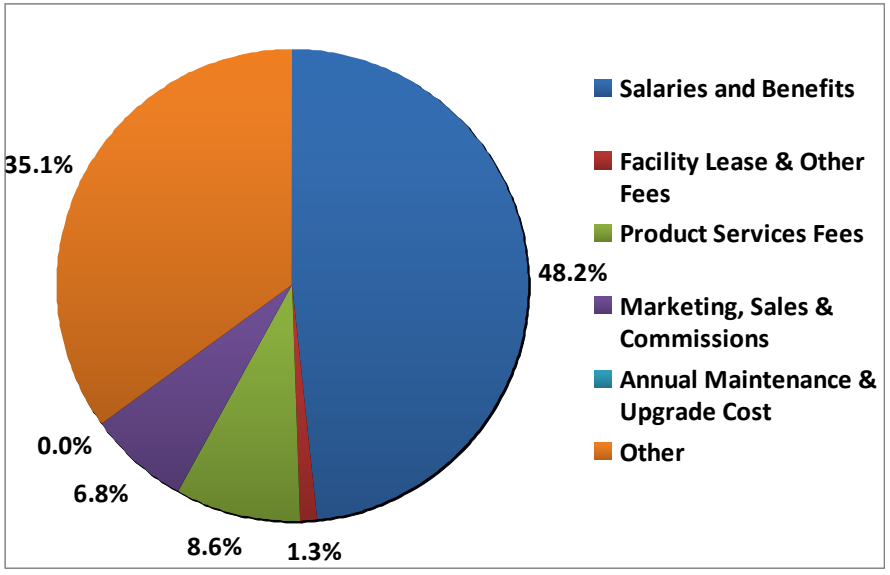
Years	1	2	3	4	5	6	7	8	9	10
Households Served	623	5,982	7,286	8,875	10,809	13,166	16,035	16,352	16,598	16,847
Percentage of All Households	1%	12%	14%	17%	21%	26%	31%	32%	32%	33%

Commercial Market Size	3,803

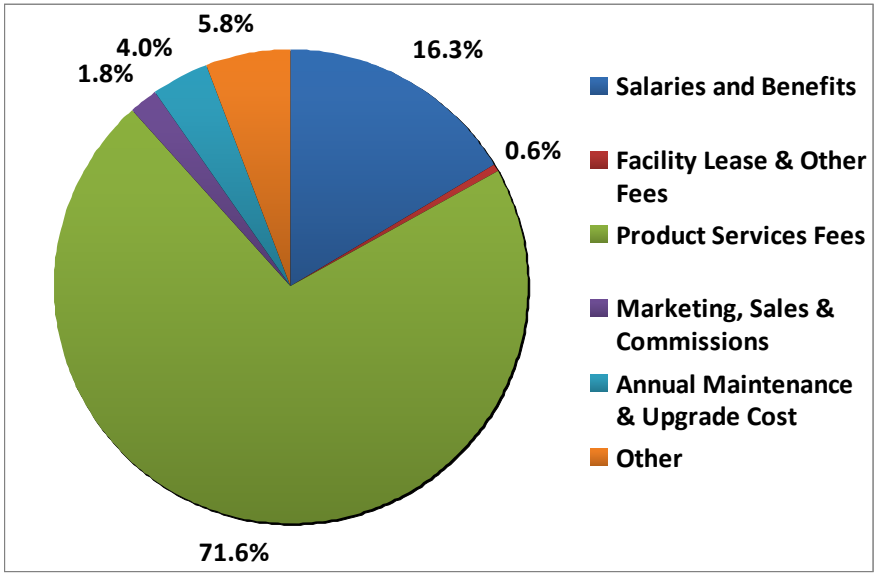
Commercial

Years	1	2	3	4	5	6	7	8	9	10
Businesses Served Served	32	144	169	199	219	242	267	294	323	356
Percentage of All Commerical	0.85%	3.78%	4.46%	5.24%	5.77%	6.35%	7.01%	7.72%	8.50%	9.37%

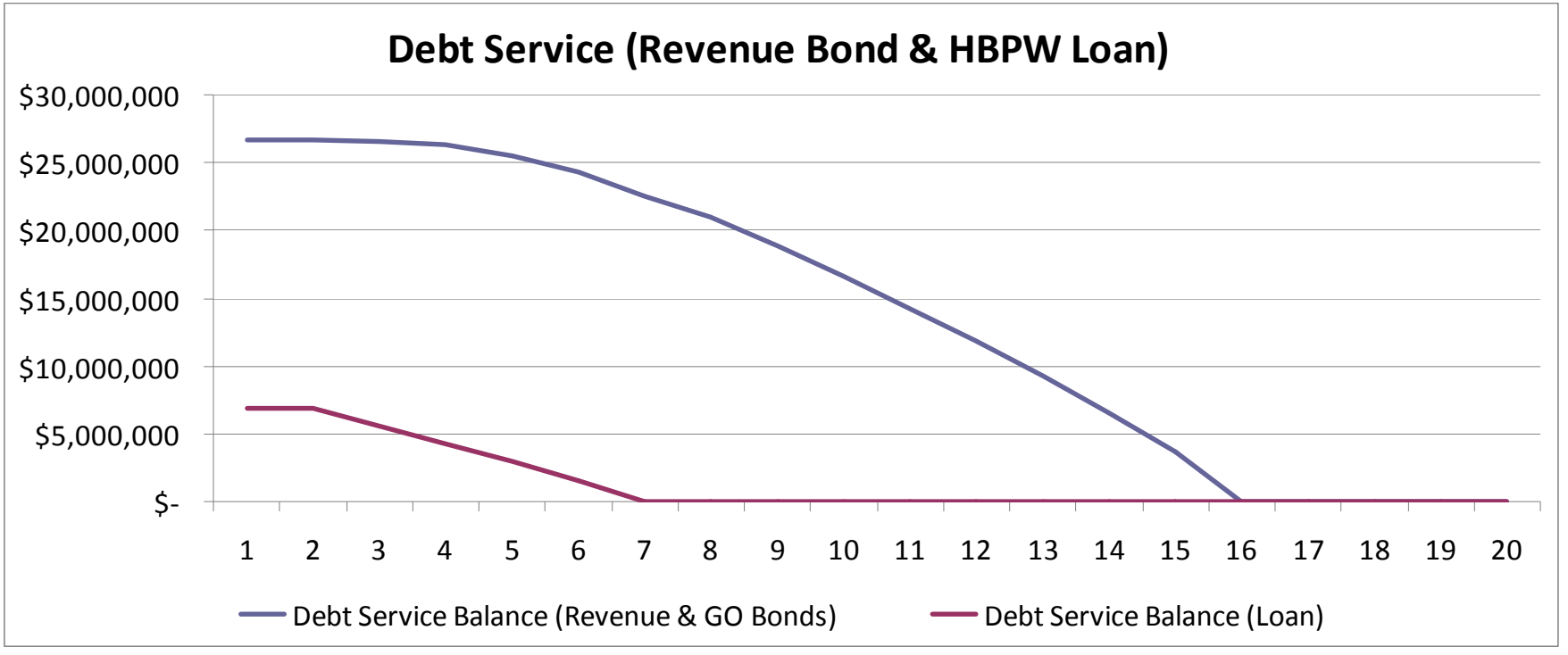
Operating Expense Breakdown Year 1



Operating Expense Breakdown Year 10



Scenario 3 – Financial Summary Single Play



The debt service approach for internal financing is based on a five-year term for each year's transfer/note. The first three years of operation require the most support for capital deployment and the need for term debt. Post Year 3 requirements are largely based on needs for working capital/cash management. Based on the 33% take rate HBPW should be fully reimbursed for its equipment and cash management financing in Year 8, at which point revenue bond principal payments fully kick in based on Annual Available Net Revenue objectives and payment goals of 35% based on ANR from Year 5 out.

At Year 10 the bond principal would be approximately $24.8 million and the available cash reserve would be approximately $9.5 million. HBPW could accelerate bond principal payments and pay off the loan significantly earlier than 20 years. HBPW could also consider longer internal payback periods for its loan and prioritize payment of the bond assuming it can maintain its internal covenants for debt service and cash reserves for the organization as a whole.

At a targeted 27% to 38% % take rate HBPW would have the financial position to provide sufficient guarantees to partially or fully bond the entire capital portion of the FTTH program.

Scenario 4 – Financial Summary Wholesale

	CAPX/Construction					
	Year 1	Year 2	Year 3	Year 4	Year 5	Total (Year 1-5)
Construction Elements						
Headend Facilities						
Internet	$ -	$ -	$ -	$ -	$ -	$ -
VoIP	$ -	$ -	$ -	$ -	$ -	$ -
IPTV	$ -	$ -	$ -	$ -	$ -	$ -
Network Infrastructure						
Fiber Plant	$ 15,410,483	$ 15,410,483	$ -	$ -	$ -	$ 30,820,965
Network Service Electronics	$ 6,154,236	$ 6,154,236	$ -	$ -	$ -	$ 12,308,471
Subscriber Electronics						
Network Interface Device (NID)	$ 1,165,767	$ 1,533,173	$ 408,782	$ 470,690	$ 536,762	$ 4,115,174
Internet/VoIP Router	$ -	$ -	$ -	$ -	$ -	$ -
IPTV Set-Top-Box (STB)	$ -	$ -	$ -	$ -	$ -	$ -
Subscriber Installation Services						
Internet	$ -	$ -	$ -	$ -	$ -	$ -
Internet/VoIP	$ -	$ -	$ -	$ -	$ -	$ -
IPTV Set-Top-Box (STB)	$ -	$ -	$ -	$ -	$ -	$ -
Total Project Construction Costs (Years 1-5)	**$ 22,730,485**	**$ 23,097,891**	**$ 408,782**	**$ 470,690**	**$ 536,762**	**$ 47,244,611**

The CAPX requirements for wholesale services include additional head-end facilities for 3rd party carrier traffic management. Subscriber equipment and projected installation are based on a ramp up to a 36% take rate. The total CAPX cost for the first five years of operation are expected to be just over $47.2 million. The fixed cost of CAPX includes the head-end facilities and network Infrastructure for approximately $47.2 Million or 100% of the total capital cost. The subscriber electronics and installation is subject to variables such as take rate.

Scenario 4 – Financial Summary Wholesale

Capital Cost per Passing/Subscriber (Year 10)

Subscriber Cost	**Passed**	**Subs**
Residences Passed	51,495	18,847
Commercial Buildings Passed	3,803	473
Total Passings	**55,298**	**19,319**

Network Access	**CAPX**	**Cost/Pass**	**Cost/Subs**
Fiber Plant	$ 30,820,965	$ 557.36	$ 1,595.34
Transport Electronics (GPON/Ethernet)	$ 16,423,646	$ 297.00	$ 850.11
	$ 47,244,611	**$ 854.36**	**$ 2,445.45**

Scenario 4 – Financial Summary Wholesale 36% Take Rate

Income Summary	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenue	$ 2,808,837	$ 6,665,762	$ 7,343,795	$ 8,280,314	$ 9,311,123	$ 11,984,836	$ 13,073,720
Cost of Goods Sold (COGS)	$ 1,683,123	$ 3,112,253	$ 2,337,059	$ 3,163,954	$ 3,239,473	$ 3,796,505	$ 4,478,899
Gross Operating Margin	**$ 1,125,714**	**$ 3,553,509**	**$ 5,006,736**	**$ 5,116,360**	**$ 6,071,650**	**$ 8,188,331**	**$ 8,594,821**
	40%	53%	68%	62%	65%	68%	66%
Sales, General & Administrative (SG&A)	$ 1,450,470	$ 1,467,033	$ 1,223,206	$ 1,284,786	$ 1,347,005	$ 1,530,310	$ 1,781,637
Income Before Depreciation & Interest	**$ (324,756)**	**$ 2,086,476**	**$ 3,783,529**	**$ 3,831,573**	**$ 4,724,645**	**$ 6,658,021**	**$ 6,813,184**
	-12%	31%	52%	46%	51%	56%	52%
Depreciation	$ 1,816,239	$ 3,684,964	$ 3,743,362	$ 3,810,603	$ 3,887,283	$ 2,613,388	$ 3,351,377
Interest	$ 1,232,839	$ 1,251,331	$ 1,544,131	$ 1,794,579	$ 1,694,599	$ 1,123,230	$ 978,088
Net Income	**$ (3,373,833)**	**$ (2,849,819)**	**$ (1,503,963)**	**$ (1,773,608)**	**$ (857,237)**	**$ 2,921,404**	**$ 2,483,719**
	-120%	-43%	-20%	-21%	-9%	24%	19%
Debt Service Balance (Revenue Bond)	$ 31,283,280	$ 31,283,280	$ 31,208,522	$ 31,125,082	$ 30,820,834	$ 27,360,376	$ 23,674,699
Debt Service Balance (Loan)	$ 7,320,003	$ 15,007,412	$ 14,064,723	$ 11,239,889	$ 8,226,589	$ -	$ -
Debt Service (P&I)	$ 1,232,839	$ 1,251,331	$ 2,677,559	$ 4,156,615	$ 4,562,552	$ 1,843,606	$ 1,755,590
Debt Coverage Ratio	-19.49	-17.91	0.65	0.40	0.54	2.17	2.33
Cash	**$ 13,885,992**	**$ (986,620)**	**$ (382,676)**	**$ (1,730,569)**	**$ (2,664,938)**	**$ 6,658,021**	**$ 20,145,969**

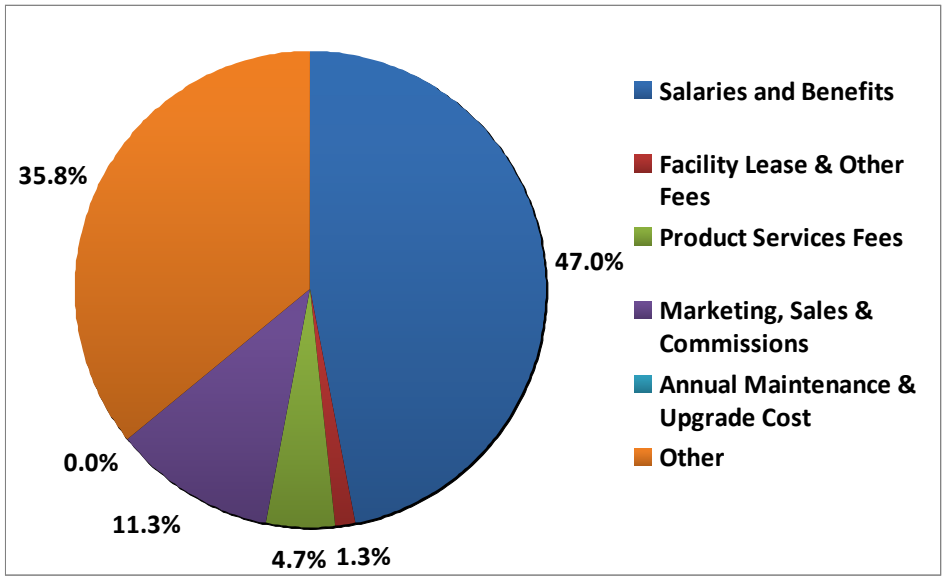
The transition to a wholesale service profile has the net effect of reducing the effective take rate by 14% and drops the top line revenue by over 71%. The bottom line impact is a reduction of 70% in net income and 69% in HBPW cash position. Debt service remains higher due to the ANR calculation and extends the overall debt service terms for the Revenue bond. Bond terms will likely extend out to 20 years due to the reduced revenue projections.

The wholesale scenario still provides a viable business services strategy and enables HBPW to achieve a relatively strong cash position by year 15. The wholesale scenario requires more proactive sales in the absence of any enhanced services. A 5% negative swing in take rate can have dramatic impact on the net income and places long-term sustainability at risk. The wholesale model is more vulnerable to price erosion since it is solely based on the availability of infrastructure and does not provide an effective service to increase its relative value proposition.

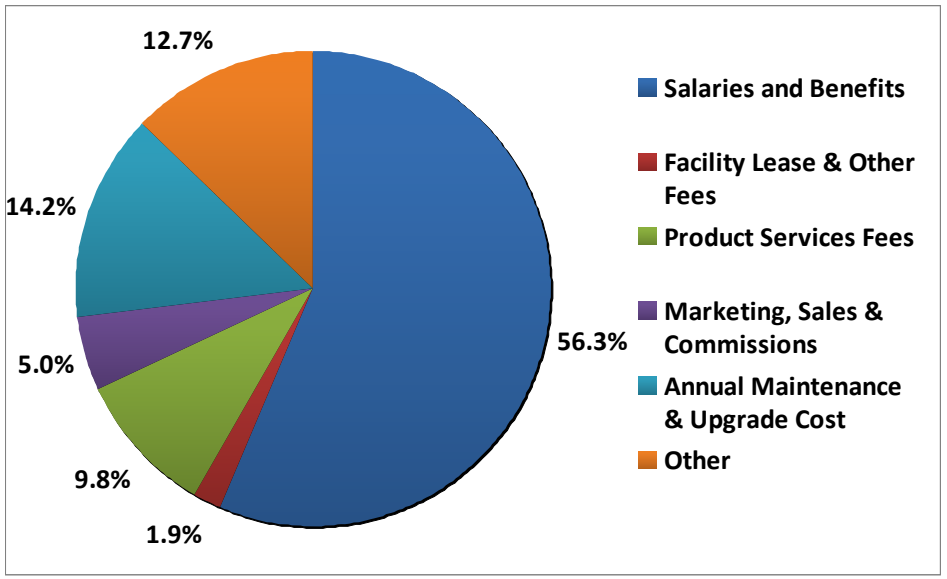
Scenario 4 – Financial Summary Wholesale

Years	Wholesale 1	2	3	4	5	6	7	8	9	10
Commercial	0.5%	2.7%	3.5%	4.4%	5.1%	5.9%	6.7%	7.9%	9.2%	10.7%
Wholesale Residential	7.6%	17.5%	20.1%	23.2%	26.6%	30.6%	35.2%	35.5%	36.1%	36.6%

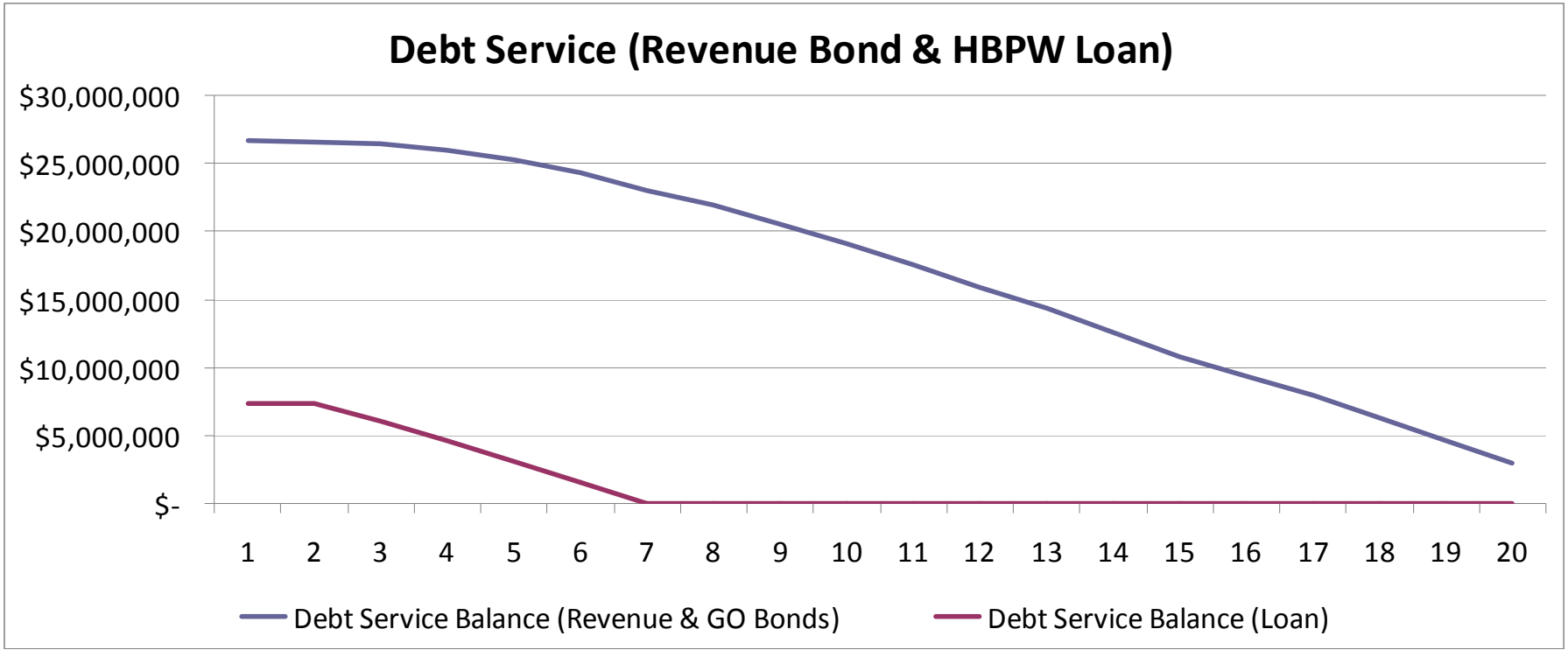
Operating Expense Breakdown Year 1



Operating Expense Breakdown Year 10



Scenario 4 – Financial Summary Wholesale



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At Year 10 the bond principal would be approximately $27.4 million and the available cash reserve would be approximately $6.65 million. HBPW could accelerate bond principal payments abut it will still be difficult to pay off the bond within 20 years. HBPW could also consider longer internal payback periods for its loan and prioritize payment of the bond assuming it can maintain its internal covenants for debt service and cash reserves for the organization as a whole.

At a targeted 31% to 41% % take rate HBPW would have a difficult time justifying the financial position to provide sufficient guarantees to partially or fully bond the entire capital portion of the FTTH program.

Financial Assumptions

Financial Assumptions for Wholesale and Triple, Double and Single Play Services

Build-Out

•Adds over 736 miles of backbone, distribution to the building/curb fiber plant

- Assumes 70% underground and 40% directional boring
- Assumes two years to complete construction within the third year

•Includes active electronics and network interface devices for subscriber side connections

- Assumes GPON with a 32 way split for residential service connections at a 50% take rate
- Assumes Active Ethernet and home run fiber to commercial services

Technology Deployed

The planned design enables HBPW to leverage the advances coming on-line in 2011 such as 10 Gigabit GPON. The average bandwidth commitment using these advanced technologies can provide an average committed rate of approximately 320 Mbps and peaks in excess of 1 Gbps. This design provides both scalability and a path for future proofing and securing the value of the investment over the useful life of the asset.

•GPON/Active Ethernet

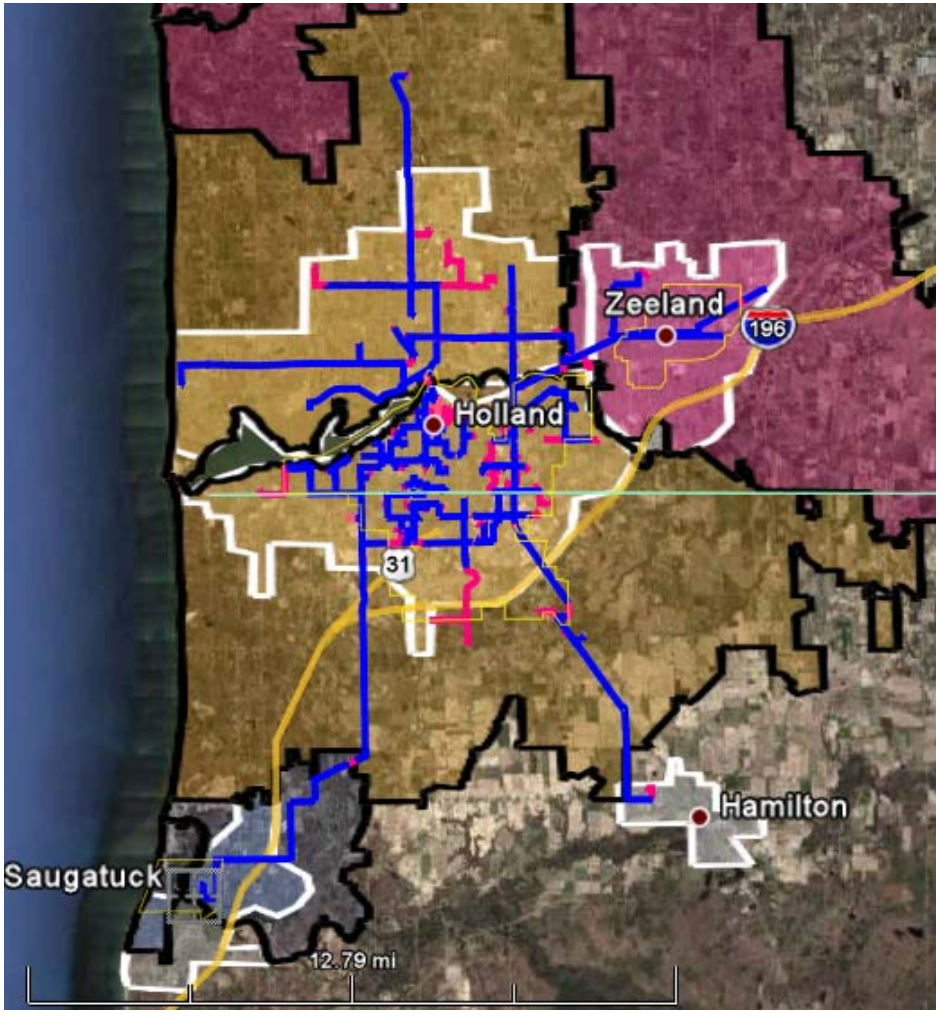
•IP Switching/Routing

•VoIP Class 5 Switch

•Full IPTV Head-end

- Satellite
- MPEG2/4
- IPTV Video On Demand
- IPTV Streaming
- Advanced Software Head-end (Example: Microsoft MediaRoom)

FTTH Build-Out to Include the Following Serving Areas (in White)



Financial Assumptions

Staffing

The financials assume forming a separate division for telecommunications and creating a standalone organization. However, that may not be the most desirable option for HBPW, and many of the higher-level functions of management can be shared within HBPW. The model assumes building an internal staff contingent of 15 core management and technology resources, and outsourcing field installations to a third party. Field network and service installations are addressed in the overtime expense line. The following position/categories have been included in the plan.

•Executive Director/General Manager Media Services
•Marketing/Sales Director
•CFO/Controller
•Network Cost Analyst
•Network Operations Manager
•Outside Plant Manager
•Network Engineer/Capacity Planning
•Network Service Manger
•Outside Plant Engineer
•Field Technician
•Customer Service Manager

Additional operational, administrative and legal expenses are treated as a fixed expense and can either be addressed through additional staff hires, merging functions with HBPW or through outsourcing.

Financial

Discounts Applied – Typical discounts vary based on quantity, timing and material pricing. For the purpose of the HBPW strategic plan no discounts were applied to materials or labor. The only discounts applied were associated with electronics based on similar projects of this size and scope.

•Fiber/Materials = No Discounts Applied
•Equipment = 30%
•Content = No Discounts Applied (Typically Based on Volumes Reached)

Take Rates

The following take rates are based on current market data for similar utility service providers with comparable serving areas. FTTH was new in 2005 and has now seen some maturity. Take rates for RBOCs/ILECs has been averaging 35% and for non-RBOC/ILEC providers 50% with take rates approaching 70 to 80% for triple play providers. The numbers used in developing the financial assumptions are based on lower averages and believed to be highly achievable under most circumstances.

In addition the model assumes a moderate 10-year ramp up to reach the desired take rates. Recent indicators from similar utility providers have shown more aggressive acceleration than what is used to create the HBPW model. It is highly possible that HBPW could see these take rates in as little as 5 years.

Both the acceleration and increased take rates would have a positive affect on HBPWs financial model. Increased take rates above 50% will have capital consequences and require additional investment.

Triple Play - Broadband Internet, VoIP, IPTV

•Residential = 50.1%

•Commercial = 12.2%

Double Play - Broadband Internet, VoIP, IPTV

•Residential = 39.0%

•Commercial = 11.4%

Single Play - Broadband Internet

•Residential = 33.0%

•Commercial = 9.4%

Wholesale – FTTH/Ethernet

•Residential = 36.6%

•Commercial = 10.7%

Financial Assumptions

Capital Purchase/Financing

The model assumes long term revenue bond financing for fiber and either an internal or external loan for electronics and cash management. The payback period for the bond will vary based on the available annual net revenue. The loan is assumed to be a fixed price instrument with deferred principal and interest Year 1.

•Revenue Bond
- Bond Amount = $31 Million
- Legal and Issuance = $465,000
- Bond Rate = 4%
- Payback % of Annual Net Revenue = Graduated Scale from 10% to 35% year 5 and beyond

•Internal HBPW Loan
- Capital Loan Amount = $15.5 Million
- Interest rate = 4%
- Loan Term = 5 Years

Depreciation

Fiber, electronics and construction are the three main drivers to providing a FTTH/B solution. The fiber component is considered to have a 20 to 30 year useful life for financial purposes. However, the asset life for fiber can be as long as 40 years given the newer fabrication and fiber specifications. The model assumes a full FTTH/B deployment. Construction costs are built into the capital costs and amortized over the life of the asset.

•Fiber = 20 Years
•Electronics = 7 Years

Cash Management

Additional operating cash will be needed over the first 4 to 6 years depending on the service scenarios selected. For the purpose of this plan 4 scenarios were selected that address providing both wholesale and retail service options.

•Triple Play Peak Cash Demand = Approximately $2.9 Million
•Double Play Peak Cash Demand = Approximately $2.9 Million
•Single Play Peak Cash Demand = Approximately $6.6 Million
•Wholesale/Commercial Peak Cash Demand = Approximately $2.7 Million

Take Rate Projection Methodology

Data from the annual RVA FTTH Advanced Broadband Report, ID Insight Internet consumer/usage survey data, and discussions with over 20 different FTTH network providers and municipal utility service providers were used in this comparison review. The multifaceted methodology for the Holland BPW FTTH study utilized extensive primary research:

A. BACKGROUND INFORMATION/SECONDARY RESEARCH

Extensive Internet searches were conducted of articles and white papers related to broadband, FTTH, and specific FTTH projects.

B. INTERVIEWS WITH FTTH EXPERTS

A total of over 100 interviews were completed with vendors and other experts knowledgeable about FTTH and projects being completed throughout North America. Similar municipal utility peer groups were reviewed and interviewed.

C. STUDY OF FTTH DEPLOYMENTS

Personal phone interviews were completed with over 25 providers in the United States and Canada.

D. INTERNET CONSUMER SERVICE STUDY

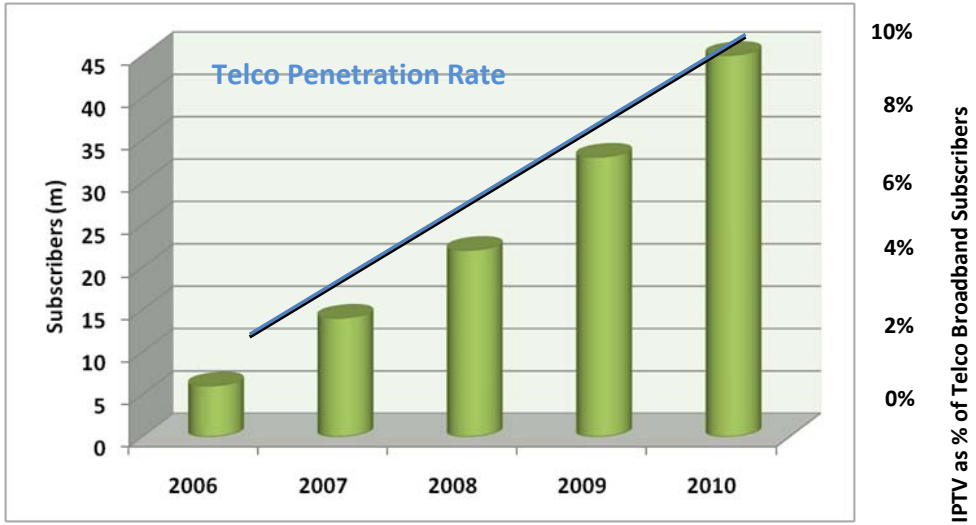
Over 6,000 residential and 276 Internet service subscribers were sampled for network provider, service connection type, speed and price. This sample size represents over 14.5 % of the Greater Holland broadband market.

IPTV Market Growth

IPTV services are starting to show significant penetration into the broadband market place.

•10 % Penetration Globally
•45 Million Subscribers Worldwide
•North America has 16% of global IPTV Subscribers

Financial Assumptions



Source: TeleGeography Research

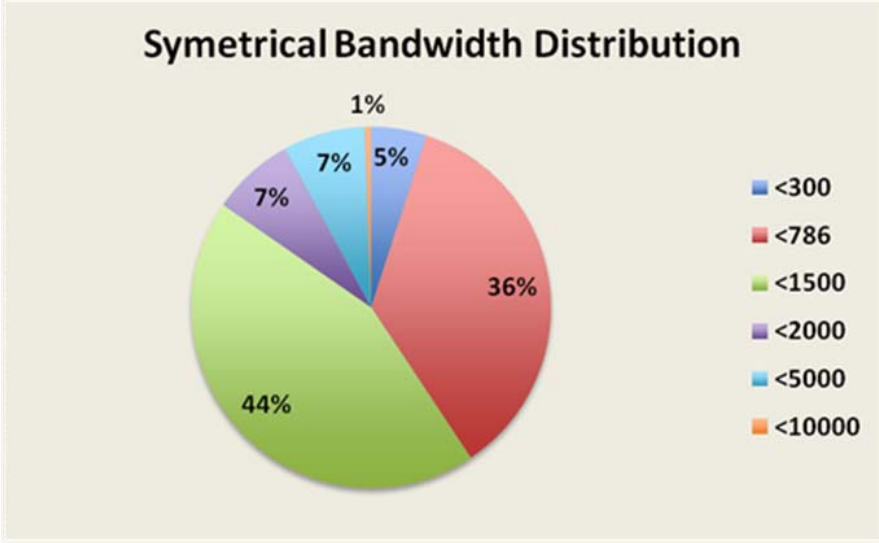
These trends illustrated in the table above suggest that IPTV is beginning to take significant hold amongst broadband subscribers and should be considered by FTTH providers if they are looking to increase take rates for broadband services or compete with other triple play providers for broadband subscribers. This growing demand for digital video and entertainment is not expected to decrease any time soon. The Multimedia Research Group estimates there were 41.2 million IPTV users at the beginning of 2010 and projects growth to 101.7 million users by 2014, a 25.3 percent compounded annual growth rate (CAGR). Based on these and other reports, it is expected that video will account for 90 percent of global network traffic by 2014.

AT&T's U-verse service and Verizon's FIOS service rank number one in their respective regions for overall customer satisfaction with TV services. Triple play operators offerings (voice, data, and video) have seen reduce subscriber churn and as much as 50 percent year-over-year improvements in some cases. In addition as much as 50% of the new revenues coming from operators IPTV customers are coming from using paid video on demand (VoD) services.

Based on our research, 48% of the Holland broadband market is served through existing HFC and over 35% is served by DSL or dial-up and 13% is served by wireless. Over 41% has less than 786 Kbit/s services and 85% are served by less than 1.5 Mbps on average. This would suggest that there is a significant untapped market for broadband consumers. A symmetrical or even a higher upstream product portfolio would likely do well in the Holland market.

Projected take rates for FTTH services vary significantly from traditional RBOCs to municipal and alternative FTTH providers. Recent analysis by RVAL LLC and the Fiber to the Home Council show that municipal FTTH providers are experiencing close to 55% take rates compared to their counterpart RBOCs at around 35%. Some of the more successful municipal utilities, Bristol Virginia – OptiNet http://www.bvu-optinet.com, (~pop. 17,800) and Bristol Tennessee Essential Services http://www.btes.net/btesinternetservices.html (~pop. 24,000) have experienced closer to 70% and 80% take rates respectively.

Larger communities early in their stage of deployment such as Chattanooga Tennessee http://www.epb.net/services/ (~pop. 167,674) are experiencing accelerated take rates with as many as 125 new subscriber request daily.



Financial Assumptions

Financial Model Take Rate Assumptions

A. When compared to the actual take-rates experienced by HBPWs closest peers, i.e. competitive municipal utility FTTH providers (providers facing similar consumers and similar competition), HBPWs projected Broadband Internet, VoIP and overall "triple play" take-rate estimates of 50% are on par with national averages for comparable FTTH providers but also conservative when compared to municipal utilities with similar demographics. Our take rates for 36% at wholesale and 50% for the triple play are conservative for the purpose of developing the HBPW strategic plan.

B. HBPWs early sign up are projected to be significantly higher base on the market segmentation and current market distribution of Broadband Internet consumers. Recent trends show 4.5% take rates over the first 6 months are easily attainable. Based on past RVA LLC research, early sign ups for service are a good indication of ultimate success.

Gigabit Squared believes that HBPW will exceed its take-rate projections. Having a clearly superior fiber based infrastructure provides protection against future competition. Further, Gigabit Squared knows of no place in North America where another provider has overbuilt the first FTTH provider with a second fiber to the home system.

2011 Broadband Strategic Plan

Addendum

comcast

Economy Internet Service

Way faster than dial-up with downloads up to 1.5 Mbps and uploads up to 384 Kbps.

- No dialing in required and no tying up the phone line.
- Download speeds that are way faster than dial-up.
- Constant Guard™ - a $360 value of top-rated security software, including the Norton™ Security Suite and much more.
- The SmartZone® Communications Center, which combines e-mail, Comcast voice mail and contacts into one convenient place online.
- Seven e-mail accounts, each with 10GB of storage.
- Access to Comcast.net to share photos, check e-mail and more.
- Backed by the Comcast 30-day money-back guarantee.

$41.95 per month

Performance

Downloads up to 12 Mbps, uploads up to 2 Mbps with PowerBoost®

- The perfect upgrade from DSL.
- Surf the net, download music, upload photos and chat with friends faster than ever before.
- Constant Guard™ - a $360 value of top-rated security software, including the Norton™ Security Suite and much more.
- SmartZone® Communications Center.
- Access to Comcast.net.
- 7 e-mail accounts, each with 10GB of storage.
- Backed by the Comcast 30-day money-back guarantee.

$59.95 per month

Performance Starter

Downloads up to 6Mbps, uploads up to 1Mbps.

- The perfect upgrade from DSL.
- Surf the net, download music, upload photos and chat with friends faster than ever before.
- Constant Guard™ - a $360 value of top-rated security software, including the Norton™ Security Suite and much more.
- SmartZone® Communications Center.
- Access to Comcast.net.
- 7 e-mail accounts, each with 10GB of storage.
- Backed by the Comcast 30-day money-back guarantee.

$49.95 per month

Blast!®

Downloads up to 20 Mbps, uploads up to 4 Mbps with PowerBoost®.

- All the speed you need for downloading music and movies, and uploading photos and streaming video.
- Constant Guard™ - a $360 value of top-rated security software, including the Norton™ Security Suite and much more.
- SmartZone® Communications Center.
- Access to Comcast.net.
- 7 e-mail accounts, each with 10GB of storage.
- Backed by the Comcast 30-day money-back guarantee.

$71.95 per month

Source: Comcast Website Customer Portal - 05.26.2011

SAMPLE SERVICE OFFERINGS & PRICING – RESIDENTIAL: Holland, Michigan

Source: Comcast Website Customer Portal - 05.26.2011

Starter XF Triple Play

Online Exclusive for New Subscribers!

$100 Visa® Prepaid Card

When you sign up for Starter XF Triple Play with a 2-year agreement.
PLUS, get HBO® FREE for 3 months.

Package Details:
- Over 80 digital cable channels.
- Thousands of On Demand movies and TV shows – on TV and online.
- Lightning-fast Internet speeds – way faster than DSL.
- Constant Guard™ - a $360 value of top-rated security software, including the Norton™ Security Suite and much more.
- Unlimited local and long-distance calling to the US, Canada and Puerto Rico.
- Voicemail plus 12 popular calling features including Caller ID, Call Waiting, and more.
- Backed by the Comcast 30-day money-back guarantee.

Online Exclusive!

$99.00 per month

for the first 12 months
with 2-year agreement

ADD TO MY CART

HD Preferred Plus XF Triple Play

Online Exclusive for New Subscribers!

$200 Visa® Prepaid Card

When you sign up for the HD Preferred Plus XF Triple Play with a 2-year agreement.

Package Details:
- HD included – no HD access fees or HD equipment fees.
- Over 160 digital cable channels, including HBO® and Starz®.
- Thousands of On Demand movies and TV shows – on TV and online.
- Faster Internet speeds.
- Constant Guard™ - a $360 value of top-rated security software, including the Norton™ Security Suite and much more.
- Unlimited local and long-distance calling to the US, Canada and Puerto Rico.
- Voicemail plus 12 popular calling features including Caller ID, Call Waiting, and more.
- Backed by the Comcast 30-day money-back guarantee.

Online Exclusive!

$139.99 per month

for the first 12 months
with 2-year agreement

ADD TO MY CART

HD Preferred XF Triple Play

Online Exclusive for New Subscribers!

$150 Visa® Prepaid Card

When you sign up for the HD Preferred XF Triple Play with a 2-year agreement.
PLUS, get HBO® FREE for 3 months.

Package Details:
- HD included – no HD access fees or HD equipment fees.
- Over 100 digital cable channels, including Starz®.
- Thousands of On Demand movies and TV shows – on TV and online.
- Lightning-fast Internet speeds – way faster than DSL.
- Constant Guard™ - a $360 value of top-rated security software, including the Norton™ Security Suite and much more.
- Unlimited local and long-distance calling to the US, Canada and Puerto Rico.
- Voicemail plus 12 popular calling features including Caller ID, Call Waiting, and more.
- Backed by the Comcast 30-day money-back guarantee.

Online Exclusive!

$119.99 per month

for the first 12 months
with 2-year agreement

ADD TO MY CART

HD Premier XF Triple Play

Online Exclusive for New Subscribers!

$250 Visa® Prepaid Card

When you sign up for the HD Premier XF Triple Play with a 2-year agreement.

Package Details:
- HD DVR included – no HD access fees or HD DVR equipment fees.
- Sports Entertainment Package, including NFL RedZone.
- Over 200 digital cable channels, including HBO®, Starz®, Cinemax® and Showtime®.
- Thousands of On Demand movies and TV shows – on TV and online.
- Faster Internet speeds.
- Constant Guard™ - a $360 value of top-rated security software, including the Norton™ Security Suite and much more.
- Unlimited local and long-distance calling to the US, Canada and Puerto Rico.
- Voicemail plus 12 popular calling features including Caller ID, Call Waiting, and more.
- Backed by the Comcast 30-day money-back guarantee.

Online Exclusive!

$159.99 per month

for the first 12 months
with 2-year agreement

ADD TO MY CART

comcast

Details and Restrictions

Close

Offer ends 6/21/11 and is limited to new residential customers. Not available in all areas. Requires subscription to HD Premier Triple Play with Digital Premier with HD DVR, Performance PLUS or Blast!® (where available) Internet and Comcast Unlimited® service. Two-year contract required. Early termination fees apply. To qualify for offer, service must be ordered via www.comcast.com. After first 12 months, monthly charge goes to $174.99 for months 13-24. After 24 months, or if any service is cancelled or downgraded, regular rates apply. Comcast's current monthly service charge for the HD Premier XF Triple Play is $199.99. Digital TV and Internet service limited to a single outlet. Equipment, installation, taxes, franchise fees, the Regulatory Recovery Fee and other applicable charges (e.g., per-call or international charges) extra. May not be combined with other offers. **TV:** Basic service subscription required to receive other levels of service. On Demand selections subject to charge indicated at time of purchase. HD choices include HD channel lineup and HD programming available On Demand. Not all programming available in all areas. **Internet:** Speed comparison between Comcast 8 Mbps or 16 Mbps (where available) service and standard 1.5 Mbps DSL (downloads only). Actual speeds vary and are not guaranteed. Not all features compatible with Macintosh systems. **Voice:** $29.95 activation fee may apply. Service (including 911/emergency services) may not function after an extended power outage. Call clarity claim based on August 2010 analysis by Tektronix. Visa® Prepaid Card offer requires activation of Comcast services within 30 days from order date and maintenance of account in good standing for 90 days. Card mailed within 16 weeks from completed installation. Cards are issued by Citibank, N.A. pursuant to a license from Visa U.S.A. Inc. and managed by Citi Prepaid Services. Cards will not have cash access and can be used everywhere Visa debit cards are accepted. Not available to Comcast employees or their family members. 30-Day Money-Back Guarantee applies to one month's recurring charges and standard installation up to $500. Call for restrictions and complete details. © Comcast 2011. All rights reserved. Norton™ is a registered mark of Symantec Corporation. HBO® and related channels and service marks are the property of Home Box Office, Inc.

Details and Restrictions

Close

Not all services available in all areas. High-Speed Internet service limited to a single outlet. Service subject to Comcast standard terms and conditions. Prices shown do not include equipment and installation charges or taxes. PowerBoost provides bursts of download and upload speeds for the first 20 MB and 10 MB of a file, respectively. Many factors affect speed. Actual speeds vary and are not guaranteed. Cable modem required. Norton comparisons based on Antivirus, Internet Security and Total Security Performance Benchmarking, Edition 4, by PassMark Software Pty., Ltd. (March 2009). Pricing, services and features subject to change. 30-Day Money-Back Guarantee applies to one month's recurring charges and standard installation up to $500. Please call your local Comcast office for restrictions and complete details about service, prices and equipment. Comcast ©2011. All rights reserved. Norton is a trademark of Symantec Corporation. All other trademarks are the property of their respective owners.

XFINITY Voice from Comcast

- **The Freedom to Talk and the Best Clarity**
  Talk all you want with unlimited nationwide calling and the best call clarity.
- **The Features You Want**
  Get 12 popular calling features, plus voicemail you can check online-all for no additional cost.

Learn More

Unlimited

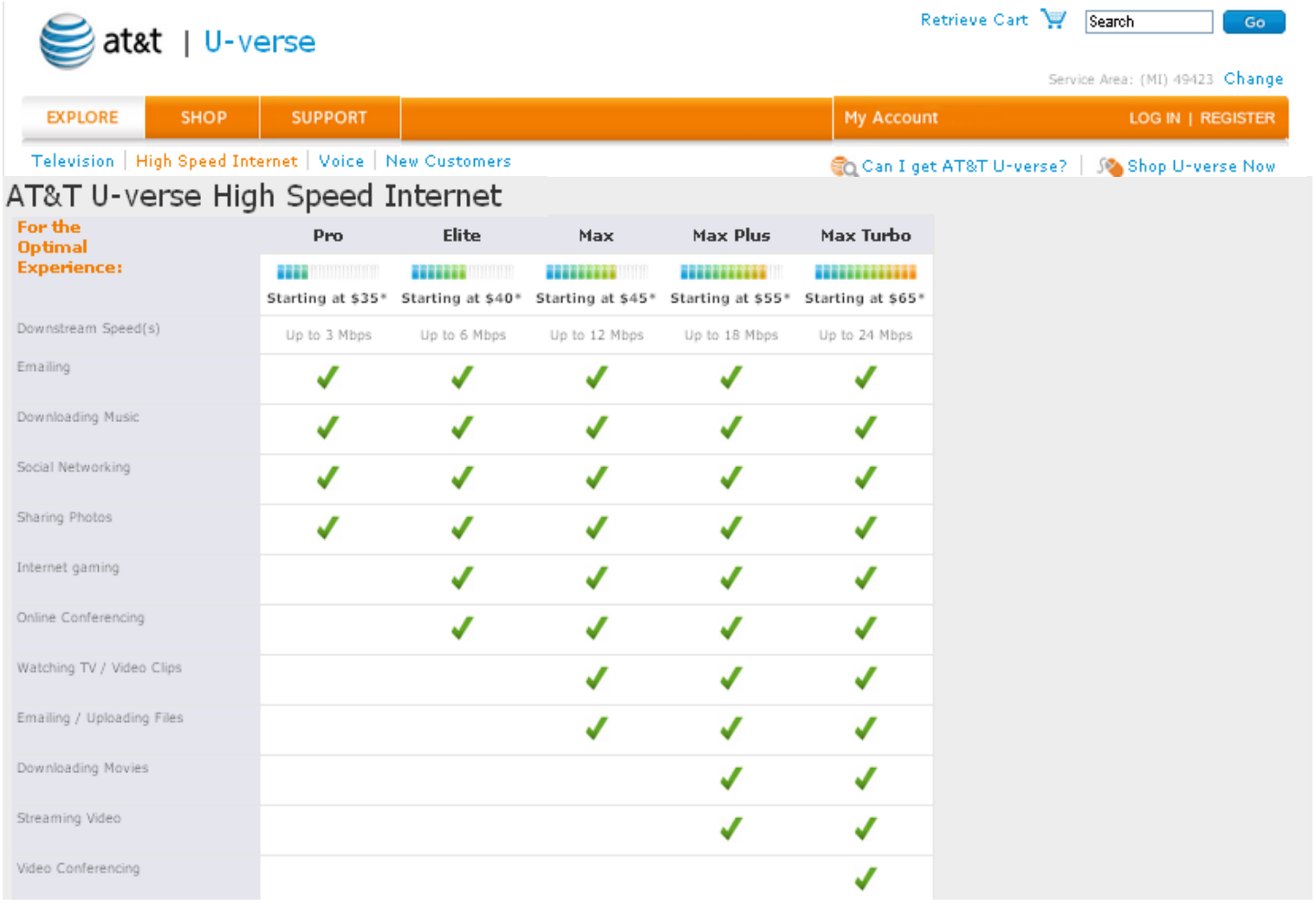
$19.99 per month for 6 months

BEST PRICE

For Current Customers

Source: Comcast Website Customer Portal - 05.26.2011

Source: AT&T Website Customer Portal - 05.26.2011



at&t | U-verse

Retrieve Cart Search Go

Service Area: (MI) 49423 Change

EXPLORE | SHOP | SUPPORT | My Account | LOG IN | REGISTER

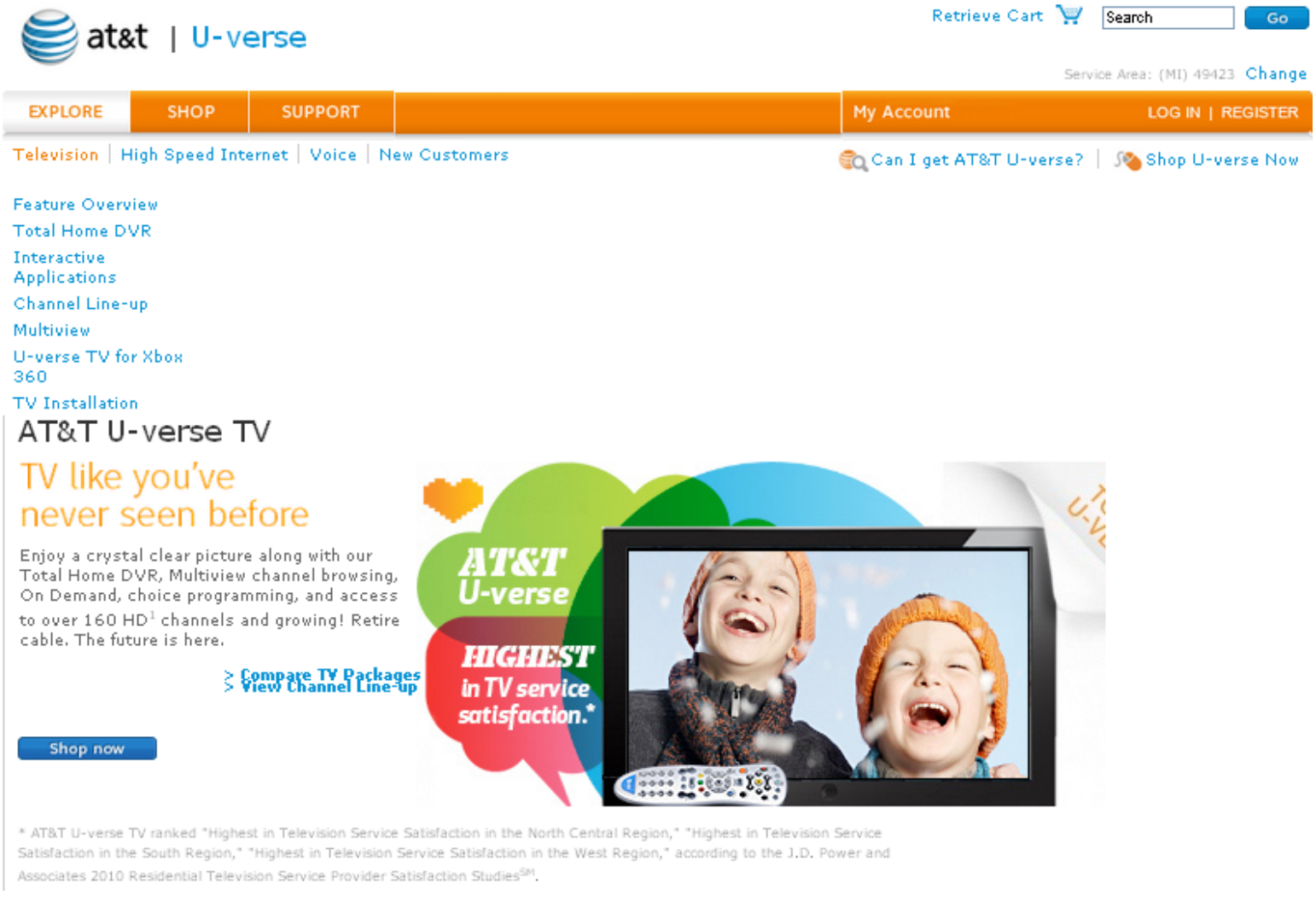
Television | High Speed Internet | Voice | New Customers

Can I get AT&T U-verse? | Shop U-verse Now

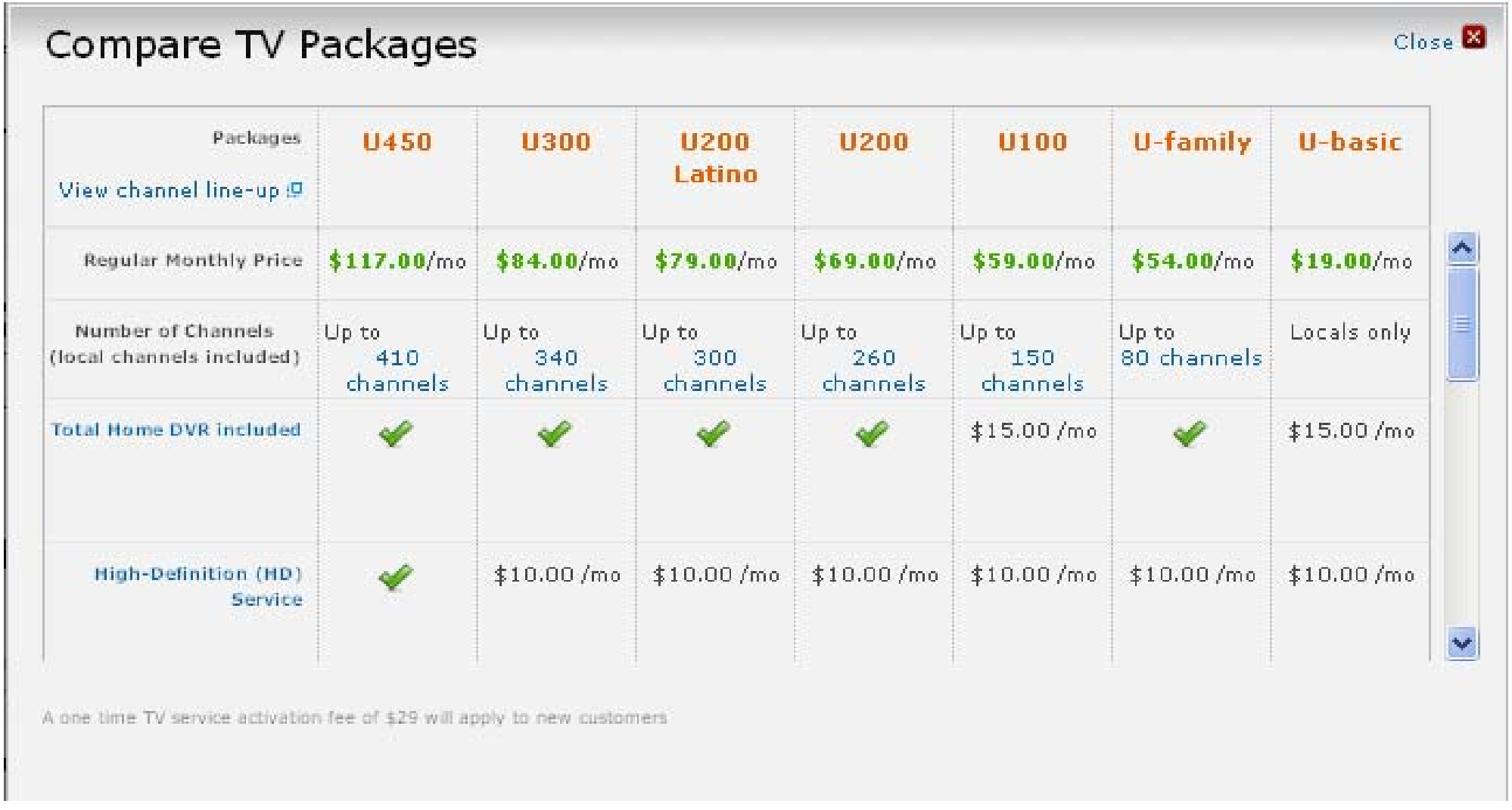
AT&T U-verse High Speed Internet

For the Optimal Experience:	Pro	Elite	Max	Max Plus	Max Turbo
	Starting at $35*	Starting at $40*	Starting at $45*	Starting at $55*	Starting at $65*
Downstream Speed(s)	Up to 3 Mbps	Up to 6 Mbps	Up to 12 Mbps	Up to 18 Mbps	Up to 24 Mbps
Emailing	✓	✓	✓	✓	✓
Downloading Music	✓	✓	✓	✓	✓
Social Networking	✓	✓	✓	✓	✓
Sharing Photos	✓	✓	✓	✓	✓
Internet gaming		✓	✓	✓	✓
Online Conferencing		✓	✓	✓	✓
Watching TV / Video Clips			✓	✓	✓
Emailing / Uploading Files			✓	✓	✓
Downloading Movies				✓	✓
Streaming Video				✓	✓
Video Conferencing					✓

Source: AT&T Website Customer Portal - 05.26.2011



Source: AT&T Website Customer Portal - 05.26.2011



Compare TV Packages

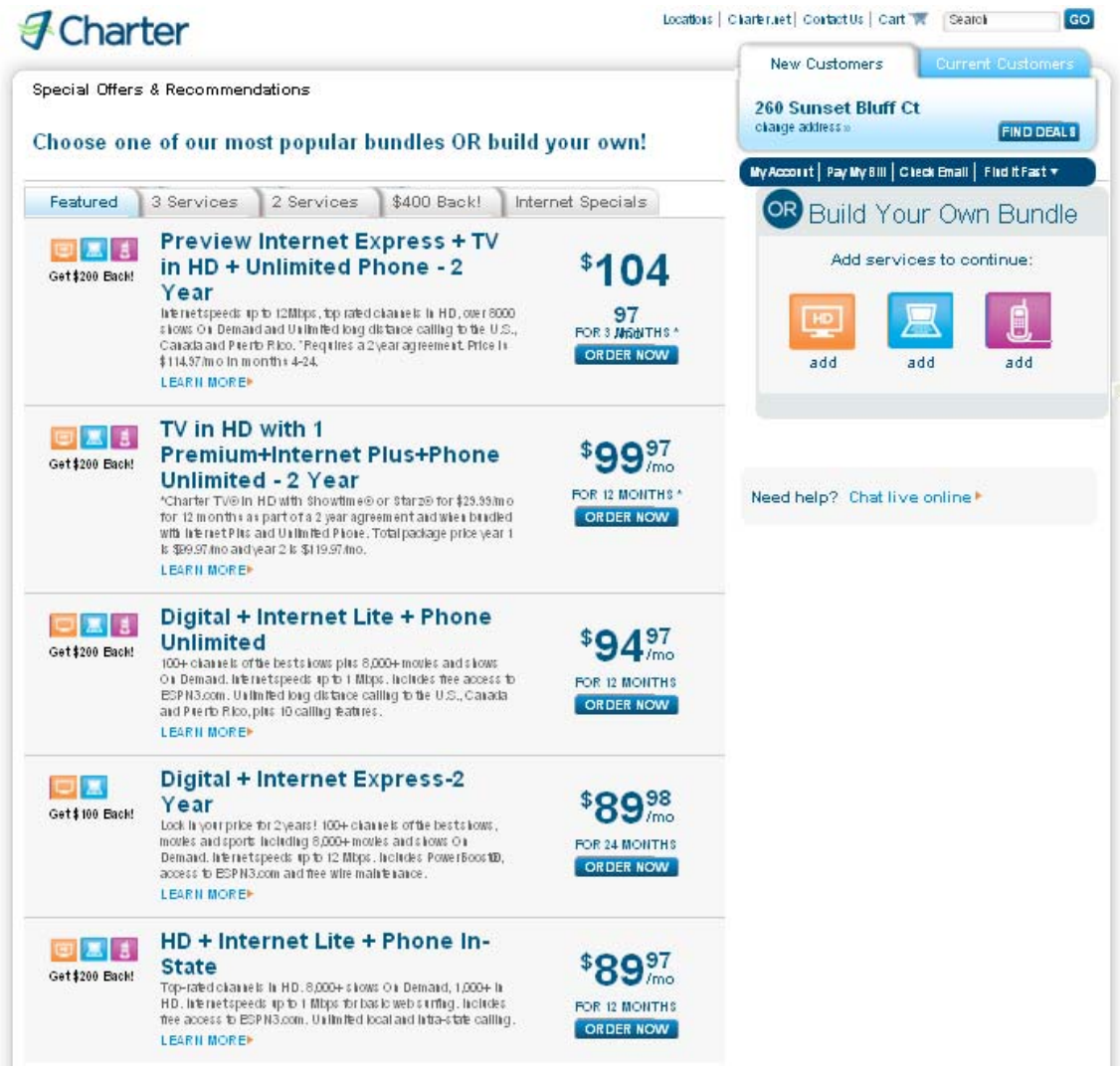
Close

Packages View channel line-up	U450	U300	U200 Latino	U200	U100	U-family	U-basic
Regular Monthly Price	$117.00/mo	$84.00/mo	$79.00/mo	$69.00/mo	$59.00/mo	$54.00/mo	$19.00/mo
Number of Channels (local channels included)	Up to 410 channels	Up to 340 channels	Up to 300 channels	Up to 260 channels	Up to 150 channels	Up to 80 channels	Locals only
Total Home DVR included	✓	✓	✓	✓	$15.00 /mo	✓	$15.00 /mo
High-Definition (HD) Service	✓	$10.00 /mo	$10.00 /mo	$10.00 /mo	$10.00 /mo	$10.00 /mo	$10.00 /mo

A one time TV service activation fee of $29 will apply to new customers

Source: AT&T Website Customer Portal - 05.26.2011

SAMPLE SERVICE OFFERINGS & PRICING – RESIDENTIAL: Holland, Michigan



Charter

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Get $200 Back!
Preview Internet Express + TV in HD + Unlimited Phone - 2 Year
Internet speeds up to 12Mbps, top rated channels in HD, over 8000 shows On Demand and Unlimited long distance calling to the U.S., Canada and Puerto Rico. *Requires a 2 year agreement. Price is $114.97/mo in months 4-24.
LEARN MORE
$104.97 FOR 3 MONTHS * ORDER NOW

Get $200 Back!
TV in HD with 1 Premium+Internet Plus+Phone Unlimited - 2 Year
*Charter TV® in HD with Showtime® or Starz® for $29.99/mo for 12 months as part of a 2 year agreement and when bundled with Internet Plus and Unlimited Phone. Total package price year 1 is $99.97/mo and year 2 is $119.97/mo.
LEARN MORE
$99.97/mo FOR 12 MONTHS * ORDER NOW

Get $200 Back!
Digital + Internet Lite + Phone Unlimited
100+ channels of the best shows plus 8,000+ movies and shows On Demand. Internet speeds up to 1 Mbps. Includes free access to ESPN3.com. Unlimited long distance calling to the U.S., Canada and Puerto Rico, plus 10 calling features.
LEARN MORE
$94.97/mo FOR 12 MONTHS ORDER NOW

Get $100 Back!
Digital + Internet Express-2 Year
Lock in your price for 2 years! 100+ channels of the best shows, movies and sports including 8,000+ movies and shows On Demand. Internet speeds up to 12 Mbps. Includes PowerBoost®, access to ESPN3.com and free wire maintenance.
LEARN MORE
$89.98/mo FOR 24 MONTHS ORDER NOW

Get $200 Back!
HD + Internet Lite + Phone In-State
Top-rated channels in HD, 8,000+ shows On Demand, 1,000+ in HD. Internet speeds up to 1 Mbps for basic web surfing. Includes free access to ESPN3.com. Unlimited local and intra-state calling.
LEARN MORE
$89.97/mo FOR 12 MONTHS ORDER NOW

New Customers | Current Customers

260 Sunset Bluff Ct
change address » FIND DEALS

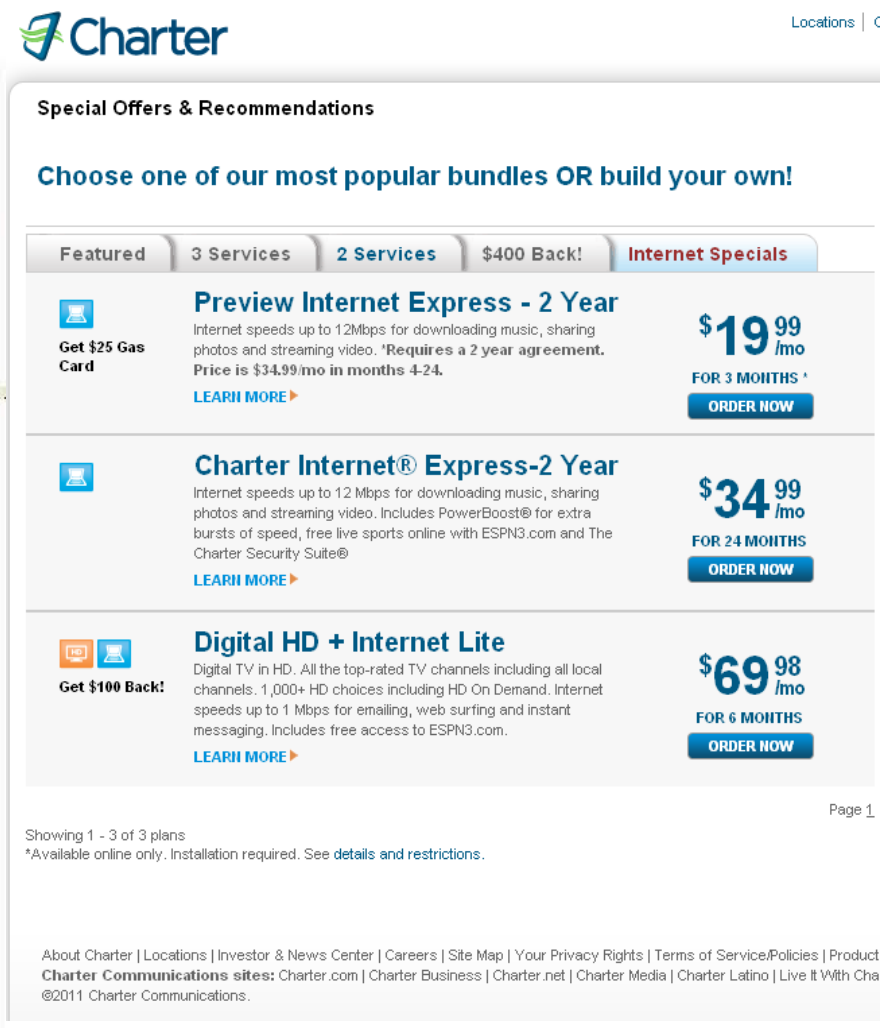
My Account | Pay My Bill | Check Email | Find It Fast

OR Build Your Own Bundle

Add services to continue:

add add add

Need help? Chat live online



Charter

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Special Offers & Recommendations

Choose one of our most popular bundles OR build your own!

Featured | 3 Services | 2 Services | $400 Back! | Internet Specials

Get $25 Gas Card
Preview Internet Express - 2 Year
Internet speeds up to 12Mbps for downloading music, sharing photos and streaming video. *Requires a 2 year agreement. Price is $34.99/mo in months 4-24.
LEARN MORE
$19.99/mo FOR 3 MONTHS * ORDER NOW

Charter Internet® Express-2 Year
Internet speeds up to 12 Mbps for downloading music, sharing photos and streaming video. Includes PowerBoost® for extra bursts of speed, free live sports online with ESPN3.com and The Charter Security Suite®
LEARN MORE
$34.99/mo FOR 24 MONTHS ORDER NOW

Get $100 Back!
Digital HD + Internet Lite
Digital TV in HD. All the top-rated TV channels including all local channels. 1,000+ HD choices including HD On Demand. Internet speeds up to 1 Mbps for emailing, web surfing and instant messaging. Includes free access to ESPN3.com.
LEARN MORE
$69.98/mo FOR 6 MONTHS ORDER NOW

Page 1

Showing 1 - 3 of 3 plans
*Available online only. Installation required. See details and restrictions.

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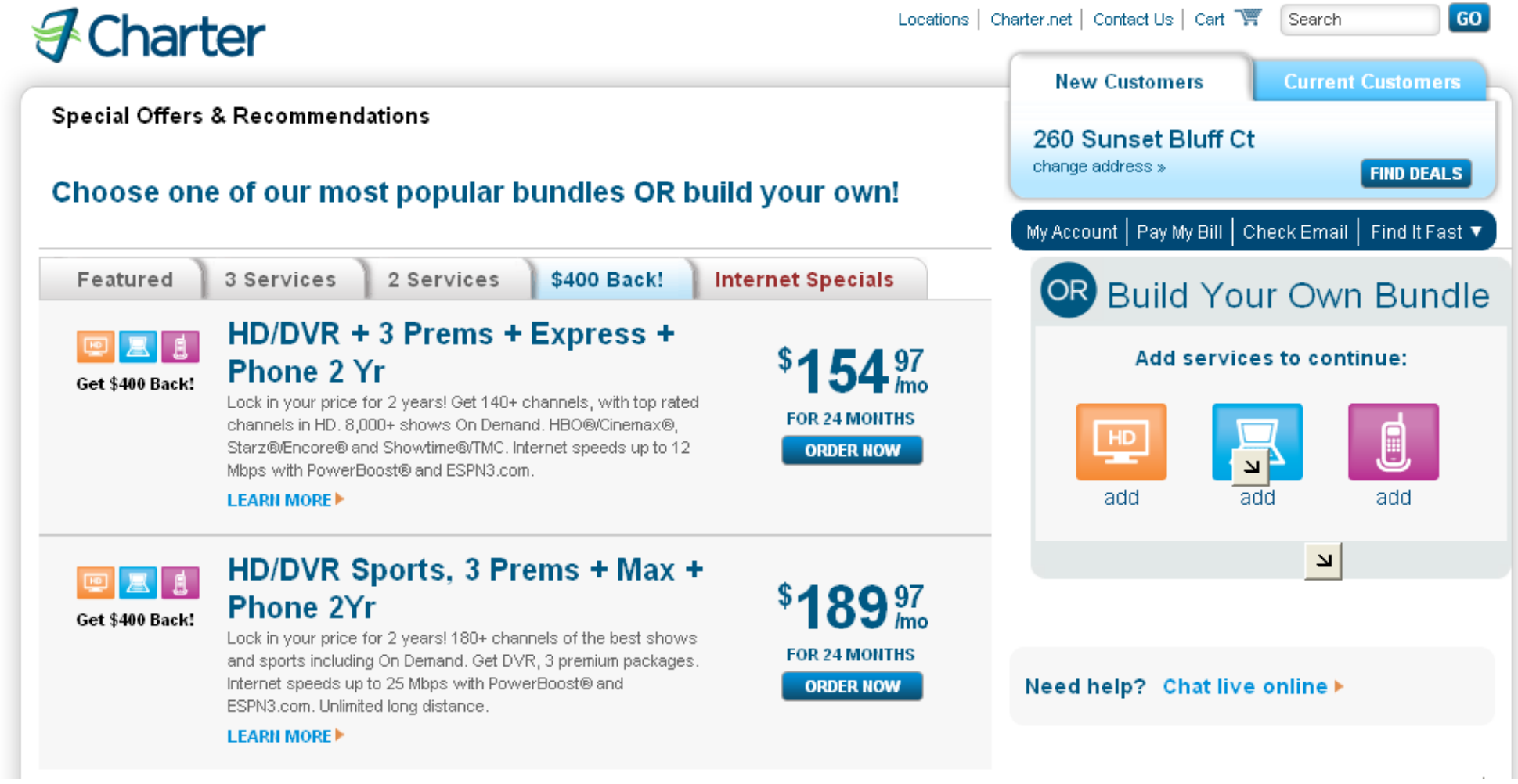
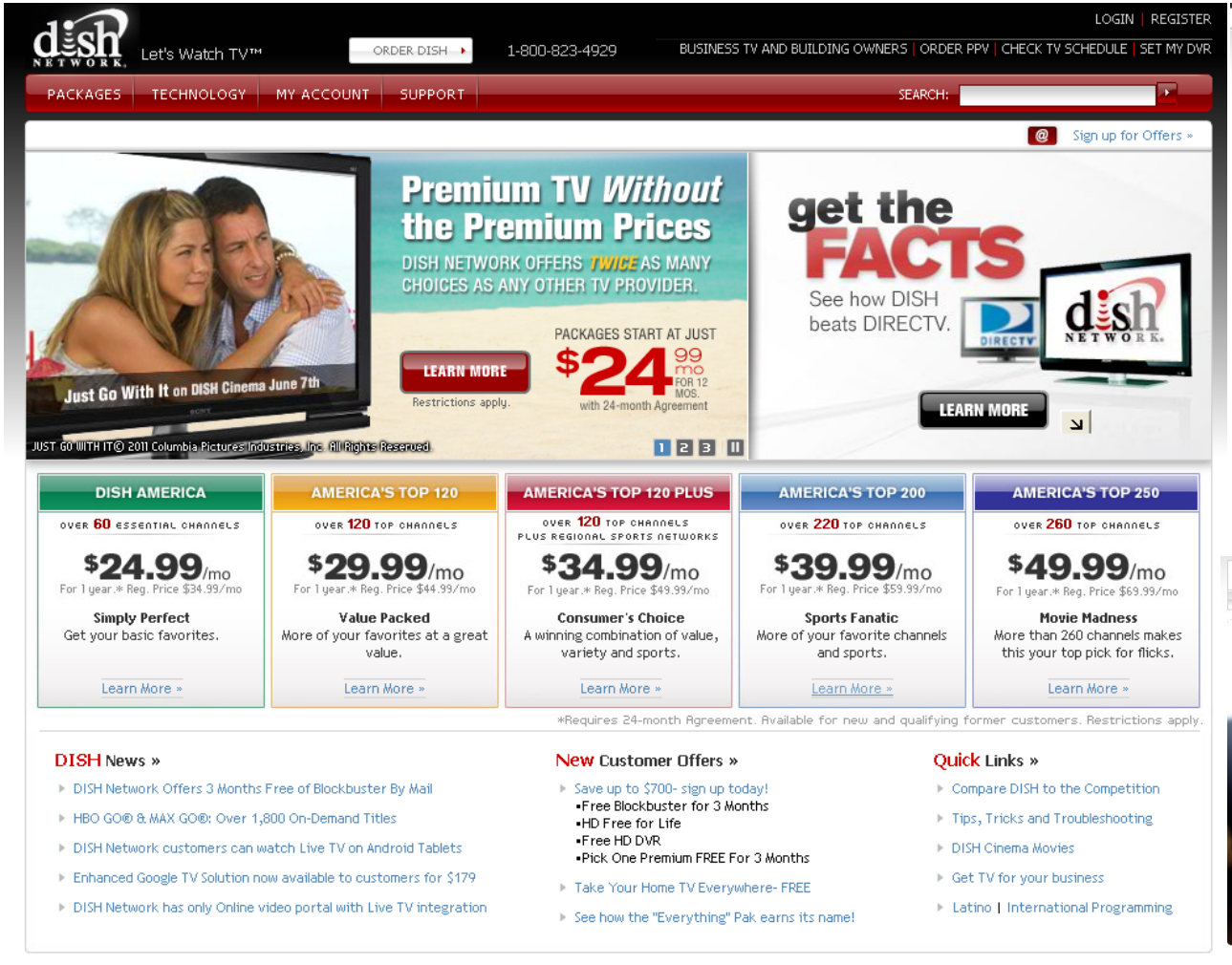
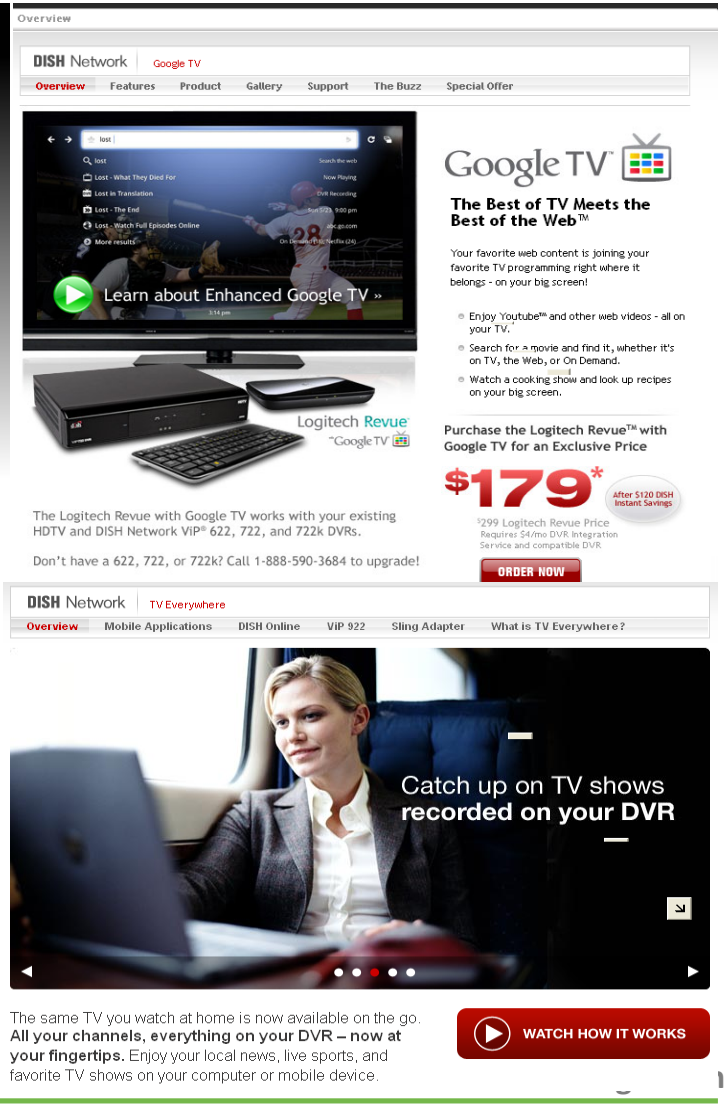
Source: Charter Website Customer Portal - 05.26.2011



Source: Charter Website Customer Portal - 05.26.2011

SAMPLE SERVICE OFFERINGS & PRICING – RESIDENTIAL: Holland, Michigan



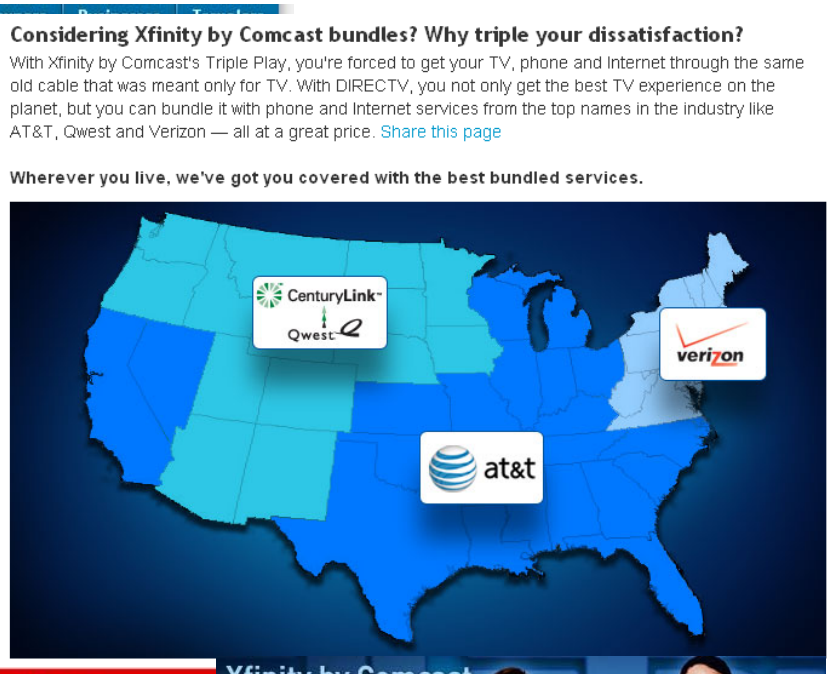


Source: Dish Network Website Customer Portal - 05.26.2011

SAMPLE SERVICE OFFERINGS & PRICING – RESIDENTIAL: Holland, Michigan

Source: Dish Network Website Customer Portal - 05.26.2011

SAMPLE SERVICE OFFERINGS & PRICING – RESIDENTIAL: Holland, Michigan



Source: DIRECTV Website Customer Portal - 05.26.2011

Competitive Analysis

Sirus TECHNOLOGY SOLUTIONS

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Services

- Enterprise Internet
- Consumer Internet
- Web and E-mail Hosting
- Managed Services
- IP Telephony
- Network Integration
- WAN Teleco Consulting
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  - **Consumer Internet**
  - **Web and E-mail Hosting**
  - **Managed Services**
  - **IP Telephony**
  - **Network Integration**
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  - **Product Acquisition**
- Search
- Contact Us
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About Sirus » Services » Enterprise Internet

Enterprise Internet

In today's competitive business world the most effective technologies require greater use of the internet. It is vital for competitive organizations to have greater access to the internet. Your organization must be empowered to compete in the information age. Sirus Networks can provide you with the capabilities your organization needs to thrive in today's technology-driven business market.

T1 Technology
- Full T1 Bandwidth (1.544MB)
- Fractional Bandwidth (128k, 256k, 384k, 512k)

DS-3 Technology
- Fractional Bandwidth (from 3MB to 45MB)
- Burstable technologies available

Sonet Technology
- OC 3 (155MB)
- Bandwidth intensive applications

T1 Technology

T1 is a high speed digital network (1.544 mbps) developed by AT&T in 1957 and implemented in the early 1960's to support long-haul pulse-code modulation (PCM) voice transmission. The primary innovation of T1 was to introduce "digitized" voice and to create a network fully capable of digitally representing what was up until then, a fully analog telephone system.

The term T1 circuit is commonly used to identify a multiplexed 24 channel, 1.544 Mbps digital data circuit providing communications between two facilities or from a local service provider. T1 refers to the transport of a DS-1 formatted signal onto a copper, fiber or wireless medium for deploying voice, data or video-conferencing services. The T1 is part of an extensive digital hierarchy that starts with 24 DS0s at 64 kbps. These individual DS0s are used to provide voice or digital data to support point to point or network applications. By combining multiple DS0s, a high-speed interface can be provided to support a synchronous interface to a LAN router or voice PBX. For distances longer than one mile, a repeater is placed every mile to regenerate the signal.

Reliable and fast, T1 lines remain the most popular way for businesses to access the Internet.

Fractional T1

This option allows the flexibility of lower cost for lower bandwidth usage and a high performance dedicated connection. Fractional service allows scalability with a single set up. Costs are aligned with bandwidth usage. (T1 increments include: 128K, 256K, 512K, and 1.54MB.)

Source: Sirus Website - 05.26.2011

DS-3 Technology

Sirus Networks Dedicated High-Capacity DS-3 Internet Access is the ideal solution for businesses that require high-bandwidth access at a great price. Whether you host high-traffic web sites or need high-capacity bandwidth on an as needed basis, there's a level of DS-3 service - dedicated, fractional, or
burstable - that will meet your needs.

Dedicated DS-3 Service

Sirus Networks dedicated DS-3 service is the answer if you need dedicated, high bandwidth connectivity to support web hosting, high-traffic web sites, large data and file transfers, multimedia applications, or hundreds of Internet users. With this service, dedicated point-to-point circuits connect your LAN directly
to Sirus Networks world-class IP backbone.

Fractional DS-3 Service

If your Internet traffic is predictable throughout the month, then our Fractional DS-3 access is the service for you. Because this service is billed at a fixed monthly cost based on the bandwidth level you choose, it's easy to plan your budget. You can easily adjust bandwidth up or down as your needs change.

Burstable DS-3 Service

This cost-effective option is ideal for organizations that want the benefits and potential - but not the entire cost - of full DS-3 bandwidth over an unshared 45 Mbps digital leased line. When you choose burstable DS-3 service, you pay only for what you use. Monthly billings are based on traffic samples and are priced in tiers of 3 Mbps increments from 3 Mbps to 45 Mbps.

Sonet Technology

SONET is an acronym for **S**ynchronous **O**ptical **NET**work. It defines optical signals and a synchronous frame structure for multiplexed digital traffic. It is a set of standards defining the rates and formats for optical networks specified in ANSI T1.105, ANSI T1.106 and ANSI T1.117.

A similar standard, Synchronous Digital Hierarchy (SDH), has also been established in Europe by International Telecommunication Union Telecommunication Standardization Sector (ITU-T). SONET equipment is generally used in North America and SDH equipment is generally used everywhere else in the world.

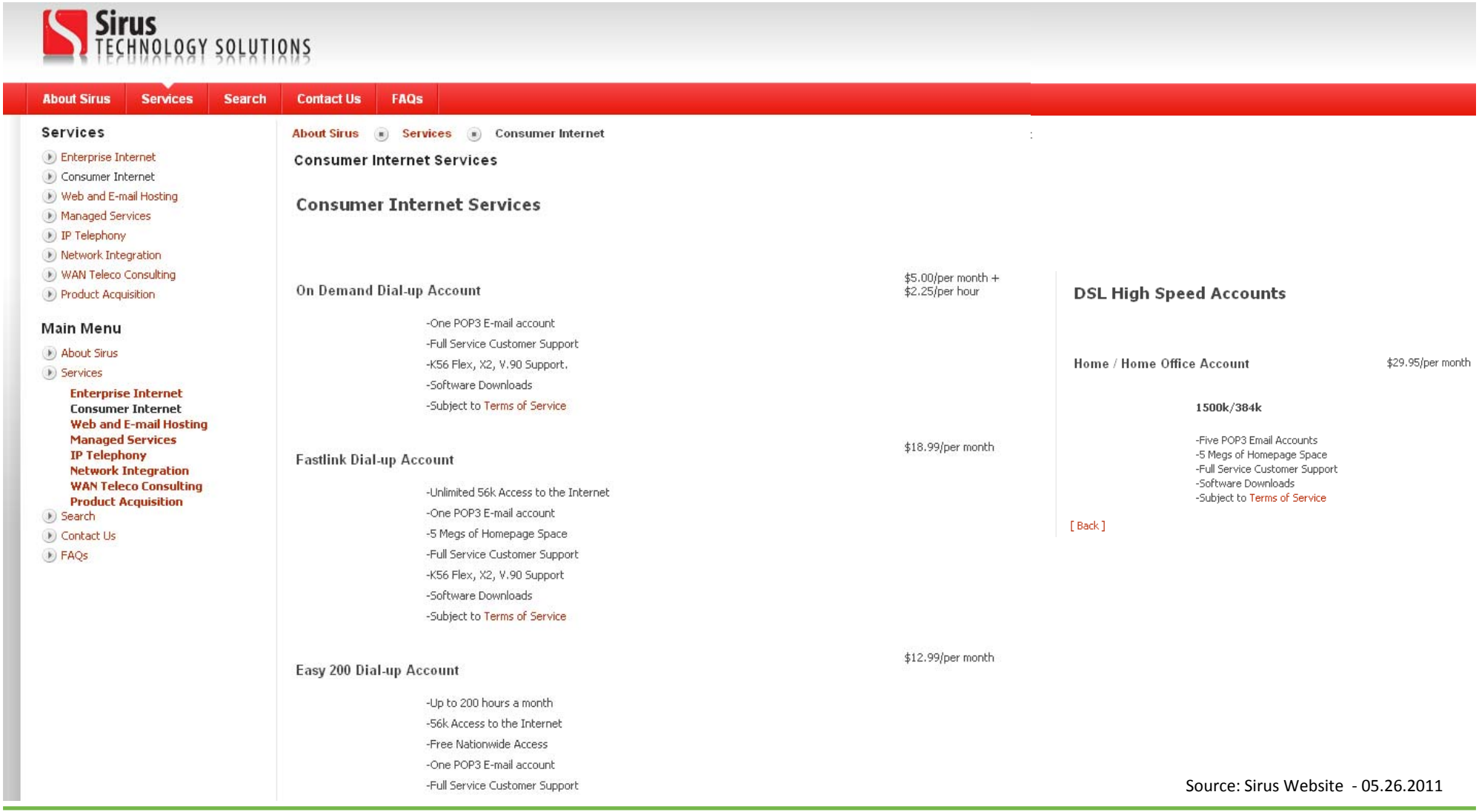
Both SONET and SDH are based on a structure that has a basic frame and speed. The frame format used by SONET is the synchronous transport signal (STS), with STS-1 being the base level signal at 51.84 Mbps. A STS-1 frame can be carried in an OC-1 signal. The frame format used by SDH is the synchronous transport module (STM), with STM-1 being the base level signal at 155.52Mbps. A STM-1 frame can be carried in an OC-3 signal.

Both SONET and SDH have a hierarchy of signaling speeds. Multiple lower level signals can be multiplexed together to form higher level signals. For example, three STS-1 signals can be multiplexed together to form a STS-3 signal, and four STM-1 signals multiplexed together will form a STM-4 signal.

SONET and SDH are technically comparable standards. The term SONET is often used when referring to either.

Source: Sirus Website - 05.26.2011

Competitive Analysis



Source: Sirus Website - 05.26.2011

Competitive Analysis

123 NET

Prime T

24 Voice and Data Channels - Lower Cost

RELIABILITY

SPEED

VALUE

123.Net

Voice/Data
1.5 Mb

Call your 123.NET representative to learn more about our products!

OVERVIEW

The Prime T is a cost effective way for small and medium sized businesses to gain Voice and Internet access. Combined Voice and Data is delivered in a highly customized package designed to work with virtually any PBX system. Channels can be configured individually for unmatched versatility.

TECHNOLOGY

Each T1 contains 24 channels, allowing customers to specify the configuration that works best. Since only one circuit is required for this connection, cost is greatly reduced in comparison with larger bundled offerings. This allows companies to receive entry level services they need at a great price.

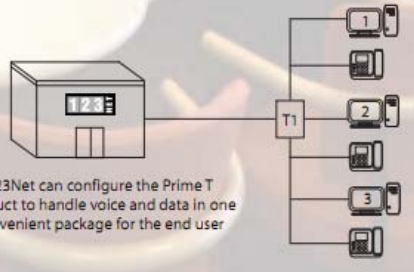
FEATURES AND OPTIONS

Data
- Bandwidth Speed up to 1.23 Mbps
- Same great 123Net bandwidth
- IP addresses included
- Router included

Voice
- Statewide local numbers available
- Unlimited local calling
- Great Calling Features included
- 4 Voice lines, up to 20 optional

BENEFITS

- Economical, low and predictable monthly cost with only one bill
- No additional capital investment is typically required
- Custom configurations available to fit customer needs
- Speed and ease of installation; most orders connected in 2 weeks
- Seamless, non-disruptive transition includes professionally installed CPE
- Compatible with fax, modem and alarm lines
- Guaranteed 99.99% availability
- Features include: Caller ID with Name & Number; Call Waiting; 3-Way Calling; Call Forwarding; Call Forwarding Busy; Call Forward No Answer with Anonymous Caller Rejection and more



123Net can configure the Prime T product to handle voice and data in one convenient package for the end user

Source: 123 NET Website - 05.26.2011

123 NET

Prime T Plus

Dynamic Voice and Data - up to 24 phone lines

RELIABILITY

SPEED

VALUE

123.Net

Voice/Data
1.5 - 6.0 Mb

Call your 123.NET representative to learn more about our products!

OVERVIEW

The Prime T Plus is a very flexible and unique product that allows bandwidth to be allocated only while calls are taking place. When calls are ended, the bandwidth becomes accessible for data usage as opposed to a channelized product. The Prime T Plus can utilize up to 4 T1s for 6.0mb symmetrical throughput.

TECHNOLOGY

This product can be ordered in various different configurations ranging anywhere from 4 phone lines and 1.5mb all the way to 24 phone lines and 6.0mb. Each call reduces the available throughput by 64k for the length of that particular call. When a call ends, that bandwidth is then dynamically allocated back for available data usage within milliseconds.

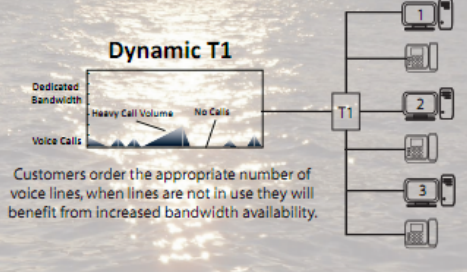
FEATURES AND OPTIONS

Data
- Bandwidth Speed up to 6.0 Mbps
- Same great 123Net bandwidth
- IP addresses included
- Router included

Voice
- Statewide local numbers available
- Unlimited local calling
- Great Calling Features included
- 4 Voice lines, up to 20 optional

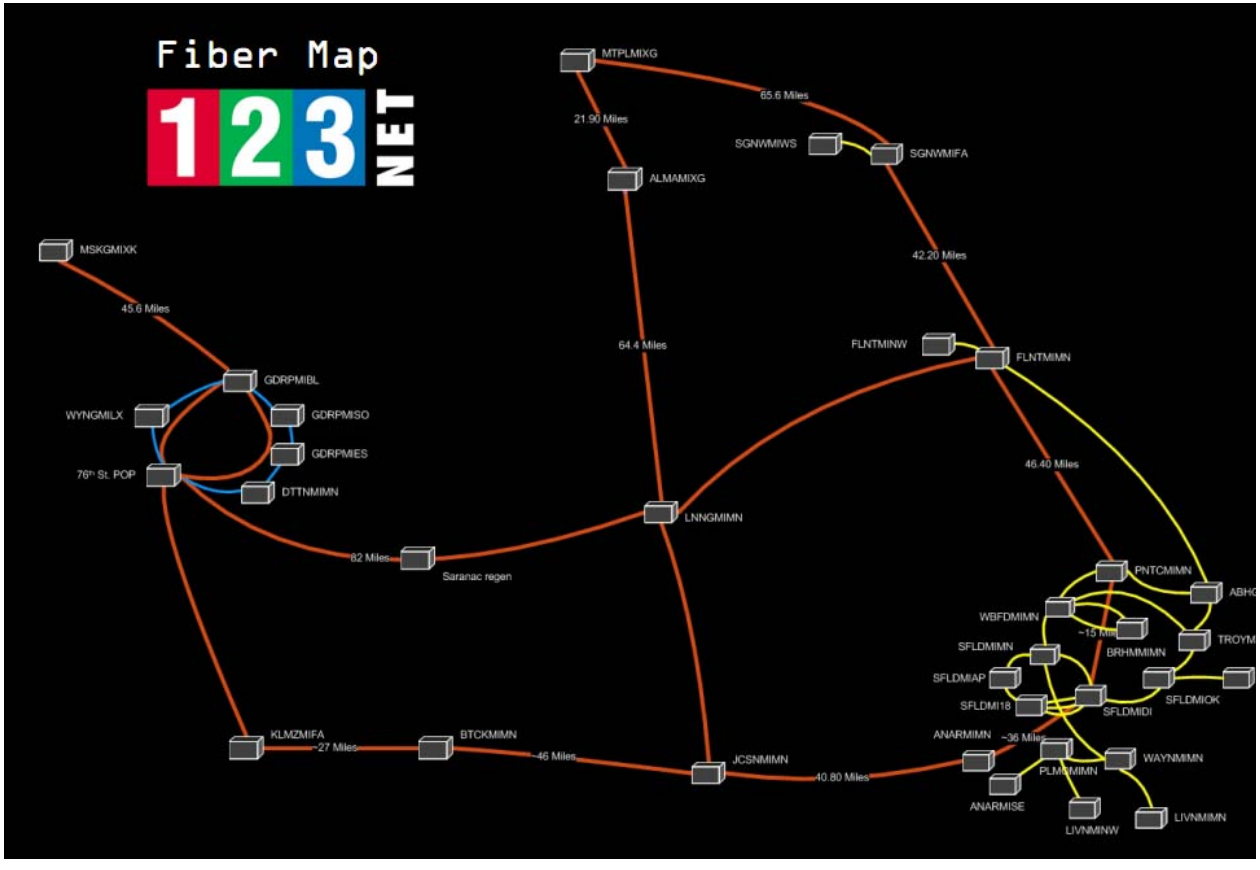
BENEFITS

- Economical, low and predictable monthly cost with only one bill
- No need to purchase a new digital PBX system
- Flexibly customize the Prime T Plus to fit your business requirements
- Orders are typically completed in 2 weeks or less
- Seamless, non-disruptive transition includes professionally installed CPE
- 99.99% network availability
- Features include: Caller ID with Name & Number; Call Waiting; 3-Way Calling; Call Forwarding; Call Forwarding Busy; Call Forward No Answer with Anonymous Caller Rejection and more



Customers order the appropriate number of voice lines, when lines are not in use they will benefit from increased bandwidth availability.

Competitive Analysis



Fiber Transport

123Net owns over 1250 miles of Fiber in Michigan

123Net is primarily a wholesale company. We focus on carrier to carrier transport and collocation to ISPs and other organizations. We can provide fiber connectivity between many different facilities and providers in Michigan.

When you need fiber transport services, it pays to turn to the experts at 123Net. Whether you require an inter-building or intra-building installation, 123Net's professionals have the knowledge and expertise necessary to perform a quick, flawless installation certain to provide you with the highest possible levels of reliability and service – and at a much lower cost than you would probably expect. Contact your 123Net representative today to discuss your particular needs.

Level(3) COMMUNICATIONS

cogent COMMUNICATIONS Optical Internet

Global Crossing

SAVVIS

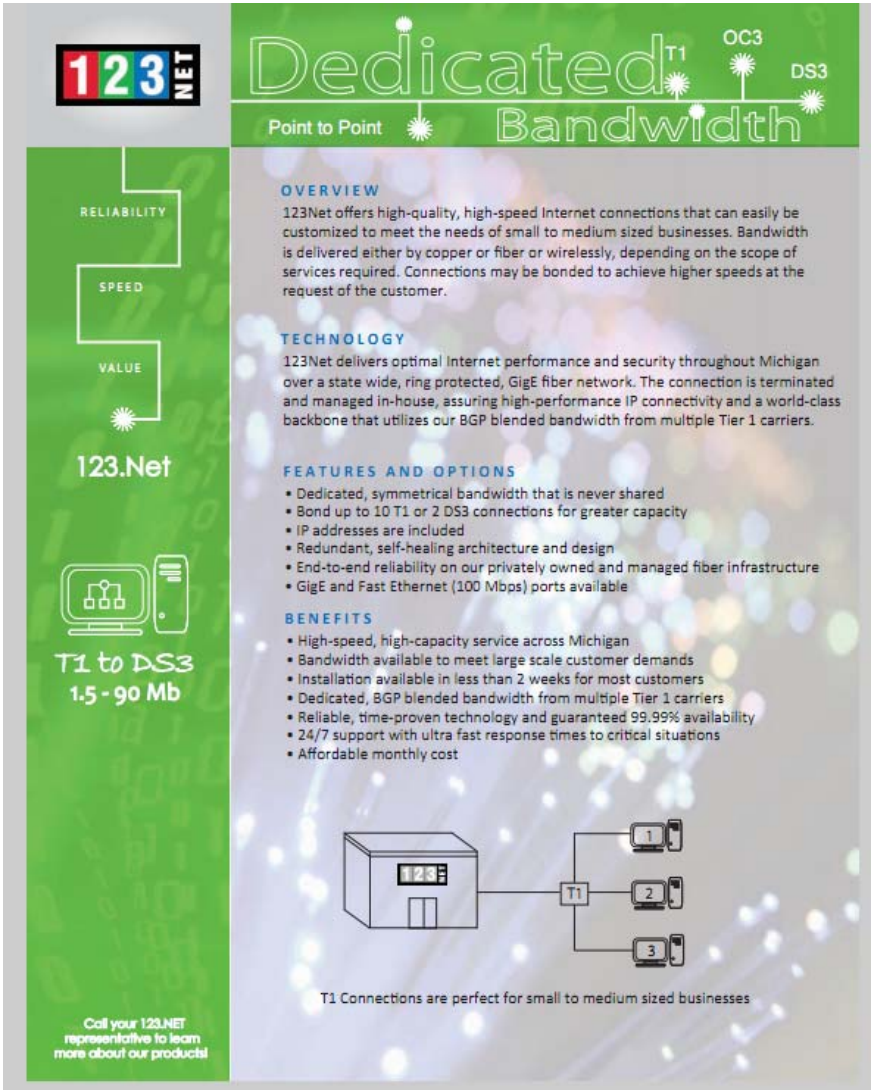
at&t

verizon

Source: 123 NET Website - 05.26.2011

Competitive Analysis

Source: 123 NET Website - 05.26.2011



Competitive Analysis

Source: T2 Communications Website - 05.26.2011

Competitive Analysis

Residential Internet

As one of the Midwest's most trusted independent sources for Internet, data and voice connectivity, Iserv prides itself on superior service and exceptional value. Iserv is all about providing complete, customized solutions that satisfy both business and residential needs.

Whether you want to download movies or work from home, Iserv has the connection solution that will work for you. See if you qualify for service or compare offerings below.

GET A QUOTE

- Residential Internet
- Residential Voice
- Additional Services & Promotions
- Dialup Exchange Tool

Service	Home Phone Required: Basic Broadband	Home Phone Required: Expert Broadband	NO Home Phone Required: Broadband Express	NO Home Phone Required: Broadband Pro	NO Home Phone Required: Broadband Elite	NO Home Phone Required: Residential T1
Speeds	up to 1.5Mb	up to 3.0Mb	up to 384k	up to 768k	up to 1.5Mb	Dedicated 1.5Mb
Monthly	$29.95	$44.95	as low as $35.95	as low as $40.45	as low as $62.95	as low as $199
Promotional Rate*	$19.95/month for the 1st 6 months	$19.95/month for the 1st 6 months	$19.95/month for the 1st 3 months, FREE Installation and Modem use	$19.95/month for the 1st 3 months, FREE Installation and Modem use	$19.95/month for the 1st 3 months, FREE Installation and Modem use	
Features	Unlimited Monthly Access, Anti-SPAM Protection	Unlimited Monthly Access, Anti-SPAM Protection	Unlimited Monthly Access, Anti-SPAM Protection	Unlimited Monthly Access, Anti-SPAM Protection	Unlimited Monthly Access, Anti-SPAM Protection	Dedicated Line Unlimited Monthly Access, Anti-SPAM Protection
Email Addresses	10 email accounts	10 email accounts	3 email accounts	3 email accounts	3 email accounts	3 email accounts
Web-based Mail (access from any computer with Internet)	YES	YES	YES	YES	YES	YES
Personal Web Space	No	No	15MB Included	15MB Included	15MB Included	15MB Included
Static IP	No	No	YES	YES	YES	YES
Modem *(standard fee)*	$69.99 + s&h	$69.99 + s&h	$4.95/month usage fee	$4.95/month usage fee	$4.95/month usage fee	
Installation	Free self	Free self	Free professional	Free professional	Free professional	Free professional

Now is the Time to Bundle

Iserv's powerful, cost effective, Voice & Internet services were created specifically for businesses like yours. No more chasing multiple vendors, phone companies, and consultants. Simplify your company's communication requirements without breaking the bank.

- Business Internet
- Metro Ethernet
- Business Voice
- Integrated Voice and Internet
- Data Center
- Data Center Services
- Engineering Services
- Iserv Specials

Internet
Iserv's cost-effective Internet service delivers symmetrical speeds from 1.5Mbps up to 45Mbps or more. Your business can now easily transfer huge files or access multimedia applications without having to upgrade your existing infrastructure and the installation process is fast.

Voice
Using your existing phone equipment and numbers, Iserv's Voice Service delivers a clear reliable quality service which includes a full range of features including Voicemail, Caller ID, E911, etc.

GET A QUOTE

— CALL TODAY — 888.64.ISERV (47378) or email sales-info@iserv.net

DOWNLOAD DATASHEET

Source: iserv Website - 05.26.2011

Competitive Analysis

iserv

SEARCH
SITE SEARCH

BUSINESS RESIDENTIAL SERVICE & SUPPORT ABOUT US ACCESS YOUR WEBMAIL

Metro Ethernet

Maximum Connectivity, Maximum Value

As your company grows, your ability to share information becomes even more critical. Iserv Metro Ethernet — with symmetrical bandwidth up to 40 Mbps — delivers more bandwidth than traditional T1 or Bonded T1 service at a much lower cost. It's ideal for small, medium, and large businesses. Easy to deploy, less expensive, and faster than other options, Iserv's Metro Ethernet minimizes network interruptions and exchanges data faster than other high bandwidth options.

- Business Internet
- Metro Ethernet
- Business Voice
- Integrated Voice and Internet
- Data Center
- Data Center Services
- Engineering Services
- Iserv Specials

Benefits

More bandwidth at a lower cost
For maximum connectivity at a minimum cost, there's no greater value than Iserv Metro Ethernet. Highly scalable, choose the bandwidth that best fits your business, from 3 Mbps up to 40 Mbps.

Ease of Use
Connect your network directly to the Internet with an Ethernet interface — a quick and easy way to add additional bandwidth without the typical delays normally experienced when ordering new circuits.

High Availability
Minimize interruptions and keep your business running smoothly. Iserv monitors and supports your Internet service 24/7.

Optimized ROI
Reduce operating and maintenance costs with lower capital and operational requirements for Internet access. Provision only the capacity you need today and easily upgrade your bandwidth when your business demands it.

Minimized Risk
Deliver high-speed Internet access to your internal customers on-time and on-budget. Iserv handles everything from initial network design to ongoing maintenance and support for a fixed price.

Productivity Enhancing
Symmetrical bandwidth means no one gets shortchanged — you send information as fast as you get it. No difference between upload and download times means you stay connected at your pace.

The bandwidth you need, right where you need it.

GET A QUOTE

— CALL TODAY — 888.64.ISERV (47378) or email sales-info@iserv.net

METRO ETHERNET

MAXIMUM CONNECTIVITY, MAXIMUM VALUE

As your company grows, your ability to share information becomes even more critical. Iserv Metro Ethernet — with symmetrical bandwidth up to 40 Mbps — delivers more bandwidth than traditional T1 or Bonded T1 service at a much lower cost. It's ideal for small, medium, and large businesses. Easy to deploy, less expensive, and faster than other options, Iserv's Metro Ethernet minimizes network interruptions and exchanges data faster than other high bandwidth options.

BENEFITS

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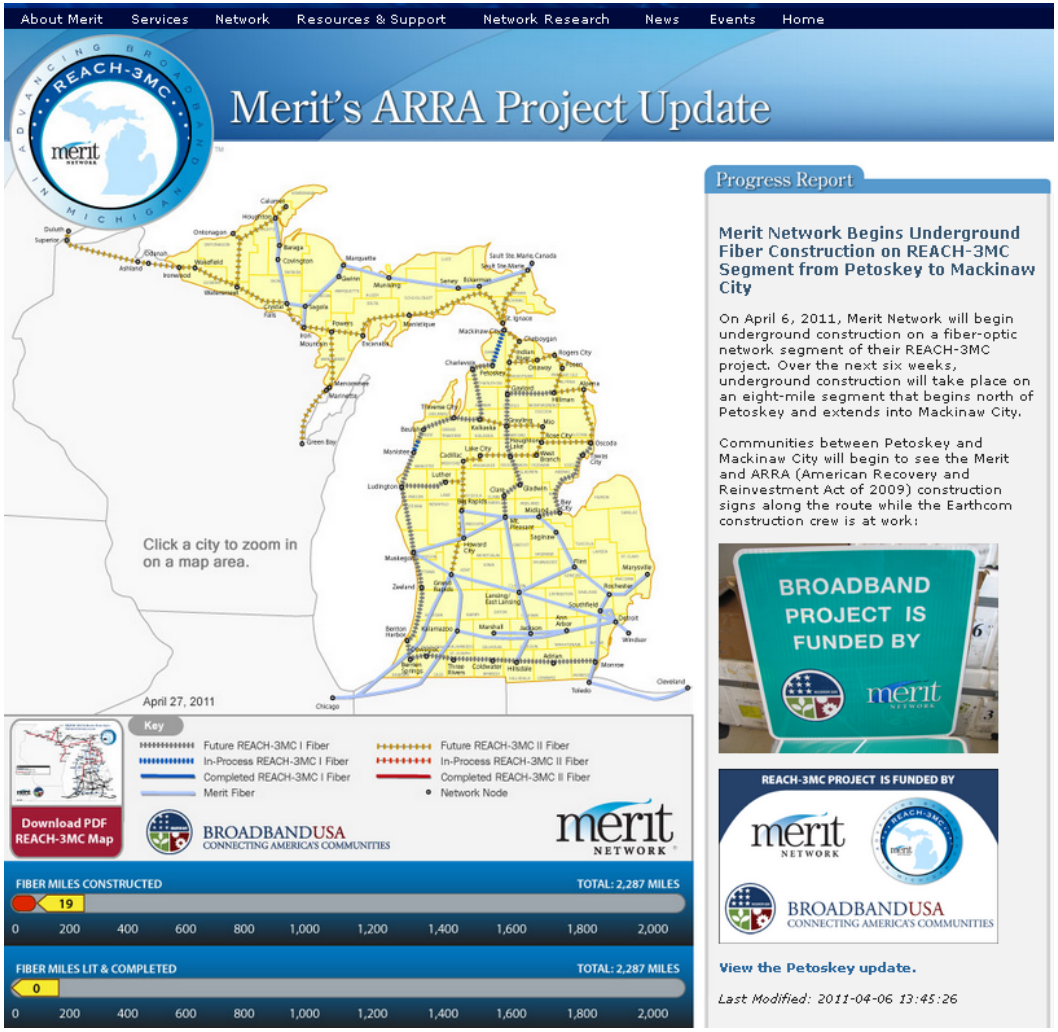
Source: iserv Website - 05.26.2011

Competitive Analysis



Source: Merit Network Website - 05.26.2011

Merit On-Net / Off-Net Service™

An Excellent Way to Save on Network Connectivity

Merit Connectivity
- MeritFiber
- MeritFiber PLUS
- MeritConnect

Merit Connectivity Service Options
- Merit On-Net/Off-Net Service »
- Merit On-Net Service
- Merit Diverse Connection
- Merit Consortium Service

Internet2

Merit Services

Membership Information

Merit Connectivity Home

Share Data and Resources Locally Using Merit's Network, Plus Connect to the Internet

Merit On-Net/Off-Net Service rewards Members who collaborate or share data across Merit's robust fiber-optic network. Traffic exchanged between organizations or between an organization and its satellite locations that are directly connected to Merit's network is considered "on-net." That is, Merit will be able to provide transit within Merit's network at a relatively lower cost to Members participating in the On-Net/Off-Net Program.

Members taking advantage of the Merit On-Net/Off-Net Service can also use their dedicated connection to Merit's network to reach the Internet, which is considered "off-net" traffic.

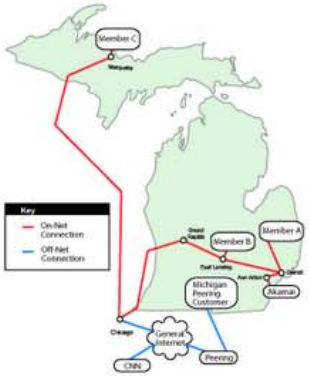
Merit's robust backbone boasts two physically diverse 10 Gigabit paths to Network Access Points in Chicago that connect with the commodity Internet and Internet2, a 10 Gigabit connection to Internet2 in Cleveland, over 25 peering agreements with private networks and content providers, as well as connections to other research and education networks in the Midwest.

Who Most Benefits from the Merit On-Net/Off-Net Service

Members that use their network connections to exchange data across Merit's network for the following uses:

- Multiple, geographically distant campuses.
- Distance education between Merit's Members.
- Merit organizations who share administrative resources (many schools and libraries).
- Institutions conducting joint research across institutions.
- Members who may serve as content providers to other Members.
- Organizations using any type of caching or content servers hosted within the Merit network, such as Akamai.

Example 1: Traffic to other Merit Members



Example 2: Traffic for a Member with multiple locations:

Source: Merit Network Website - 05.26.2011

Competitive Analysis

MeritFiber PLUS™ Connections

Get More from Your Merit Fiber Connection

Merit Connectivity
- MeritFiber
- MeritFiber PLUS »
- MeritConnect

Merit Connectivity Service Options
- Merit On-Net/Off-Net Service
- Merit On-Net Service
- Merit Diverse Connection
- Merit Consortium Service

Internet2

Merit Services

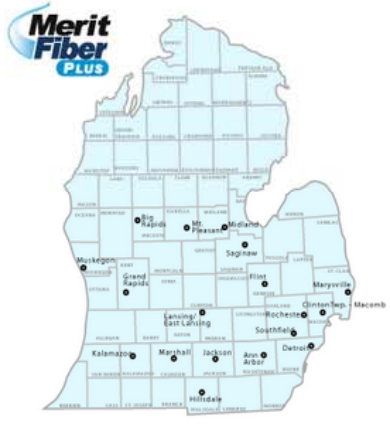
Membership Information

Merit Connectivity Home

Unlimited Bandwidth Service

Merit Network is pleased to offer MeritFiber PLUS to its Members. The Merit statewide backbone, once provisioned exclusively over circuits, is now composed largely of Merit-owned and provisioned private fiber-optics, MeritFiber. MeritFiber allows Merit Network to provision nearly unlimited bandwidth on its backbone without the "stair-step" price increases associated with increasing capacity on circuits. Taking advantage of Merit's facilities-based network, Members that have a MeritFiber connection to the backbone can now gain additional flexibility and significant cost savings with adding MeritFiber PLUS as their connection service.

Members must be connected by fiber to a Merit core backbone node to be eligible for this service. Currently approximately 25% of Merit's backbone nodes are capable of supporting MeritFiber PLUS.



The areas that are currently capable of supporting MeritFiberPlus are:

- Ann Arbor
- Clinton Twp. - Macomb
- Detroit
- Grand Rapids
- Hillsdale
- Jackson
- Kalamazoo
- Lansing/East Lansing
- Marshall
- Marysville/Port Huron
- (Midland, Saginaw, Flint, Big Rapids) **
- Mt. Pleasant
- Muskegon
- Rochester
- Southfield

** Members in this area should contact Merit Network to ensure that their area is eligible for this service.

Two Tiers are available.

- Tier 1 - 500 Mbps
- Tier 2 - 1 Gbps

Benefits of MeritFiber PLUS

- No bursting charges ever!
- No packet shaper appliance required resulting in savings on:
  - equipment
  - equipment maintenance cost
  - power & rack space
  - upgrades, etc.
- Members can leverage the investment of their MeritFiber connection.
- Members use of the network without additional provisioning or charges.
- Members can concentrate on their mission and let the network handle the through-put.

Source: Merit Network Website - 05.26.2011

Competitive Analysis

Merit Services

Merit Network is a member-focused provider of network and related services; a trusted strategic partner to the education and non-profit community for over 40 years. Learn more about our services at: www.merit.edu/services

Symbol Key: This symbol indicates that a Merit Network connection is required to subscribe to this service.

MeritLicensing Service can provide eligible Members with software and/or hardware licenses — often at a significant discount. Merit's current licensing programs include VMware and Zimbra. For more, please see: www.merit.edu/services/licensing/

MeritMail can save your organization thousands of dollars over owning and operating your own email service. The full-featured hosted email service includes an AJAX web interface, Outlook and email client support, shared calendars, address books, collaborative applications, mobile support for phones, and unlimited storage. For more details, see: www.merit.edu/services/meritmail/

MeritConnectivity offers flexible solutions for connecting to Merit's network. Merit's community-based network connects universities, colleges, K-12 organizations, libraries, government locations, health care organizations, and other nonprofits across Michigan. MeritFiber service is a dedicated fiber-optic network connection that will provide your organization with the appropriate bandwidth for today's needs and into the future. Merit can provide a circuit-based connection as well. See: www.merit.edu/connectivity/

Merit Network Monitoring puts the power of Merit's Network Operations Center (NOC) to work for you. As your organization makes more academic and administrative resources available over its network, network uptime and reliability are critical to the day-to-day operations of an organization and its users. Merit's NOC can monitor your network and other important assets, logging and reporting issues and assisting with problem resolution. For more details, please see: www.merit.edu/services/monitoring/

MeritVoice provides your organization with all the benefits of an advanced, low cost IP Telephone service without changing your current phone system. For further information, see: www.merit.edu/services/meritvoice/

Colocation allows you to keep your web server or other mission critical applications in Merit's Data Center. Merit's Data Center is also the clear choice for hosting your Disaster Recovery or other off-site backup servers. For more, see: www.merit.edu/services/colocation/

Additional Services

Internet2 is the nation's high-speed research and education network backbone. Merit Network is Michigan's gateway to Internet2, providing access to over 40 institutions. The National Internet2 K20 Initiative brings together Internet2 member institutions and innovators from primary and secondary schools, colleges and universities, libraries, museums, and state government agencies to utilize new technologies and high-speed network applications. For more details, see: www.merit.edu/internet2/

Merit Professional Learning provides training and professional development opportunities to your staff and students. Increase your organization's productivity and employee retention by taking advantage of Merit's professional learning opportunities. For a list of upcoming events and more information, please see: www.merit.edu/learning/

Merit Cloud Services is a suite of cloud-based services being developed for Merit's Members. Utilizing Merit's secure datacenter resources and the Merit network infrastructure, the new offering will include cloud storage and other cloud-related services.

Web Contingency Services seamlessly re-routes your web traffic to a Merit-hosted contingency web site when a disaster occurs. Be prepared for a catastrophic event that could shut down your organization's web site and cut off communication to your staff and community. For more details, see: www.merit.edu/services/webcontingency/

Network Time Protocol (NTP) Services are essential for maintaining accurate timekeeping across a network. For time-sensitive, mission-critical services, Merit offers Stratum 1 NTP services as a value-added feature to our Members. More details available at: www.merit.edu/services/ntp/

Routing Assets Database (RADb) is a public registry of routing information for networks on the Internet. Organizations throughout the world use the information in Merit Network's RADb to troubleshoot routing problems, automatically configure backbone routers, generate access lists, and perform network planning. For more information, see: www.radb.net

For more details about these and other Merit Network services, contact a Member Relations representative at info@merit.edu or visit www.merit.edu

Source: Merit Network Website - 05.26.2011

Competitive Analysis

Holland Board of Public Works
Your Hometown Utility in Holland, Michigan

RESIDENTIAL | BUSINESS | VENDOR/CONTRACTOR | MEETINGS/EVENTS | CONTACT US

Home > Broadband

Broadband

- Fiber Network
- FiberTown

Services

As our network has grown, we have been able to provide service to school districts, small and large businesses, municipal offices, medical offices and community service organizations. The Holland Board of Public Works provides two service options: Commercial Bandwidth and Dark Fiber.

Commercial Bandwidth Option

This service provides an ethernet interface, at bandwidths from 0.5 to 1000 Mbps. Point to point ethernet can replace local T-1 circuits or dial-up networks. Additional nodes are available at discounted rates. We can also provide point to point bandwidth service from your building to one of our connected ISPs. Installation estimates, setup fees, and bandwidth rates are available upon request.

Dark Fiber Option

We offer the option of using our fiber optic cable infrastructure on a lease basis. Dark fiber is leased on a per strand per foot per month basis, with an aggregate minimum of $1000 per month. With miles of cable in place we can provide a fiber optic pipe between sites. This option allows the customer to design, install and maintain the electronic equipment required. Installation estimates, setup fees, and lease rates are available upon request.

About Our Internet Service Providers (ISP)

There are currently four ISPs (listed below) connected to our fiber network. Some ISPs also utilize our fiber network to provide services such as off-site storage and disaster recovery systems. Together, we provide reliable and affordable network solutions.

The Iserv Company	West Michigan Online	Sirus	T² Communications
888.644.7378	616.392.3698	616.394.0558	616.355.2201
www.iserv.net	www.wmol.com	www.sirus.com	www.t2comm.net

Please note, the Holland Board of Public Works is not an ISP, and does NOT have a preferred ISP.

Source: Holland BPW Website - 05.26.2011

Holland Board of Public Works
Broadband Service Rate

Effective Date:
April 1, 2011

This service provides broadband services on the Holland BPW fiber optic network. Service charges and installation charges will apply as noted.

Residential Digital Bandwidth Rates

Charges are per connection. Internet Connection service is provided for Internet services only. All Services connection is offered for connections providing voice, whether POTS or VoIP, and video content. Bandwidth rates over 5.0 Mbps are charged at the Commercial Digital Bandwidth Rates.

Bandwidth	Internet Connection	All Services
1.0 Mbps	$13.00	$31.50
1.5 Mbps	$16.00	$35.00
2.0 Mbps	$19.00	$38.00
3.0 Mbps	$22.00	$41.00
4.0 Mbps	$25.50	$44.00
5.0 Mbps	$28.50	$47.50

Commercial Digital Bandwidth Rates

Charges are for nodes connected to the Holland BPW fiber network. Installation charges apply to service provided under this rate schedule. Customers with one network connection will be charged at the Additional Node rates for additional network connections to the customer's network provided the application for service and billing for additional nodes go to the same customer as the First Node billing. All bandwidths are nominal bandwidth rates. Actual bandwidth throughput may be less due to routing overhead and other factors beyond the control of the Holland BPW.

Tier 1

Bandwidth	First Node	Additional Node
0.5 Mbps	$45.50	$39.00
1.0 Mbps	$53.50	$46.50
1.5 Mbps	$62.00	$54.50
2.0 Mbps	$70.50	$62.00
3.0 Mbps	$87.50	$77.00
4.0 Mbps	$104.00	$92.50
5.0 Mbps	$121.00	$107.00
6.0 Mbps	$137.50	$123.00
7.0 Mbps	$154.50	$138.00
8.0 Mbps	$171.50	$153.50
9.0 Mbps	$188.00	$168.00
10.0 Mbps	$205.00	$184.00

Search this site

Holland
Board of Public Works
Your Hometown Utility in Holland, Michigan

Water | Electric | Wastewater | Broadband

RESIDENTIAL | BUSINESS | VENDOR/CONTRACTOR | MEETINGS/EVENTS | CONTACT US

Home > Broadband > Fiber Network

Broadband

Fiber Network

- Fiber Network
- FiberTown

The Holland Board of Public Works owns and operates a fiber-optic network in the greater Holland area. This system was installed over fifteen years ago to improve communications between electric substations, and has expanded to service the local community.

Fiber optic data transfer works by sending laser light waves through glass or acrylic plastic fibers. Data transmission with fiber optics can exceed the fastest speeds available via DSL or cable because it travels faster and farther than an electric pulse through copper wire.

Speed Comparison (per second at typical available speeds)

Service	Speed
T1 Line	1.5 Mbps
DSL	3 Mbps
Cable	10 Mbps
HBPW Fiber	1000Mbps

Source: Holland BPW Website - 05.26.2011

Competitive Analysis

OUR FIBER-OPTIC NETWORK

The Holland Board of Public Works (HBPW) owns and operates a fiber-optic network in the greater Holland area. This system was installed over fifteen years ago to improve communications between electric substations, and has expanded to service the local community.

Fiber optic data transfer works by sending laser light waves through glass or acrylic plastic fibers. Data transmission with fiber optics can exceed the fastest speeds available via DSL or cable because it travels faster and farther than an electric pulse through copper wire.

Speed Comparison (per second at typical available speeds)

T1 Line	1.5 Mbps
DSL	3 Mbps
Cable	10 Mbps
HBPW Fiber-Optic	**1000 Mbps**

About Our Internet Service Providers (ISP)
There are currently four ISPs (listed below) connected to our fiber network. Some ISPs also utilize our fiber network to provide services such as off-site storage and disaster recovery systems. Together, we provide reliable and affordable network solutions. *

The Iserv Company	West Michigan Online	Sirus	T² Communications
888.644.7378	616.392.3698	616.394.0558	616.355.2201
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* Please note, the HBPW is not an ISP and does NOT have a preferred ISP.

OUR SERVICES

As our network has grown, we have been able to provide service to school districts, small and large businesses, municipal offices, medical offices and community service organizations. The HBPW provides two service options: Commercial Bandwidth and Dark Fiber.

Commercial Bandwidth Option
This service provides an ethernet interface, at bandwidths from 0.5 to 1000 Mbps. Point to point ethernet can replace local T-1 circuits or dial-up networks. Additional nodes are available at discounted rates. We can also provide point to point bandwidth service from your building to one of our connected ISPs. Installation estimates, setup fees, and bandwidth rates are available upon request.

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Holland Board of Public Works
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Broadband

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- FiberTown

FiberTown

The City of Holland would like to congratulate the City of Kansas City, Kansas in being selected ... Google to provide fiber to their community.

It was a fun and lively competition that brought attention to the growing demand for high-speed Internet access within the Greater Holland Area, and throughout the United States.

And though the Google initiative seems to be over (but we're really not quite sure), the HBPW is NOT done yet. We heard the voices in our community saying that they want gigabit Internet access. In response, HBPW will begin evaluating fiscally responsible options for expanding HBPW fiber throughout the Greater Holland Area. We're not making promises, but we are investigating all available options.

The HBPW gratefully thanks all of the citizens in the Greater Holland Area for their support of the FiberTown initiative, and we hope this is just the beginning to new opportunities in our innovative community.

Find us on Facebook | twitter FOLLOW ME | LinkedIn

Source: Holland BPW Website - 05.26.2011

Detailed Triple Play Financials

Income Statement

	2011	Forecast Period Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Revenues								
Network Services Revenues:								
IPTV		$ 644,666	$ 3,092,369	$ 3,762,695	$ 4,577,562	$ 5,602,277	$ 11,452,151	$ 12,481,612
Telephone Services		$ 580,438	$ 2,243,635	$ 2,724,353	$ 3,069,617	$ 3,121,687	$ 3,364,872	$ 3,679,419
Internet Services (Includes Modem)		$ 421,182	$ 4,594,955	$ 6,426,453	$ 10,336,908	$ 15,154,826	$ 23,750,353	$ 25,701,078
Ethernet Services	377,592	$ 399,683	$ 529,352	$ 689,290	$ 859,820	$ 1,033,275	$ 1,063,226	$ 1,116,214
Dark Fiber	499,519	$ 595,056	$ 1,833,854	$ 1,866,312	$ 1,914,998	$ 1,947,456	$ 2,223,346	$ 2,515,464
Misc. Revenues	6,180	$ 6,180	$ 6,180	$ 6,180	$ 6,180	$ 6,180	$ 6,180	$ 6,180
Bulk Leasing		$ -	$ -	$ -	$ -	$ -	$ -	$ -
New Product		$ -	$ -	$ -	$ -	$ -	$ -	$ -
FES Bandwidth Charge		$ -	$ -	$ -	$ -	$ -	$ -	$ -
Customer Installation Charges		$ 215,831	$ 935,628	$ 247,616	$ 265,549	$ 267,145	$ 49,249	$ 50,992
Interest Income		-	127,774	-	-	-	22,256	754,799
Total Revenues	**$ 883,291**	**$ 2,863,034**	**$ 13,363,747**	**$ 15,722,899**	**$ 21,030,635**	**$ 27,132,845**	**$ 41,931,632**	**$ 46,305,757**
Expenses								
Cost of Goods Sold (COGS)								
Network Staffing	$ 211,827	$ 1,315,025	$ 2,600,870	$ 1,805,156	$ 1,868,866	$ 1,901,302	$ 2,013,858	$ 2,420,695
Facility and Lease Fees		$ 165,735	$ 192,846	$ 219,956	$ 94,831	$ 94,831	$ 96,236	$ 97,788
Interconnection Services	$ 406,077	$ 918,874	$ 4,898,941	$ 6,532,006	$ 9,890,360	$ 13,457,135	$ 21,907,515	$ 23,940,082
Insurance Costs		$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 51,000	$ 51,000
Maintenance & Upgrades		$ -	$ 1,034,348	$ 50,000	$ 1,078,255	$ 1,102,236	$ 1,318,603	$ 1,589,155
Software Support		$ 250,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 55,204	$ 60,950
Transportation		$ 40,500	$ 59,765	$ 64,902	$ 70,167	$ 75,019	$ 101,775	$ 114,915
Customer Services								
Total Cost of Goods Sold (COGS)	$ 617,904	$ 2,740,134	$ 8,886,770	$ 8,772,020	$ 13,102,480	$ 16,730,522	$ 25,544,191	$ 28,274,584
Sales, Overhead & Administration (SG&A)								
Overhead	63,736	288,000	436,101	452,874	469,647	486,420	591,805	720,021
Corporate General and Administration		534,500	153,765	158,902	164,167	169,019	209,306	237,384
Sales & Marketing		314,849	375,546	394,778	414,331	432,850	555,500	654,430
Commissions		197,617	1,037,294	248,693	530,774	610,221	71,164	65,291
Billing		11,443	59,846	72,737	85,949	98,077	149,492	161,844
Contingency		75,000	76,500	78,030	79,591	81,182	89,632	98,961
Pre-Paid Expenses		8,231	49,655	64,568	89,920	119,394	192,837	209,311
Other Operating Expense		30,690	156,905	204,042	282,659	373,681	594,460	644,675
Total SG&A	$ 63,736	$ 1,460,330	$ 2,345,612	$ 1,674,623	$ 2,117,038	$ 2,370,845	$ 2,454,195	$ 2,791,916
Total	**$ 681,640**	**$ 4,200,464**	**$ 11,232,381**	**$ 10,446,642**	**$ 15,219,518**	**$ 19,101,367**	**$ 27,998,387**	**$ 31,066,500**
Depreciation	$ 498,678	$ 2,299,958	$ 4,526,247	$ 4,675,827	$ 4,839,871	$ 5,011,167	$ 3,421,863	$ 4,184,414
Amortization		$ -	$ -	$ -	$ -	$ -	$ -	$ -
arnings Before Interest and Taxes	**$ (297,027)**	**$ (3,637,388)**	**$ (2,394,881)**	**$ 600,430**	**$ 971,246**	**$ 3,020,311**	**$ 10,511,382**	**$ 11,054,843**
Interest Expense - Revenue Bond		$ 1,232,839	$ 1,251,331	$ 1,251,331	$ 1,246,776	$ 1,237,646	$ 917,787	$ 429,425
Interest Expense - Other		$ -	$ -	$ 428,242	$ 756,791	$ 641,189	$ -	$ -
Income Before Taxes	**$ (297,027)**	**$ (4,870,227)**	**$ (3,646,212)**	**$ (1,079,142)**	**$ (1,032,321)**	**$ 1,141,477**	**$ 9,593,595**	**$ 10,625,418**
Taxable Income	$ -	$ -	$ -	$ -	$ -	$ -	$ 17,368,676	$ 24,966,008
Property Tax								
Income Taxes	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Net Income	**$ (297,027)**	**$ (4,870,227)**	**$ (3,646,212)**	**$ (1,079,142)**	**$ (1,032,321)**	**$ 1,141,477**	**$ 9,593,595**	**$ 10,625,418**

Balance Sheet

Assets	Forecast Period Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Current Assets							
Cash	$ 12,998,168	$ (1,959,939)	$ (841,479)	$ (2,413,554)	$ (2,815,749)	$ 20,699,689	$ 64,402,129
Cash Reserve	$ 469,249	$ 469,249	$ 469,249	$ 469,249	$ 469,249	$ 469,249	$ 469,249
Marketable Securities	-	-	-	-	-	-	-
Accounts Receivable	352,977	1,647,585	1,938,440	2,592,818	3,345,145	5,169,653	5,708,929
Notes Receivable	-	-	-	-	-	-	-
Inventory	-	-	-	-	-	-	-
Prepayments	-	-	-	-	-	-	-
Grants Receivable	-	-	-	-	-	-	-
Total Current Assets	$ 13,820,394	$ 156,895	$ 1,566,210	$ 648,513	$ 998,645	$ 26,338,591	$ 70,580,307
Non-Current Assets							
Long-Term Investments	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Amortizable Asset (Net of Amortizat	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Plant in Service	$ 26,116,522	$ 51,717,354	$ 52,764,414	$ 53,912,726	$ 55,111,796	$ 65,930,116	$ 79,457,715
Less: Accumulated Depreciation	2,299,958	6,826,205	11,502,032	16,341,903	21,353,070	43,006,025	63,030,132
Add Plant Under Construction							
Net Plant	$ 23,816,563	$ 44,891,149	$ 41,262,382	$ 37,570,823	$ 33,758,726	$ 22,924,091	$ 16,427,583
Other	-	-	-	-	-	-	-
Long Term Unconditional Promise to	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Non-Current Assets	23,816,563	44,891,149	41,262,382	37,570,823	33,758,726	22,924,091	16,427,583
Total Assets	$ 37,636,957	$ 45,048,044	$ 42,828,592	$ 38,219,336	$ 34,757,372	$ 49,262,682	$ 87,007,889

Liabilities and Owners' Equity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Liabilities							
Current Liabilities							
Accounts Payable	$ 517,865	$ 1,384,814	$ 1,287,942	$ 1,876,379	$ 2,354,963	$ 3,451,856	$ 3,830,116
Notes Payable							
Current Portion							
Current Portion - Revenue Bond	-	113,873	228,267	794,120	1,256,039	2,311,560	7,994,829
Current Portion - Other Debt							
Accrued Liabilities		-	-	-	-	-	-
Total Current Liabilities	$ 517,865	$ 1,498,687	$ 1,516,209	$ 2,670,499	$ 3,611,002	$ 5,763,416	$ 11,824,945
Long-Term Liabilities							
Revenue Bond	31,283,280	31,169,407	30,941,140	30,147,020	28,890,981	18,248,338	-
Project Credit Line HBPW	10,706,039	20,896,389	19,966,824	16,029,719	11,741,814	-	-
Other Liabilities	-	-	-	-	-	-	-
Total Long-Term Liabilities	$ 41,989,319	$ 52,065,796	$ 50,907,964	$ 46,176,739	$ 40,632,795	$ 18,248,338	$ -
Total Liabilities	$ 42,507,184	$ 53,564,483	$ 52,424,173	$ 48,847,238	$ 44,243,797	$ 24,011,754	$ 11,824,945
Owner's Equity							
Capital Stock							
Common Stock & Paid In Capital	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Retained Earnings Beginning	$ -	$ (4,870,227)	$ (8,516,439)	$ (9,595,581)	$(10,627,902)	$ 15,657,332	$ 64,557,526
Net Income	$ (4,870,227)	$ (3,646,212)	$ (1,079,142)	$ (1,032,321)	$ 1,141,477	$ 9,593,595	$ 10,625,418
Retained Earnings End	$ (4,870,227)	$ (8,516,439)	$ (9,595,581)	$(10,627,902)	$ (9,486,425)	$ 25,250,928	$ 75,182,944
Total Equity	$ (4,870,227)	$ (8,516,439)	$ (9,595,581)	$(10,627,902)	$ (9,486,425)	$ 25,250,928	$ 75,182,944
Total Liabilities and Owner's Equity	$ 37,636,957	$ 45,048,044	$ 42,828,592	$ 38,219,336	$ 34,757,372	$ 49,262,682	$ 87,007,889

Detailed Triple Play Financials

Statement of Cash Flows

	Forecast Period														
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Beginning Cash	$ -	$ 12,998,168	$ (1,959,939)	$ (841,479)	$ (2,413,554)	$ (2,815,749)	$ (1,941,585)	$ 258,062	$ 5,021,290	$ 12,518,810	$ 20,699,689	$ 28,733,002	$ 37,010,162	$ 45,798,304	$ 54,924,392
CASH FLOWS FROM OPERATING ACTIVITIES															
Net Income	(4,870,227)	(3,646,212)	(1,079,142)	(1,032,321)	1,141,477	3,057,503	5,115,881	7,593,125	9,377,248	9,593,595	9,521,832	9,685,710	9,904,942	10,194,114	10,625,418
Cash Reserve	(469,249)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Adjustments to Reconcile Net Income to Net Cash Provided by Operating Activities															
Add: Depreciation	$ 2,299,958	$ 4,526,247	$ 4,675,827	$ 4,839,871	$ 5,011,167	$ 5,218,227	$ 5,469,543	$ 4,316,356	$ 3,226,968	$ 3,421,863	$ 3,662,113	$ 3,906,156	$ 4,075,403	$ 4,196,021	$ 4,184,414
Add: Amortization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Changes in Current Assets and Liabilities:															
Marketable Securities	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Accounts Receivable	(352,977)	(1,294,608)	(290,854)	(654,378)	(752,327)	(549,880)	(664,709)	(298,455)	(220,984)	(90,481)	(131,125)	(90,710)	(108,214)	(109,332)	(99,894)
Inventory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Prepayments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unconditional Promise to Give	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grants Receivable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long Term Unconditional Promise to Give															
Other Current Assets	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Deferred Taxes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Accounts Payable	517,865	866,949	(96,872)	588,437	478,584	313,191	408,138	166,629	156,935	52,000	122,113	51,818	72,000	71,247	61,083
Other Current Liabilities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Cash Provided (Used) by Operations	**$ (2,874,629)**	**$ 452,375**	**$ 3,208,958**	**$ 3,741,608**	**$ 5,878,901**	**$ 8,039,042**	**$ 10,328,852**	**$ 11,777,655**	**$ 12,540,167**	**$ 12,976,978**	**$ 13,174,933**	**$ 13,552,974**	**$ 13,944,131**	**$ 14,352,050**	**$ 14,771,021**
CASH FLOWS FROM FINANCING ACTIVITIES:															
Notes Payable	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Principal Payments															
Project Credit Line	10,706,039	10,190,350	(929,565)	(3,937,105)	(4,287,905)	(4,459,421)	(4,637,798)	(2,418,443)	(226,152)	-	-	-	-	-	-
Current Portion of Revenue Bond	-	113,873	114,394	565,853	461,919	476,155	230,061	289,605	132,913	(73,213)	56,878	153,403	100,587	118,377	5,254,025
Long Term Portion of Revenue Bond	31,283,280	(113,873)	(228,267)	(794,120)	(1,256,039)	(1,732,194)	(1,962,255)	(2,251,860)	(2,384,773)	(2,311,560)	(2,368,438)	(2,521,840)	(2,622,427)	(2,740,804)	(7,994,829)
issue Revenue Bond															
Additional Paid-in Capital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Additions to Patronage Capital Credits	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Payment of Dividends	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Cash Provided by Financing Activities	**$ 41,989,319**	**$ 10,190,350**	**$ (1,043,438)**	**$ (4,165,372)**	**$ (5,082,025)**	**$ (5,715,460)**	**$ (6,369,992)**	**$ (4,380,698)**	**$ (2,478,012)**	**$ (2,384,773)**	**$ (2,311,560)**	**$ (2,368,438)**	**$ (2,521,840)**	**$ (2,622,427)**	**$ (2,740,804)**
CASH FLOWS FROM INVESTING ACTIVITIES:															
Capital Expenditures	26,116,522	25,600,832	1,047,060	1,148,312	1,199,071	1,449,417	1,759,213	2,633,729	2,564,636	2,411,325	2,830,060	2,907,376	2,634,148	2,603,535	2,552,480
Amortizable Asset (Net of Amortization)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Long-Term Investments	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Cash Used by Investing Activities	$ 26,116,522	$ 25,600,832	$ 1,047,060	$ 1,148,312	$ 1,199,071	$ 1,449,417	$ 1,759,213	$ 2,633,729	$ 2,564,636	$ 2,411,325	$ 2,830,060	$ 2,907,376	$ 2,634,148	$ 2,603,535	$ 2,552,480
Net Increase (Decrease) in Cash	**$ 12,998,168**	**$ (14,958,107)**	**$ 1,118,461**	**$ (1,572,076)**	**$ (402,195)**	**$ 874,164**	**$ 2,199,647**	**$ 4,763,228**	**$ 7,497,519**	**$ 8,180,879**	**$ 8,033,313**	**$ 8,277,160**	**$ 8,788,142**	**$ 9,126,088**	**$ 9,477,736**
Ending Cash	**$ 12,998,168**	**$ (1,959,939)**	**$ (841,479)**	**$ (2,413,554)**	**$ (2,815,749)**	**$ (1,941,585)**	**$ 258,062**	**$ 5,021,290**	**$ 12,518,810**	**$ 20,699,689**	**$ 28,733,002**	**$ 37,010,162**	**$ 45,798,304**	**$ 54,924,392**	**$ 64,402,129**

IPTV Subscriber Revenue Projections – Years 1 - 10

Year	1	2	3	4	5	6	7	8	9	10
Number of charges to subscribers										
Lifeline Services (Basic)	1,675	8,034	9,782	11,908	14,498	17,649	21,488	26,161	29,341	29,782
SD Basic (85 Channel Lineup)	1,150	5,515	6,695	8,128	9,874	11,977	14,541	17,659	19,784	20,083
SD Premium (120 Channel Lineup)	1,127	5,405	6,575	7,997	9,730	11,831	14,392	17,508	19,630	19,925
HD Premium Plus (180 Channel Lineup)	2,246	10,773	13,109	15,950	19,411	23,613	28,733	34,966	39,208	39,797
HD Premium Plus Starz (200+ Channel Lineup)	1,119	5,368	6,535	7,953	9,778	11,879	14,441	17,558	19,681	19,978
HD Premium Plus Starz & 1 Premium Channel (250+ Channel Lineup)	1,119	5,368	6,535	7,953	9,778	11,879	14,441	17,558	19,681	19,978
HD Premium Plus Starz & 2 Premium Channel (275+ Channel Lineup)	1,119	5,368	6,535	7,953	9,778	11,879	14,441	17,558	19,681	19,978
HD Premium Plus Starz & 3 Premium Channel (300+ Channel Lineup)	1,119	5,368	6,535	7,953	9,778	11,879	14,441	17,558	19,681	19,978
Pay-per-View (average)	563	2,702	3,287	3,998	4,961	6,013	7,295	8,855	9,918	10,068
Institutional	31	146	161	175	144	146	149	151	155	158
Total	11,268	54,048	65,748	79,968	97,728	118,745	144,364	175,534	196,760	199,723
Revenues										
Lifeline Services (Basic)	$ 25,119	$ 120,510	$ 146,727	$ 178,614	$ 217,476	$ 264,735	$ 322,317	$ 392,418	$ 440,118	$ 446,724
SD Basic (85 Channel Lineup)	45,950	220,308	267,481	324,722	394,450	478,465	580,913	705,485	790,387	802,324
SD Premium (120 Channel Lineup)	56,284	269,970	328,411	399,440	485,994	590,948	718,860	874,525	980,499	995,244
HD Premium Plus (180 Channel Lineup)	134,636	645,841	785,909	956,191	1,163,701	1,415,599	1,722,567	2,096,188	2,350,496	2,385,818
HD Premium Plus Starz (200+ Channel Lineup)	78,274	375,506	457,095	556,312	683,943	830,964	1,010,176	1,228,210	1,376,700	1,397,433
HD Premium Plus Starz & 1 Premium Channel (250+ Channel Lineup)	89,464	429,188	522,441	635,842	781,719	949,758	1,154,590	1,403,794	1,573,512	1,597,209
HD Premium Plus Starz & 2 Premium Channel (275+ Channel Lineup)	100,654	482,870	587,787	715,372	879,495	1,068,552	1,299,004	1,579,378	1,770,324	1,796,985
HD Premium Plus Starz & 3 Premium Channel (300+ Channel Lineup)	111,844	536,552	653,133	794,902	977,271	1,187,346	1,443,418	1,754,962	1,967,136	1,996,761
Pay-per-View (average)	1,662	7,972	9,698	11,795	14,634	17,737	21,521	26,122	29,258	29,701
Institutional	778	3,653	4,012	4,371	3,593	3,638	3,728	3,772	3,862	3,952
Total	**$ 644,666**	**$ 3,092,369**	**$ 3,762,695**	**$ 4,577,562**	**$ 5,602,277**	**$ 6,807,743**	**$ 8,277,094**	**$ 10,064,854**	**$ 11,282,291**	**$ 11,452,151**

IPTV Subscriber Revenue Projections – Years 11 - 20

Year	11	12	13	14	15	16	17	18	19	20
Number of charges to subscribers										
Lifeline Services (Basic)	30,674	31,135	31,603	32,077	32,557	33,046	33,542	34,046	34,556	35,076
SD Basic (85 Channel Lineup)	20,683	20,993	21,310	21,632	21,957	22,288	22,624	22,965	23,311	23,662
SD Premium (120 Channel Lineup)	20,521	20,830	21,143	21,461	21,782	22,110	22,442	22,780	23,122	23,470
HD Premium Plus (180 Channel Lineup)	40,988	41,605	42,230	42,865	43,507	44,161	44,824	45,497	46,180	46,875
HD Premium Plus Starz (200+ Channel Lineup)	20,467	20,775	21,087	21,404	21,724	22,051	22,382	22,718	23,059	23,405
HD Premium Plus Starz & 1 Premium Channel (250+ Channel Lineup)	20,467	20,775	21,087	21,404	21,724	22,051	22,382	22,718	23,059	23,405
HD Premium Plus Starz & 2 Premium Channel (275+ Channel Lineup)	20,467	20,775	21,087	21,404	21,724	22,051	22,382	22,718	23,059	23,405
HD Premium Plus Starz & 3 Premium Channel (300+ Channel Lineup)	20,467	20,775	21,087	21,404	21,724	22,051	22,382	22,718	23,059	23,405
Pay-per-View (average)	10,261	10,415	10,571	10,730	10,891	11,055	11,221	11,390	11,561	11,735
Institutional	216	218	223	228	233	238	242	247	252	257
Total	205,212	208,296	211,428	214,608	217,824	221,100	224,424	227,796	231,216	234,696
Revenues										
Lifeline Services (Basic)	$ 460,107	$ 467,028	$ 474,039	$ 481,158	$ 488,358	$ 495,693	$ 503,136	$ 510,687	$ 518,346	$ 526,140
SD Basic (85 Channel Lineup)	826,294	838,686	851,342	864,190	877,182	890,414	903,837	917,452	931,258	945,305
SD Premium (120 Channel Lineup)	1,025,034	1,040,439	1,056,083	1,071,967	1,088,031	1,104,395	1,120,998	1,137,841	1,154,924	1,172,307
HD Premium Plus (180 Channel Lineup)	2,457,255	2,494,196	2,531,677	2,569,733	2,608,221	2,647,428	2,687,211	2,727,569	2,768,503	2,810,156
HD Premium Plus Starz (200+ Channel Lineup)	1,431,681	1,453,211	1,475,036	1,497,196	1,519,608	1,542,439	1,565,607	1,589,110	1,612,949	1,637,208
HD Premium Plus Starz & 1 Premium Channel (250+ Channel Lineup)	1,636,353	1,660,961	1,685,906	1,711,234	1,736,850	1,762,945	1,789,425	1,816,288	1,843,535	1,871,262
HD Premium Plus Starz & 2 Premium Channel (275+ Channel Lineup)	1,841,025	1,868,711	1,896,776	1,925,272	1,954,092	1,983,451	2,013,243	2,043,466	2,074,121	2,105,316
HD Premium Plus Starz & 3 Premium Channel (300+ Channel Lineup)	2,045,697	2,076,461	2,107,646	2,139,310	2,171,334	2,203,957	2,237,061	2,270,644	2,304,707	2,339,370
Pay-per-View (average)	30,269	30,724	31,186	31,655	32,129	32,612	33,103	33,600	34,104	34,618
Institutional	5,389	5,449	5,569	5,689	5,808	5,928	6,048	6,168	6,287	6,407
Total	**$ 11,759,102**	**$ 11,935,866**	**$ 12,115,258**	**$ 12,297,403**	**$ 12,481,612**	**$ 12,669,263**	**$ 12,859,668**	**$ 13,052,825**	**$ 13,248,735**	**$ 13,448,087**

Internet Services Subscriber Revenue Projections – Years 1 - 10

Year	1	2	3	4	5	6	7	8	9	10
Number of charges to subscribers (Based on 12 Months)										
Moderate Speed (Residential) (5 Mbps)	2,292	19,752	21,396	22,800	23,796	28,992	35,304	36,000	36,540	37,092
Moderate Speed (Residential) (10 Mbps)	5,772	47,112	49,188	49,032	47,796	58,200	70,860	72,276	73,380	74,496
High Speed (Small Business & Residential) (20 Mbps)	684	7,608	11,592	17,172	24,576	29,856	36,252	37,044	37,692	38,364
High Speed (Small Business & Residential) (50 Mbps)	516	6,840	11,148	16,992	24,576	29,856	36,252	37,044	37,692	38,364
High Speed (Small Business & Residential) (100 Mbps)	456	6,720	10,992	16,812	24,576	29,856	36,252	37,044	37,692	38,364
High Speed (Small Business & Residential) (200 Mbps)	-	2,328	5,652	10,296	24,384	29,640	36,012	36,780	37,404	38,040
High Speed (Medium Business) (50 Mbps)	-	-	-	180	192	216	240	264	288	312
High Speed (Institutional & Large Business) (100 Mbps)	-	-	-	180	192	216	240	264	288	312
High Speed (Institutional & Large Business) (500 Mbps)	-	-	-	180	192	216	240	264	288	312
High Speed (Institutional & Large Business) (1 Gbps)	-	-	-	180	192	216	240	264	288	312
High Speed (Institutional & Large Business) (10 Gbps)	-	-	-	-	-	-	-	-	-	-
Revenues										
Moderate Speed (Residential) (5 Mbps)	$ 68,645	$ 591,572	$ 640,810	$ 682,860	$ 712,690	$ 868,310	$ 1,057,355	$ 1,078,200	$ 1,094,373	$ 1,110,905
Moderate Speed (Residential) (10 Mbps)	$ 227,354	$ 1,855,697	$ 1,937,469	$ 1,931,324	$ 1,882,640	$ 2,292,443	$ 2,791,109	$ 2,846,884	$ 2,890,369	$ 2,934,327
High Speed (Small Business & Residential) (20 Mbps)	$ 32,927	$ 366,242	$ 558,028	$ 826,644	$ 1,183,066	$ 1,437,240	$ 1,745,137	$ 1,783,263	$ 1,814,457	$ 1,846,807
High Speed (Small Business & Residential) (50 Mbps)	$ 38,385	$ 508,821	$ 829,289	$ 1,264,019	$ 1,828,186	$ 2,220,960	$ 2,696,752	$ 2,755,668	$ 2,803,872	$ 2,853,862
High Speed (Small Business & Residential) (100 Mbps)	$ 53,871	$ 793,894	$ 1,298,585	$ 1,986,154	$ 2,903,386	$ 3,527,160	$ 4,282,777	$ 4,376,343	$ 4,452,897	$ 4,532,287
High Speed (Small Business & Residential) (200 Mbps)	$ -	$ 478,728	$ 1,162,272	$ 2,117,260	$ 5,014,303	$ 6,095,142	$ 7,405,474	$ 7,563,405	$ 7,691,723	$ 7,822,510
High Speed (Medium Business) (50 Mbps)	$ -	$ -	$ -	$ 53,302	$ 56,855	$ 63,962	$ 71,069	$ 78,176	$ 85,283	$ 92,390
High Speed (Institutional & Large Business) (100 Mbps)	$ -	$ -	$ -	$ 98,662	$ 105,239	$ 118,394	$ 131,549	$ 144,704	$ 157,859	$ 171,014
High Speed (Institutional & Large Business) (500 Mbps)	$ -	$ -	$ -	$ 461,542	$ 492,311	$ 553,850	$ 615,389	$ 676,928	$ 738,467	$ 800,006
High Speed (Institutional & Large Business) (1 Gbps)	$ -	$ -	$ -	$ 915,142	$ 976,151	$ 1,098,170	$ 1,220,189	$ 1,342,208	$ 1,464,227	$ 1,586,246
High Speed (Institutional & Large Business) (10 Gbps)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Internet Service Revenue	**$ 421,182**	**$ 4,594,955**	**$ 6,426,453**	**$ 10,336,908**	**$ 15,154,826**	**$ 18,275,631**	**$ 22,016,800**	**$ 22,645,778**	**$ 23,193,528**	**$ 23,750,353**

Internet Services Subscriber Revenue Projections – Years 11 - 20

Year	11	12	13	14	15	16	17	18	19	20
Number of charges to subscribers (Based on 12 Months)										
Moderate Speed (Residential) (5 Mbps)	37,656	38,220	38,784	39,372	39,960	40,560	41,172	41,784	42,408	43,044
Moderate Speed (Residential) (10 Mbps)	75,624	76,752	77,916	79,092	80,268	81,480	82,692	83,940	85,212	86,484
High Speed (Small Business & Residential) (20 Mbps)	38,952	39,540	40,128	40,740	41,364	41,988	42,624	43,272	43,920	44,592
High Speed (Small Business & Residential) (50 Mbps)	38,952	39,540	40,128	40,740	41,364	41,988	42,624	43,272	43,920	44,592
High Speed (Small Business & Residential) (100 Mbps)	38,952	39,540	40,128	40,740	41,364	41,988	42,624	43,272	43,920	44,592
High Speed (Small Business & Residential) (200 Mbps)	38,628	39,204	39,792	40,404	41,004	41,628	42,264	42,900	43,548	44,196
High Speed (Medium Business) (50 Mbps)	324	324	336	348	348	360	360	372	384	384
High Speed (Institutional & Large Business) (100 Mbps)	324	324	336	348	348	360	360	372	384	384
High Speed (Institutional & Large Business) (500 Mbps)	324	324	336	348	348	360	360	372	384	384
High Speed (Institutional & Large Business) (1 Gbps)	324	324	336	348	348	360	360	372	384	384
High Speed (Institutional & Large Business) (10 Gbps)	-	-	-	-	-	-	-	-	-	-
Revenues										
Moderate Speed (Residential) (5 Mbps)	$ 1,127,797	$ 1,144,689	$ 1,161,581	$ 1,179,191	$ 1,196,802	$ 1,214,772	$ 1,233,101	$ 1,251,431	$ 1,270,120	$ 1,289,168
Moderate Speed (Residential) (10 Mbps)	2,978,829	3,023,261	3,069,111	3,115,434	3,161,757	3,209,497	3,257,238	3,306,397	3,356,501	3,406,605
High Speed (Small Business & Residential) (20 Mbps)	1,875,149	1,903,456	1,931,762	1,961,224	1,991,263	2,021,302	2,051,919	2,083,114	2,114,309	2,146,659
High Speed (Small Business & Residential) (50 Mbps)	2,897,639	2,941,381	2,985,122	3,030,649	3,077,068	3,123,487	3,170,799	3,219,004	3,267,209	3,317,199
High Speed (Small Business & Residential) (100 Mbps)	4,601,789	4,671,256	4,740,722	4,813,024	4,886,743	4,960,462	5,035,599	5,112,154	5,188,709	5,268,099
High Speed (Small Business & Residential) (200 Mbps)	7,943,462	8,061,911	8,182,827	8,308,679	8,432,063	8,560,382	8,691,169	8,821,956	8,955,211	9,088,465
High Speed (Medium Business) (50 Mbps)	95,943	95,943	99,496	103,050	103,050	106,603	106,603	110,157	113,710	113,710
High Speed (Institutional & Large Business) (100 Mbps)	177,591	177,591	184,168	190,746	190,746	197,323	197,323	203,901	210,478	210,478
High Speed (Institutional & Large Business) (500 Mbps)	830,775	830,775	861,544	892,314	892,314	923,083	923,083	953,853	984,622	984,622
High Speed (Institutional & Large Business) (1 Gbps)	1,647,255	1,647,255	1,708,264	1,769,274	1,769,274	1,830,283	1,830,283	1,891,293	1,952,302	1,952,302
High Speed (Institutional & Large Business) (10 Gbps)	-	-	-	-	-	-	-	-	-	-
Total Internet Service Revenue	**$ 24,176,230**	**$ 24,497,516**	**$ 24,924,598**	**$ 25,363,583**	**$ 25,701,078**	**$ 26,147,196**	**$ 26,497,119**	**$ 26,953,258**	**$ 27,413,170**	**$ 27,777,307**

Detailed Triple Play Financials

VoIP Services Subscriber Revenue Projections – Years 1 - 20

Year	1	2	3	4	5	6	7	8	9	10
Number of charges to subscribers										
Standard - Unlimited Local & LD (US Only)	19,284	74,628	90,612	102,096	103,824	105,408	107,004	108,612	110,256	111,924
Second Line	4,524	17,388	21,120	23,796	24,204	24,564	24,924	25,308	25,692	26,076
0	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-	-
Revenues										
Standard - Unlimited Local & LD (US Only)	$ 481,136	$ 1,861,969	$ 2,260,769	$ 2,547,295	$ 2,590,409	$ 2,629,930	$ 2,669,750	$ 2,709,869	$ 2,750,887	$ 2,792,504
Second Line	99,302	381,667	463,584	522,322	531,278	539,180	547,082	555,511	563,939	572,368
0	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-	-
Total Revenue	**$ 580,438**	**$ 2,243,635**	**$ 2,724,353**	**$ 3,069,617**	**$ 3,121,687**	**$ 3,169,109**	**$ 3,216,832**	**$ 3,265,380**	**$ 3,314,827**	**$ 3,364,872**

Year	11	12	13	14	15	16	17	18	19	20
Number of charges to subscribers										
Standard - Unlimited Local & LD (US Only)	115,248	117,000	118,764	120,564	122,388	124,248	126,120	128,040	129,984	131,940
Second Line	26,856	27,264	27,672	28,092	28,512	28,944	29,376	29,820	30,276	30,732
0	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-	-
Revenues										
Standard - Unlimited Local & LD (US Only)	$ 2,875,438	$ 2,919,150	$ 2,963,162	$ 3,008,072	$ 3,053,581	$ 3,099,988	$ 3,146,694	$ 3,194,598	$ 3,243,101	$ 3,291,903
Second Line	589,489	598,445	607,400	616,619	625,838	635,321	644,803	654,549	664,558	674,567
0	-	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-	-
Total Revenue	**$ 3,464,927**	**$ 3,517,595**	**$ 3,570,562**	**$ 3,624,691**	**$ 3,679,419**	**$ 3,735,308**	**$ 3,791,497**	**$ 3,849,147**	**$ 3,907,659**	**$ 3,966,470**

Ethernet Services Subscriber Revenue Projections – Years 1 - 10

Year	1	2	3	4	5	6	7	8	9	10
Total Market										
Serving Area (Wholesale)	3,862	8,883	10,215	11,748	13,510	15,536	17,867	18,023	18,294	18,568
Expanded Service Territory	58	133	153	176	203	233	268	270	274	279
Total possible wholesale market	**3,920**	**9,016**	**10,369**	**11,924**	**13,712**	**15,769**	**18,135**	**18,294**	**18,568**	**18,847**
Serving Area 1	761	1,711	1,902	2,092	2,092	2,092	2,092	2,123	2,155	2,187
Expanded Service Territory	15	26	29	31	31	31	31	32	32	33
Total possible subscriber market	**776**	**1,737**	**1,930**	**2,123**	**2,123**	**2,123**	**2,123**	**2,155**	**2,187**	**2,220**
Revenues										
MAN (1 Mbps)	$ 1,541	$ 6,208	$ 5,288	$ 6,689	$ 7,693	$ 7,693	$ 7,693	$ 7,808	$ 7,925	$ 8,044
MAN (5 Mbps)	$ 6,032	$ 29,810	$ 32,709	$ 29,854	$ 21,081	$ 21,081	$ 21,081	$ 21,397	$ 21,718	$ 22,044
MAN (10 Mbps)	$ 5,028	$ 33,767	$ 51,776	$ 76,413	$ 100,428	$ 100,428	$ 100,428	$ 101,934	$ 103,463	$ 105,015
MAN (50 Mbps)	$ 2,347	$ 18,913	$ 32,222	$ 50,951	$ 70,312	$ 70,312	$ 70,312	$ 71,367	$ 72,437	$ 73,524
MAN (100 Mbps)	$ 2,716	$ 19,455	$ 31,074	$ 47,171	$ 63,287	$ 63,287	$ 63,287	$ 64,237	$ 65,200	$ 66,178
MAN (500 Mbps)	$ 1,777	$ 9,548	$ 24,400	$ 46,300	$ 70,993	$ 70,993	$ 70,993	$ 72,058	$ 73,139	$ 74,236
MAN (1 Gbps)	$ 2,649	$ 14,232	$ 36,371	$ 69,014	$ 105,821	$ 105,821	$ 105,821	$ 107,409	$ 109,020	$ 110,655
MAN (10 Gbps)	$ -	$ 19,826	$ 50,668	$ 96,142	$ 147,417	$ 147,417	$ 147,417	$ 149,629	$ 151,873	$ 154,151
MAN (40 Gbps)	$ -	$ -	$ 47,190	$ 59,696	$ 68,650	$ 68,650	$ 68,650	$ 69,680	$ 70,725	$ 71,786
Existing Revenue (2011)	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592
Wholesale (100 Mbps)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wholesale (500 Mbps)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wholesale (1000 Mbps)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Ethernet Service Revenue	**$ 399,683**	**$ 529,352**	**$ 689,290**	**$ 859,820**	**$ 1,033,275**	**$ 1,033,275**	**$ 1,033,275**	**$ 1,043,110**	**$ 1,053,093**	**$ 1,063,226**

Ethernet Services Subscriber Revenue Projections – Years 11 - 20

Year	11	12	13	14	15	16	17	18	19	20
Total Market										
Serving Area (Wholesale)	18,847	19,129	19,416	19,707	20,003	20,303	20,608	20,917	21,230	21,549
Expanded Service Territory	283	287	291	296	300	305	309	314	318	323
Expanded Service Territory	**19,129**	**19,416**	**19,707**	**20,003**	**20,303**	**20,608**	**20,917**	**21,230**	**21,549**	**21,872**
Serving Area 1	2,220	2,253	2,287	2,321	2,356	2,392	2,427	2,464	2,501	2,538
Expanded Service Territory	33	34	34	35	35	36	36	37	38	38
Total possible subscriber market	**2,253**	**2,287**	**2,321**	**2,356**	**2,392**	**2,427**	**2,464**	**2,501**	**2,538**	**2,576**
Revenues										
MAN (1 Mbps)	$ 8,165	$ 8,287	$ 8,412	$ 8,538	$ 8,666	$ 8,796	$ 8,928	$ 9,062	$ 9,198	$ 9,336
MAN (5 Mbps)	$ 22,375	$ 22,710	$ 23,051	$ 23,397	$ 23,748	$ 24,104	$ 24,465	$ 24,832	$ 25,205	$ 25,583
MAN (10 Mbps)	$ 106,591	$ 108,189	$ 109,812	$ 111,460	$ 113,131	$ 114,828	$ 116,551	$ 118,299	$ 120,074	$ 121,875
MAN (50 Mbps)	$ 74,627	$ 75,746	$ 76,882	$ 78,036	$ 79,206	$ 80,394	$ 81,600	$ 82,824	$ 84,067	$ 85,328
MAN (100 Mbps)	$ 67,171	$ 68,178	$ 69,201	$ 70,239	$ 71,293	$ 72,362	$ 73,448	$ 74,549	$ 75,668	$ 76,803
MAN (500 Mbps)	$ 75,349	$ 76,479	$ 77,627	$ 78,791	$ 79,973	$ 81,172	$ 82,390	$ 83,626	$ 84,880	$ 86,153
MAN (1 Gbps)	$ 112,315	$ 114,000	$ 115,710	$ 117,445	$ 119,207	$ 120,995	$ 122,810	$ 124,652	$ 126,522	$ 128,420
MAN (10 Gbps)	$ 156,463	$ 158,810	$ 161,193	$ 163,610	$ 166,065	$ 168,556	$ 171,084	$ 173,650	$ 176,255	$ 178,899
MAN (40 Gbps)	$ 72,863	$ 73,956	$ 75,065	$ 76,191	$ 77,334	$ 78,494	$ 79,671	$ 80,866	$ 82,079	$ 83,310
Existing Revenue (2011)	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592	$ 377,592
Wholesale (100 Mbps)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wholesale (500 Mbps)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Wholesale (1000 Mbps)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Ethernet Service Revenue	**$ 1,073,510**	**$ 1,083,949**	**$ 1,094,544**	**$ 1,105,298**	**$ 1,116,214**	**$ 1,127,293**	**$ 1,138,539**	**$ 1,149,953**	**$ 1,161,538**	**$ 1,173,298**

Dark Fiber Revenue Projections – Years 1 - 20

Year	1	2	3	4	5	6	7	8	9	10
Description										
Entry Fee (MAN)	$ 9,200	$ 28,200	$ 28,800	$ 29,400	$ 30,000	$ 30,600	$ 31,500	$ 32,400	$ 33,300	$ 34,200
Entry Fee (WAN)	1,800	5,700	5,700	6,000	6,000	6,000	6,300	6,600	6,600	6,900
Per Access Point Connection	11,000	33,900	34,500	35,400	36,000	36,600	37,800	39,000	39,900	41,100
Per Fiber/Mile	573,056	1,766,054	1,797,312	1,844,198	1,875,456	1,906,714	1,969,229	2,031,744	2,078,630	2,141,146
Total Dark Fiber Revenues	**$ 595,056**	**$1,833,854**	**$1,866,312**	**$1,914,998**	**$1,947,456**	**$1,979,914**	**$2,044,829**	**$2,109,744**	**$2,158,430**	**$2,223,346**

Year	11	12	13	14	15	16	17	18	19	20
Description										
Entry Fee (MAN)	$ 35,100	$ 36,000	$ 36,900	$ 37,800	$ 38,700	$ 39,600	$ 40,500	$ 41,400	$ 42,300	$ 43,200
Entry Fee (WAN)	6,900	7,200	7,500	7,500	7,800	7,800	8,100	8,400	8,400	8,700
Per Access Point Connection	42,000	43,200	44,400	45,300	46,500	47,400	48,600	49,800	50,700	51,900
Per Fiber/Mile	2,188,032	2,250,547	2,313,062	2,359,949	2,422,464	2,469,350	2,531,866	2,594,381	2,641,267	2,703,782
Total Dark Fiber Revenues	**$2,272,032**	**$2,336,947**	**$2,401,862**	**$2,450,549**	**$2,515,464**	**$2,564,150**	**$2,629,066**	**$2,693,981**	**$2,742,667**	**$2,807,582**

Operating Expense Projections – Years 1 - 15

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
I. Salaries and Benefits															
Executive Director	$ 288,000	$ 311,501	$ 323,482	$ 335,462	$ 347,443	$ 361,341	$ 375,795	$ 390,826	$ 406,459	$ 422,718	$ 439,626	$ 457,212	$ 475,500	$ 494,520	$ 514,301
Marketing/Sales	$ 153,600	$ 166,134	$ 172,524	$ 178,913	$ 185,303	$ 192,715	$ 200,424	$ 208,441	$ 216,778	$ 225,449	$ 234,467	$ 243,846	$ 253,600	$ 263,744	$ 274,294
CFO/Controller	$ -	$ 124,600	$ 129,393	$ 134,185	$ 138,977	$ 144,536	$ 150,318	$ 156,331	$ 162,584	$ 169,087	$ 175,851	$ 182,885	$ 190,200	$ 197,808	$ 205,720
Network Cost Analyst	$ 89,600	$ 96,911	$ 100,639	$ 104,366	$ 108,093	$ 112,417	$ 116,914	$ 121,590	$ 126,454	$ 131,512	$ 136,773	$ 142,244	$ 147,933	$ 153,851	$ 160,005
Network Operations Manager	$ 153,600	$ 166,134	$ 172,524	$ 178,913	$ 185,303	$ 192,715	$ 200,424	$ 208,441	$ 216,778	$ 225,449	$ 234,467	$ 243,846	$ 253,600	$ 263,744	$ 274,294
Outside Plant Manager	$ 153,600	$ 166,134	$ 172,524	$ 178,913	$ 185,303	$ 192,715	$ 200,424	$ 208,441	$ 216,778	$ 225,449	$ 234,467	$ 243,846	$ 253,600	$ 263,744	$ 274,294
Network Engineer	$ 256,000	$ 415,334	$ 431,309	$ 447,283	$ 463,258	$ 481,788	$ 501,059	$ 521,102	$ 541,946	$ 563,624	$ 586,169	$ 609,615	$ 634,000	$ 659,360	$ 685,734
Network Service Manager	$ 102,400	$ 221,512	$ 230,031	$ 238,551	$ 247,071	$ 256,954	$ 267,232	$ 277,921	$ 289,038	$ 300,599	$ 312,623	$ 325,128	$ 338,133	$ 351,659	$ 365,725
Outside Plant Engineer	$ 108,800	$ 117,678	$ 122,204	$ 126,730	$ 131,256	$ 136,507	$ 141,967	$ 147,646	$ 153,551	$ 159,693	$ 166,081	$ 172,724	$ 179,633	$ 186,819	$ 194,291
Field Technician	$ 83,200	$ 179,978	$ 186,900	$ 193,823	$ 200,745	$ 208,775	$ 217,126	$ 225,811	$ 234,843	$ 244,237	$ 254,006	$ 264,167	$ 274,733	$ 285,723	$ 297,152
Customer Service Manager	$ 83,200	$ 89,989	$ 93,450	$ 96,911	$ 100,372	$ 104,387	$ 108,563	$ 112,905	$ 117,422	$ 122,118	$ 127,003	$ 132,083	$ 137,367	$ 142,861	$ 148,576
Overtime	284,625	1,147,200	295,575	303,375	279,900	343,275	419,925	221,625	153,975	41,175	48,000	18,150	18,975	19,800	20,625
	$ 1,756,625	$ 3,203,105	$ 2,430,554	$ 2,517,427	$ 2,573,025	$ 2,728,125	$ 2,900,169	$ 2,801,079	$ 2,836,607	$ 2,831,112	$ 2,949,535	$ 3,035,746	$ 3,157,275	$ 3,283,632	$ 3,415,010
II. Other Operating Expenses															
Facility Lease & Other Fees															
Facility lease & other fees	$ 13,500	$ 13,500	$ 13,500	$ 13,500	$ 13,500	$ 13,770	$ 14,045	$ 14,326	$ 14,613	$ 14,905	$ 15,203	$ 15,507	$ 15,817	$ 16,134	$ 16,456
Pole attachment fees	27,110	54,221	81,331	81,331	81,331	81,331	81,331	81,331	81,331	81,331	81,331	81,331	81,331	81,331	81,331
Product content/management fees:															
Interconnection/Node Fees	38,774	38,774	38,774	38,774	38,774	39,550	40,341	41,148	41,971	42,810	43,666	44,540	45,430	46,339	47,266
IPTV	421,123	2,040,237	2,506,915	3,079,535	3,802,585	4,665,420	5,726,584	7,029,353	7,953,355	8,147,839	8,779,407	8,992,387	9,209,780	9,431,721	9,657,731
Telephony	228,035	915,269	1,118,954	1,271,828	1,308,236	1,340,938	1,374,022	1,407,941	1,442,638	1,477,994	1,476,420	1,512,499	1,549,121	1,586,656	1,624,883
Internet	107,982	1,525,737	2,481,742	5,104,559	7,905,180	9,380,809	11,113,857	11,366,616	11,574,573	11,779,595	11,891,134	11,902,116	11,992,985	12,084,318	12,090,662
Ethernet															
Dark Fiber	122,960	378,924	385,620	395,664	402,360	409,056	422,448	435,840	445,884	459,276	469,320	482,712	496,104	506,148	519,540
Billing @	11,443	59,846	72,737	85,949	98,077	112,650	130,285	139,994	146,995	149,492	152,432	154,733	157,068	159,439	161,844
Legal and consulting fees	200,000	50,000	50,000	50,000	50,000	51,000	52,020	53,060	54,122	55,204	56,308	57,434	58,583	59,755	60,950
Commission Fee	197,617	1,037,294	248,693	530,774	610,221	446,013	539,153	242,081	179,242	71,164	92,048	59,706	73,563	73,549	65,291
Payment in lieu of taxes	8,231	49,655	64,568	89,920	119,394	141,262	167,554	179,880	188,953	192,837	197,001	199,755	203,052	206,428	209,311
Buisness initiation costs	250,000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Franchise fee	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Insurance Costs	50,000	50,000	50,000	50,000	50,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000	51,000
Equipment leasing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transportation Expense	40,500	59,765	64,902	70,167	75,019	81,745	89,999	95,196	99,408	101,775	104,665	107,096	109,612	112,218	114,915
Annual Maintenance & Upgrade Cost	-	1,034,348	50,000	1,078,255	1,102,236	1,131,225	1,166,409	1,219,084	1,270,376	1,318,603	1,375,204	1,433,352	1,486,034	1,538,105	1,589,155
Make-ready costs	125,125	125,125	125,125	-	-	-	-	-	-	-	-	-	-	-	-
Marketing & Advertising	161,249	209,412	222,254	235,418	247,547	267,362	291,056	307,172	320,885	330,050	340,587	350,043	359,779	369,809	380,136
Accounting & Collections	24,500	43,765	48,902	54,167	59,019	66,145	74,807	80,421	85,057	87,857	91,188	94,070	97,045	100,120	103,295
Office expenses	60,000	60,000	60,000	60,000	60,000	61,200	62,424	63,672	64,946	66,245	67,570	68,921	70,300	71,706	73,140
Software support	250,000	50,000	50,000	50,000	50,000	51,000	52,020	53,060	54,122	55,204	56,308	57,434	58,583	59,755	60,950
Contingency	75,000	76,500	78,030	79,591	81,182	82,806	84,462	86,151	87,874	89,632	91,425	93,253	95,118	97,020	98,961
Property tax	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Allowance for bad debts	30,690	156,905	204,042	282,659	373,681	439,287	518,161	555,287	582,657	594,460	607,107	615,524	625,575	635,865	644,675
	$ 2,443,839	$ 8,029,276	$ 8,016,089	$ 12,702,091	$ 16,528,342	$ 18,913,571	$ 22,051,977	$ 23,502,615	$ 24,740,003	$ 25,167,274	$ 26,039,326	$ 26,373,414	$ 26,835,883	$ 27,287,415	$ 27,651,490
Total Operating Expenses	**$ 4,200,464**	**$ 11,232,381**	**$ 10,446,642**	**$ 15,219,518**	**$ 19,101,367**	**$ 21,641,696**	**$ 24,952,147**	**$ 26,303,694**	**$ 27,576,610**	**$ 27,998,387**	**$ 28,988,861**	**$ 29,409,160**	**$ 29,993,158**	**$ 30,571,047**	**$ 31,066,500**

Detailed Triple Play Financials

IPTV Content Costs – Years 1 - 15

Year	1	2	3	4	5	6	7	8	9	10
Description										
Lifeline Services (Basic)	$ 22,627	$ 109,641	$ 134,815	$ 165,722	$ 203,738	$ 250,396	$ 307,763	$ 378,233	$ 428,174	$ 438,625
SD Basic (85 Channel Lineup)	38,522	186,542	228,727	280,396	343,914	421,176	516,227	632,842	715,628	733,162
SD Premium (120 Channel Lineup)	45,784	221,804	272,490	334,673	411,146	504,744	619,844	761,181	861,396	882,446
HD Premium Plus (180 Channel Lineup)	95,181	461,147	566,714	696,263	855,592	1,050,804	1,290,845	1,585,644	1,794,631	1,838,466
HD Premium Plus Starz (200+ Channel Lineup)	47,425	229,790	282,488	347,176	430,970	528,646	648,778	796,251	900,858	922,892
HD Premium Plus Starz & 1 Premium Channel (250+ Channel	53,076	257,170	316,148	388,543	482,322	591,636	726,083	891,127	1,008,199	1,032,859
HD Premium Plus Starz & 2 Premium Channel (275+ Channel	56,601	274,249	337,144	414,347	514,353	630,928	774,303	950,308	1,075,155	1,101,452
HD Premium Plus Starz & 3 Premium Channel (300+ Channel	60,294	292,142	359,139	441,379	547,910	672,090	824,819	1,012,307	1,145,299	1,173,311
Pay-per-View (average)	1,127	5,459	6,706	8,237	10,318	12,626	15,466	18,949	21,423	21,948
Institutional	484	2,294	2,544	2,799	2,323	2,375	2,457	2,510	2,593	2,678
Total Programming Costs	**$421,123**	**$2,040,237**	**$2,506,915**	**$3,079,535**	**$3,802,585**	**$4,665,420**	**$5,726,584**	**$7,029,353**	**$7,953,355**	**$8,147,839**

Year	11	12	13	14	15	16	17	18	19	20
Description										
Lifeline Services (Basic)	$ 455,910	$ 466,974	$ 478,255	$ 489,771	$ 501,499	$ 513,497	$ 525,739	$ 538,230	$ 550,971	$ 563,995
SD Basic (85 Channel Lineup)	761,993	780,452	799,367	818,675	838,337	858,447	878,965	899,897	921,247	943,067
SD Premium (120 Channel Lineup)	917,198	939,446	962,162	985,354	1,008,970	1,033,129	1,057,779	1,082,928	1,108,582	1,134,803
HD Premium Plus (180 Channel Lineup)	1,910,886	1,957,246	2,004,556	2,052,855	2,102,040	2,152,355	2,203,695	2,256,075	2,309,505	2,364,119
HD Premium Plus Starz (200+ Channel Lineup)	1,067,879	1,093,793	1,120,221	1,147,203	1,174,680	1,202,789	1,231,471	1,260,733	1,290,583	1,321,095
HD Premium Plus Starz & 1 Premium Channel (250+ Channel	1,138,798	1,166,433	1,194,616	1,223,390	1,252,692	1,282,667	1,313,254	1,344,460	1,376,292	1,408,830
HD Premium Plus Starz & 2 Premium Channel (275+ Channel	1,213,094	1,242,531	1,272,554	1,303,205	1,334,418	1,366,349	1,398,931	1,432,173	1,466,082	1,500,743
HD Premium Plus Starz & 3 Premium Channel (300+ Channel	1,287,390	1,318,630	1,350,492	1,383,020	1,416,145	1,450,031	1,484,609	1,519,887	1,555,872	1,592,656
Pay-per-View (average)	22,573	23,121	23,680	24,251	24,832	25,427	26,033	26,652	27,283	27,929
Institutional	3,686	3,760	3,878	3,997	4,117	4,238	4,362	4,486	4,613	4,740
Total Programming Costs	**$8,779,407**	**$8,992,387**	**$9,209,780**	**$9,431,721**	**$9,657,731**	**$9,888,928**	**$10,124,839**	**$10,365,521**	**$10,611,031**	**$10,861,978**

List of Acronyms

AE	Active Ethernet
BTOP	Broadband Technology Opportunities Program
BIP	Broadband Infrastructure Program
CAPX	Capital Expense
CLEC	Competitive Local Exchange Carrier
COGS	Cost of Goods Sold
DSL	Digital Subscriber Loop
FTTH	Fiber-to-the-Home
FTTB	Fiber-to-the-Business
FTTP	Fiber-to-the-Premise
GPON	Gigabit Optical Networking
ICT	Information Communications Technologies
IPTV	Internet Protocol Television
IP	Internet Protocol
IRU	Indefeasible Right of Use/Capital Lease
ISP	Internet Service Provider
IT	Information Technology
MB	Megabits
Mbps	Megabits Per Second
MDU	Multi-Dwelling Unit
MPLS	Multi Protocol Label Switching
NGO	Non-Governmental Organization
OPX	Operating Expenses
QoS	Quality of Services
RBOC	Regional Bell Operating Company
ROI	Return on Investment
SG&A	Sales, General and Administrative Expenses
SIP	Session Internet Protocol
VoIP	Voice over Internet Protocol
VLAN	Virtual Local Area Network

Glossary of Terms

This Glossary of terms is broken up into specific categories as they relate to fiber-to-the-home (FTTH).

Fiber-to-the-Home (FTTH)

"Fiber to the Home" is defined as a communications architecture in which the final connection to the subscriber's premises is Optical Fiber.
The fiber optic communications path is terminated on or in the premise for the purpose of carrying communications to a single subscriber.

In order to be classified as FTTH, the access fiber must cross the subscriber's premises boundary and terminate inside the premises, or on an external wall of the subscriber's premises, or not more than 2m from an external wall of the subscriber's premises.
FTTH services may deliver just one application, but generally deliver several such as data, voice and video.

This FTTH definition excludes architectures where the optical fiber terminates in public or private space before reaching the premises and where the access path to the subscriber over a physical medium other than optical fiber (for example copper loops, power cables, wireless and/or coax).

Fiber-to-the-Building (FTTB)
"Fiber to the Building" is defined as a communications architecture in which the final connection to the subscriber's premises is a communication medium other than fiber.
The fiber communications path is terminated on the premises for the purpose of carrying communications for a single building with potentially multiple subscribers.

It is implicit that in order to be classified as FTTB, the fiber must at least enter the building, or terminate on an external wall of the building, or terminate no more than 2m from an external wall of the building, or enter at least one building within a cluster of buildings on the same property, or terminate on an external wall of one building within a cluster of buildings on the same property, or terminate no more than 2m from an external wall of one building within a cluster of buildings on the same property.

FTTB services may deliver just one application, but generally deliver several such as data, voice and video.

This FTTB definition excludes architectures where the optical fiber cable terminates in public space more than 2m from an external wall of one building (for example an operator's street-side cabinet) and where the access path continues to the subscriber over a physical medium other than optical fiber (for example copper loops, power cables, wireless and/or coax).

Fiber-to-the-Node (FTTN)

There are two technologies for delivering broadband: Fiber-to-the-node (FTTN) uses fiber to bring data to a node and uses copper to bring the data into the home. Fiber-to-the-home (FTTH) brings fiber all the way into the home.

Glossary of Terms (Continued)

Communications Architecture Definition

The cable plant, which connects the operators' premises and subscribers' premises, can be deployed in the following different topologies:

"Point-to-Point" (P2P, Pt-Pt, or PtP) cable plant provides optical fiber paths from a communication node to single premises such that the optical paths are dedicated to traffic to and from this single location. (Uninterrupted single fiber from last communication switching equipment-point to the premises.)

"Point-to-Multipoint" (P2MP) cable plant provides branching optical fiber paths from a communication node to more than one premises such that a portion of the optical paths are shared by traffic to and from multiple premises. In generic terms this is a tree topology.4

"Ring" cable plant provides a sequence of optical fiber paths in a closed loop that connects a series of more than one communication node.
Note that from these definitions it is not possible to identify the access protocol used over the cable plant.
It is possible for a network to be built so that a common cable plant can include a mix of different architectures, or be re-configured over time to support different architectures, to allow for mixed user categories, to allow access diversity for reliability, and for future flexibility and network longevity.

Premises, Subscriber "**Premises**" is defined as the subscriber's home or place of business. In a multi-dwelling unit5 each apartment is therefore counted as one premises.

"**Subscriber**" is a premises that is connected to an FTTH/B-network and uses at least one service on this connection under a commercial contract.

Network Size

The size of FTTH/FTTB Networks is described in the following terms:

The number of **"Homes Passed"** is the potential number of premises to which an operator has capability to connect in a service area, but the premises may or may not be connected to the network.6

This definition excludes premises that cannot be connected without further installation of substantial cable plant such as feeder and distribution cables (fiber) to reach the area in which a potential new subscriber is located.

The number of **"Homes Connected"** is the number of premises that are connected to an FTTH/FTTB-network.

With respect to a particular network, either FTTH or FTTB, the following three definitions are measures of network utilization and calculated as follows:

The "**Penetration Rate**" - "Homes Connected" divided by the number of premises in a served area.

The **"Take Rate"** - "Subscribers" divided by "Homes Connected" .7

The **"Connect Rate"** - "Homes Connected" divided by "Homes Passed"

FTTH/B Access Protocols Definition

Access Protocols are the methods of communication used by the equipment located at the ends of the optical paths to ensure reliable and effective transmission and reception of information over the optical paths. These protocols are defined in detail by the standards organizations that have created them, and are recognized and implemented by manufacturers around the world.

The Access Protocols in use today for FTTH Networks and the optical portion of FTTB Networks are:

"Active Ethernet" uses optical Ethernet switches to distribute the signal, thus incorporating the customers' premises and the central office into one giant switched Ethernet network.

"EFM" defined as Ethernet in the First Mile in IEEE 802.3ah **"EP2P"** defined as Ethernet over P2P in IEEE 802.3ah

"EPON" defined as Ethernet PON in IEEE802.3ah (Note that the expression Gigabit EPON is synonymous with EPON.)

"BPON" defined as Broadband PON in ITU-T Recommendation G.983 **"GPON"** defined as Gigabit PON in ITU-T Recommendation G.984

"GPON" (gigabit passive optical network) standard differs from other PON standards in that it achieves higher bandwidth and higher efficiency using larger, variable-length packets. GPON offers efficient packaging of user traffic, with frame segmentation allowing higher quality of service (QoS) for delay-sensitive voice and video communications traffic.

"OTHER" access protocols such as proprietary or pre-standard access protocols may be noted for the purpose of completeness in research.

Where a Passive Optical Network (PON) is defined as a point-to-multipoint, fiber to the premises network architecture in which unpowered optical splitters are used to enable a single optical fiber to serve multiple premises, typically 32-128. A PON consists of an Optical Line Terminal (OLT) at the service provider's central office and a number of Optical Network Terminals (ONTs) also called Optical Network Units (ONUs) at the premises

Other Network Services Protocols Definition

"Digital Subscriber Line (DSL)" Xdsl refers collectively to all types of digital subscriber lines, the two main categories being ADSL and SDSL. Two other types of xDSL technologies are High-data-rate DSL (HDSL) and Symmetric DSL (SDSL). DSL technologies use sophisticated modulation schemes to pack data onto copper wires. They are sometimes referred to as last-mile technologies because they are used only for connections from a telephone switching station to a home or office, not between switching stations. xDSL is similar to ISDN inasmuch as both operate over existing copper telephone lines (POTS) and both require the short runs to a central telephone office (usually less than 20,000 feet).

"High Definition Television (HDTV)" An improved television system that provides approximately twice the vertical and horizontal resolution of existing television standards. It also provides audio quality approaching that of compact discs.

"Interactive Video Data Service (IVDS)" A communication system, operating over a short distance that allows nearly instantaneous two-way responses by using a hand-held device at a fixed location. Viewer participation in game shows, distance learning and e-mail on computer networks are examples.

"Internet Protocol (IP)" pronounced as two separate letters. IP specifies the format of packets, also called data grams, and the addressing scheme. Most networks combine IP with a higher-level protocol called Transport Control Protocol (TCP), which establishes a virtual connection between a destination and a source.

"Internet Protocol television (IPTV)" is a system through which television services are delivered using the Internet Protocol Suite over a packet-switched network such as the Internet, instead of being delivered through traditional terrestrial, satellite signal, and cable television formats.
IPTV services may be classified into three main groups:

- live television, with or without interactivity related to the current TV show;
- time-shifted television: catch-up TV (replays a TV show that was broadcast hours or days ago), start-over TV (replays the current TV show from its beginning);
- video on demand (VOD): browse a catalog of videos, not related to TV programming.

IPTV is distinguished from Internet television by its on-going standardization process (e.g., European Telecommunications Standards Institute) and preferential deployment scenarios in subscriber-based telecommunications networks with high-speed access channels into end-user premises via set-top boxes or other customer-premises equipment.

"Multiprotocol Label Switching (MPLS)" is a mechanism in high-performance telecommunications networks that directs and carries data from one network node to the next with the help of labels. MPLS makes it easy to create "virtual links" between distant nodes. It can encapsulate packets of various network protocols.

"Session Initiation Protocol (SIP)" is an IETF-defined signaling protocol widely used for controlling communication sessions such as voice and video calls over Internet Protocol (IP). The protocol can be used for creating, modifying and terminating two-party (unicast) or multiparty (multicast) sessions. Sessions may consist of one or several media streams.
Other SIP applications include video conferencing, streaming multimedia distribution, instant messaging, presence information, file transfer and online games.

"Voice over Internet Protocol (VoIP)" is a method of transmission of voice or fax calls over the Internet.

Network Usage Definition

FTTH/FTTB Networks may be dedicated to the services of a single retail service provider, or made available to many retail service providers, who may connect to the network at the packet, wavelength or physical layer.

"Bandwidth" is the capacity of a telecom line to carry signals. The necessary bandwidth is the amount of spectrum required to transmit the signal without distortion or loss of information. FCC rules require suppression of the signal outside the band to prevent interference.

"Broadband" is a descriptive term for evolving digital technologies that provide consumers a signal switched facility offering integrated access to voice, high-speed data service, video-demand services, and interactive delivery services.

"Exclusive Access" refers to the situation where a single retail service provider (who may or may not be the network operator) has exclusive use of the FTTH network.

"Megabyte (MB)" a measure of amount of information used, for example, to quantify computer memory or storage capacity

"Megabits Per Second (Mbps)" is an abbreviation for megabits per second. It refers to data transfer speeds as measured in megabits.

"Open Access (Packet)" refers to the situation where multiple retail service providers may use the FTTH Network on an equable base by connecting at a packet layer interface and compete to offer their services to end users.

"Open Access (Wavelength)" refers to the situation where multiple retail or wholesale service providers may use the FTTH Network on an equable base by connecting at a wavelength layer interface and compete to offer their services.

"Open Access (Fiber)" refers to the situation where multiple retail or wholesale service providers may use the infrastructure by connecting at a physical layer ("dark" fiber) interface and compete to offer their services.

"Open Access (Duct)" refers to the situation where multiple retail or wholesale service providers may share the use of infrastructure covering a substantial region by drawing or blowing their fiber cables through the shared ducts, and compete to offer their services.

Services Definition

FTTH/FTTB Networks are used to deliver the following services;

"Indefeasible right of use (IRU)" is a contractual agreement between the operators of a communications cable, such as submarine communications cable or a fiber optic network and a client.
The IRU: shall mean the exclusive, unrestricted, and indefeasible right to use the relevant capacity (including equipment, fibers or capacity) for any legal purpose.

It refers to the bandwidth purchased after the submarine cable system has sealed the Construction and Maintenance Agreement (C&MA) among the owners or after the system came into service and where the unowned capacity is available. IRU may also be purchased from the existing owner.

The right of use is indefeasible, so as the capacity purchased is also unreturnable and maintenance cost incurred becomes payable and irrefusable. "IRU user" can unconditionally and exclusively uses the relevant capacity of the "IRU grantor's" fiber network for the specified time period.

"Internet/Data" refers to use of the Public Internet for exchanging email, web- browsing, etc..

"Voice" refers to the exchange of human bi-directional, real time, full-duplex conversations by use of **"IP"** or **"Other"** encoding and transport protocols. (This category does not include Voice carried over the Public Internet.)

"Video" refers to the exchange of visual material by use of **"IP" (IPTV), "RF"** (carried via a separate optical wavelength, overlay video) or **"Other"** encoding and transport protocols. (This category does not include Video carried over the Public Internet.) Applications other than those listed above are categorized as **"Other"**.

"Quality of Service (QoS)" In the field of computer networking and other packet-switched telecommunication networks, the traffic engineering term quality of service (QoS) refers to resource reservation control mechanisms rather than the achieved service quality. Quality of service is the ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance to a data flow. For example, a required bit rate, delay, jitter, packet dropping probability and/or bit error rate may be guaranteed. Quality of service guarantees are important if the network capacity is insufficient, especially for real-time streaming multimedia applications such as voice over IP, online games and IPTV, since these often require fixed bit rate and are delay sensitive, and in networks where the capacity is a limited resource, for example in cellular data communication.

"UNIVERSAL SERVICE" The financial mechanism that helps compensate telephone companies or other communications entities for providing access to telecommunications services at reasonable and affordable rates throughout the country, including rural, insular and high costs areas, and to public institutions. Companies, not consumers, are required by law to contribute to this fund. The law does not prohibit companies from passing this charge on to customers.

Glossary of Terms (Continued)

Service Provider Definitions

"Aggregator" Any person or business that, in the normal course of business, provides a public telephone for the use of patrons through an Operator Service Provider (OSP).

"Common Carrier" The term used to describe a telephone company. It is a telecommunications company that is available for hire on a nondiscriminatory basis to provide communication transmission services, such as telephone and telegraph, to the public.

"Competitive Access Providers" Common carriers who provide local service and compete against local telephone companies' access services that connect customers to long distance companies. These carriers often use fiber optic networks.

"Enhanced Service Providers" A for-profit business that offers to transmit voice and data messages and simultaneously adds value to the messages it transmits. Examples include telephone answering services, alarm/security companies and transaction processing companies.

"Internet Service Provider (ISP)" A company that provides access to the Internet. For a monthly fee, the service provider gives you a software package, username, password and access phone number. Equipped with a modem, you can then log on to the Internet and browse the World Wide Web and USENET, and send and receive e-mail.

"Non-governmental organization, or NGO", is a legally constituted organization created by natural or legal persons that operates independently from any government. The term originated from the United Nations (UN), and is normally used to refer to organizations that do not form part of the government and are not conventional for-profit business. In the cases in which NGOs are funded totally or partially by governments, the NGO maintains its non-governmental status by excluding government representatives from membership in the organization. The term is usually applied only to organizations that pursue some wider social aim that has political aspects, but that are not overtly political organizations such as political parties. Unlike the term "intergovernmental organization", the term "non-governmental organization" has no generally agreed legal definition. In many jurisdictions, these types of organization are called "civil society organizations" or referred to by other names.

"Regional Bell Operating Company (RBOC)" Any one of the seven local telephone companies
Created in 1984 as part of the break-up of AT&T. The RBOCs are Ameritech, Bell Atlantic, Bell South, NYNEX, Pacific Telesis Group, Southwestern Bell, and U. S. West.

"Resale Carrier or Reseller" A carrier that does not own transmission facilities, but obtains communications services from another carrier for resale to the public for a profit.

"Service Provider" A telecommunications provider that owns circuit switching equipment.

Glossary of Terms (Continued)

Business Model Definitions

"Vertical Integration" The involvement of cable systems in other links of the video distribution chain, such as program production and supply.

"Passive Sharing" This model leverages a single passive infrastructure, which is built and maintained by one owner. The active and services layers are owned by a different organization. A second service provider may share the same passive infrastructure with the first service provider, but will still have to invest in active network equipment and operations, as well as the services and go-to-market activities. Typically, this model goes hand-in-hand with regulatory requirements for passive wholesaling. This model typically results in long term capital leasing (5, 10, 15 or 20 years) of fiber and facilities that are often referred to as an Indefeasible Right to Use (IRU).

"Active Sharing" In the active sharing model a single organization owns the passive infrastructure and operates the active network. This vertical infrastructure owner wholesales broadband access to the various retail service providers who will then compete against each other for customers. The regulatory framework associated with this operator model regulates active wholesale specifically, and seeks to encourage service competition.

"Full Separation" Full separation, as was already mentioned above, partitions the ownership of the different layers. A different player, owns each layer with the infrastructure owner generating income by providing passive infrastructure access to the network operator, who in turn wholesales broadband access to retail service providers. This model stimulates competition at the services level and goes hand in hand with regulatory requirements for passive and active wholesaling.