

# Making Cents of it All

## Costs/Key Drivers for Profitable FTTH

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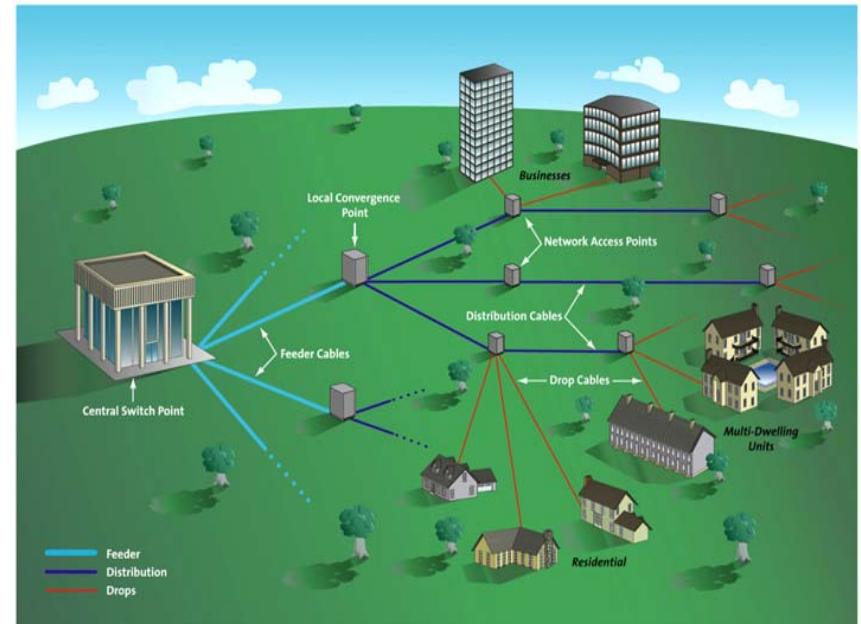
# Agenda

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- Background
  - FTTH drivers and activity in the US
- Network costs and options
  - Network Equipment
  - Engineering & Project Management
  - Outside Plant
  - Head End
  - Central Office
- Operating Expense
- Profitability
  - Drivers for success

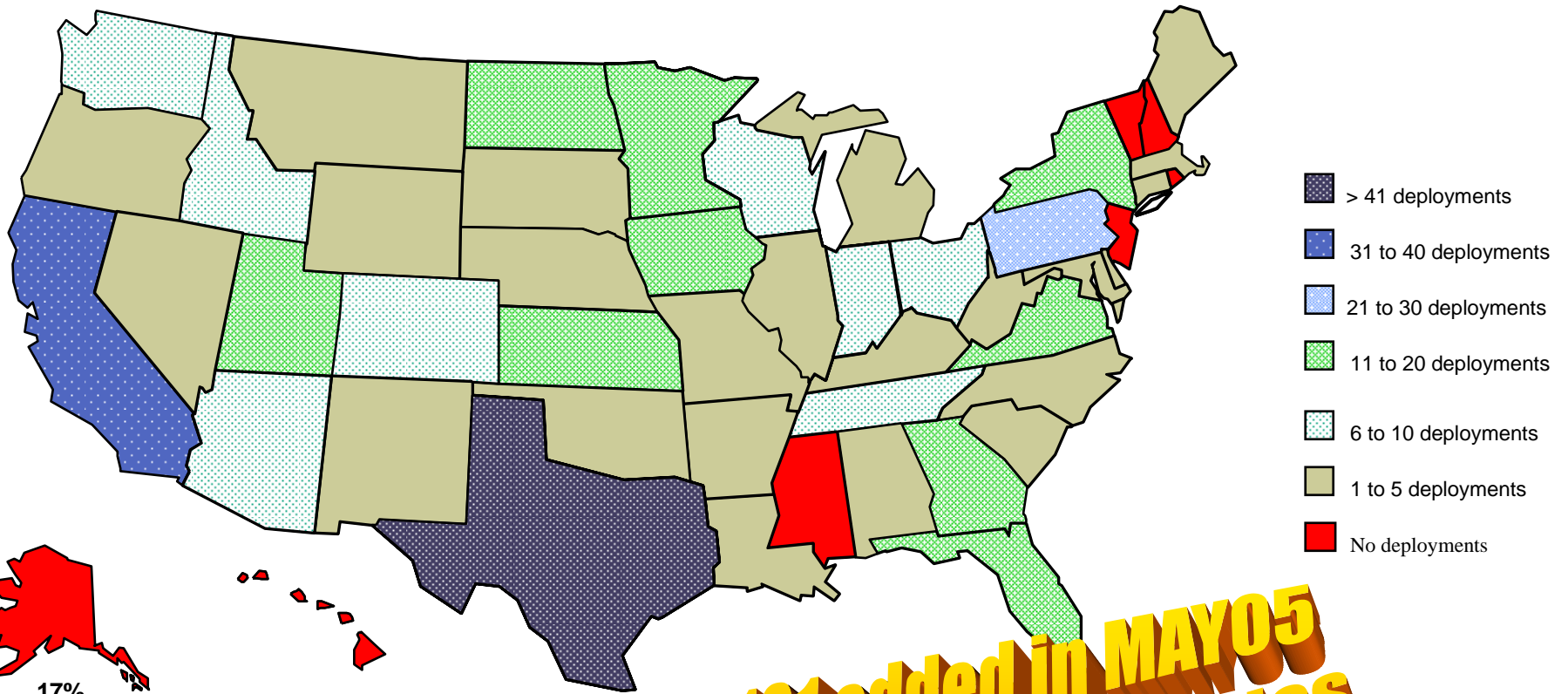
# Access Market Drivers

- **Emerging bandwidth-intensive applications and services**
- **Increasingly limited capacity of traditional networks**
- **Continuing innovations and cost reductions in optical infrastructure and active equipment**
- **Ability to leverage existing infrastructure to capture incremental revenues and an accelerated ROI**
- **Broadband viewed by governments as tool for national competition**



# FTTH overview

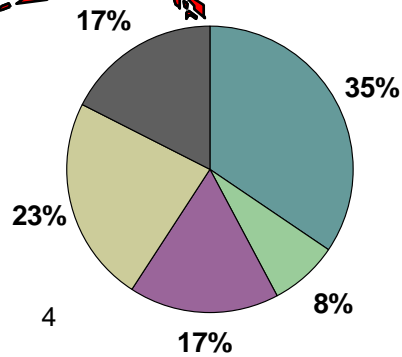
## List of Lit 'US Optical Fiber Communities'\*



**181 added in MAY05**  
**398 total in 43 States**

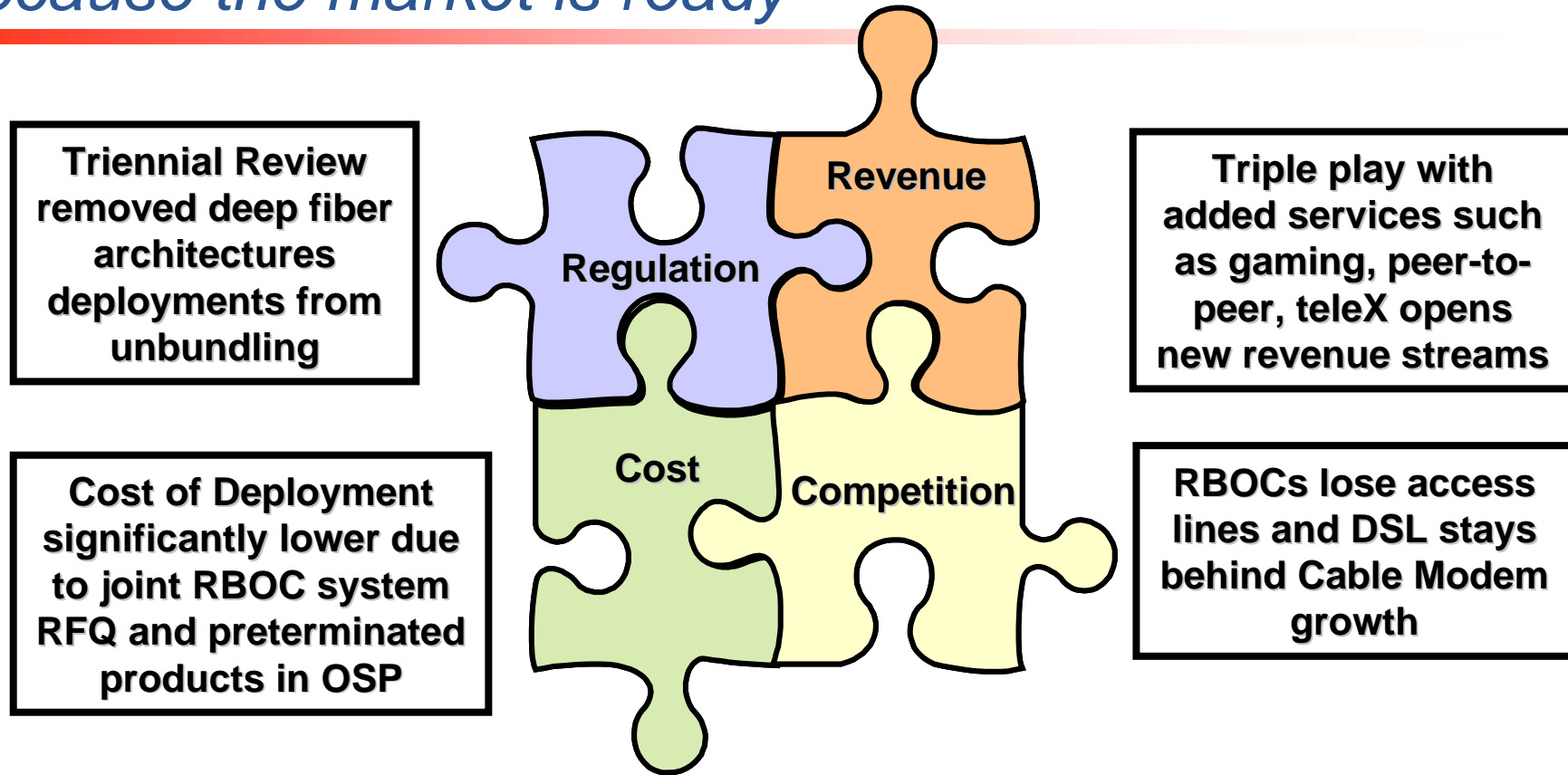
FTTH Conference  
 04OCT05

Source: Render, Vanderslice & Associates

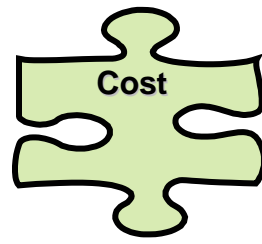


# Why is FTTH Becoming a Reality in the US?

*Because the market is ready*



**The three natural market drivers, combined with the removal of the regulatory barrier, make FTTH an attractive wireline business**

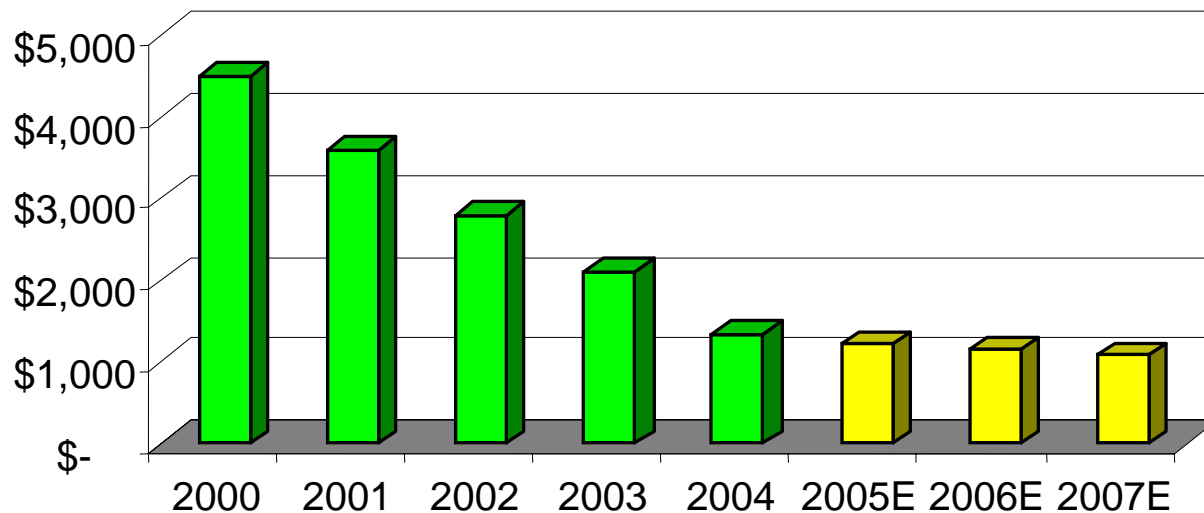


# FTTH in the US

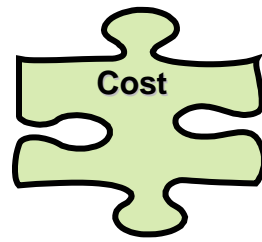
## *Homes Connected Cost*

- FTTH network deployment CAPEX costs have significantly decreased
  - Cost decreases include actives, passives and labor/installation
  - Today a proven FTTH business case can be made for greenfield deployments
- OPEX savings coupled with increased revenue opportunities for fiber based networks makes for a compelling FTTH business case

### Approximate Cost of FTTH per Home Connected



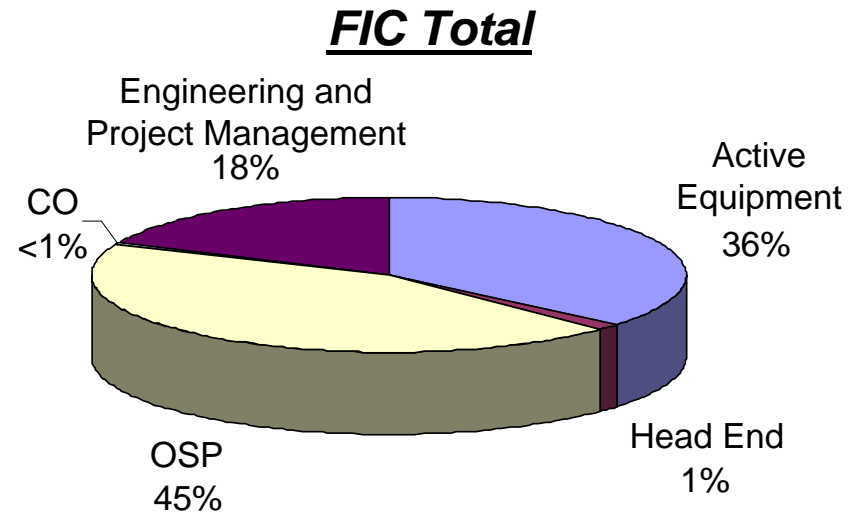
Source: Render, Vanderslice & Associates, KMI, External  
Company Reports, Corning Analysis



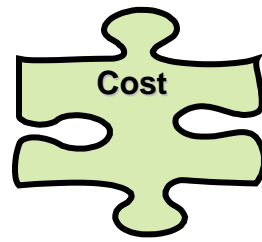
# Corning Business Case Model

## Details and Output

- Modeled US city demographics
  - 130k population
  - Similar to Alexandria, VA; Flint, MI; Naperville, IL; Sunnyvale, CA
  - ~29k residences and 2.4k businesses
  - 36-sq miles city footprint
- Network Details
  - Municipality PON overbuild
  - 3-yrs to build
    - No existing equipment present
    - 70% aerial, 30% buried
  - Max penetration rate is 70% in 3 yrs
  - Offering IP voice, data & video
    - Build complete Head End



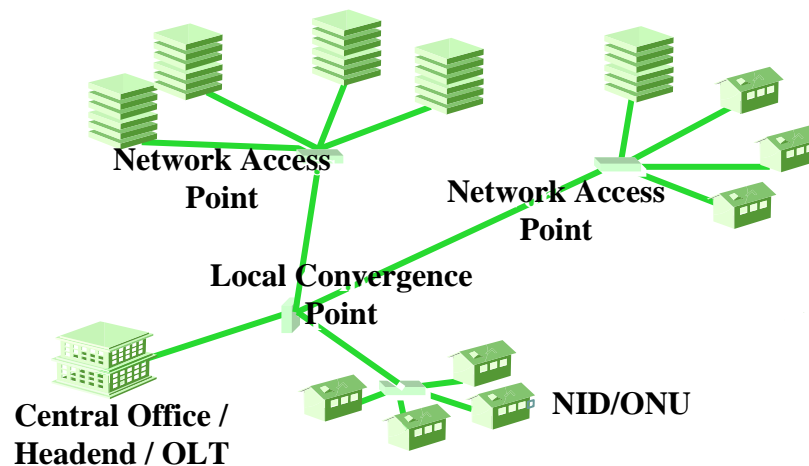
<b>Category</b>	<b>Cost (\$M)</b>
OSP	\$ 29.8
Equipment	\$ 24.4
Head End	\$ 0.9
CO	\$ 0.3
Engr & PM	\$ 12.2
<b>Total</b>	<b>\$ 67.6</b>

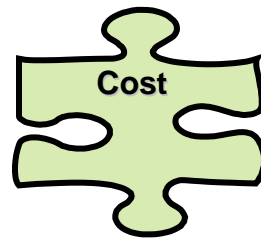


# Network Costs

- Network Equipment (36% of Total Cost)
  - Equipment prices are falling as FTTH deployments grow; industry scaled
  - Many new suppliers and architecture options
- Engineering and Project Management (18% of Total Cost)
  - Widely dependent on partner, reputation, expertise, experience
  - Can be shifted or reduced depending on in-house capabilities

## Passive Optical Network

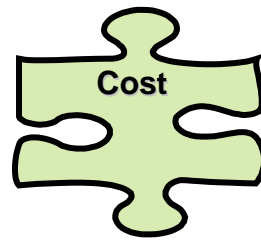




# Network Costs

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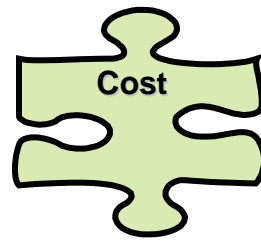
- **Outside Plant - OSP (45% of Total Cost)**
  - Includes labor and passive components
    - Labor is 86% of OSP
    - Passive products are 16% of OSP
- **Head End (1% of Total Cost)**
  - Required to receive CATV satellite signals
- **Central Office (<1% of Total Cost)**
  - Can build new or refurbish existing building
  - Protects equipment from environment
  - Provides backup power



# Impact of Community Size on Costs

- Most categories change proportionally with community size
  - True for OSP, Network Equipment, Engineering & Project Management
- Cost of the Head End and Central Office are mostly fixed
  - Cost can be challenging to small communities

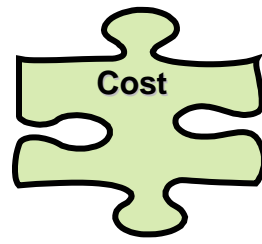
<b>Subscribers</b>	<b>Head End Cost/Sub</b>	<b>Central Office Cost/Sub</b>	<b>Total Cost/Sub</b>	<b>% of Build</b>
50,000	\$ 20	\$ 6	\$ 26	1%
30,000	\$ 33	\$ 10	\$ 43	2%
10,000	\$ 100	\$ 11	\$ 111	5%
5,000	\$ 200	\$ 22	\$ 222	9%
1,000	\$1,000	\$ 97	\$1,097	28%



# Labor Cost Breakdown

- **Distribution and Drop network make up the majority of labor costs**
  - Feeder cable
    - A few high fiber count cables, fibers shared over many subscribers
    - Mass fusion spliced
  - Distribution cables
    - Many lower fiber count cables, individual fiber/fibers for each home
    - Single fusion spliced
  - Drop Cables
    - One for every subscriber
    - Spliced at the NAP and at the NID

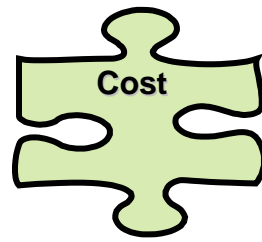
<b>Part of Network</b>	<b>OSP Labor Cost</b>
Feeder	4%
Distribution	69%
<u>Drop</u>	<u>27%</u>
Total	100%



# OSP Labor Costs

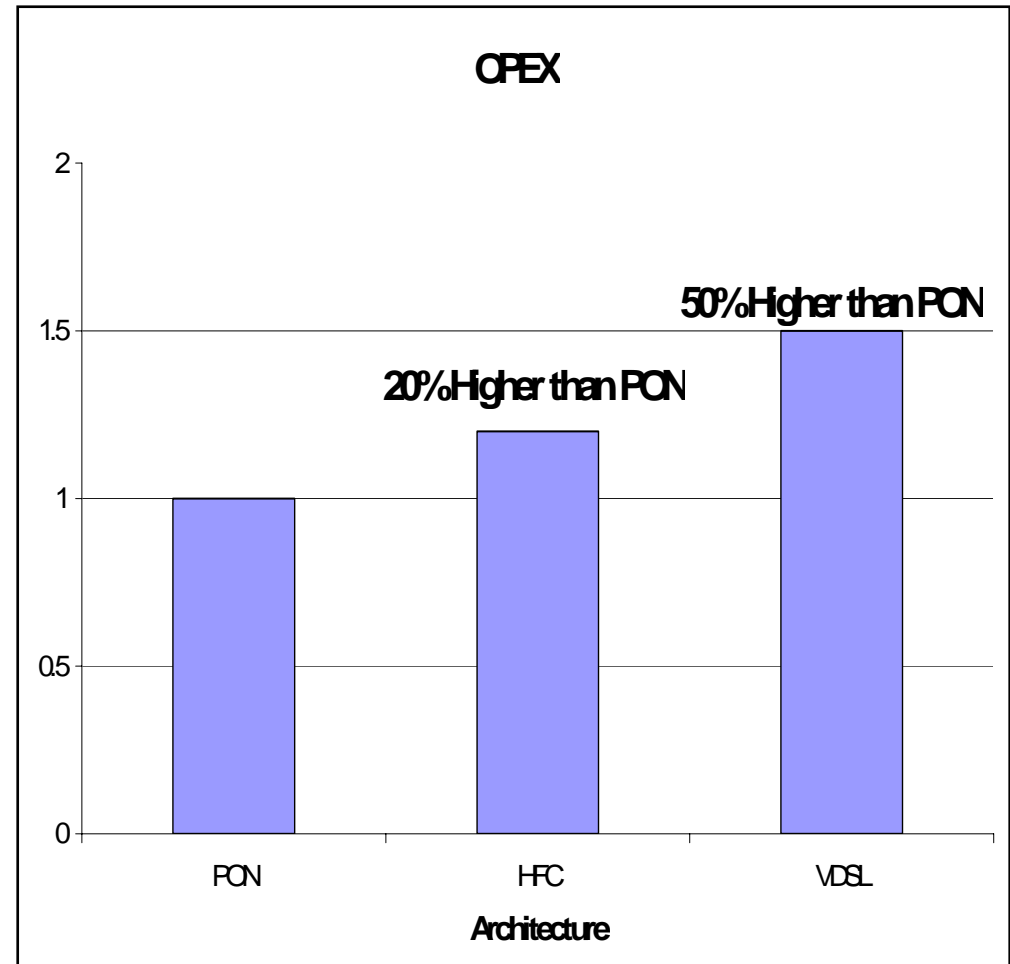
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- New innovations are addressing labor costs
  - Focus is on the Distribution and Drop
- Drop
  - Preterminated terminals, drop cables and NIDs significantly reduce labor costs
    - Using lower labor rate workers and quicker to install
- Distribution
  - Terminal Distribution Systems
  - Reduces splicing time
  - Increases rate of deployment
- Improved fiber types are increasing network flexibility



# OPEX

- **Cost to operate the network**
  - Staff
  - Network Maintenance and Promotion
  - Office Related Expenditures
  - Tools & Vehicles
  - Power for CO/HE
  - Truck Roll Repairs
- **Largest factors are employees**
  - Grows with changing wages and adding people to support growing network
- **OPEX = Significant FTTH advantage**
  - Less actives in field require less servicing → less people → decreased OPEX
  - PON has a significant advantage over VDSL and HFC





# Profitability

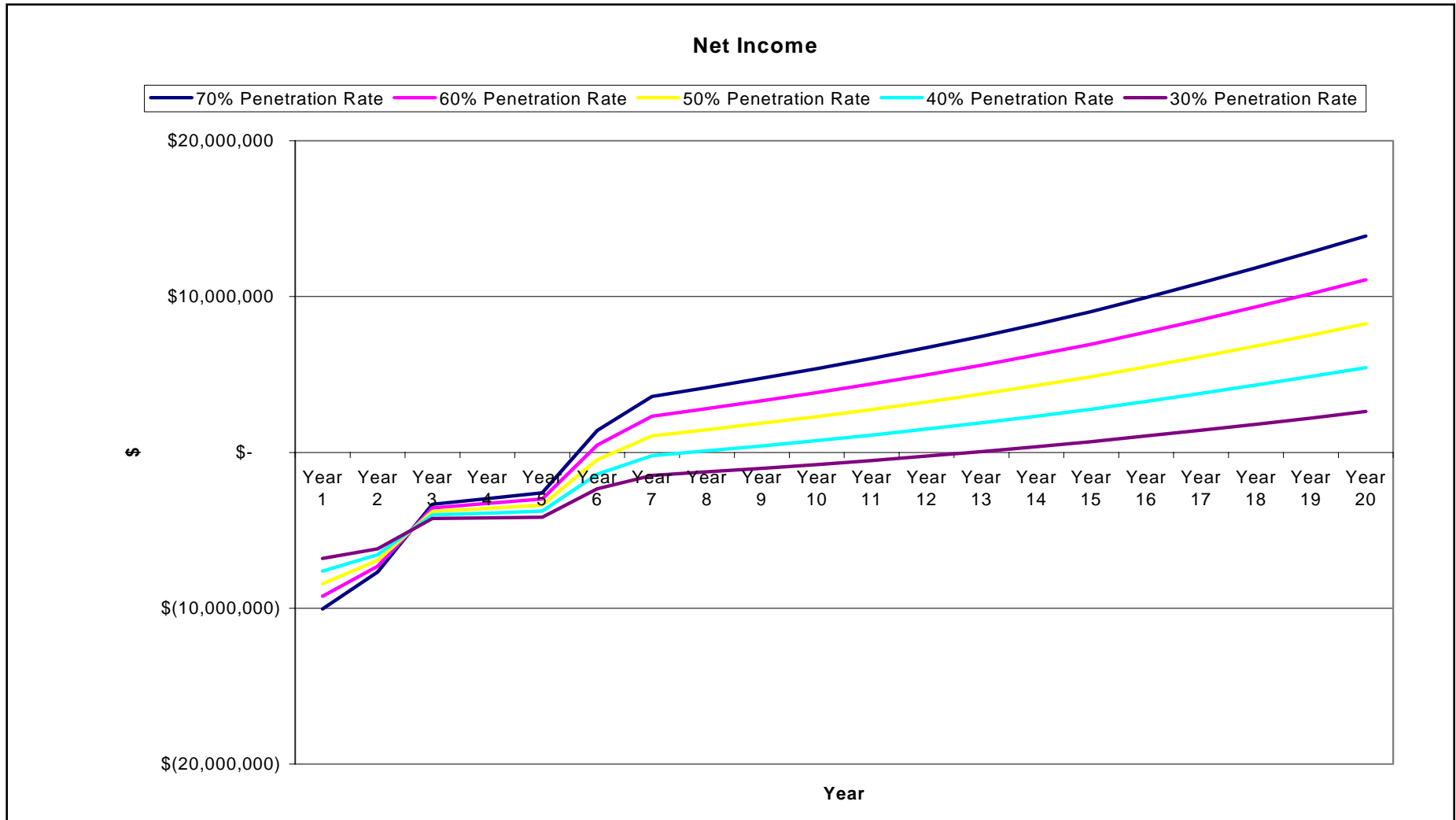
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$$\text{Net Income} = \text{Revenues} - \text{OPEX} - \text{Depreciation} - \text{Interest} - \text{Taxes}$$

- **Biggest factors include**
  - Revenues and OPEX
- **Revenues are influenced by**
  - Penetration rate
- **Penetration rate**
  - Leading services (HSD, Voice, HDTV, VOD, PVR, Home Security, + new ones)
  - Prices ( One bill, bundled service discount, competitive price)
  - Sales & Marketing
  - Customer Service
- **Penetration rates vary greatly**
  - 33% if in high competitive areas with 2 existing players
  - 100% in some home developments



# Impact of Penetration Rate on Profitability



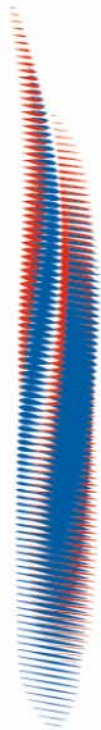
# Making Cents of it All...

## *Summary*

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- **Broadband applications continue to grow at a rapid pace**
  - New infrastructure is required to meet bandwidth needs
  - FTTH emerging as a viable option
  - Municipal governments see the possession of a robust broadband network as critical to economic development
- **FTTH economics**
  - Labor is the largest component of FIC
    - Pre-Connectorized NAPs, NIDs, drop cables and FITS can significantly reduce labor by saving time and using less skilled labor
  - Enables significant OPEX savings
  - 30% penetration rate is typical break even point

***Bottom Line: FTTP provides a path to increased revenue, competitive leverage and decreased network OPEX***



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