



Telecommunications Strategic Planning Collaboration

A partnership between Oncor and Alcatel-Lucent

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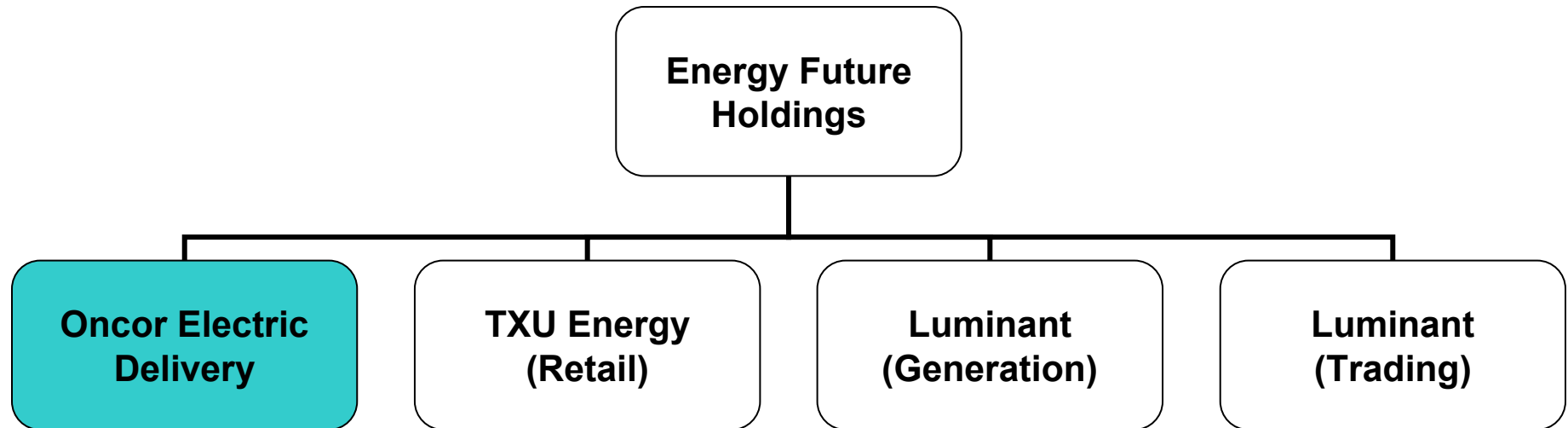
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Presentation Topics

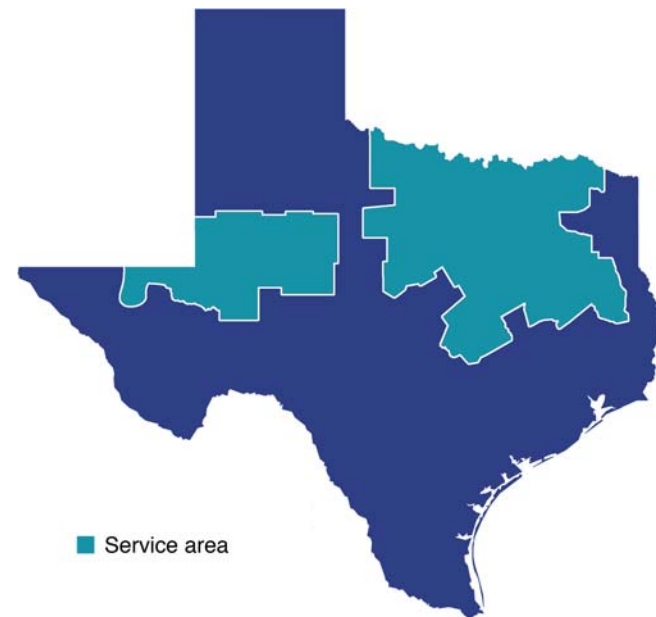


- **Who is Oncor?**
- **Current State Challenges**
- **Planning for the Future**
- **Key Results were Surprising!**
- **Questions and Answers**

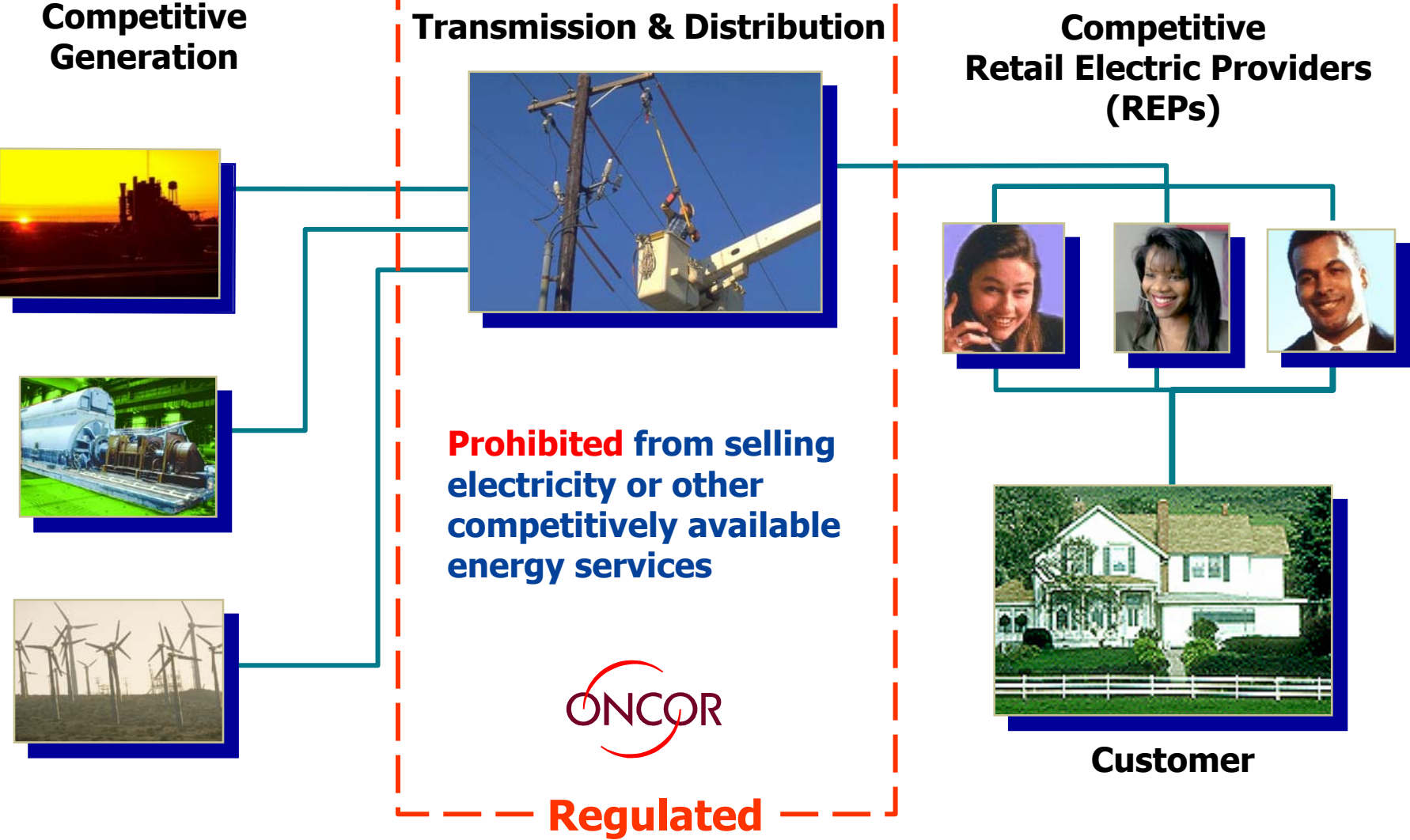
Who is Oncor Electric Delivery?



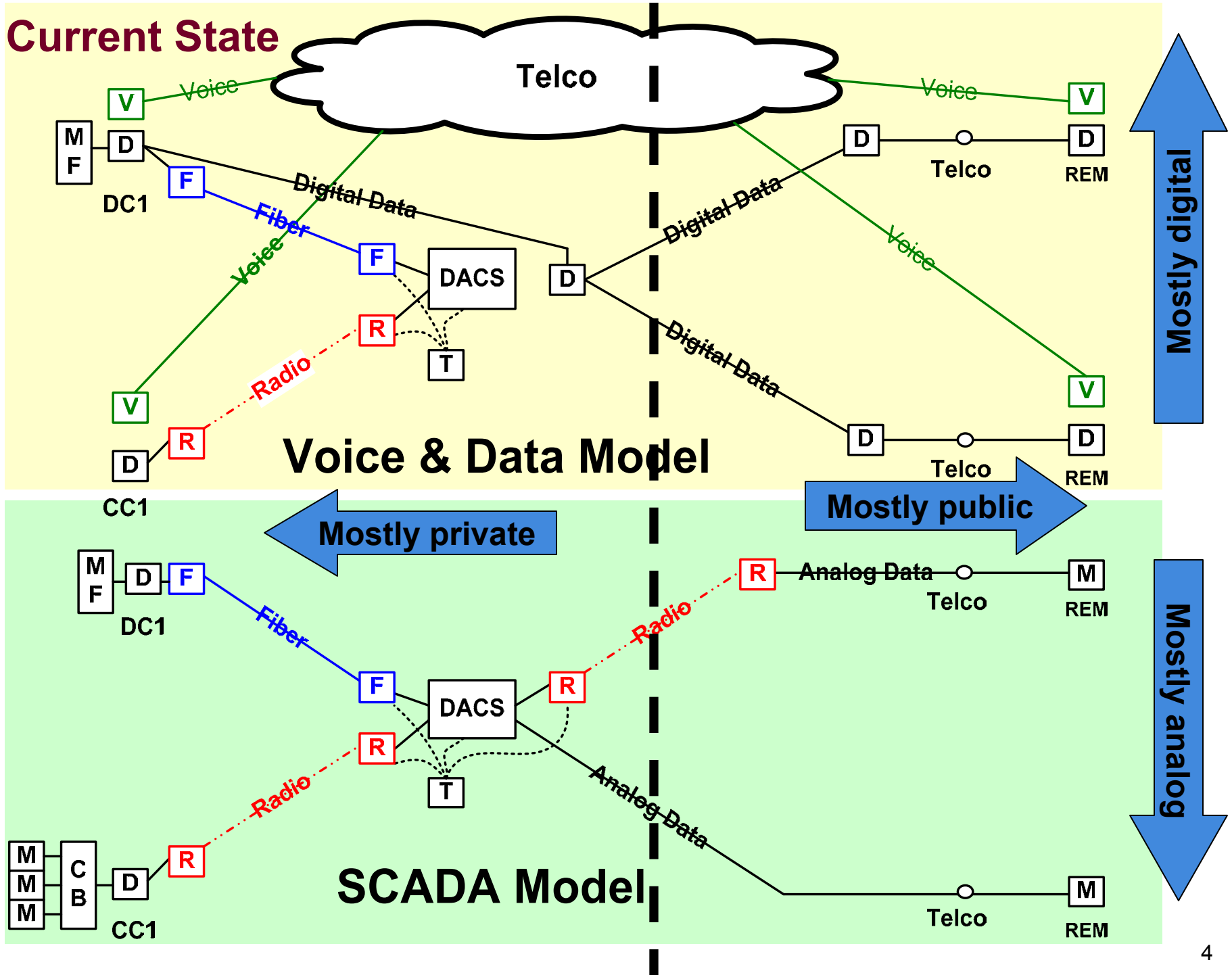
- **“Wires”** company in Texas electric market
- **3.1 million** electric meters
- **~115k miles** of T&D lines
- **6th** largest T&D company in US
- **Serve ~65 Competitive Retailers**
- **Regulated by Texas PUC**



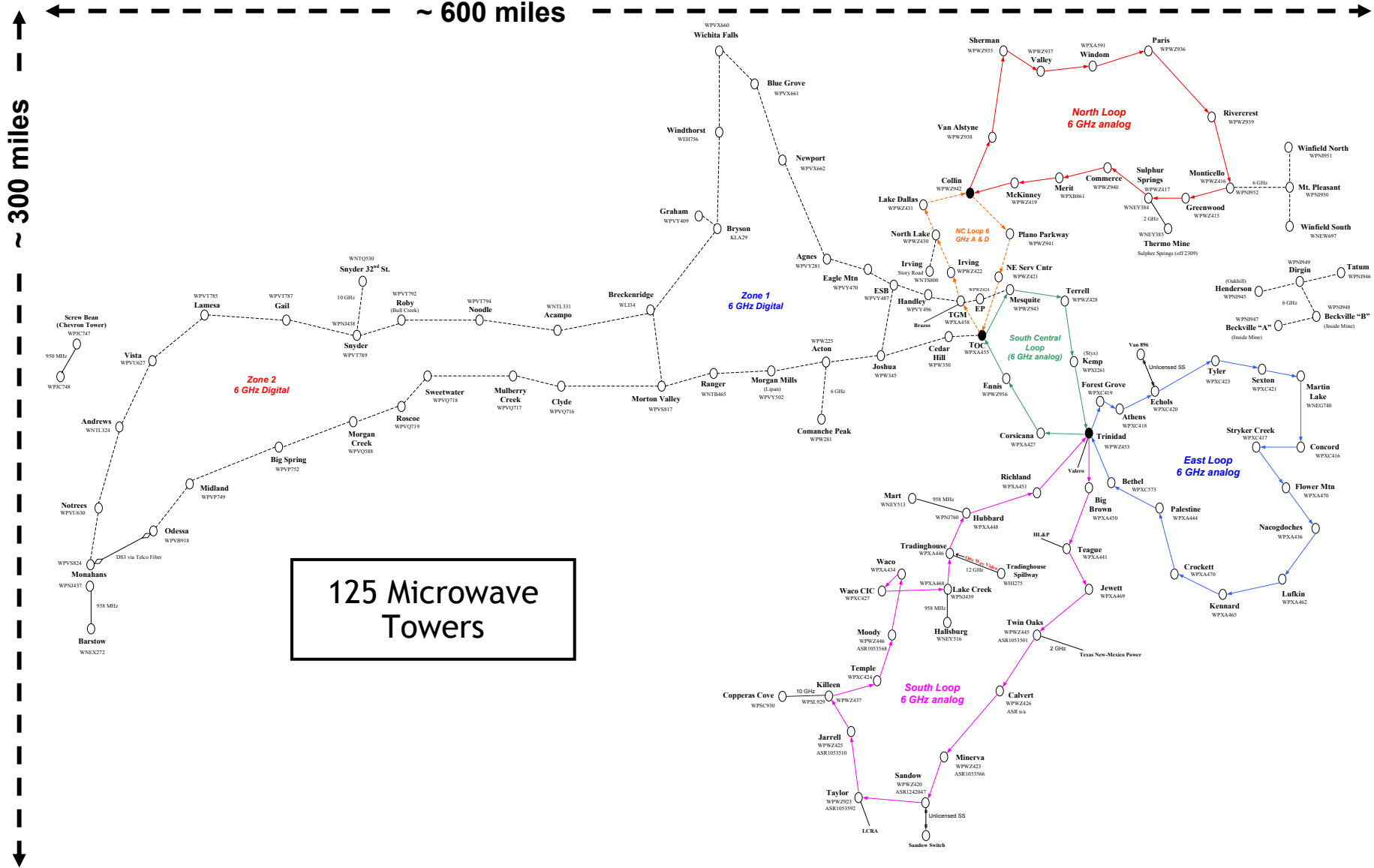
Restructured Electric Industry in Texas



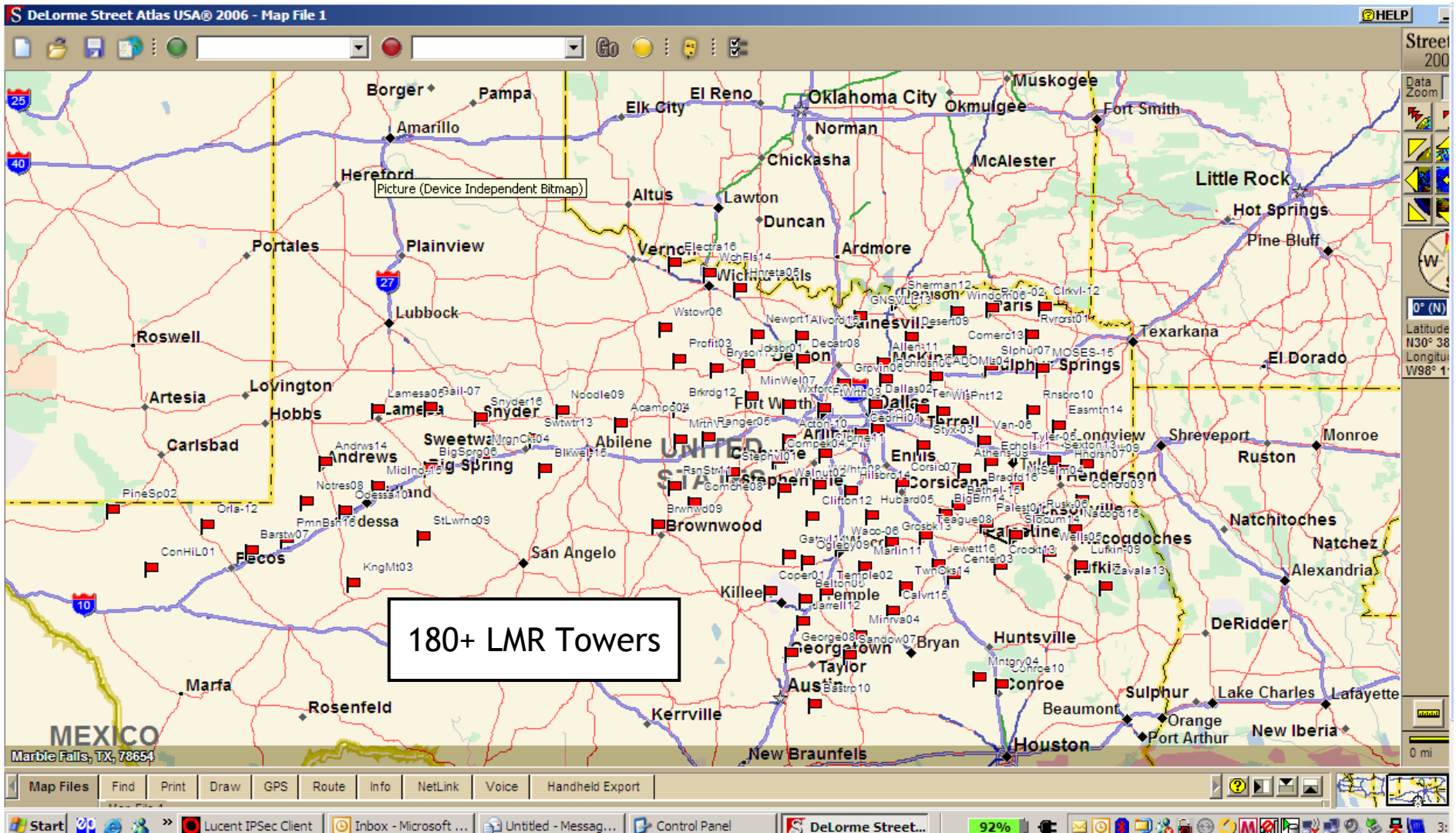
Current State



Oncor's Microwave - Architecture Overview



896 MHz LMR Two-way Radio System



Challenges facing Oncor in 2007



- Legacy network systems (fiber, microwave, two-way radio, voice, data) were at or approaching **end-of-life**
 - Increasing costs for on-going operations and maintenance
 - Decreasing reliability for critical systems, increasing risks
- Little coordinated telecommunications decision making or spending control
- **AMS** (Advanced Metering System) and **SmartGrid** efforts beginning
- Increasing movement to **IP digital** communications across Oncor
- Need to **separate** Oncor from competitive affiliates (TXU Energy and Luminant)
- Increasing default dependence upon **public networks**
- Need to position the network infrastructure to meet the *NERC “Implementation Plan for Cyber Security Standards CIP-002-1 through CIP-009-1”*
- **No overall telecommunications strategy was in place**

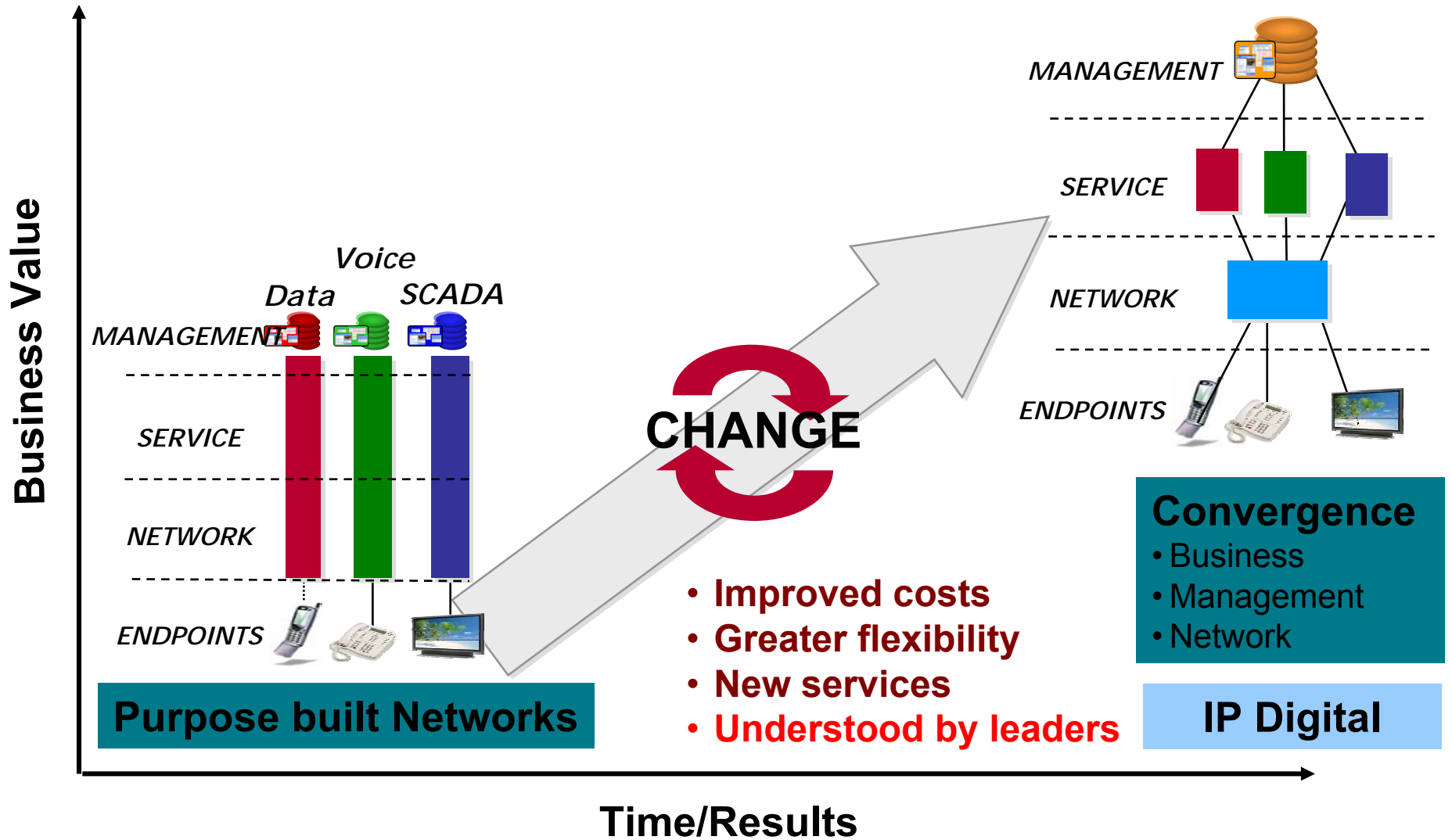


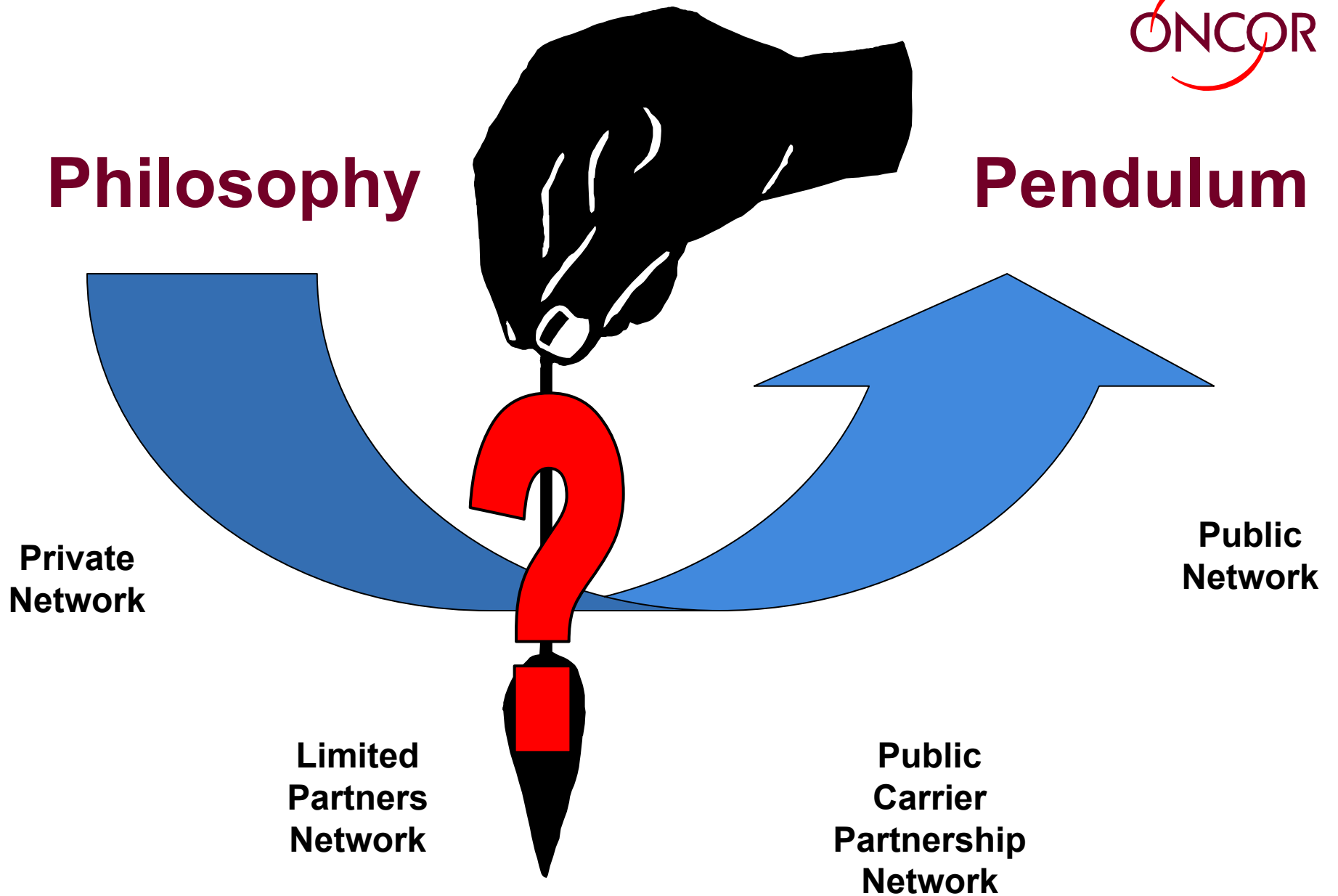
Oncor reached out to Alcatel-Lucent for help in addressing our telecommunications challenges

Why?

- Significant industry presence and breadth across telecommunications
- Depth of knowledge of both telecom and utility industries globally
- Professional consulting practice plus equipment and systems leadership
- Close relationship with Oncor, knowledge of our telecom infrastructure

Current State challenge: Converged Networking





Oncor's Prevailing Assumption Set



Public carriers have attractive advantages over a private Oncor network

- Lower cost to implement
- Frequent opportunity for technology refresh
- Expanding competition to drive down prices
- Voice/data convergence
- Private network more costly to maintain
- Oncor slow to adopt new technologies in their private network
- New technology requires maintenance of internal skills foreign to Oncor

Public carriers do have some disadvantages

- May be less reliable under certain conditions
- May not have coverage in all Oncor areas
- Private networks offer greater Oncor control and makes it possible to cover service territory with a single approach

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Surprised? We certainly were!

Telecom Strategy – Key Deliverables



Utility Telecom Operational Requirements

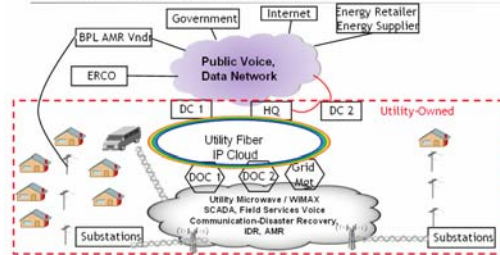
Meetings held with individual departments collected information on the present operational requirements. The details gathered in these sessions provided us with an initial base of information which we compiled into a set of requirements applicable to each group.

- Voice Communications**
 - Enterprise Voice
 - Customer Call Center
 - Backup/Overflow Call Center
 - Business to Business Communications
 - Call Center ACD (Utility Local)
 - Satellite Voice
 - GETS Service
 - Wireless Priority Service
- Data Connectivity**
 - Secure Connectivity to BPL Provider
 - Enterprise Core Network
- External Business/Government Communications**
 - ERCO EDI
 - ERCO Grid (Communications Relations)
 - Military Communications
 - Retailer Communications
 - Market Communications
- Measurements and Metering**
 - Meters Wireless Data
 - Meters Wireless Telephony
 - Meters PTT Multi-cast and Broadcast Voice
 - Fleet Tracking
 - Employee Paging
 - eMeter Access
- External Public Communications**
 - Media Communications
 - Public Health Communications
 - Public Critical Communications
 - Broadcast eMail from DOCS
 - Customer Web Portal
- Field Operations**
 - Field Ops Wireless Telephony
 - Field Ops Wireless Dispatch (Data)
 - Field Ops PTT Multi-cast and Broadcast Voice
 - Fleet Tracking
 - Employee Paging
- Power System Management**
 - Secure Power Management Network
 - Transmission SCADA Access
 - Distribution SCADA Access
 - Substation Wireless Meter Data Backhaul
 - Secure Connectivity to Substation Wireless SP
 - Substation BPL Meter Reading
 - Substation BPL Data Backhaul

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✓ **Telecom operational requirements assessed**

Utility Architecture Overview (FMO) Private

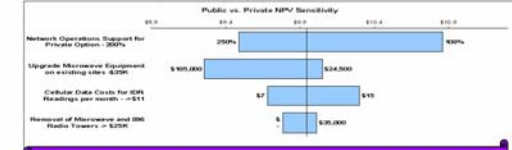
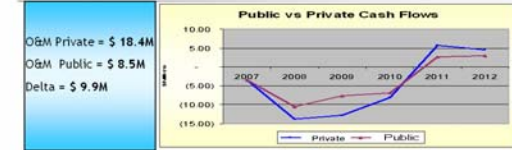


Network Edge = Private WiMAX; Backhaul = MicroWave; Core = Fiber

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✓ **Technology and support options evaluated**

Sensitivity on Difference in NPV 2007-2012

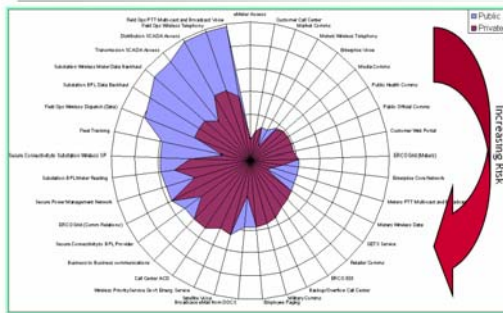


Private delivers better NPV because it results in lower O&M expense

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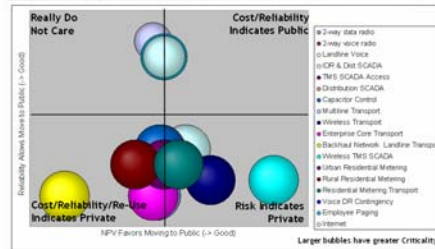
✓ **Economic forecast performed**

Public vs. Private Risk Analysis



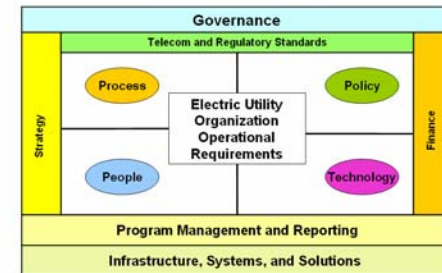
✓ **Risks and Mitigation Strategies analyzed**

Overall Scoring by Service, Scenario, Cost, & Re-Use



✓ **Strategic Approaches Scored**

Telecommunications Governance Program



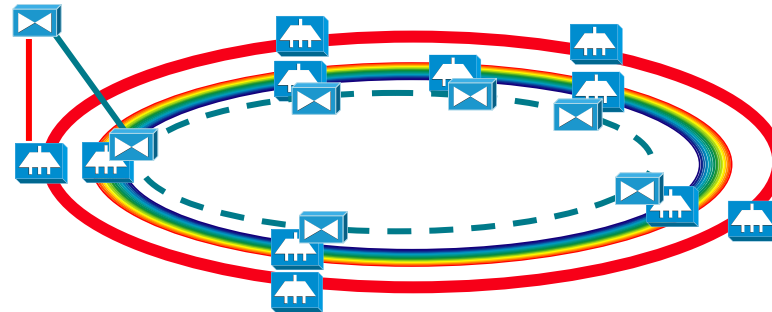
✓ **Telecom Governance Model Developed**

✓ **Alcatel-Lucent is providing value to Oncor by combining its deep knowledge of wireline and wireless networking technologies with its business acumen in understanding the challenges and opportunities faced by Oncor**

Physical Network Layers

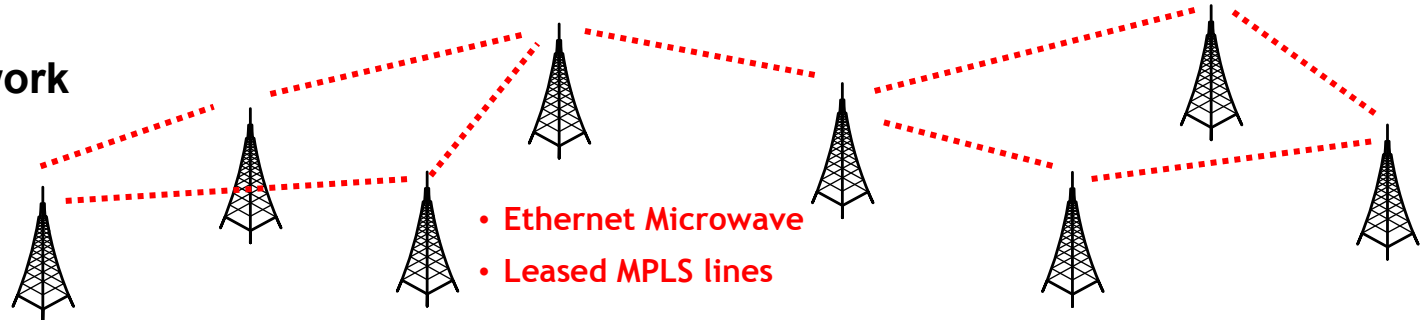


Core Network



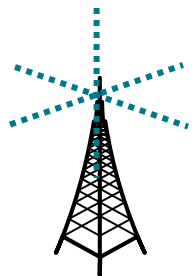
• CWDM / MPLS Ring

Backhaul Network



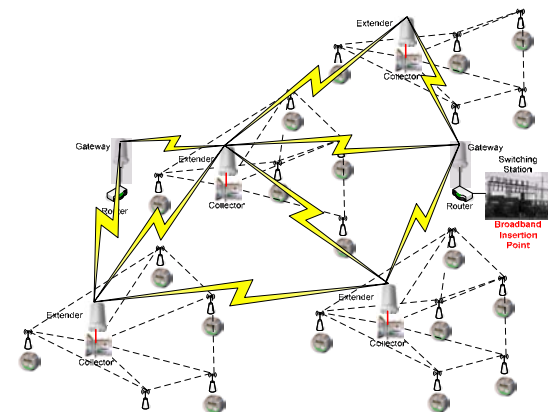
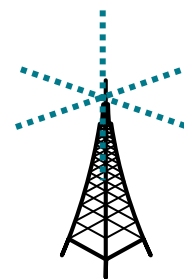
• Ethernet Microwave
• Leased MPLS lines

Access Network



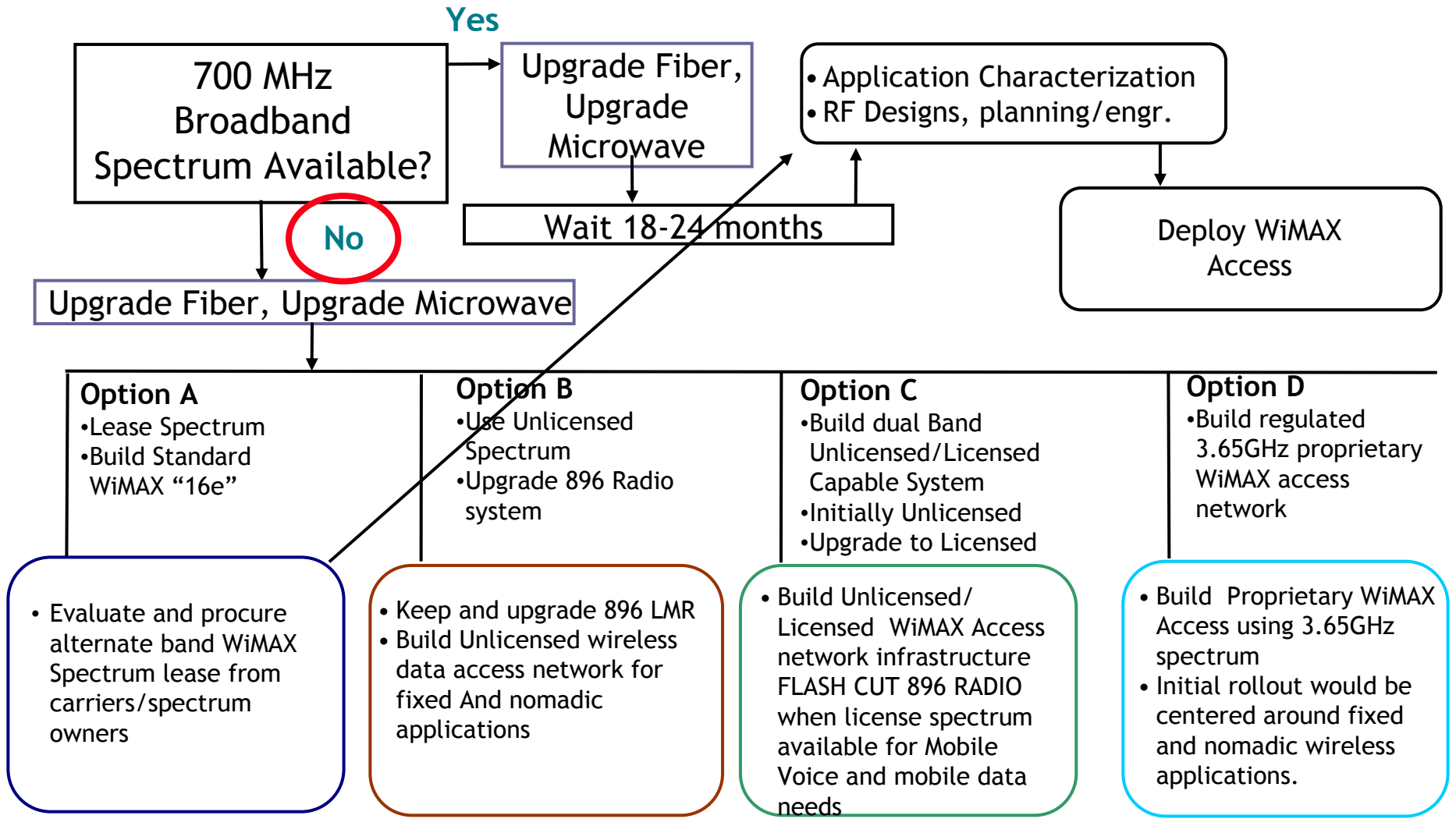
RF private wireless network several options:

- WiMAX
- RF Narrowband
- Public Safety/Utility partnership



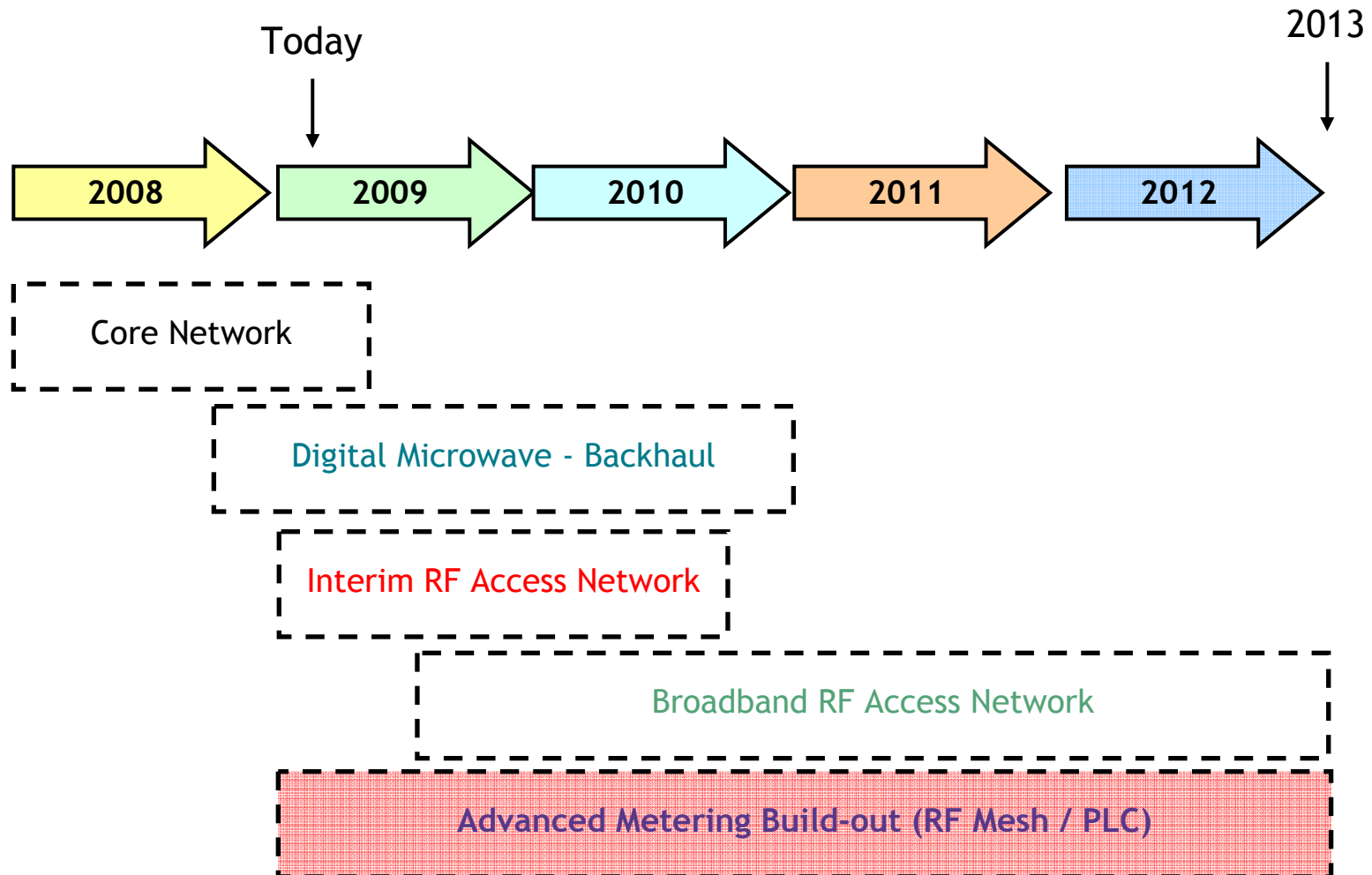
RF Mesh Network

Strategy Output Example: Decision Tree



Regardless of path, 1st Step is to Upgrade Fiber and Microwave Networks

Five Year Timeline – Integrated Communication System Build-outs



Key Lessons Learned



- **Core Network refresh is now nearing completion**
 - **Construction projects must be carefully planned and closely managed**
 - **New technologies require new skills (CWDM / MPLS)**
 - **Work doesn't end with fiber transport, refresh key network elements too**
 - **Expect the unexpected during project completion!**
- **Oncor is changing and internal culture must be brought along**
 - **Traditional electric delivery business is growing more telecom dependent**
 - **Delivery of energy and energy related information to the market participants**
 - **Oncor IS a telecommunications company too!**
- **No strategy IS a default strategy, you aren't managing your journey**



Thank you!