Tacoma Power

Undergrounding Existing Overhead Electric Facilities

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The challenge

Some City officials prefer the aesthetics of an underground electric system and believe it contributes to economic development

Some would like Tacoma Power to contribute beyond the residential LID program to the undergrounding of commercial overhead infrastructure

How can Tacoma Power be appropriately responsive?

Why this is hard

1. **Undergrounding is expensive for the utility**
   - Nation-wide rule of thumb – double electric residential rates for full T&D undergrounding
2. **Undergrounding is expensive for the individual property owner**
   - Typical residential service connection – around $7k
   - Typical commercial – around $15 to $20k
3. **Putting the electric lines underground isn't enough**
   - Poles have other uses; namely telecommunications
4. **There are equity issues; deciding who pays is difficult**

Recommendations

1. TPU adopt a policy to Co-fund Commercial Projects contingent on City of Tacoma actions:
   - Commercial Local Improvement Districts (LIDs) – Tacoma Power pays 20% of conversion costs for utility lines; customers pay 100% of converting their service to the meter
   - City of Tacoma requires customers in the LID to convert their service connection
   - City of Tacoma requires other utilities (telecom) in the LID to convert to underground
2. TPU work with the City to target a geographic area for undergrounding with separate rates:
   - Specific areas (such as downtown) may elect to have a rate adder to recover utility undergrounding costs
   - City requires customers in the area to convert their service connection at their expense
   - City requires other utilities (telecom) in the area to convert to underground
3. TPU investigate feasibility of a loan program for customer service connections
   - Security for loans will be a challenge

Current practice

Within Tacoma:

- **Residential Local Improvement Districts (LIDs) – Tacoma Power pays 30% of conversion costs for utility lines; customers pay 100% of converting their service to the meter**
- **Commercial/Industrial customers pay 100%**
- **New electric service is required to be underground.**

Outside Tacoma:

- **Residential LIDs – same as within Tacoma**
- **Franchise Agreements dictate level of co-funding; Tacoma Power typically agrees to pay 30% or more depending on type of project and the specific Agreement (in practice, co-funding is limited to road projects).**

Research and analysis

Research the legal limitations for the utility

Literature search for best practices of other utilities

Reexamine utility benefits of undergrounding

Identify pros/cons of policy alternatives

Legal limitations

No legal issues with Tacoma Power contributing to undergrounding its overhead facilities

Utility can justify spending ratepayer funds on undergrounding due to improved safety to the public, increased reliability of the system, and potential cost savings related to maintenance

Literature search of utility practice

Research:

- "A Review of Electric Utility Undergrounding Policies and Practices", Navigant Consulting for Long Island Power Authority. March, 2005.
- Draft "Distribution Study Underground vs. Overhead 2016 Update", Leidos Engineering. November, 2016.
- E Source research and report.
- Staff research

Economic Development and Undergrounding

We found no significant nexus between undergrounding and economic development; we asked E Source, Erik asked the Economic Development community, and we conducted internet searches.

“The primary driver for undergrounding existing overhead power lines continues to be aesthetic considerations, not reliability or economic benefits.” (Navigant)

Other utilities' approaches

Vast majority of utilities do not share in the cost of undergrounding.

When utilities do share in the costs, it tends to fall into three categories:

1. Fixed Percentage contribution to costs of undergrounding.
2. A rate adder for a geographic area to recover costs of undergrounding in that area
3. A utility-wide fund generated by a rate adder, with guidelines and governance system to prioritize undergrounding projects

Societal benefits of undergrounding

Aesthetics

Reliability

Reduced liability from vehicle/pole collisions

Reduced O&M (e.g., tree trimming)

Utility benefits of undergrounding

Tacoma Power engaged an independent consultant to estimate the benefits of undergrounding facilities. Benefits based on reliability, reduced liability, and reduced O&M.

Preliminary Results:

- ✓ Residential: 18% to 33%
- ✓ Commercial (light/medium): 6% to 13%
- ✓ Industrial (heavy commercial): 2% to 5%

Note that these benefits are for distribution voltage facilities. The study did not examine benefits for undergrounding transmission facilities.

Challenge #1 – conversion of customer's service connection

Utility conversion not effective if customers don't underground their service connection

Possible solution:

- City requires customers to underground their service connection

Up-front costs are a barrier

Possible solutions:

- include financing customer costs of connection conversion in LID
- create a TPU loan program (similar to conservation loans)

Challenge #2 – conversion of other utility services

Many areas of Tacoma have other overhead utility services, namely telecommunications

Many poles are co-owned by Century Link, which will complicate the process of removal

Need City support to underground those utilities

Possible solution:

- City requires undergrounding through franchise agreements

Challenge #3 – who pays?

Utility customers as a whole see only marginal benefit from undergrounding

Primary beneficiaries are property owners and neighbors

Possible solutions:

1. Status quo
2. Fixed contribution (e.g., 20%) to commercial undergrounding projects
3. Surcharge within geographic area (e.g., downtown Tacoma)
4. Utility-wide surcharge (e.g., 0.5%?) to create undergrounding fund for eventual conversion

1. Status quo

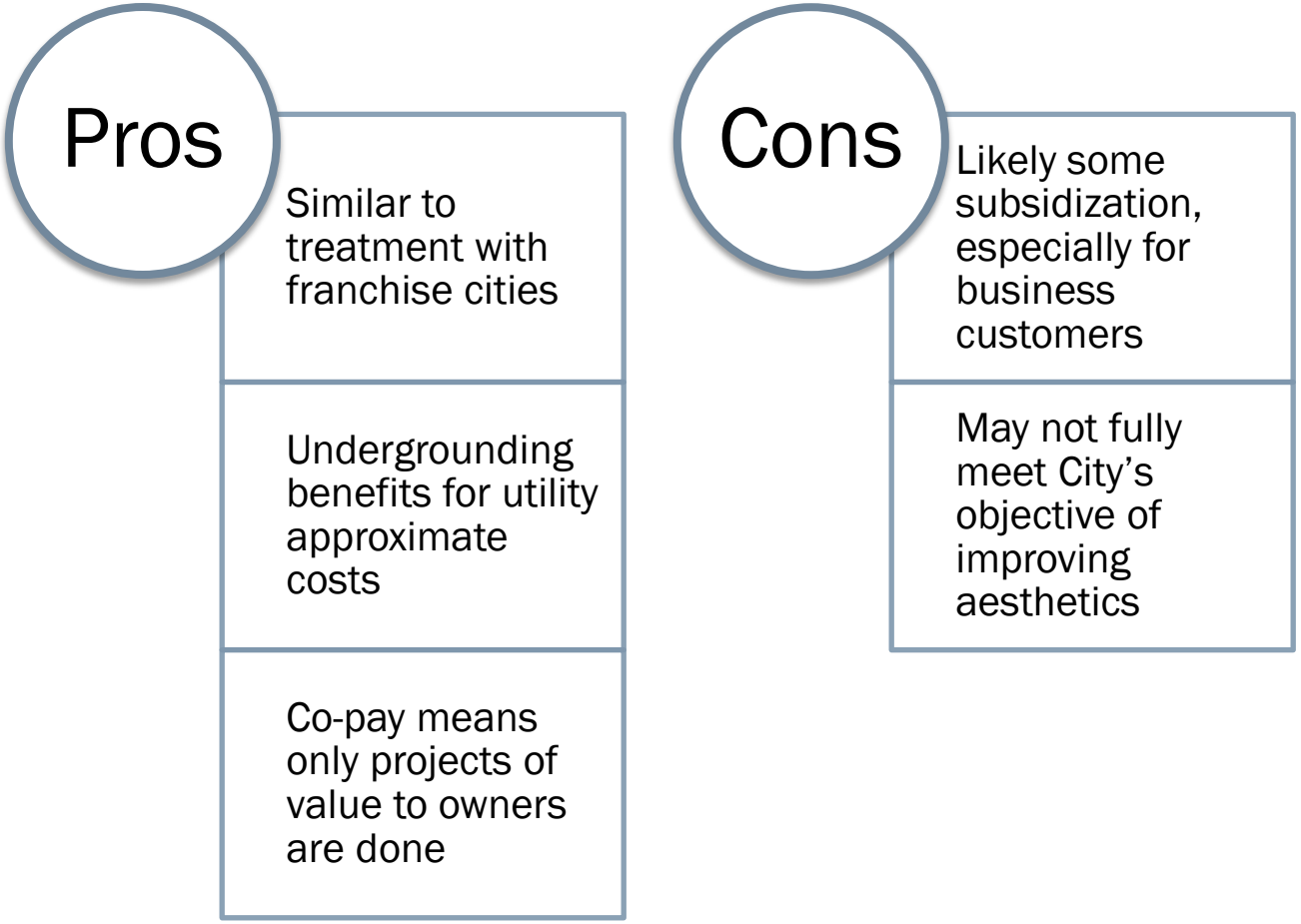
Pros

- Generally more favorable toward undergrounding than most utilities
- Customers who benefit pay most of the costs

Cons

- Doesn't address commercial undergrounding
- Different than approach in franchise cities

2. Fixed contribution to undergrounding projects



3. Surcharge within well-defined area (e.g., part of downtown Tacoma)

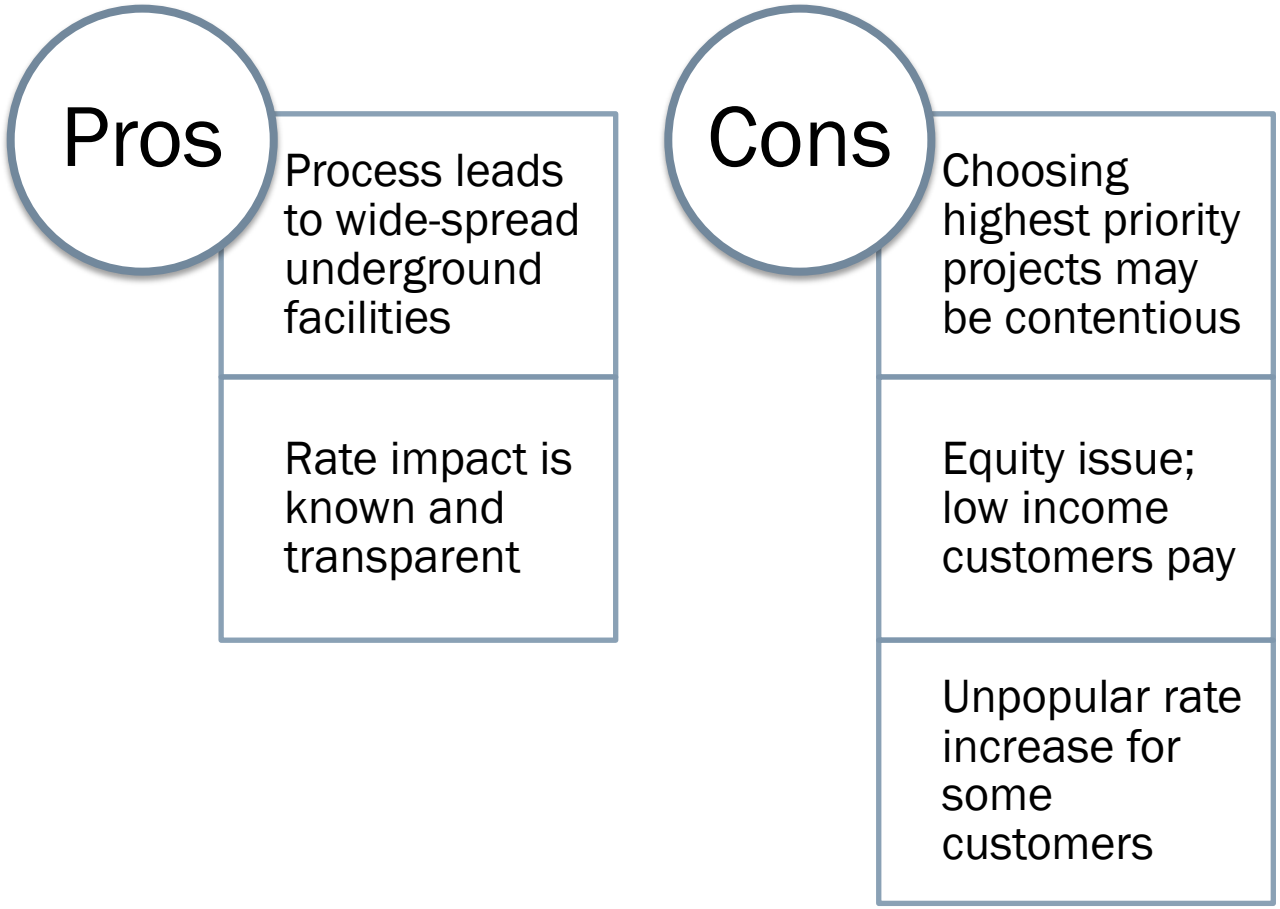
Pros

- Customers who benefit are generally the ones who pay
- Path to complete undergrounding in the targeted geographic area

Cons

- Unpopular rate increase for some customers
- Geographic area and sequencing may be contested

4. Utility-wide surcharge for undergrounding



Recommendations and summary

Recommend PUB adopt a combination of alternatives 2 and 3

Alternative 4 dismissed because of its complexity , equity concerns, and challenge in targeting specific areas/projects

1. **TPU adopt a policy to Co-fund Commercial Projects contingent on City of Tacoma actions:**
   - **Commercial LIDs – Tacoma Power pays 20% of conversion costs for utility lines**
   - **City of Tacoma requires customers in the LID to convert their service connection**
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Rationale:

- ***Provides more funding assistance than supported by engineering analysis***
- ***Can be done quickly and support development in Brewery District and other locations***
- ***Aesthetics not improved unless service connections undergrounded***

Recommendations and summary

2. TPU work with the City to target a geographic area for undergrounding with separate rates:

- Specific areas (such as downtown) have a rate adder to recover utility undergrounding costs
- City requires customers in the area to convert their service connection at their expense
- City requires other utilities (telecom) in the area to convert to underground

Rationale:

- ***Co-funding through LIDs alone is unlikely to make a material difference in the aesthetics of downtown***

3. TPU investigate feasibility of a loan program for customer service connections

Rationale:

- ***Up-front costs of conversion is a challenge for customers and may create a barrier to undergrounding projects***

POSITIVE TRAIN CONTROL (PTC)

OVERVIEW OF TACOMA RAIL'S ACTIVITIES TO ACHIEVE COMPLIANCE

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PRESENTATION OVERVIEW

- **Regulatory framework**
- **Positive train control (PTC) Overview**
- **Rail's relationship with Sound Transit**
- **Current timeline for implementation**
- **Contracts necessary to proceed**
  - Avoided costs
  - Associated contract costs
- **Rate implications moving forward**
- **Alternatives**
- **Next steps – Board considerations**

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PTC REGULATORY FRAMEWORK

THE RAIL SAFETY IMPROVEMENT ACT (RSIA) OF 2008 -

- **Title 49 Code of Federal Regulation (CFR) Part 236 Sub Part i**
  - Mandates Positive Train Control (PTC) be developed and implemented on segments of mainline tracks which transport:
  - More than 5 million gross tons annually
  - Any poisonous-inhalation-hazard (PIH) materials routes
  - Mainlines with regularly scheduled intercity passenger or commuter rail service traffic
- **Initial implementation deadline of December 31, 2015**

THE SURFACE TRANSPORTATION ACT OF 2015 (H.R. 3818)

- **Extended the implementation deadline to December 31, 2018**
  - Short lines have until 2020

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PTC OVERVIEW

WHAT IS PTC AND HOW WILL IT HELP IMPROVE SAFETY?

- **PTC refers to a set of highly advanced technologies and communication-processor based train control software designed to prevent:**
  - Train-to-train collisions
  - Over speed derailments
  - Incursions into established work zone limits
  - Train movement through a mainline switch in the improper position

- **PTC will not prevent accidents caused as a result of equipment failure, or:**
  - Improper vehicle movement through a grade crossing
  - Trespassing on railroad tracks
  - Some types of train operator errors

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PTC OVERVIEW

THREE MAIN ELEMENTS OF THE PTC SYSTEM

- **Onboard or Locomotive System**
  - Monitors the train's location and speed and can activate braking system as necessary to enforce speed restrictions and unauthorized train movement into new sections of track.
- **Wayside System**
  - Monitors railroad track signals, switches, and track circuits to communicate authorization for movement to the locomotive.
- **Back Office Server (BOS)**
  - The storehouse for all information related to the rail network and trains operating across it, including speed limits, track geometry, speed of individual locomotives, train composition – and transmits authorization for individual trains to move into new segments of track.

Definitions courtesy of Association of American Railroads

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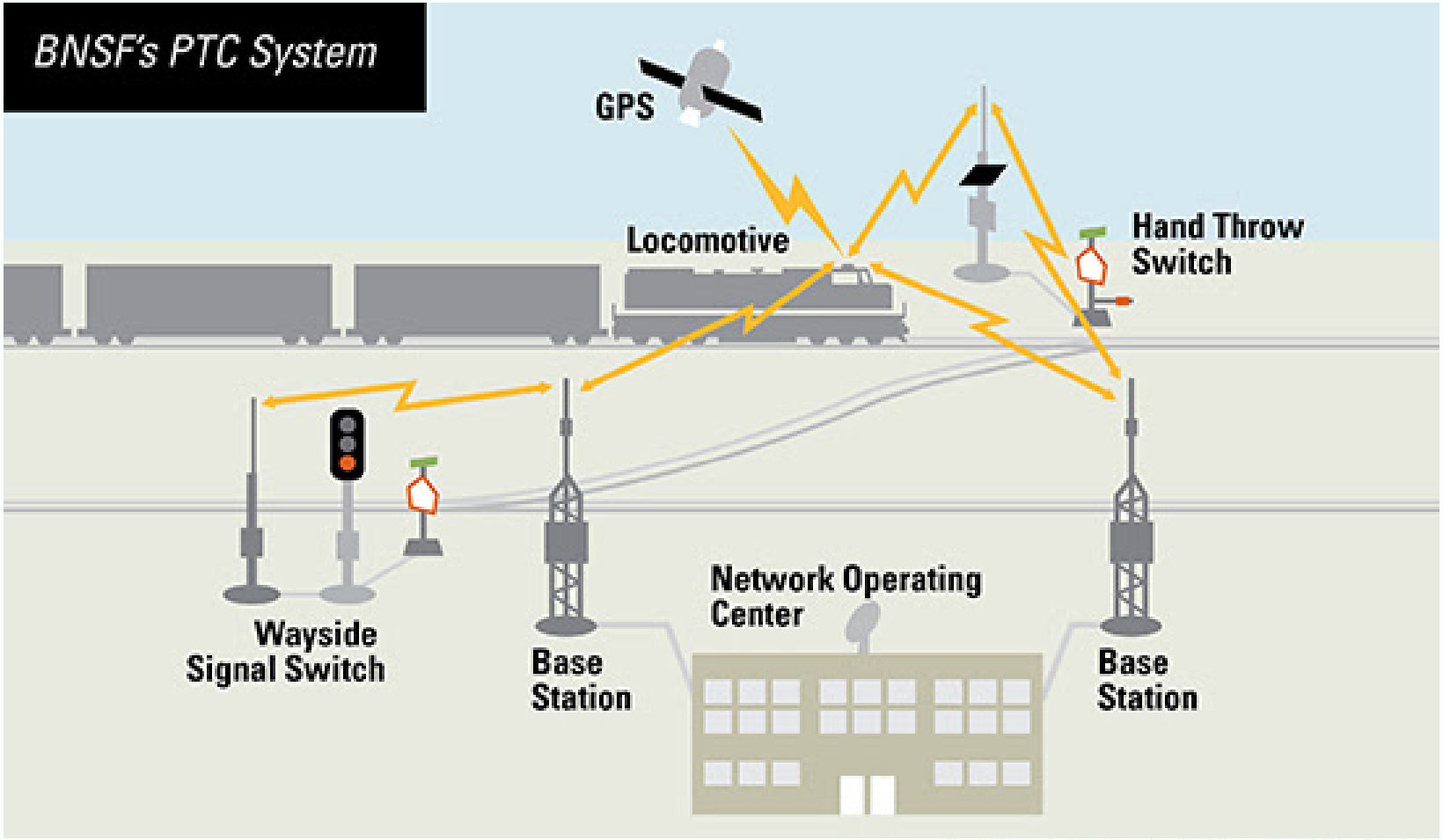
PTC OVERVIEW

ILLUSTRATION OF VARIOUS ELEMENTS



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PTC OVERVIEW

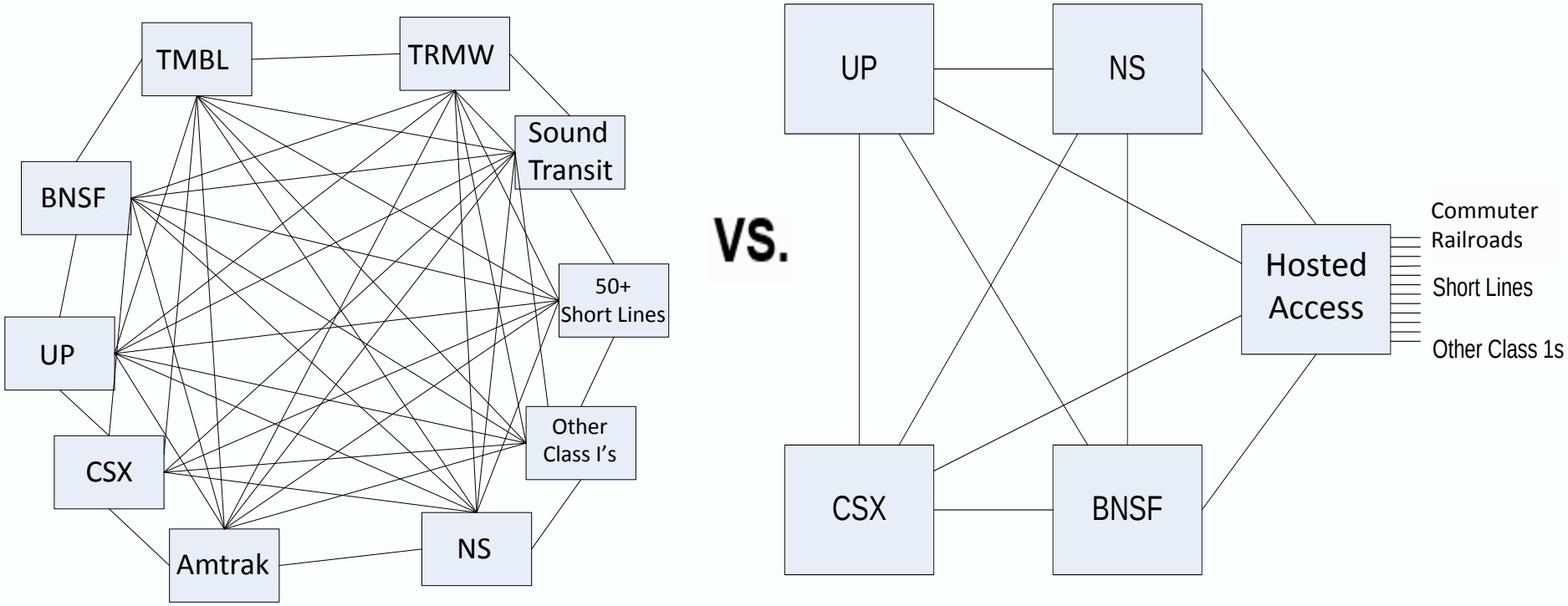
INDUSTRY DEVELOPMENT AND IMPLEMENTATION

- **Interoperability is mandated**
  - To function properly, any train operating on another railroads network must be able to communicate with the host railroad's PTC system
- **Developed by 4 Class I railroads (BNSF, CSX, NS, & UP)**
  - Jointly implementing a version of PTC called Interoperable Train Control (ITC)
- **All other railroads will be required to use an *approved* Hosted Back Office Access Provider to access the 'federated PTC network' they developed in order to preserve data integrity.**

PTC OVERVIEW

DATA MESSAGING SCHEMATIC

- **Meteorcomm data messaging software**



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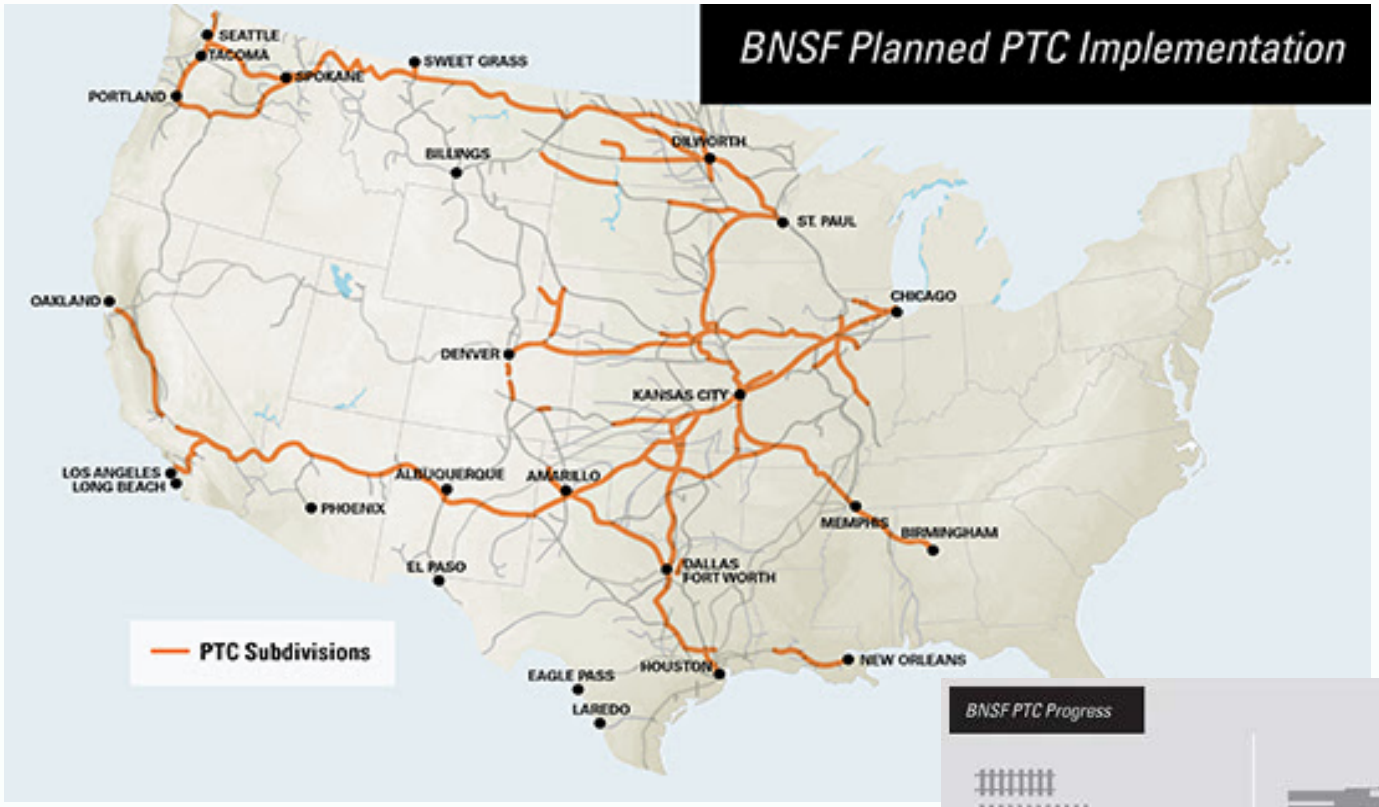
INDUSTRY PERSPECTIVE – BNSF



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LOCAL PARTNERSHIP

RELATIONSHIP WITH SOUND TRANSIT

- **Sale of Tacoma Dome segment**
  - 1.3 miles for $4 million
  - Freight House Bridge replacement
  - Wayside PTC equipment installation
- **Joint Use Agreement**
  - Outfit 4 Tacoma Rail locomotives with PTC equipment
    - Est. $125K per locomotive
    - Includes functional testing & FRA certification

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MOUNTAIN DIVISION PTC MAP

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CAPITAL DIVISION PTC MAP

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HOSTED BOS ACCESS PROVIDERS

BNSF BACK OFFICE SERVER ACCESS REQUIREMENTS

- **Series of conversations between BNSF, Sound Transit & Tacoma Rail**
  - Ongoing for 2 years
- **BNSF has indicated there are 3 acceptable BOS access providers**
- **ASLRRA hosted PTC initialization demonstrations**
  - Tacoma Rail present in October 2016
  - Two providers demonstrated an ability to initialize with BNSF's PTC system

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REGIONAL IMPLEMENTATION TIMELINE

CURRENT TIMELINE FOR IMPLEMENTATION

- **Driven entirely by BNSF**
- **Sound Transit PTC revenue service in May 2017**
- **Tacoma Rail expected to be PTC ready in July 2017**
  - Onboard locomotive equipment installed
  - Back Office System access provider needs to be in place
    - Functional & dynamic testing to obtain FRA certification
  - PTC revenue service commences following FRA certification

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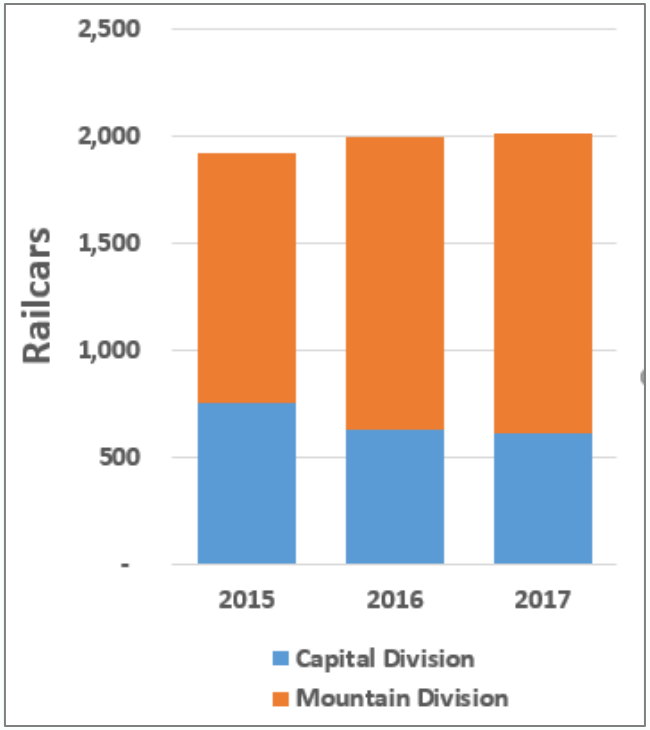
ASSOCIATED COSTS & RATE IMPLICATIONS

CONTRACTS NECESSARY TO PROCEED

- **Estimated avoided costs: $2.5M**
  - Locomotive equipment & installation
  - Wayside equipment (Tacoma Dome segment)
  - PTC Implementation Plan
- **Tacoma Rail associated contract costs**
  - First year cost: $452,000
  - Five year average: $287,000/year
- **Rate implications TRMW & TRCD**
  - 2,000 railcars per year
  - $144 per railcar or 27% increase for 5 year annualized cost
    - Approximately 3.8% increase on the total freight movement
- **Rate adjustment proposal this fall for 2018 implementation**



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ALTERNATIVES

LIMITED ALTERNATIVES

- **Capital Division scenario**
  - Sell or abandon freight franchise
    - 18 month process
    - Surface Transportation Board approval required
- **Access to the Mountain Division**
  - New operator from the South would be required
    - Large infrastructure investment
- **Sound Transit and other Stakeholders**
  - Negotiate to continue service at status quo as long as possible
    - Federal Railroad Administration
    - WSDOT Cascades this fall
    - AMTRAK

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ALTERNATIVES

ALTERNATIVE - ASLRRA

- **American Short Line & Regional Railroad Association (ASLRRA)**
- **ASLRRA received a $2M grant from FRA**
- **Intends to split money between Herzog & Wabtec to subsidize member's PTC back office access costs**
- **Work in progress, not available at this time**
- **Rail will propose language in BOS access agreement to preserve the option to 'shift lanes'**
- **No guarantee of ongoing subsidy funding**

NEXT STEPS

NEXT STEPS

- **Board Consideration of associated contracts**
  - May 24th Agenda
  - Meteorcomm – Data messaging software license
  - Herzog – Hosted Back Office Server access provider
- **June 2017**
  - Contract Executions
  - Configuration & functional testing
  - FRA approvals end obligations of Sound Transit
- **July 2017**
  - Commence operations & revenue service

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