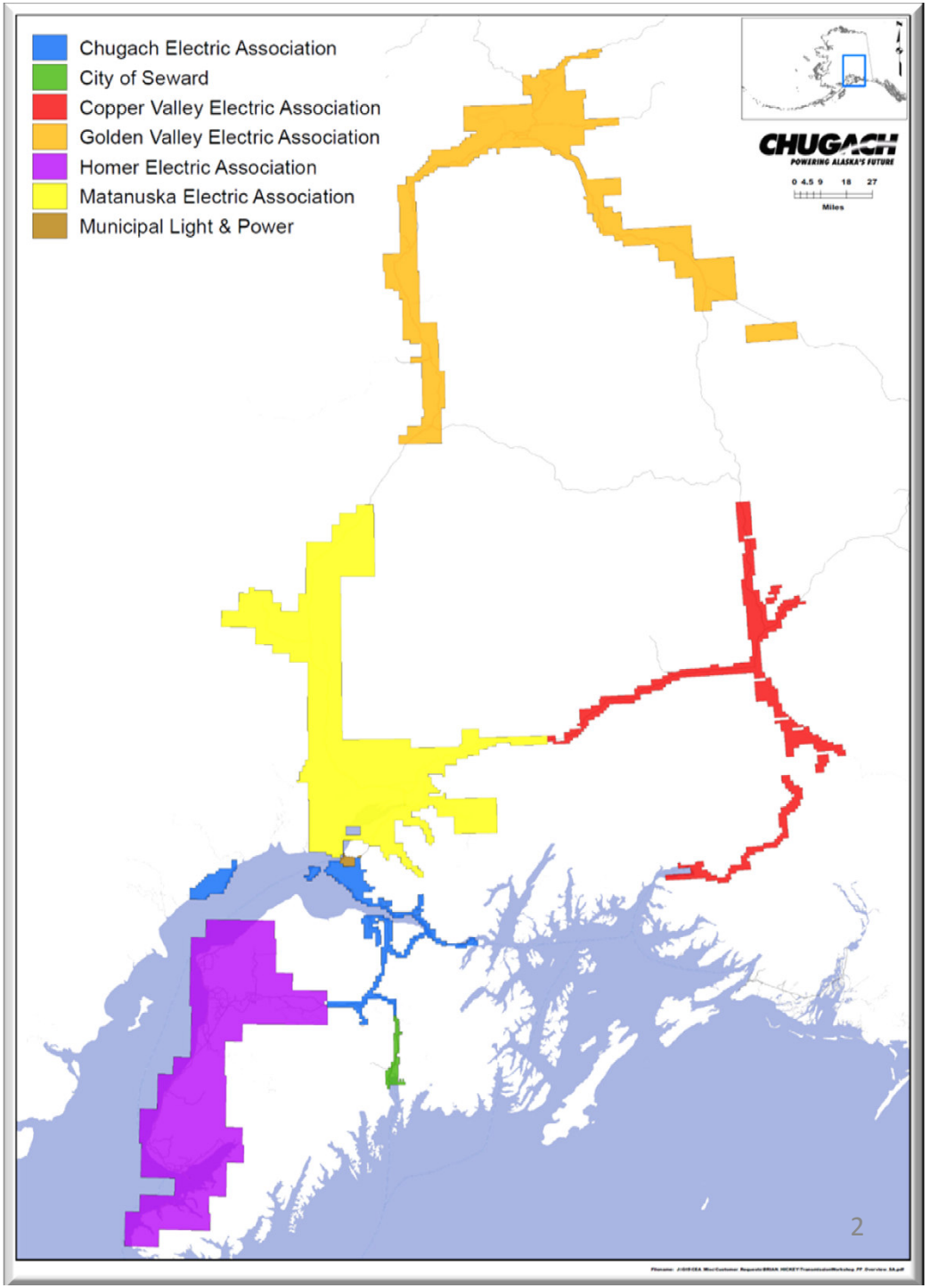
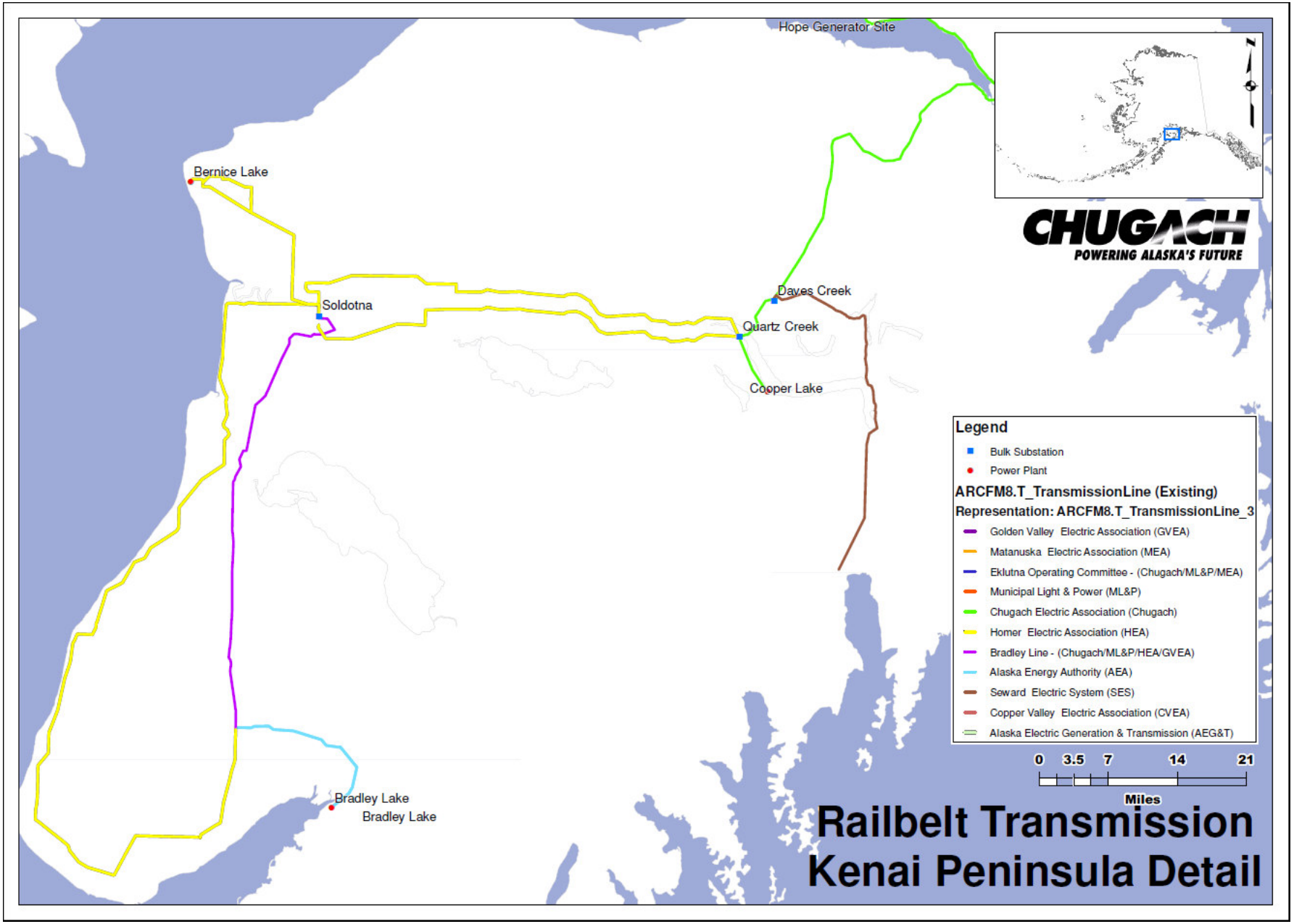
Mayor's Energy Task Force

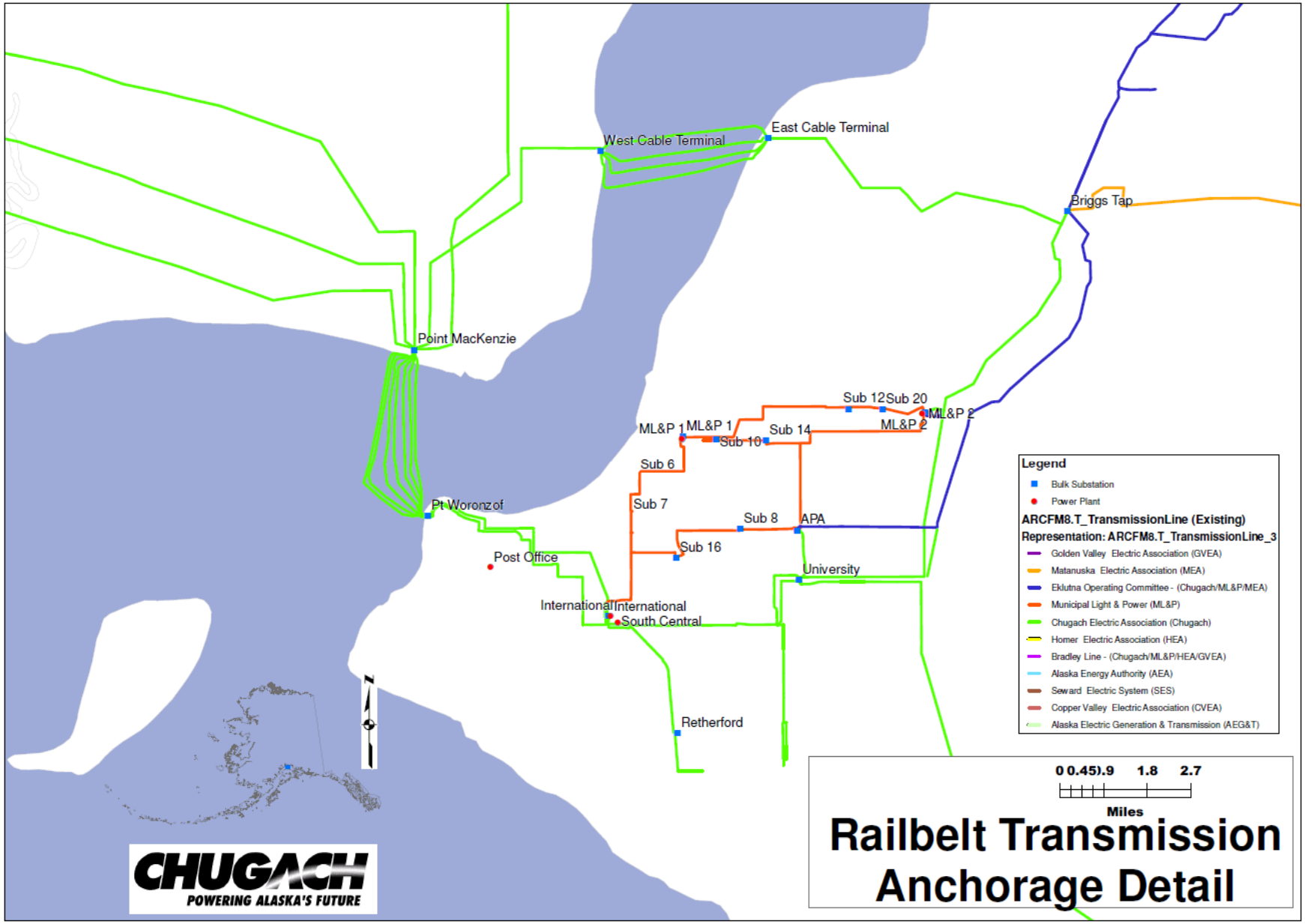
Railbelt Transmission

November 6th, 2013

Current Certificated Service Territories




Hope Generator Site
Bernice Lake
Soldotna
Daves Creek
Quartz Creek
Cooper Lake
Bradley Lake
Bradley Lake
CHUGACH
POWERING ALASKA'S FUTURE
Legend
Bulk Substation
Power Plant
ARCFM8.T_TransmissionLine (Existing)
Representation: ARCFM8.T_TransmissionLine_3
Golden Valley Electric Association (GVEA)
Matanuska Electric Association (MEA)
Eklutna Operating Committee - (Chugach/ML&P/MEA)
Municipal Light & Power (ML&P)
Chugach Electric Association (Chugach)
Homer Electric Association (HEA)
Bradley Line - (Chugach/ML&P/HEA/GVEA)
Alaska Energy Authority (AEA)
Seward Electric System (SES)
Copper Valley Electric Association (CVEA)
Alaska Electric Generation & Transmission (AEG&T)
0 3.5 7 14 21
Miles
Railbelt Transmission
Kenai Peninsula Detail


West Cable Terminal
East Cable Terminal
Briggs Tap
Point MacKenzie
Pt Woronzof
Post Office
International
International
South Central
Retherford
ML&P 1
ML&P 1
Sub 10
Sub 14
Sub 12
Sub 20
ML&P 2
ML&P 2
Sub 6
Sub 7
Sub 8
APA
Sub 16
University
Legend
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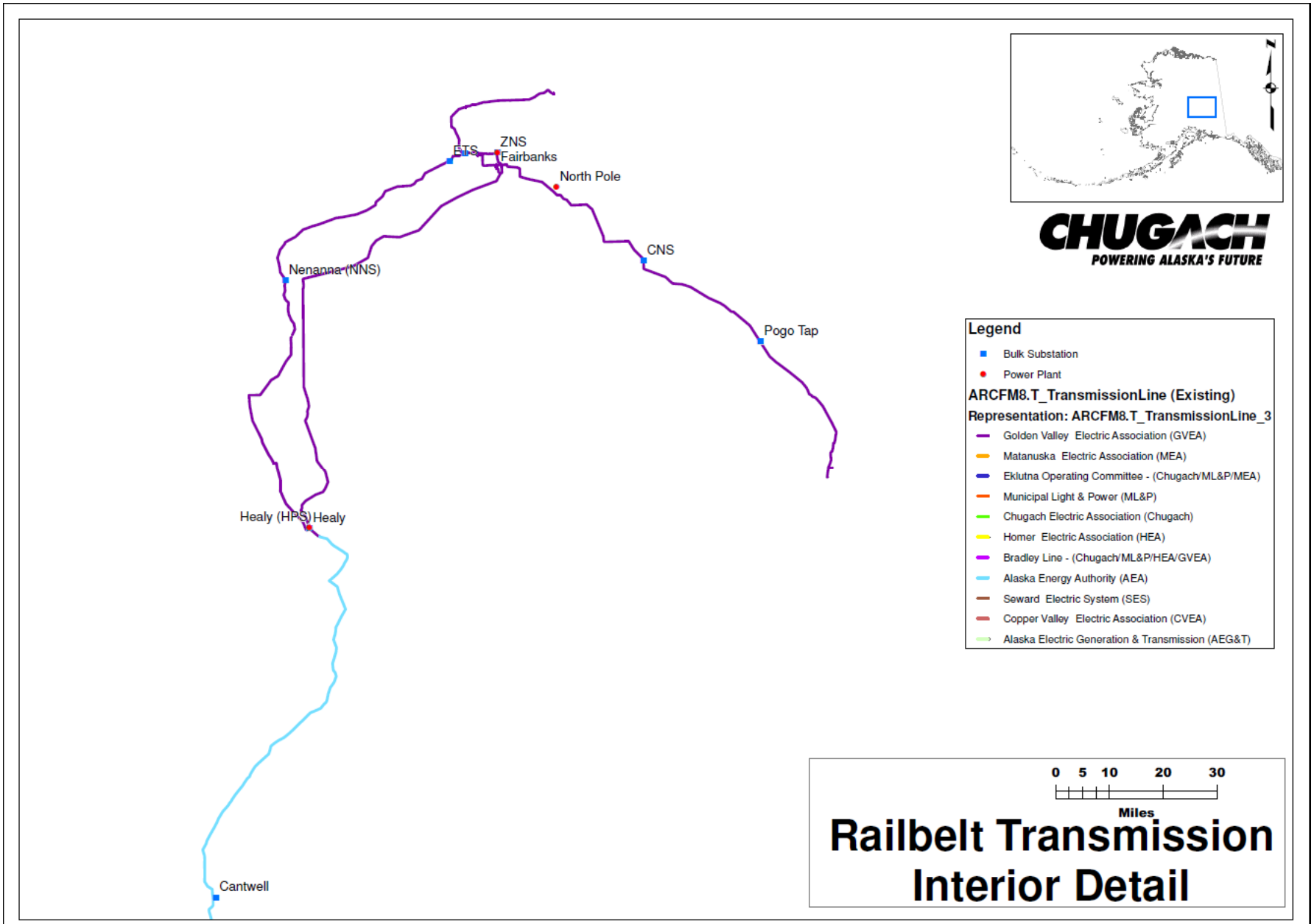
Copper Valley Electric Association (CVEA)
Alaska Electric Generation & Transmission (AEG&T)
0 0.45 0.9 1.8 2.7
Miles
Railbelt Transmission
Anchorage Detail
CHUGACH
POWERING ALASKA'S FUTURE


ETS
ZNS
Fairbanks
North Pole
CNS
Nenanna (NNS)
Pogo Tap
Healy (HPS)
Healy
Cantwell
CHUGACH
POWERING ALASKA'S FUTURE
Legend
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Copper Valley Electric Association (CVEA)
Alaska Electric Generation & Transmission (AEG&T)
0 5 10 20 30
Miles
Railbelt Transmission
Interior Detail

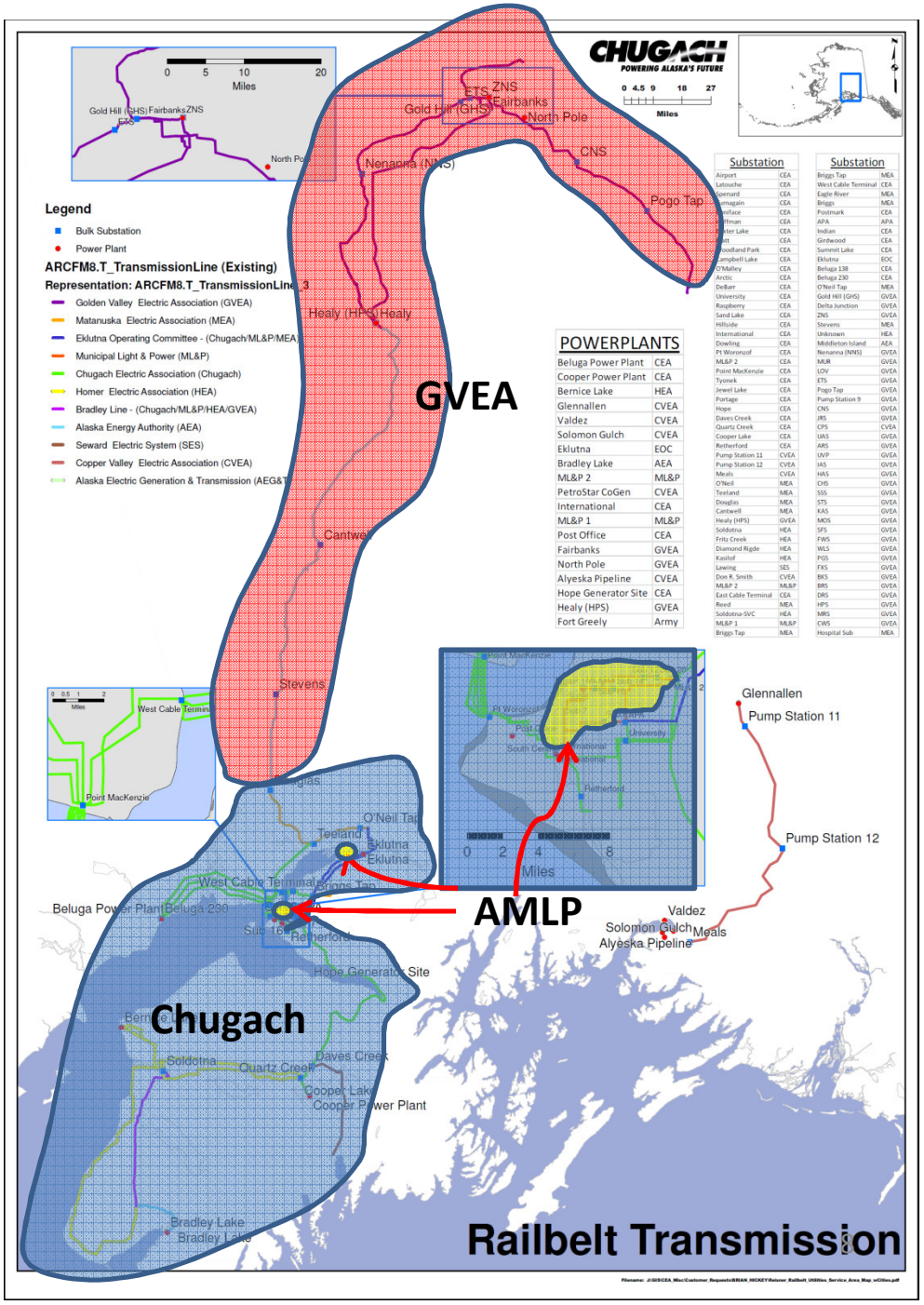
Existing Challenges

- Limited Interconnection Between Regions
- Transfer Capacity is Stretched to Stability Limit
- Infrastructure is in Need of Replacement
- Cook Inlet Fuel Supplies
- Integrate Potential Watana Project

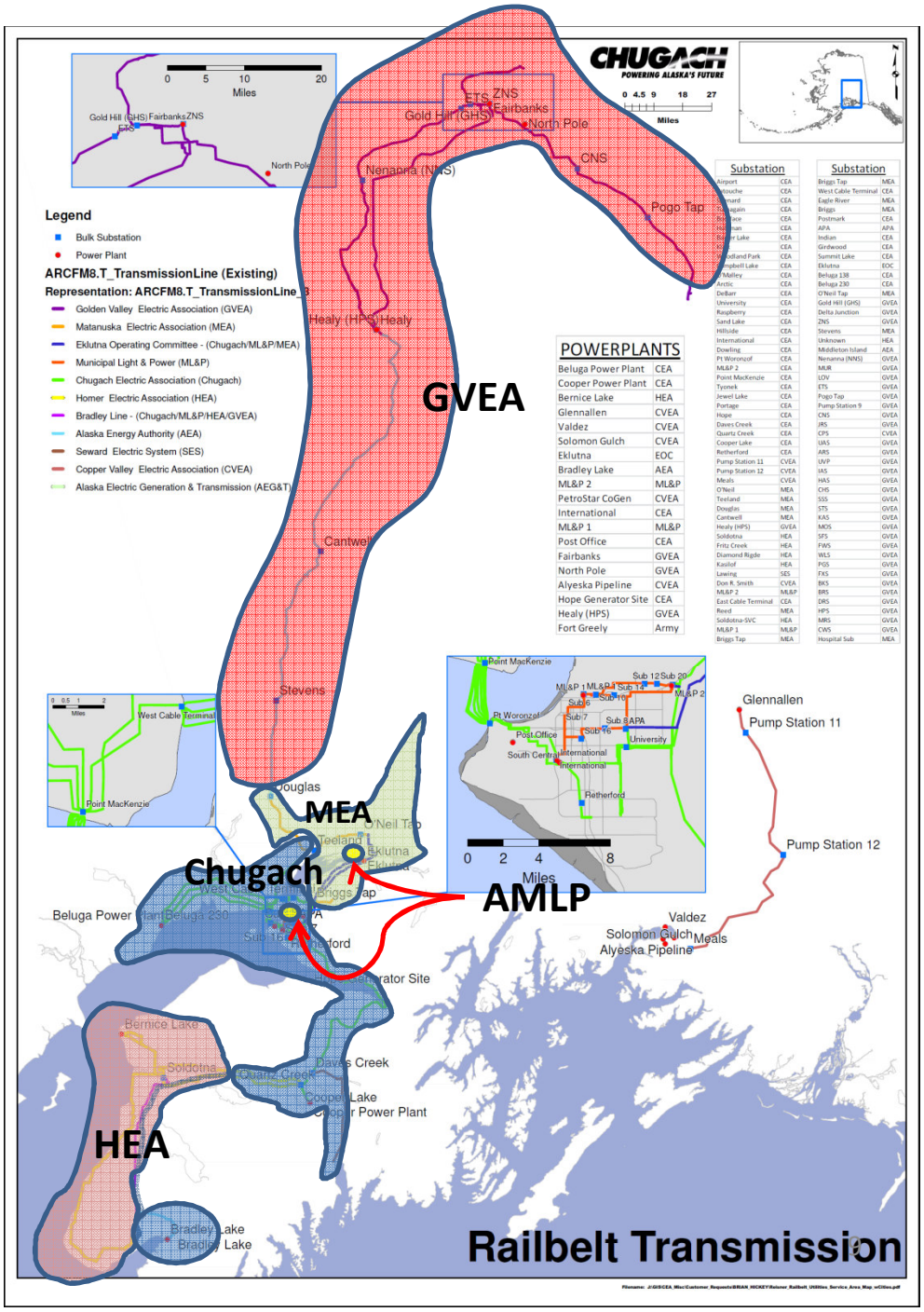
Railbelt is Changing

1985 - 2013	2014 -
3 vertically integrated utilities	Addition of 2 new vertically integrated utilities
Reliability rules unanimously adopted with voluntary compliance	Reliability rules adoption not unanimous – no arbitrator
Alaska Intertie Agreement “utility users only”	Alaska Intertie Agreement “possible new users” through open access terms
Bradley Lake Agreements with transmission access	Missing Link to Bradley Transmission access (Soldotna to QC)
Minimal changes to Generation & Transmission (G&T) system	Significant generation replacement/additions
Utility owned & operated generation	Addition of Independent Power Producers (IPP’S)

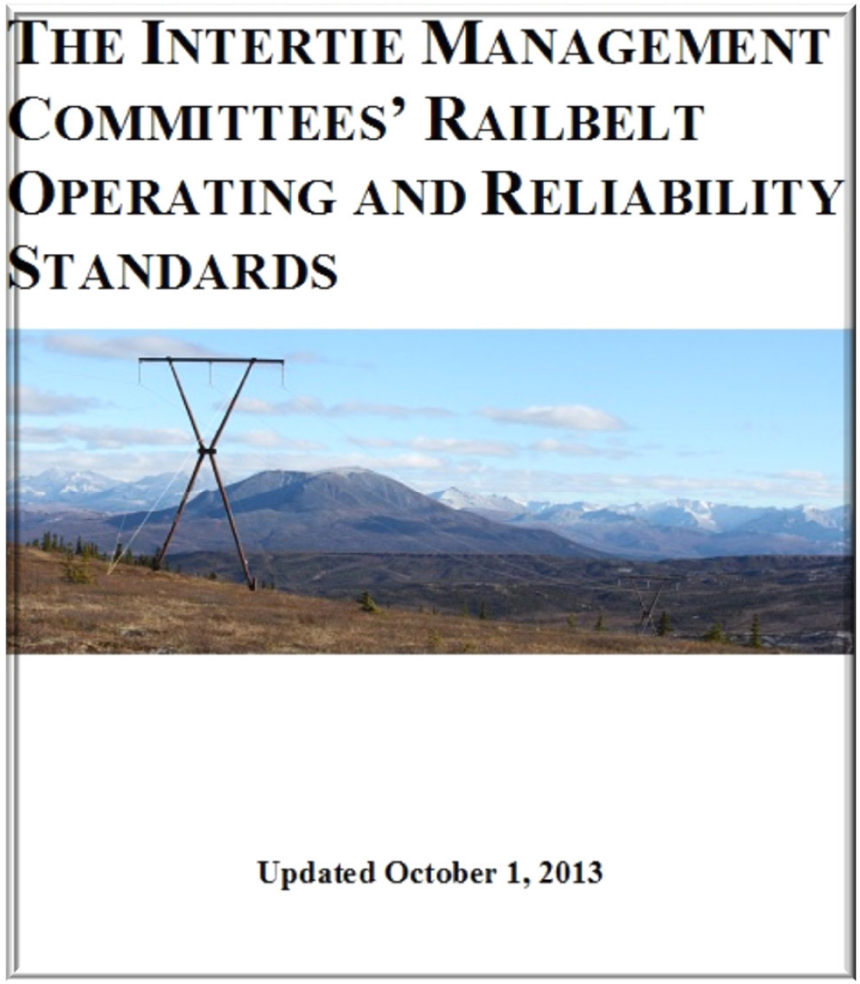
Current Load Balancing Authorities



Post 2015 Load Balancing Authorities



Reliability "Rules of the Road"



Railbelt Transmission Challenges

AEA studies highlight problem

- Weak interconnections between control areas
- Bradley Lake capacity stranded on Kenai
- Bradley Lake energy may not be available to reduce peak load
- Transfer capacity between regions prevents economic dispatch
- Study identifies costs and benefits of transmission improvements

Individual utilities do not have room on balance sheet for additional debt

Cost recovery of transmission and ancillary services through open-access tariffs is complex

Unconstrain Bradley Lake Southcentral Projects

- Physically move Bradley energy off of the Kenai Peninsula
- Reduce transmission losses and provide voltage control
- Increase reliability to N-1
- Allow for energization of Anchorage to Eklutna “express” circuit
- Allow for future transmission additions and upgrades
- Integrate MEA EGS plant

Northern Projects

More firm/low cost power from Anchorage to Fairbanks

System stabilization and voltage control

Increase reliability to N-1

Unconstraining Bradley Projects

Project	Description	Cost ($mill)
New HVDC Line: Bernice Lake to Beluga	100 MW HVDC intertie	$185.0
Anchorage Area Battery	25 MW/14MWh BESS	$30.2
New Line: Bradley to Soldonta	115 kV line and substation	$72.4
Reconstruct Line: University to Dave's Creek	Reconstruct line to 230 kV	$70.5
Upgrade Substations: University & Dave's Creek	Convert line to to 230 kV	$31.1
Upgrade Line: Dave's Creek to Quartz Creek	Upgrade line to rail conductor	$13.0
Total		**$402.2**

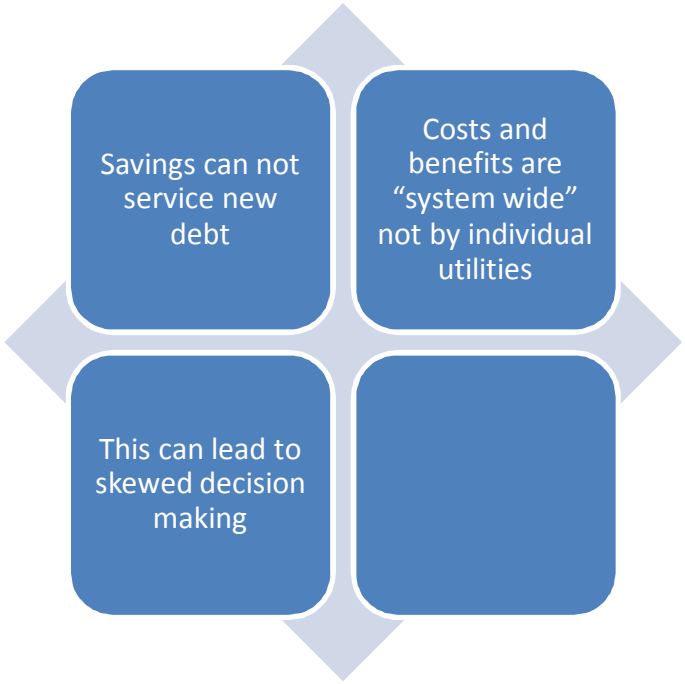
Southcentral Projects

Project	Description	Cost ($mill)
Fossil Creek Substation	New 115 kV substation	$10.7
Eklutna Hydro Substation	New 115 kV substation	$9.8
Total		**$20.5**

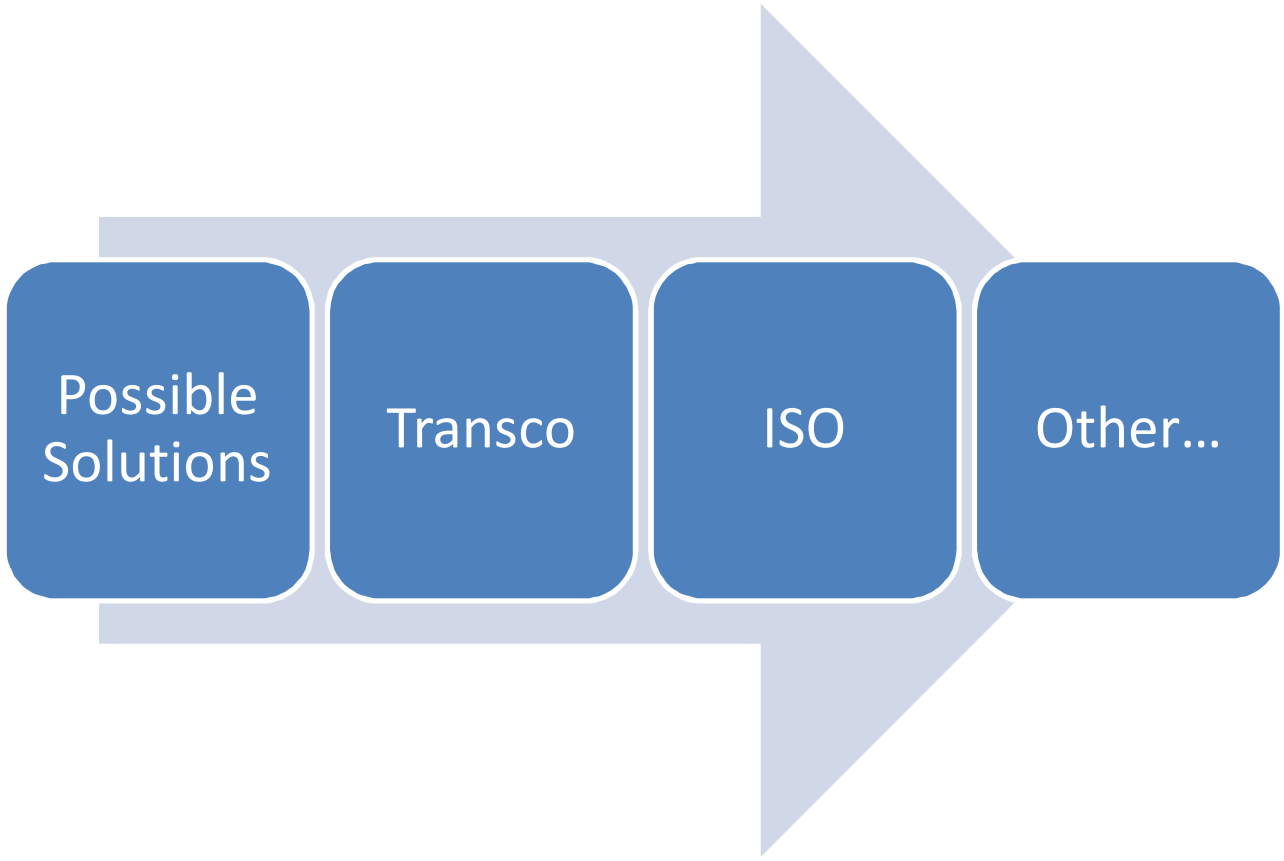
Northern Projects

Project	Description	Cost ($mill)
New Stations: Lorraine & Douglas	230 kV station	$73.4
New Line: Lorraine to Douglas	230 kV dbl circuit line	$55.9
New Stations: Gold Creek & Healy	230 kV station	$35.8
New Line: Douglas to Healy	230 kV line opearted at 138 kV	$188.1
Communication	Communication for control	$15.0
Healy Additions	2 new transformers	$5.7
Ugrade Stations: Wilson & Gold Hill	230 kV upgrade	$10.3
Ugrade Stations: Nenana, Ester, Eva & Clearly	Station updgrades	$10.8
Upgrade Line: Healy to Gold Hill	Convert line to 230 kV	$85.7
Total		**$480.7**

Economic Limitations



Utility	Improvement Cost	Benefit	Participation ?
A	$25	$60	Y (if all are in)
B	$25	$20	N
C	$25	$20	N
D	$25	$20	N
System Total	$100	$120	


Possible Solutions
Transco
ISO
Other…

Transco

Transco- A transmission owning entity

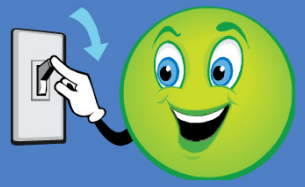
- A regulated entity which owns, constructs, and maintains transmission lines used to transmit wholesale power
- It may or may not handle power dispatch and coordination
- Secures financing
- Executes project

ISO

ISO- An independent system operator

- An ISO owns no assets
- It is neutral party responsible for planning, management and control of the electric transmission grid in a state or region

• Characteristics



- Ensures non-discriminatory access;
- Possession of operational authority for all transmission facilities under the ISO's control; and
- Exclusive authority to maintain short-term reliability.
- Regulatory Compact
- Plans, conditions and approves projects

ISO/TRANSCO Regulatory Pact

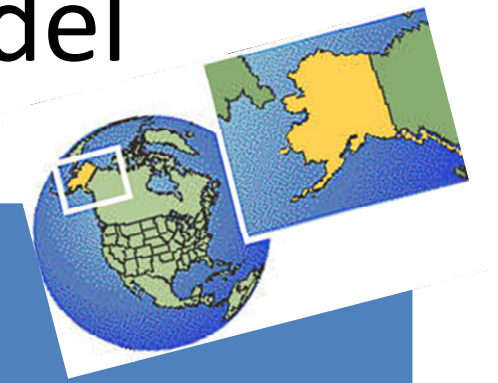
Regulatory Compact

- ISO planned projects are assured rate recovery for facility owner
- TRANSCO costs to be recovered in utilities fuel and purchased power costs

Unified System Wheeling Rate

- Net cost allocated to all interconnected participants typically based on some combination of peak demand and energy

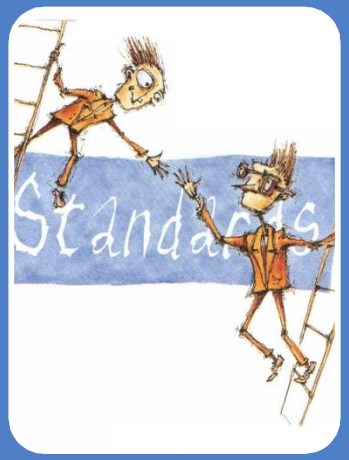
The Railbelt Model



ISO = Railbelt Reliability Authority

TRANSCO = Alaska Railbelt Cooperative Transmission & Energy Company (ARCTEC)

Railbelt Reliability Authority as ISO



- Adoption of IMC Reliability Standards Plan and Condition Projects
- Enforce Standards
- Regulatory Compact
- Ensure Non-discriminatory Transmission Access
- Single System-wide Transmission Rate
- Responsible for Short-term Reliability

ARCTEC as TRANSCO

Non-discriminatory open access

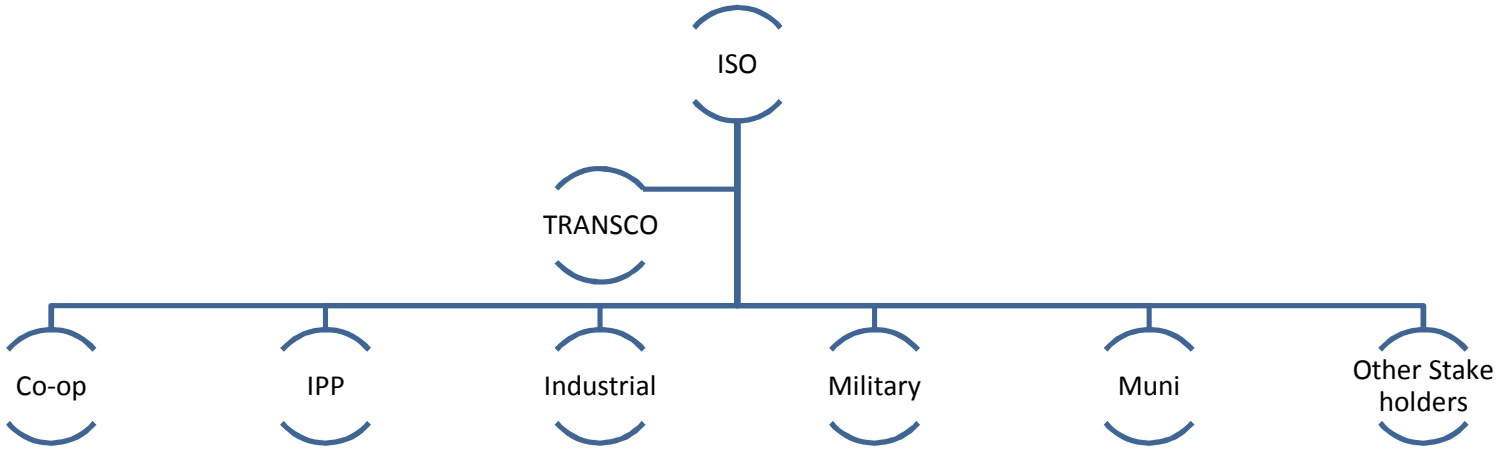
- Existing assets from transmission providers are pooled for joint use with full cost recovery for all users

Universal rates based on system load that will encourage economic transfer of generation across network

- Transition to Full implementation
  - Single control are within 5 years
  - Economic dispatch within 10 years

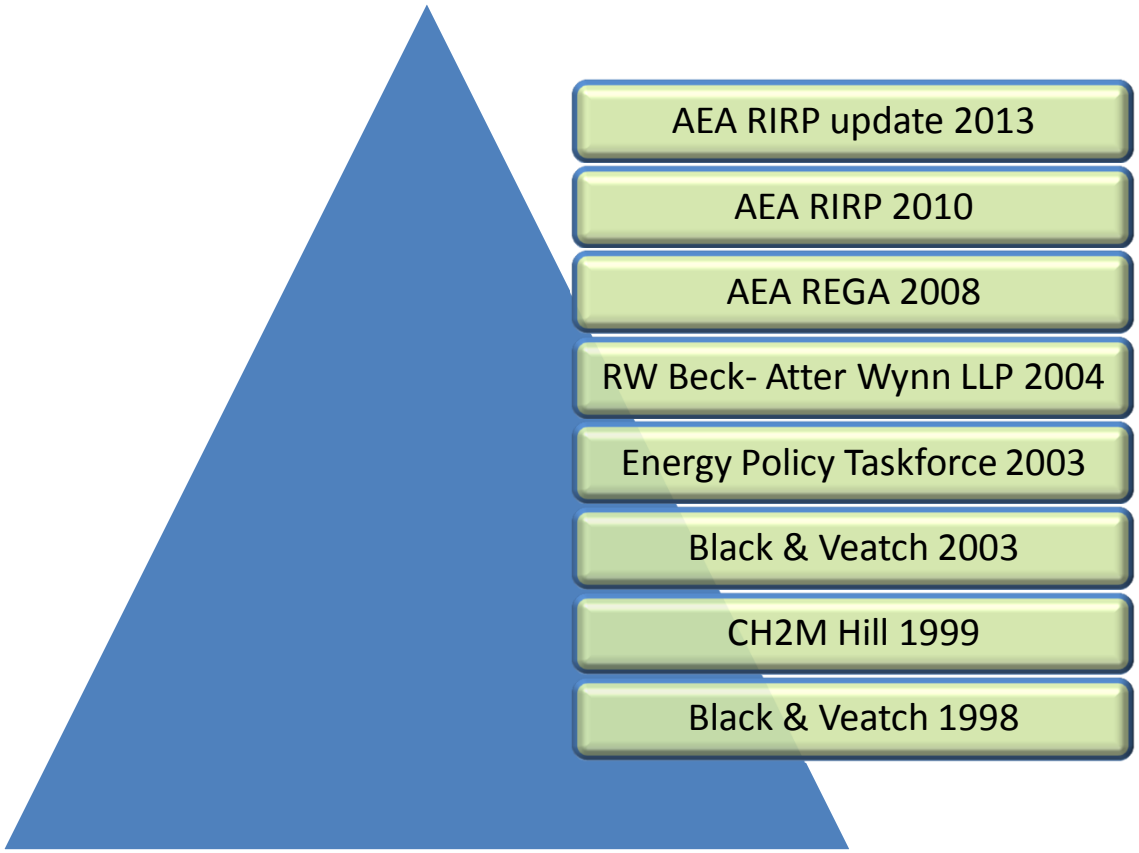
Regional planning for all future transmission

ISO/Transco Grid Structure

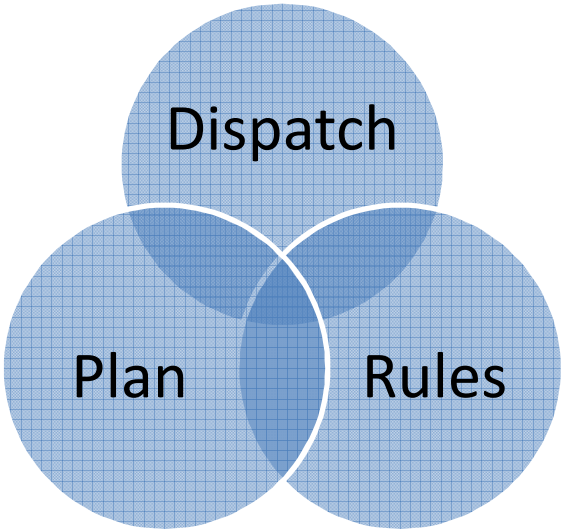


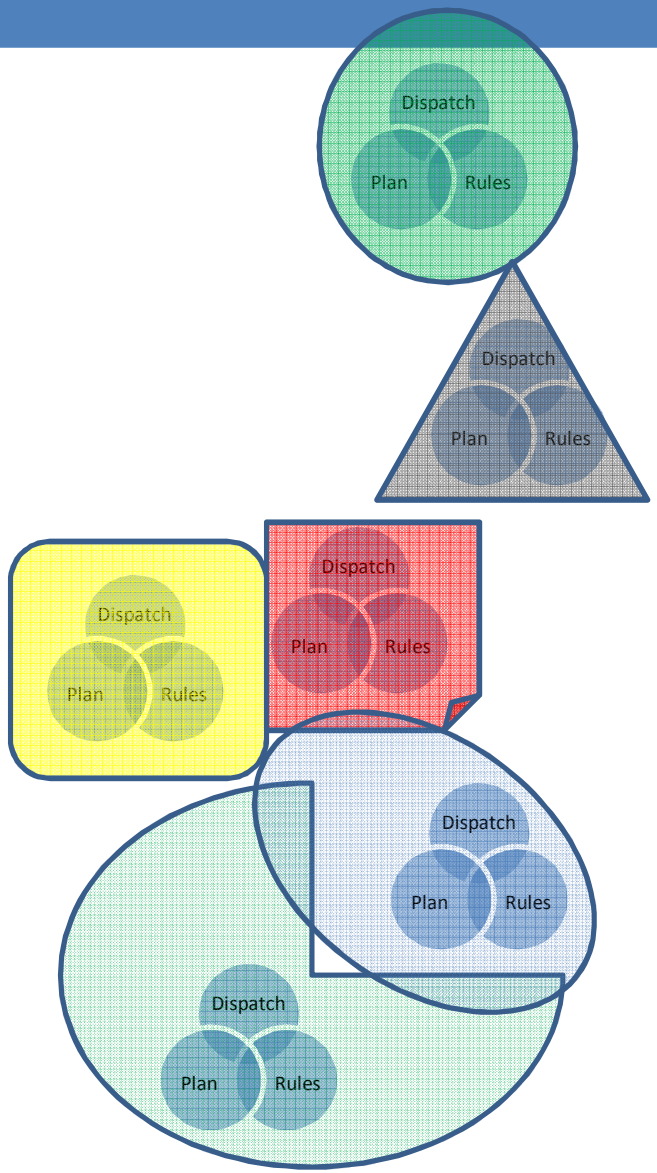
STAKEHOLDERS

Studies Recommending Unified Operator and Integrated Planning



Choices


Dispatch
Plan
Rules


Dispatch
Plan
Rules
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