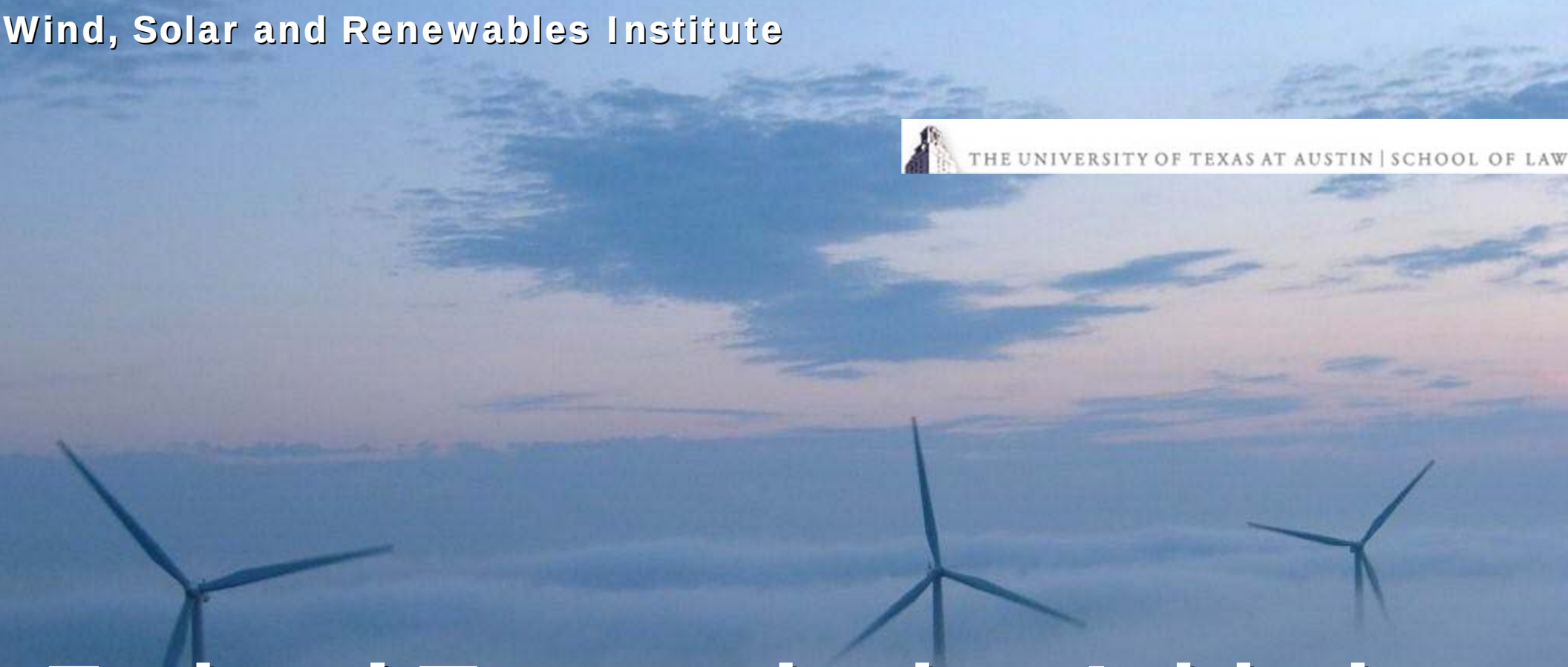
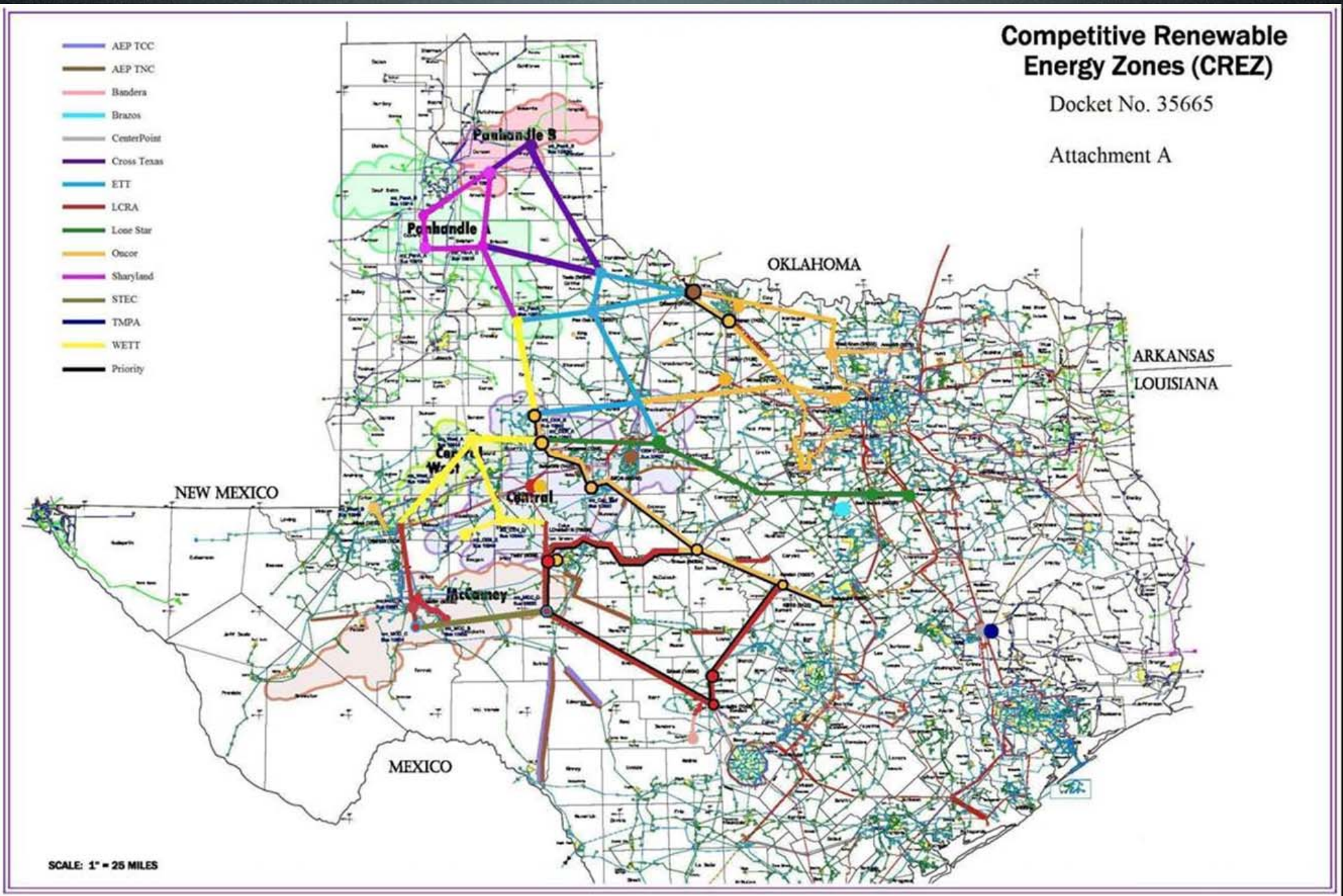


THE UNIVERSITY OF TEXAS AT AUSTIN | SCHOOL OF LAW

Federal Transmission Initiatives for Renewables: The View From FERC

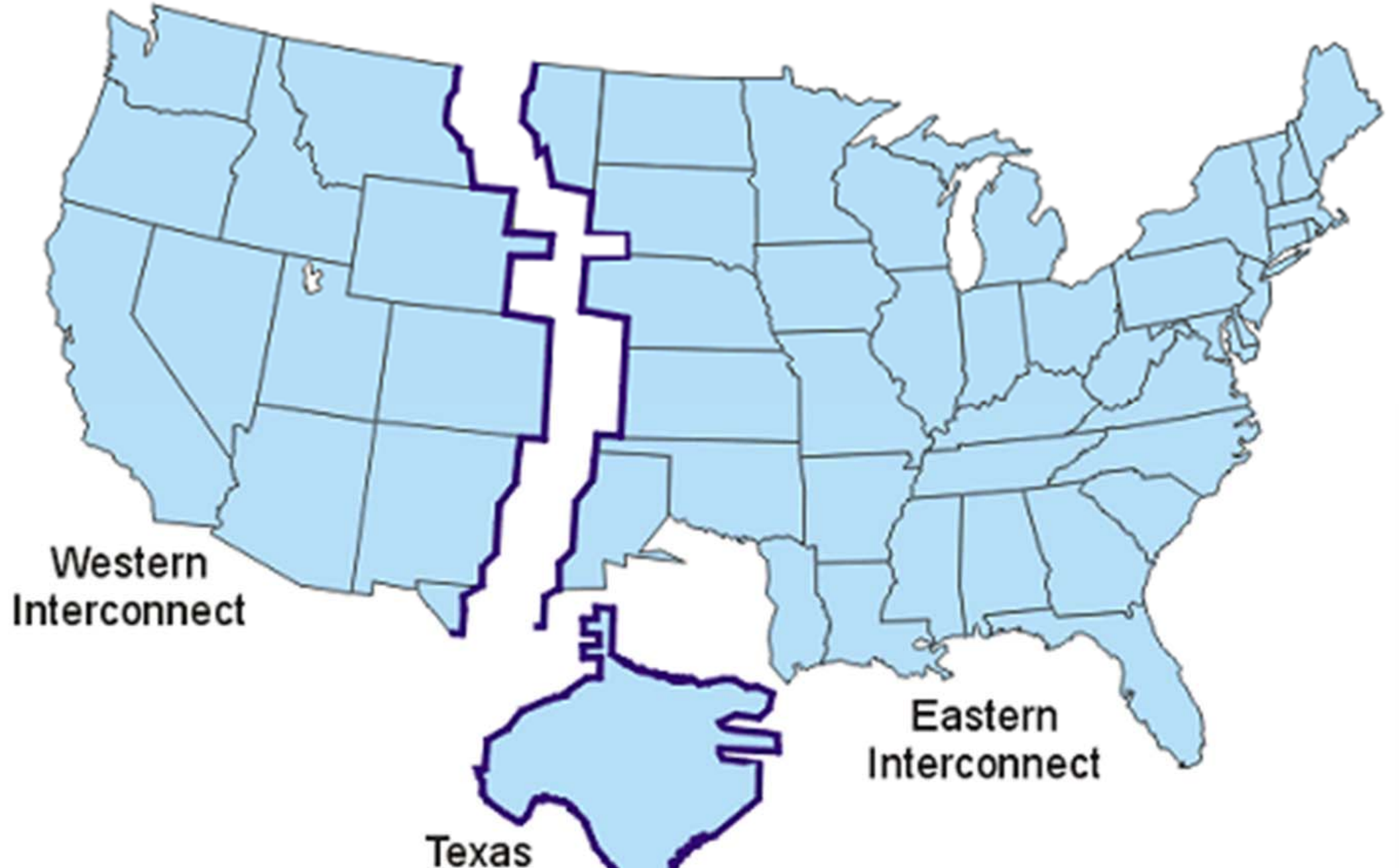
Presented by Jon Wellinghoff, Chairman
Federal Energy Regulatory Commission

February 3, 2010

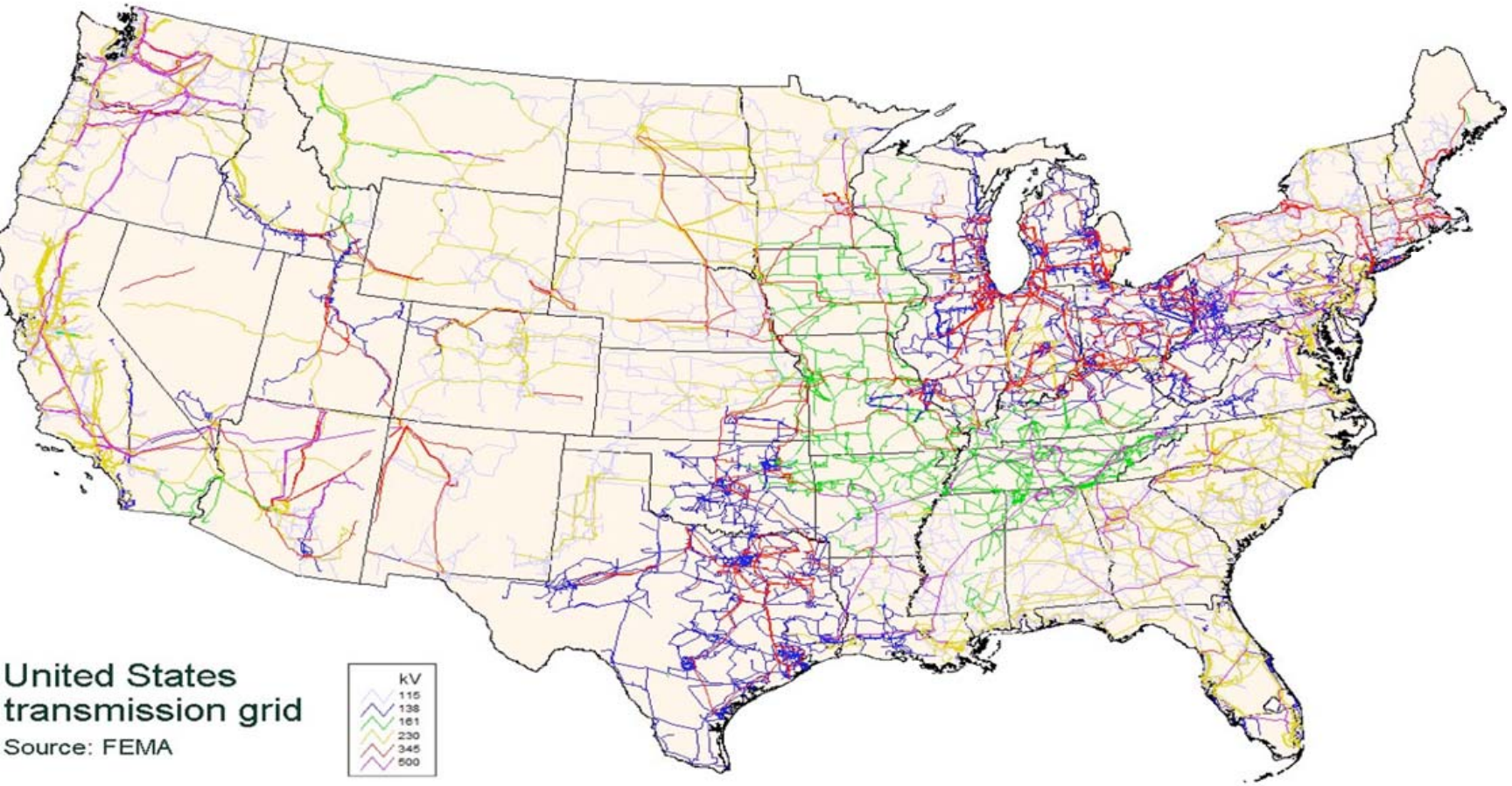

Competitive Renewable Energy Zones (CREZ)
Docket No. 35665
Attachment A
AEP TCC
AEP TNC
Bandera
Brazos
CenterPoint
Cross Texas
ETT
LCRA
Lone Star
Oncor
Sharyland
STEC
TMPA
WETT
Priority
Panhandle 3
Panhandle 1
OKLAHOMA
ARKANSAS
LOUISIANA
NEW MEXICO
Central
McCamey
MEXICO
SCALE: 1" = 25 MILES

Transmission Initiatives Adapt to US Wind Growth

Transmission Project Examples



Transmission Initiatives Adapt to US Wind Growth
Transmission Project Examples

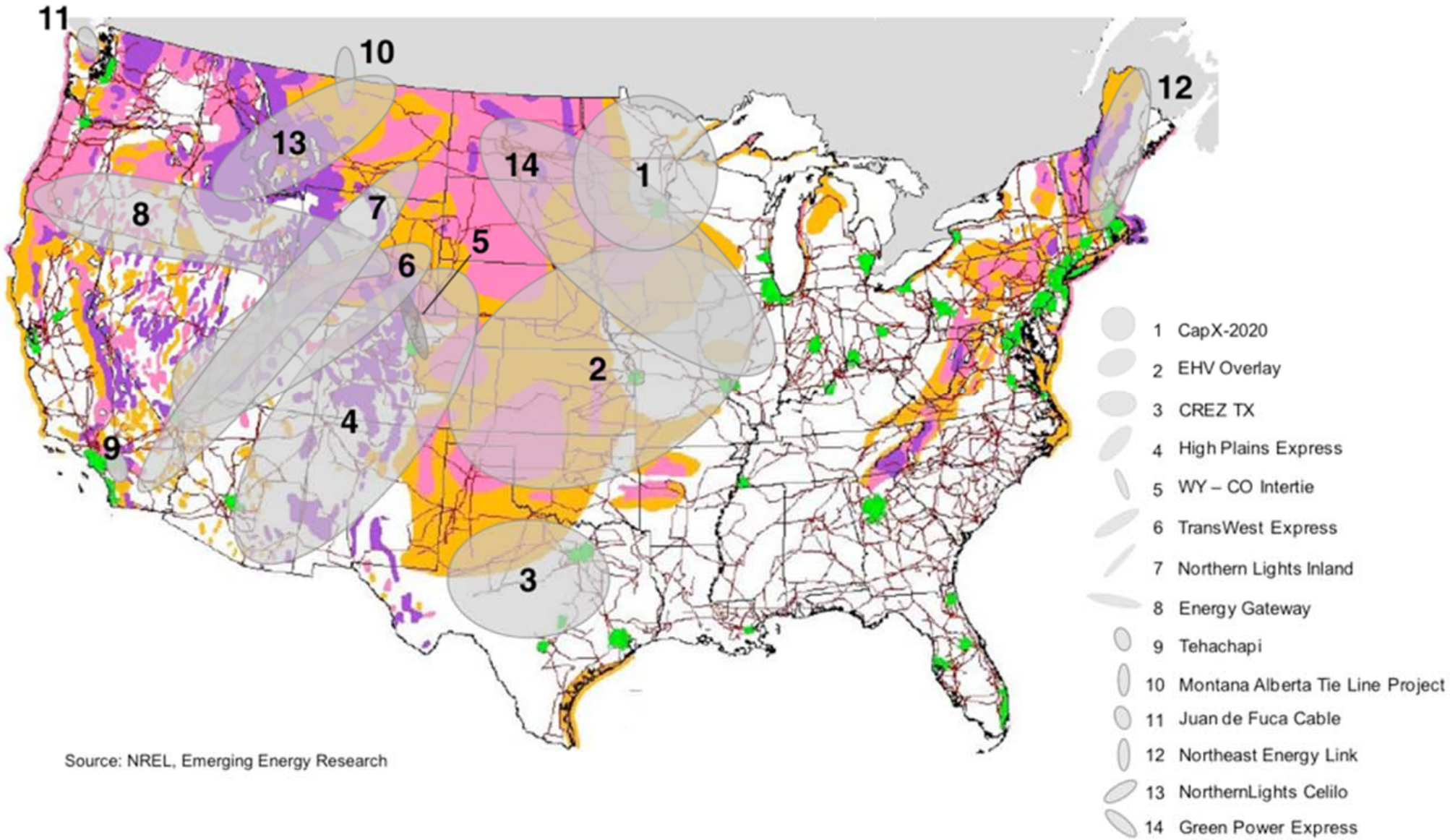


United States transmission grid

Source: FEMA

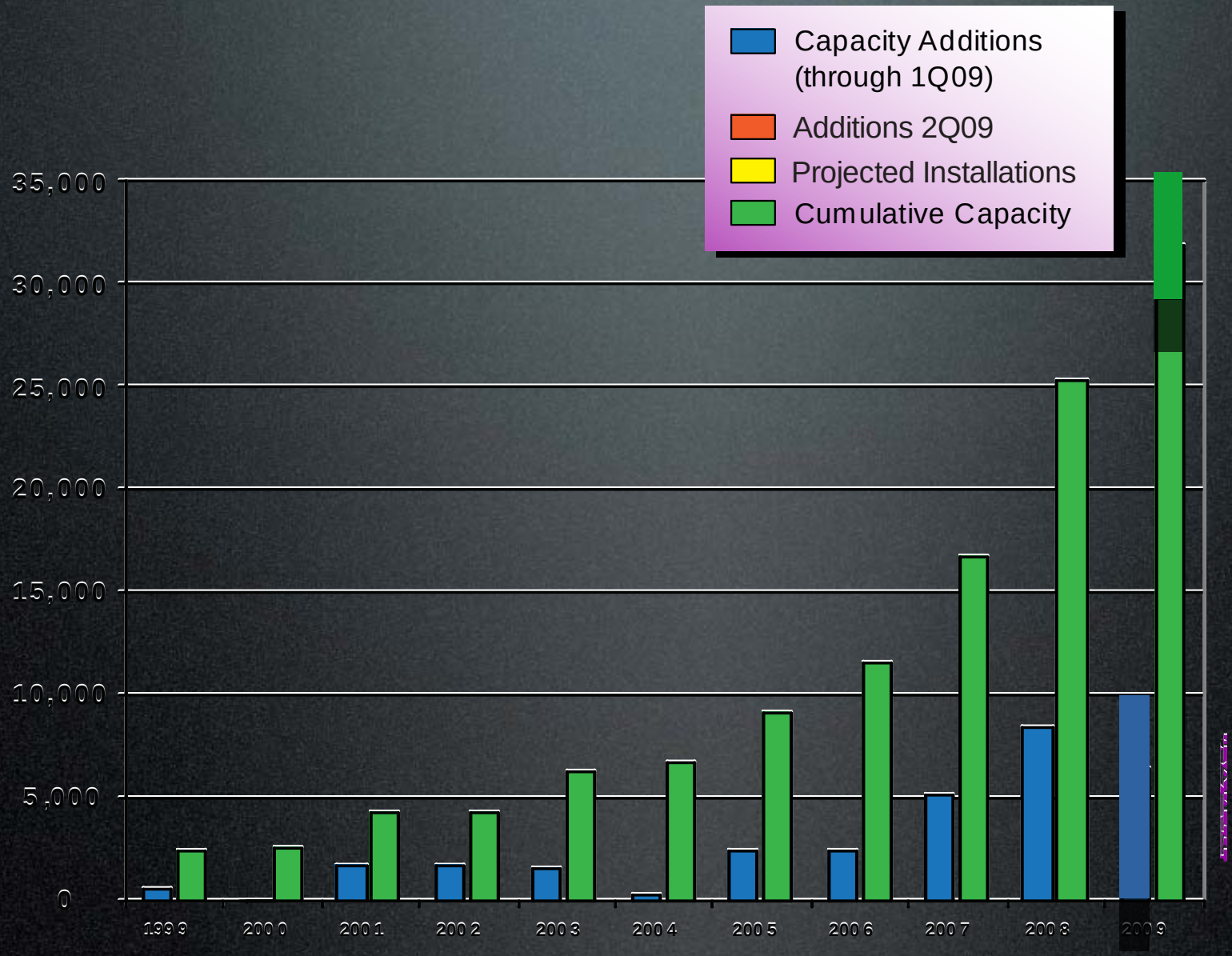
Transmission Initiatives Adapt to US Wind Growth

Transmission Project Examples

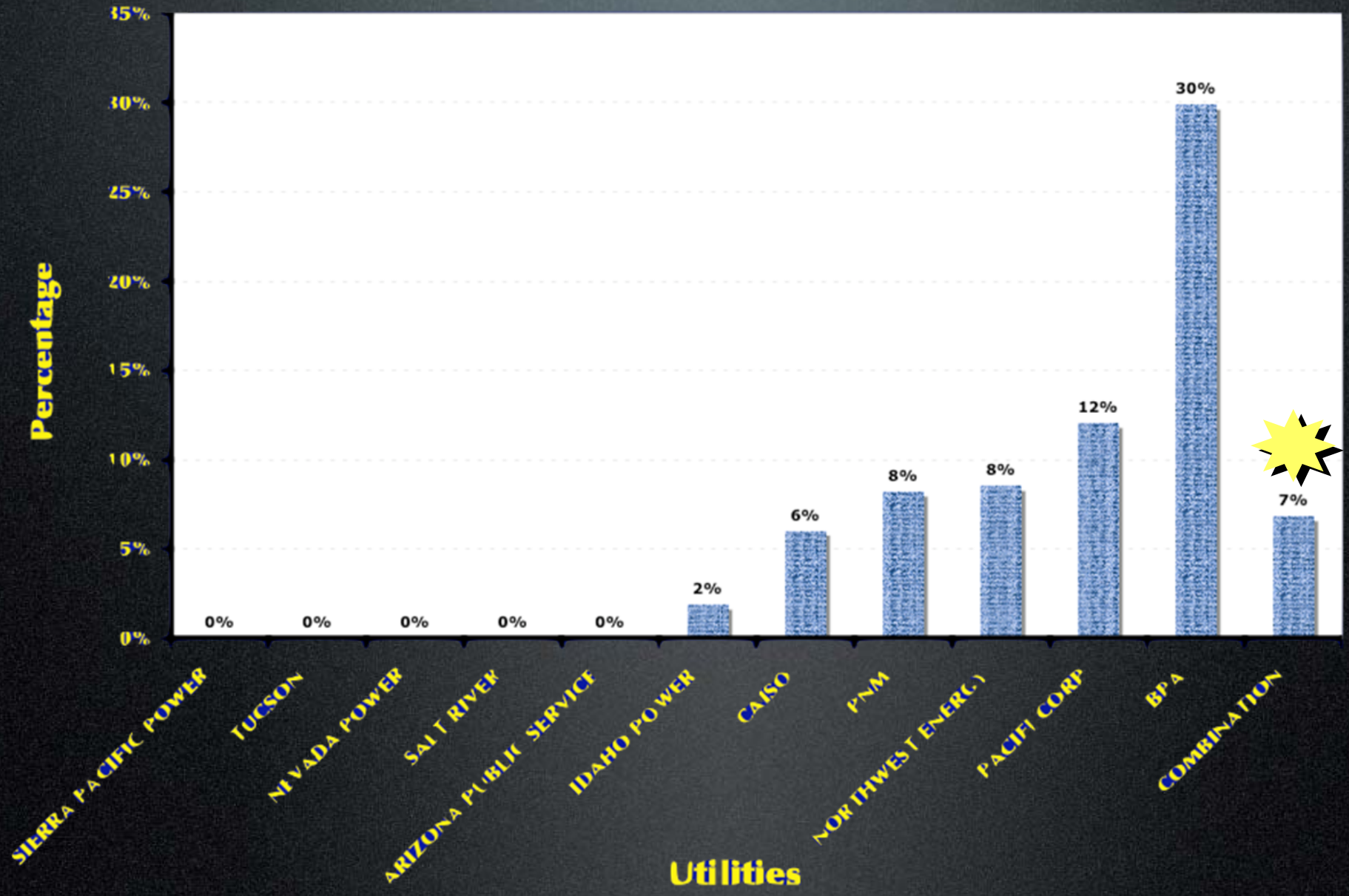


Source: NREL, Emerging Energy Research

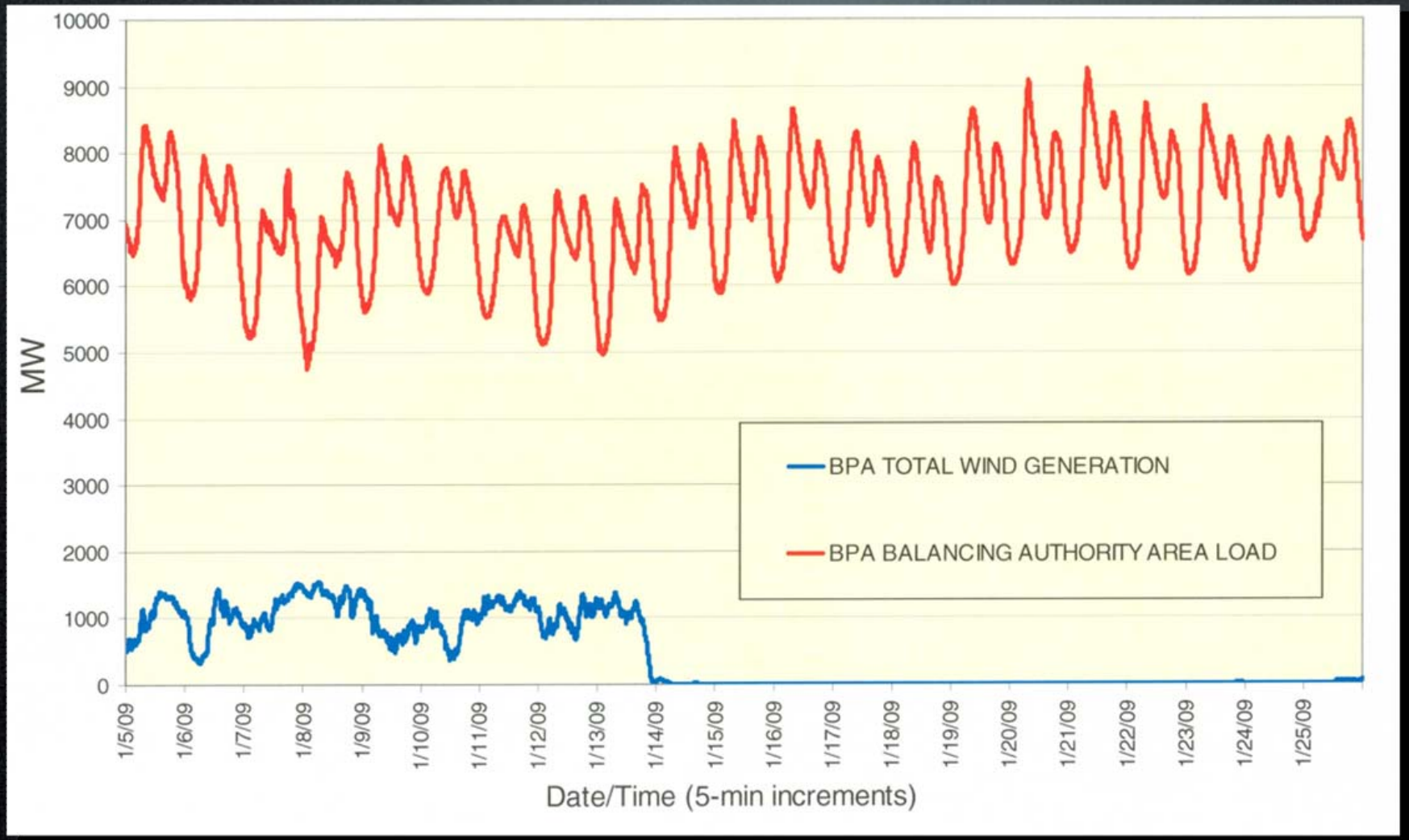
New Wind Additions



Wind Penetration as % of Peak Load- WECC

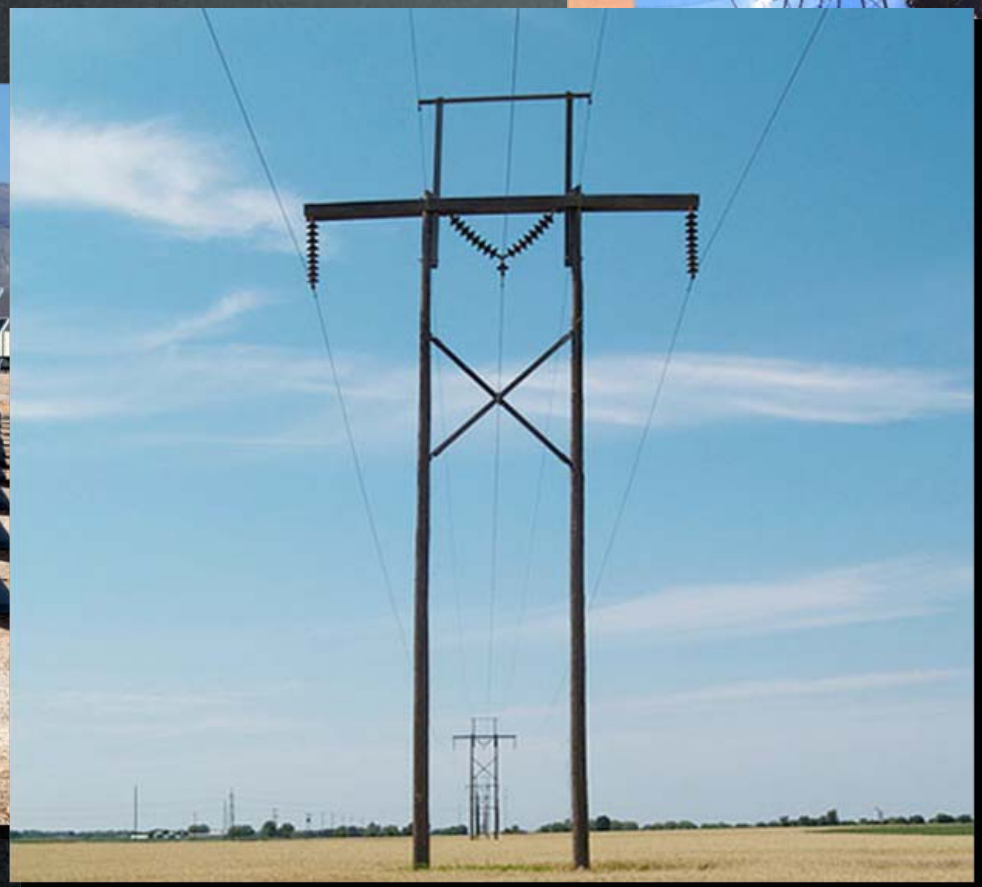


BPA Load & Wind Generation
January 5 to January 25 2009

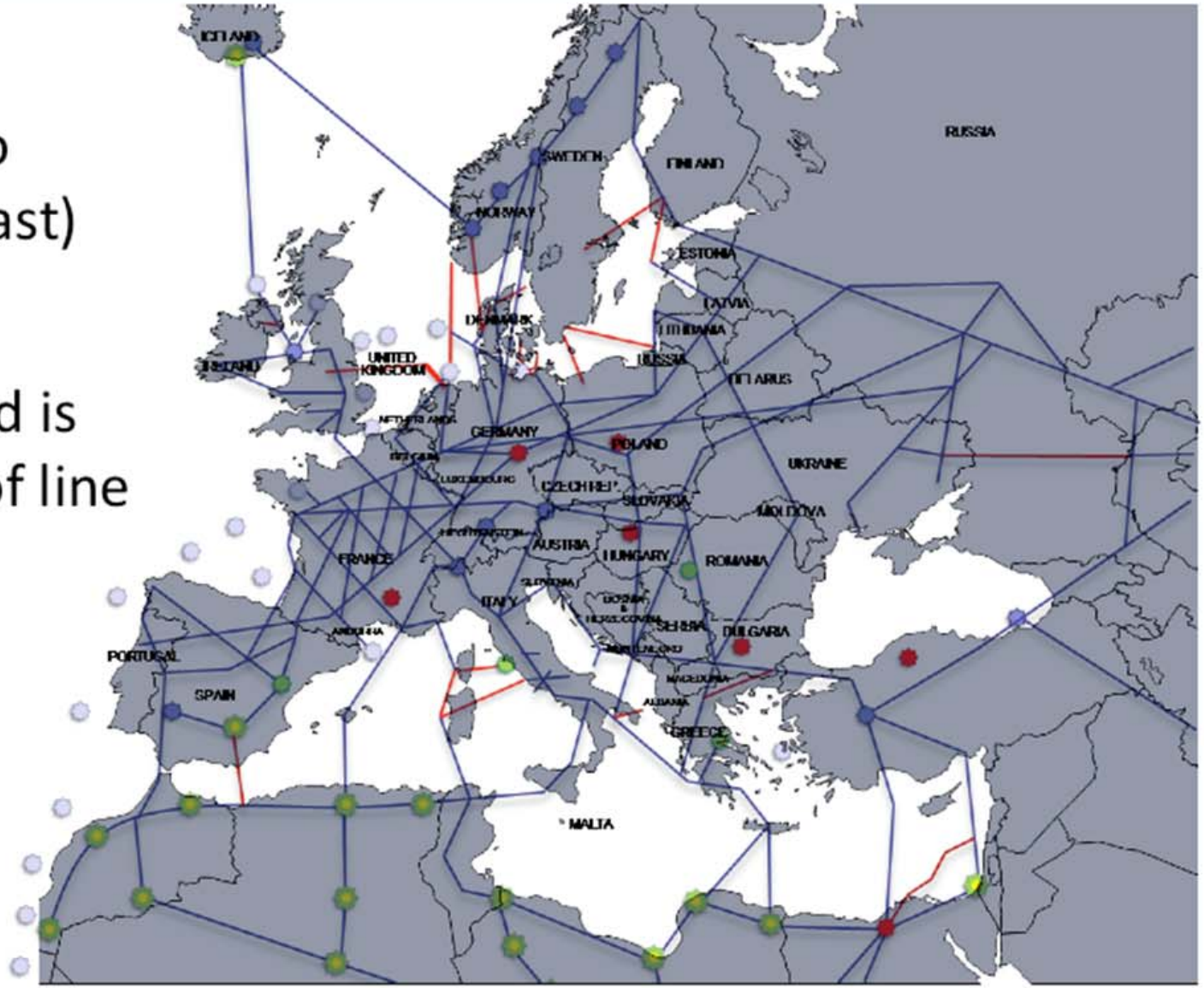


“Transmission is the Achilles heel of Renewable Energy.”

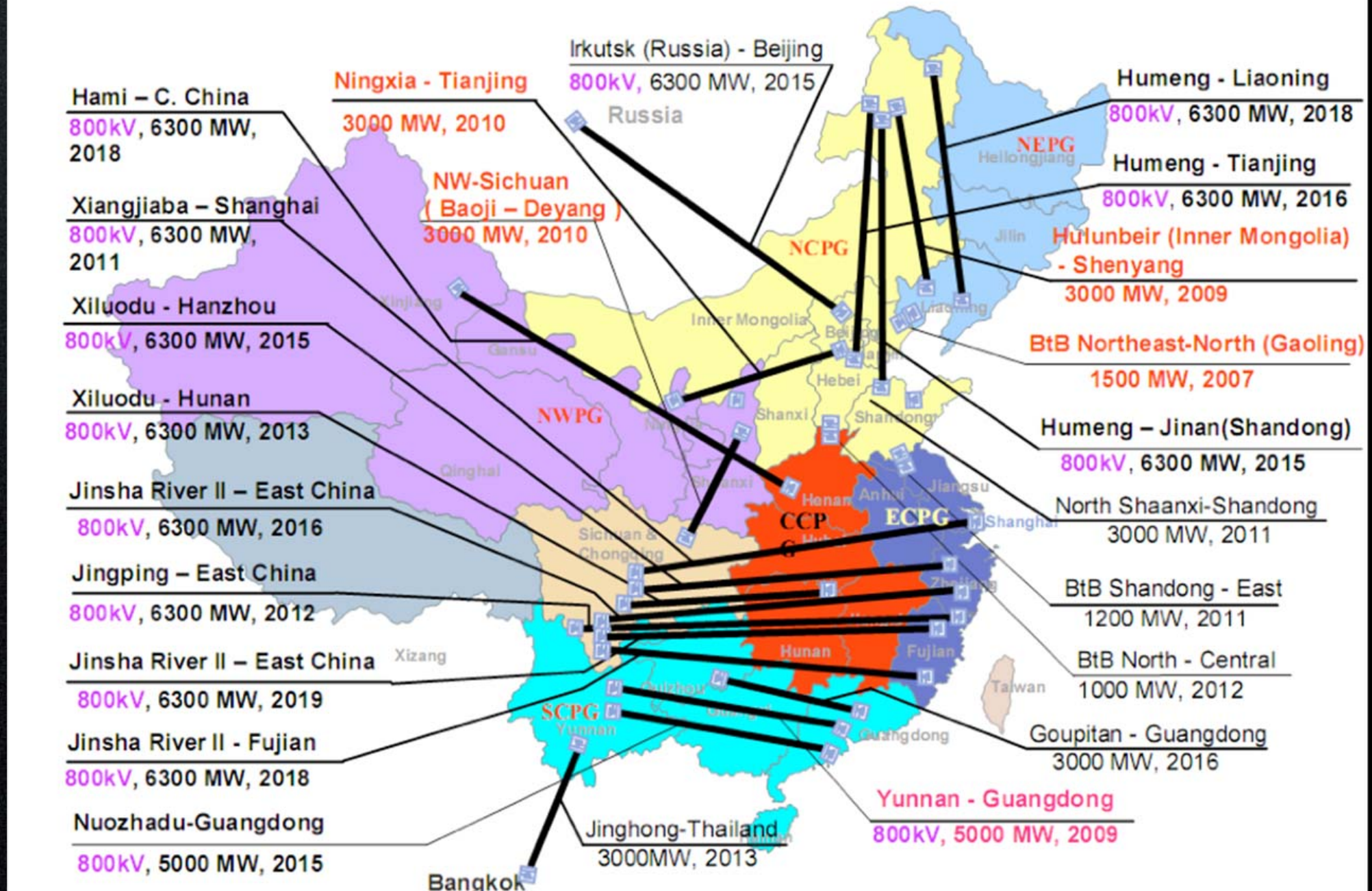
Bennett Johnson



- From Iceland (Northwest) to Israel (Southeast) = 3,200 mi
- Concept of grid is 25,000 miles of line



The new high-voltage network would range from the Sahara to the polar cap. The concept calls for main lines that are 40,000 kilometers long. And parts of it already exist.

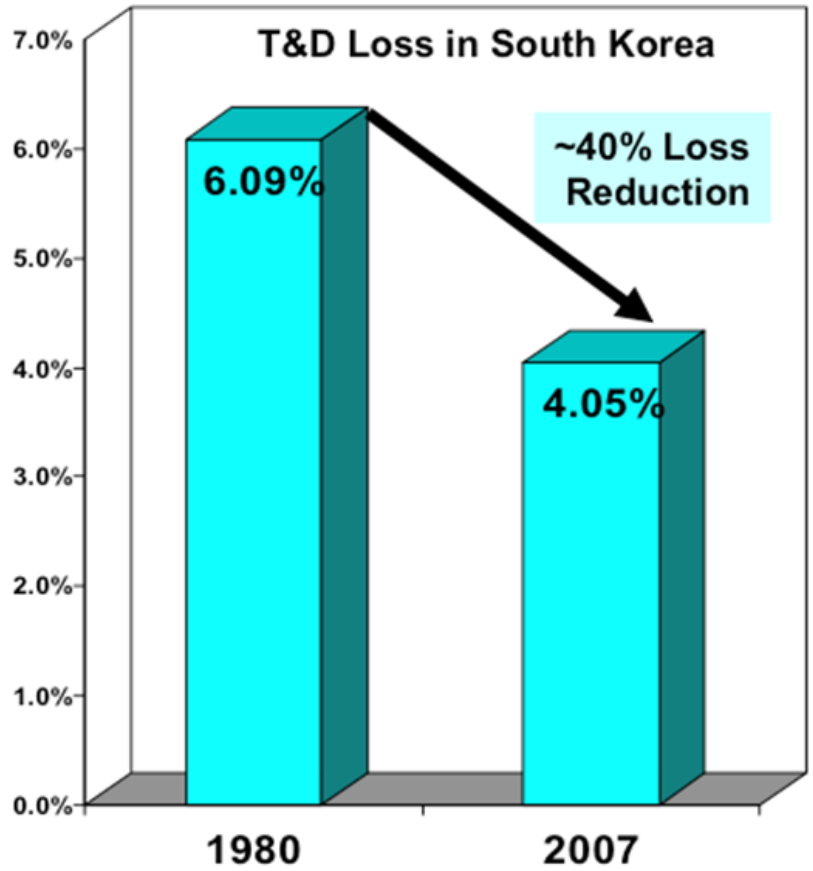

Irkutsk (Russia) - Beijing
800kV, 6300 MW, 2015
Russia
Ningxia - Tianjing
3000 MW, 2010
Hami – C. China
800kV, 6300 MW, 2018
NW-Sichuan
(Baoji – Deyang)
3000 MW, 2010
Xiangjiaba – Shanghai
800kV, 6300 MW, 2011
Xiluodu - Hanzhou
800kV, 6300 MW, 2015
Xiluodu - Hunan
800kV, 6300 MW, 2013
Jinsha River II – East China
800kV, 6300 MW, 2016
Jingping – East China
800kV, 6300 MW, 2012
Jinsha River II – East China
800kV, 6300 MW, 2019
Jinsha River II - Fujian
800kV, 6300 MW, 2018
Nuozhadu-Guangdong
800kV, 5000 MW, 2015
Bangkok
Jinghong-Thailand
3000MW, 2013
Yunnan - Guangdong
800kV, 5000 MW, 2009
Goupitan - Guangdong
3000 MW, 2016
BtB North - Central
1000 MW, 2012
BtB Shandong - East
1200 MW, 2011
North Shaanxi-Shandong
3000 MW, 2011
Humeng – Jinan(Shandong)
800kV, 6300 MW, 2015
BtB Northeast-North (Gaoling)
1500 MW, 2007
Hulunbeir (Inner Mongolia) - Shenyang
3000 MW, 2009
Humeng - Tianjing
800kV, 6300 MW, 2016
Humeng - Liaoning
800kV, 6300 MW, 2018
NEPG
NCPG
NWPG
CCPG
ECPG
SCPG
Inner Mongolia
Hebei
Shanxi
Henan
Anhui
Jiangsu
Shanghai
Hunan
Fujian
Taiwan
Yunnan
Guangdong
Xizang
Qinghai
Gansu
Xinjiang
Jilin
Liaoning
Hellongjiang

Transmission Efficiency

South Korea achieved major improvements and reduced T&D Losses by 40% in less than 30 years by:

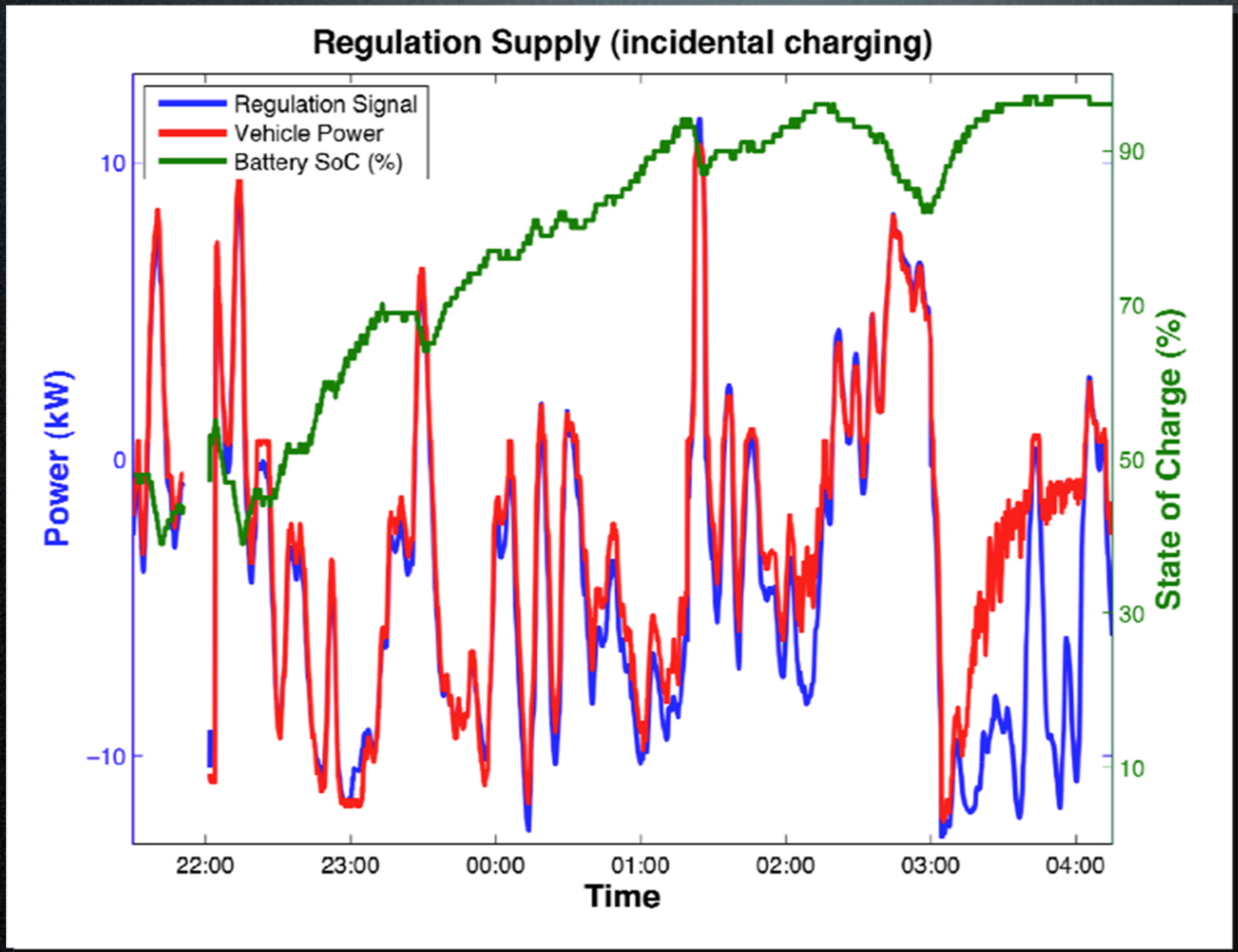
- Standardizing and upgrading transmission and distribution voltages
- Building a higher voltage overlay
- Utilizing low loss conductor and transformers
- Reactive power control.

T&D Efficiency Improvement is Achievable Using a Full Portfolio of Technologies.

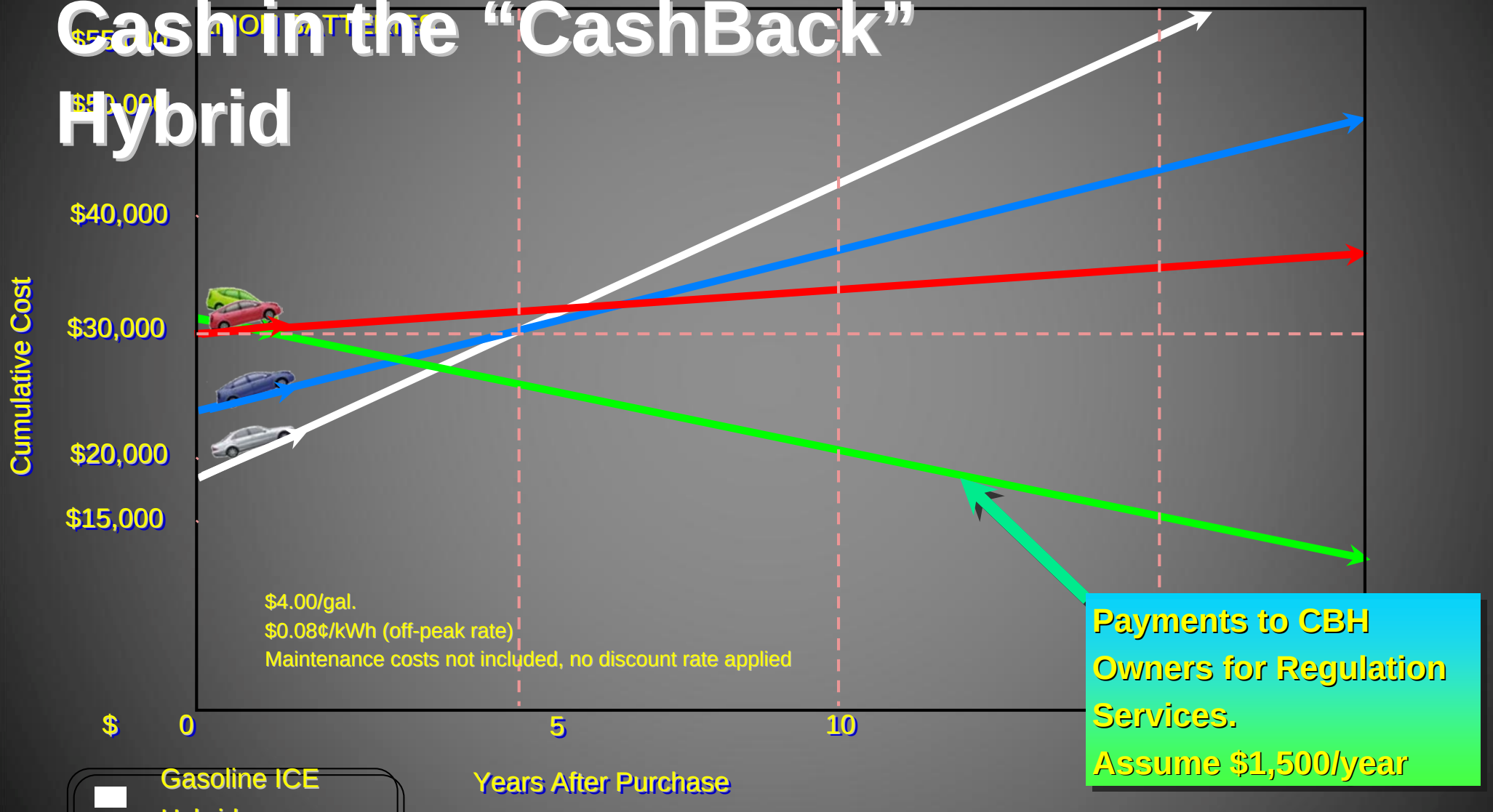


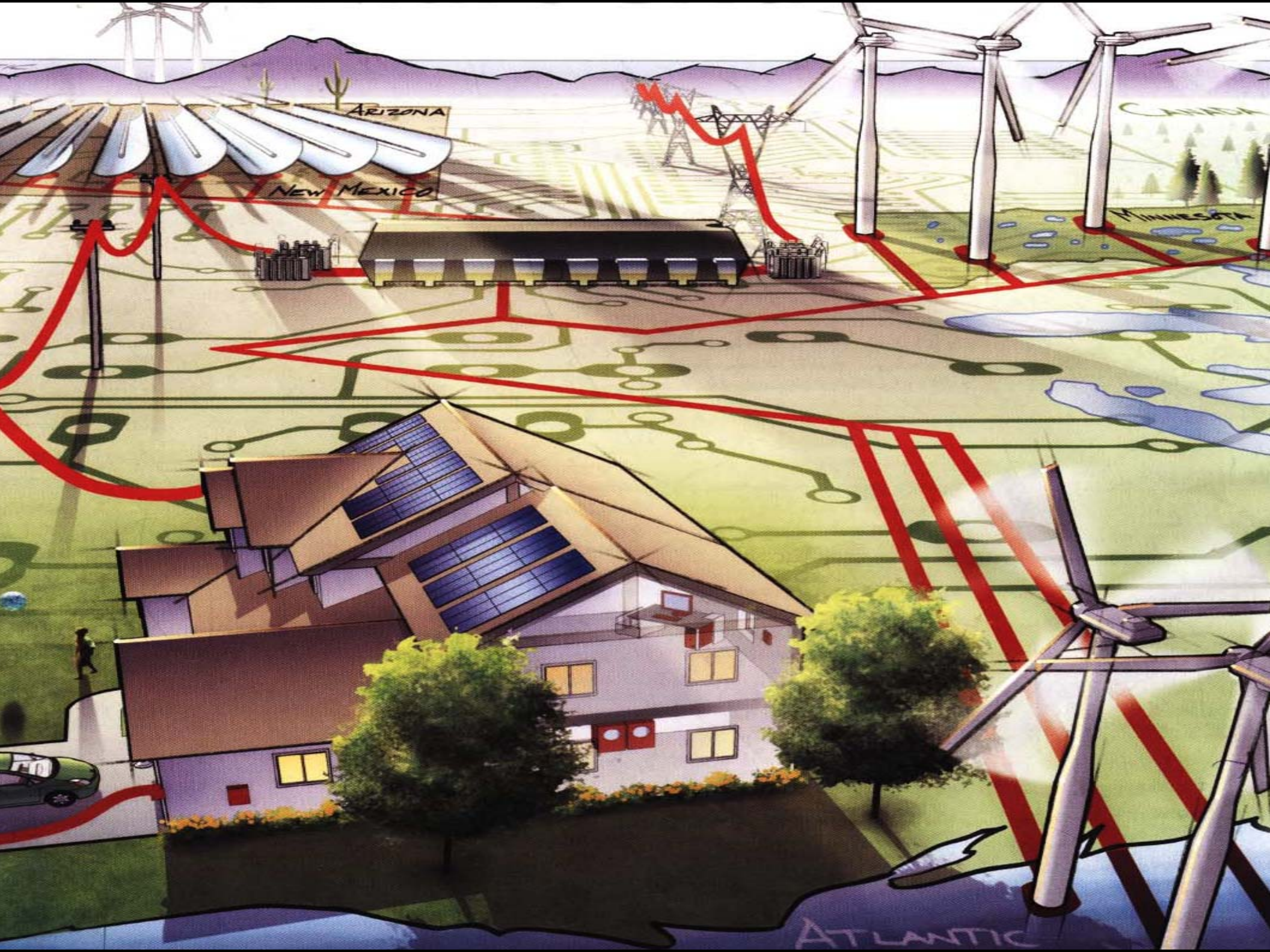
Demonstration of Regulation Services

Regulation Service While Charging



Regulation Service Payments- Cash in the "CashBack" Hybrid




ARIZONA
NEW MEXICO
MINNESOTA
ATLANTIC