NEW YORK STATE Public Service Commission

Electricity Policy: A Call for a National Solution?

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Disclaimer: The following presentation is solely the opinion of Chairman Brown and is not intended to reflect the opinion of the NYS Public Service Commission or NYS Department of Public Service staff.

Electric Policy: A Call for a National Solution?

- The U.S. electric utility industry faces five major challenges:

  Global Warming
  Improving Energy Efficiency
  Reducing Dependence on Fossil Fuel through Renewable Resources
  Rebuilding an Aging Infrastructure
  Creating a Smart Grid

- Huge investment is required to meet the challenges!

- Where will the investment come from?

- Who will decide how the investment will be recovered?

Electric Policy: A Call for a National Solution?

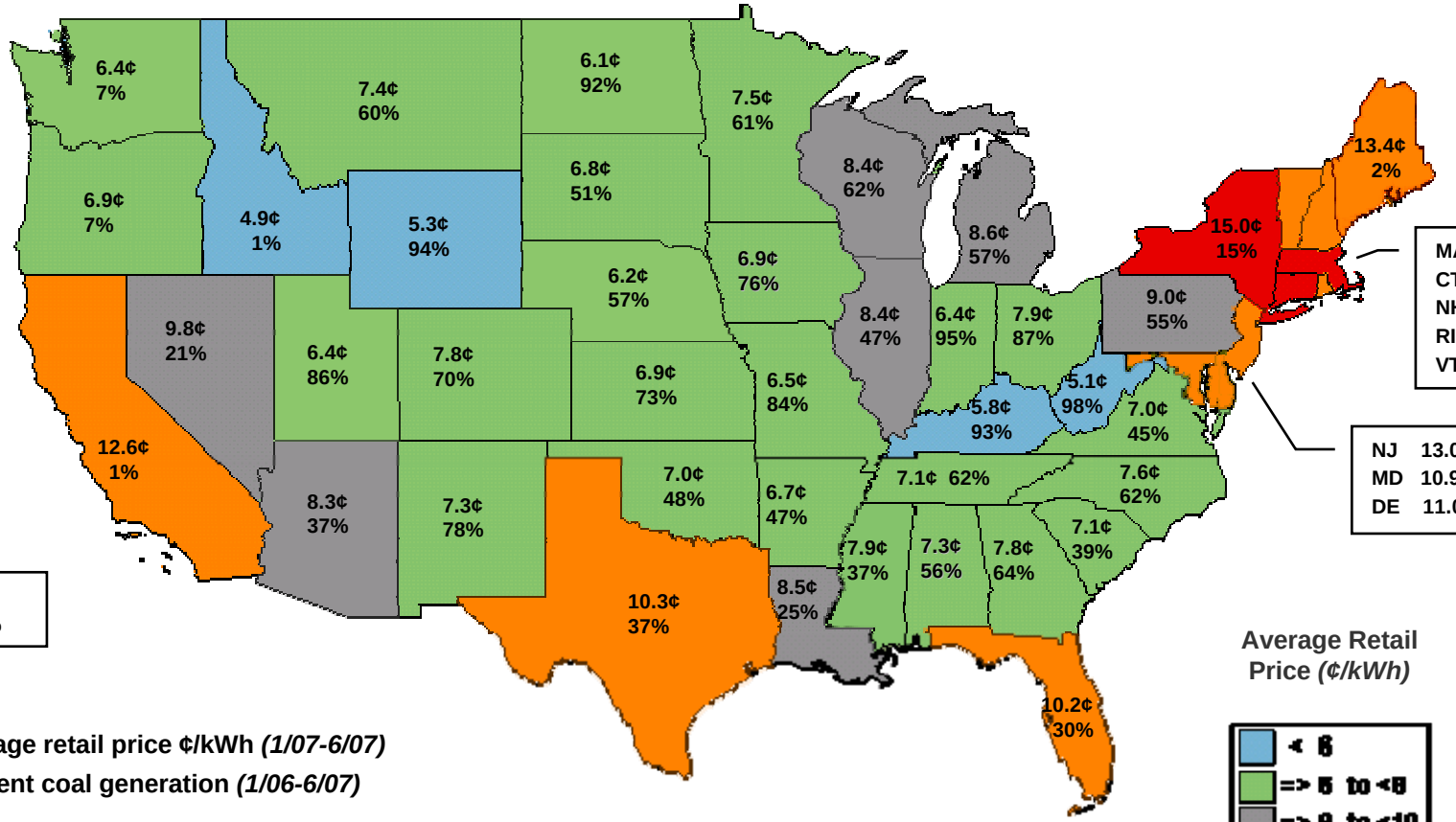
- These 5 challenges require unprecedented cooperation on a national level to solve.
- Market design is **not** the fundamental issue.
- Under current regulatory regimes (markets or non-markets), the costs to achieve these objectives fall almost entirely on electric rate payers through the state decision-making process.

Electric Policy: A Call for a National Solution?

- Yet, in reality, states compete with each other in many ways.
- The cost of electricity is highly variable between states and regions.
- Variability due mostly to natural resource base, environmental policies, and geography.

Generation Fuel & Price

Average Retail Price (¢/kWh) & Percentage of Generation from Coal



MA	15.2¢	27%
CT	16.4¢	13%
NH	13.8¢	16%
RI	13.0¢	0%
VT	12.0¢	0%

NJ	13.0¢	15%
MD	10.9¢	60%
DE	11.0¢	65%

AK	12.8¢	9%
HI	20.0¢	15%

Average Retail Price *(¢/kWh)*

- < 6
- => 6 to <8
- => 8 to <10
- =>10 to <12
- =>12 to <14
- =>14

¢ = average retail price ¢/kWh *(1/07-6/07)*

% = percent coal generation *(1/06-6/07)*

Source: U.S. Energy Information Administration

The 5 Major Challenges

- The lack of a comprehensive Federal energy policy has created a vacuum.
- EPAct addressed some issues, but only “around the edges.”
- The challenges are currently being addressed on a state-by-state or regional basis.

Global Warming

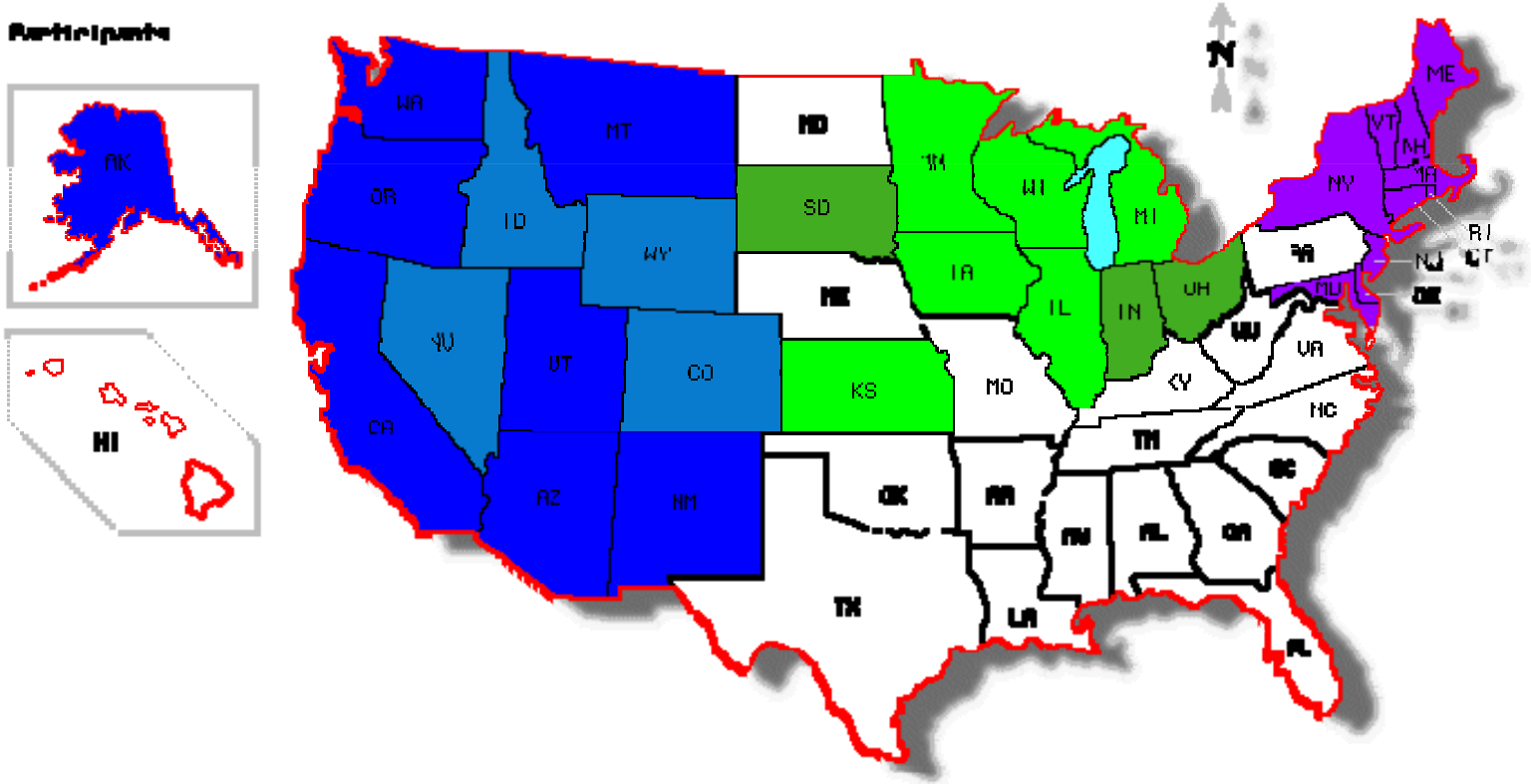
- Global climate concerns will change the way utilities do business by requiring development of low-emission generation sources.

Global Warming

- It is a global issue and concern.
- However, climate change efforts in the U.S. have largely been regional affairs.
- Lack of Federal action resulted in states voluntarily entering into programs to fill the void and “jump start” the process.

3 REGIONAL GREENHOUSE GAS INITIATIVES

- RGGI Participants
- RGGI Observers
- Midwestern Accord
- Accord Observers
- WCI Participants



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Global Warming

- **Regional Greenhouse Gas Initiative:** 10 states seek to cap CO_2 emissions and then lower cap by 10%.
- **Western Regional Climate Action Initiative:** 7 states seek to reduce global warming pollution 15% below 2005 levels by 2020.
- **Midwestern Regional Greenhouse Gas Reduction Accord:** 6 states seek to establish greenhouse gas reduction targets and develop cap-and-trade mechanism.

Global Warming

- Clearly, there are costs associated with reducing greenhouse gas emissions, and these costs will be borne by ratepayers within the active regions.

- The failure of not having a national global warming gas policy puts active regions at a competitive disadvantage compared to states that do not have such a policy.

Improving Energy Efficiency

- Bold steps are needed to improve energy efficiency and reduce consumption of costly fossil fuels.
- Energy efficiency is the most cost-effective, and most immediate, way to reduce rising energy and environmental costs on residential and business customers.
- Doing nothing is not an option.

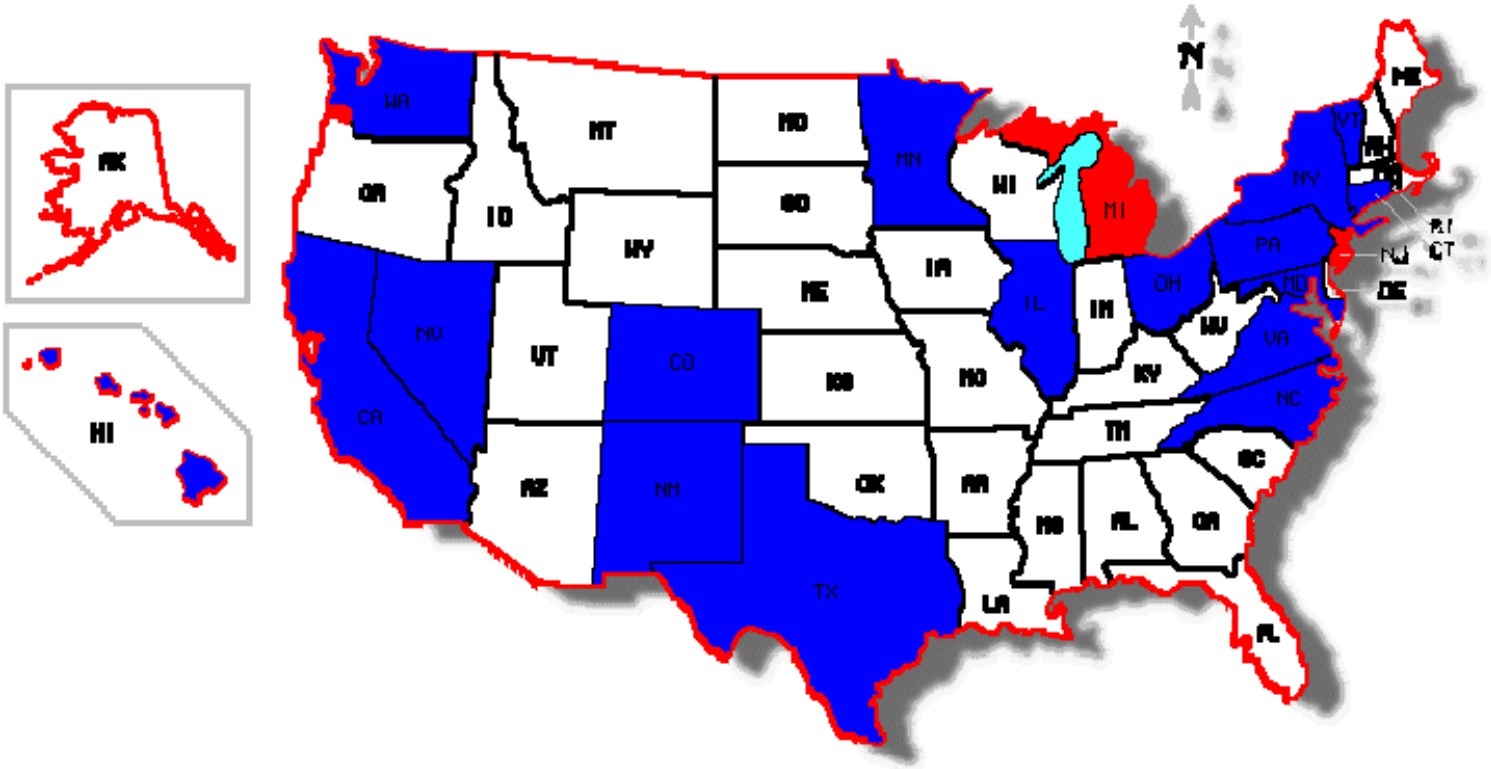
Improving Energy Efficiency

- Proper approach requires Federal/State partnerships.

- Certain programs require Federal leadership (e.g. appliance efficiency standards).

ENERGY EFFICIENCY (EE) PROGRAMS TAKE ROOT

- Existing EE Programs
- Pending EE Programs



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Source: America Council for an Energy-Efficient Economy

Improving Energy Efficiency

- Without a national energy efficiency policy, states seeking to reduce energy consumption will be at a competitive disadvantage on a cents/Kwh basis compared to those that do not.

- Focus needs to be on bills rather than rates.

States Ranked by Average Retail Price (cents/kWh)

Hawaii	20.72	North Carolina	7.53
Massachusetts	15.45	New Mexico	7.37
New York	15.27	Oklahoma	7.30
Connecticut	14.83	Alabama	7.07
Rhode Island	13.98	Illinois	7.07
New Hampshire	13.84	Iowa	7.01
Alaska	12.84	Arkansas	6.99
California	12.82	South Carolina	6.98
New Jersey	11.88	Minnesota	6.98
Maine	11.80	Tennessee	6.97
Vermont	11.37	Montana	6.91
Florida	10.45	Kansas	6.89
Texas	10.34	Virginia	6.86
Delaware	10.13	South Dakota	6.70
Maryland	9.55	Oregon	6.53
Nevada	9.63	Indiana	6.46
Pennsylvania	8.88	Missouri	6.30
Mississippi	8.53	North Dakota	6.21
Louisiana	8.30	Washington	6.14
Arizona	8.24	Nebraska	6.07
Michigan	8.14	Utah	5.99
Wisconsin	8.13	Kentucky	5.43
Ohio	7.71	Wyoming	5.27
Georgia	7.63	West Virginia	5.04
Colorado	7.61	Idaho	4.52

Source: U.S. DOE (2006)

Dependence on Fossil Fuel

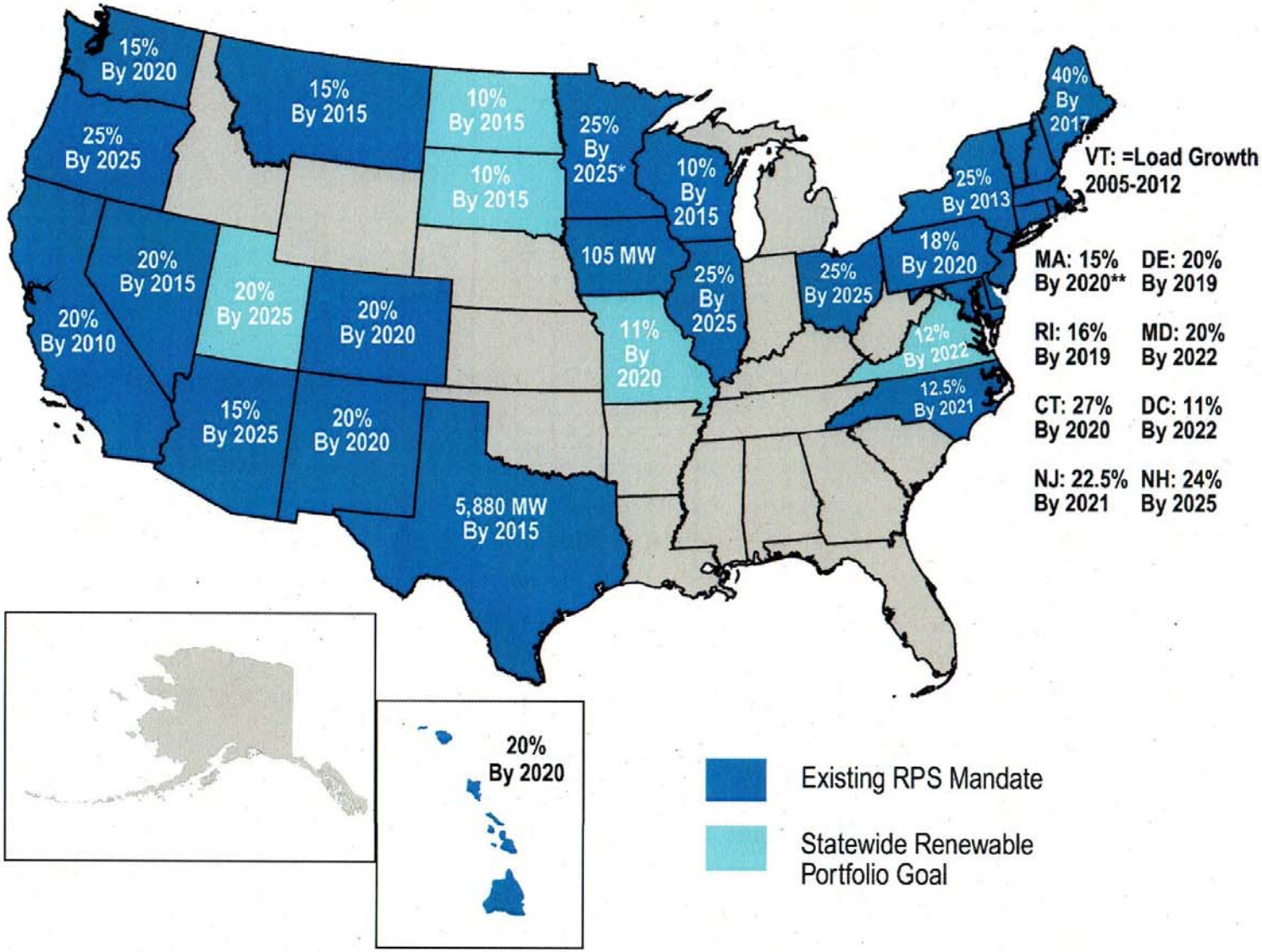
- Renewable Portfolio Standards (RPS) have the potential to improve energy security and help diversify the state's electricity generation mix.
- RPS initiatives spur increased economic development opportunities in the renewables industry, including the attraction of renewable technology manufacturers and installers.
- Still not cost-effective in the short-term.

Dependence on Fossil Fuel

- RPS initiatives address increasing concerns with the climate effects of, and over-dependence on, fossil-fired generation.

- Development of renewable, clean energy generation is of paramount necessity.

State Renewable Portfolio Standards and Goals



Source: Brattle Group

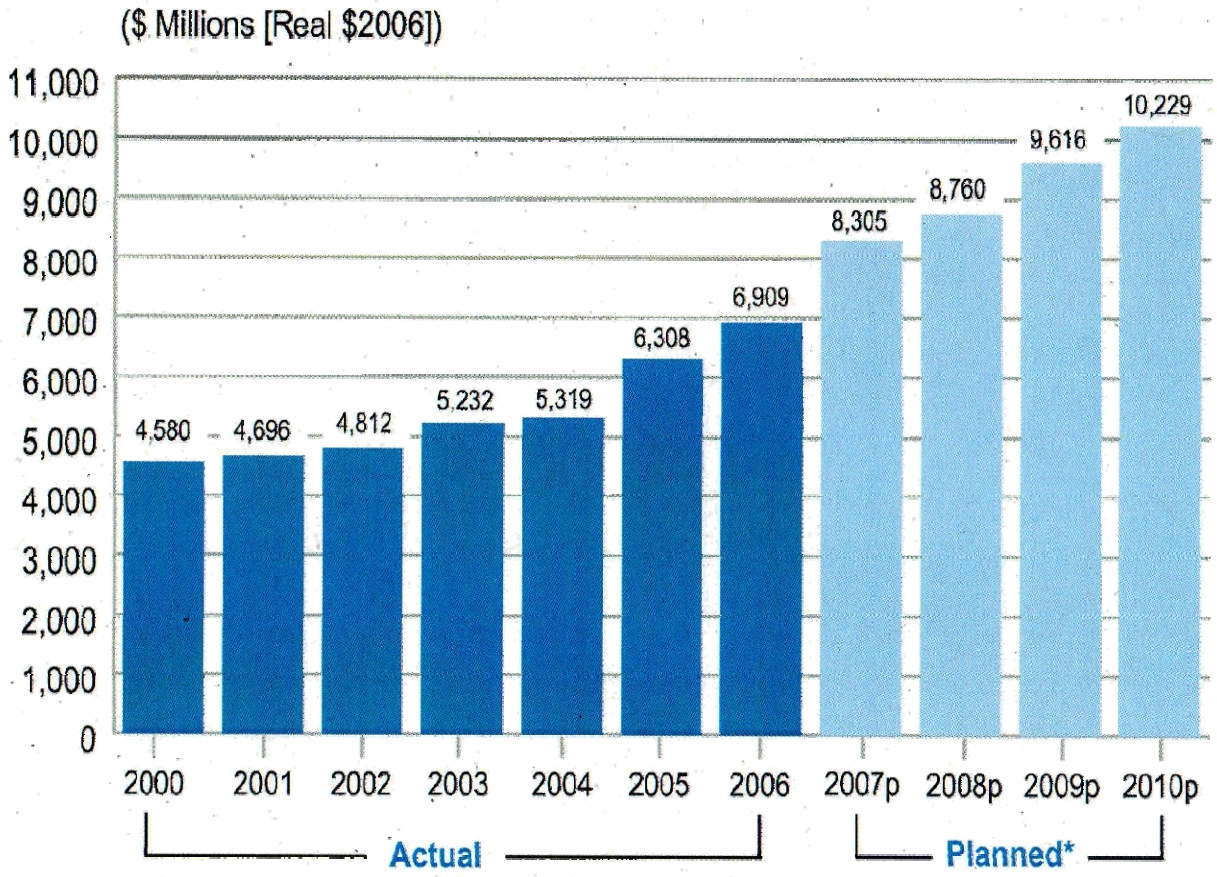
Rebuilding an Aging Infrastructure

- New distribution end-use technologies, such as advanced automation and communications and plug-in hybrid electric vehicles, will change how utilities deliver electricity and how customers use electricity.

- Remote location of best wind resources increases the need for transmission investment.

- By 2030, the electric utility industry will need to make a total infrastructure investment of $1.5 trillion to $2 trillion (Brattle Group, 2008).

Actual and Planned Transmission Investment By Shareholder-Owned Electric Utilities (2000-2010)



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Note: The Handy-Whitman Index of Public Utility Construction Costs used to adjust actual investment for inflation from year to year. The GDP Deflator used to adjust planned investment for inflation from year to year. Data represent both shareholder-owned utilities and stand-alone transmission companies.

Source: Brattle Group

Rebuilding an Aging Infrastructure

- 214 GW of new generation capacity would be required by 2030, at an investment cost of $697 billion (Brattle Group, 2008).
- Required transmission and distribution investment could be as large as, or larger than, generation investment.
- Energy efficiency and demand response programs could significantly reduce, but not eliminate, the need for new generation.

Projected Cost of New Transmission 2008-2015
Millions of Dollars (Nominal)

	Voltage Level					
Year	**AC 230**	**AC 345**	**AC 500**	**AC 765**	**DC 500**	**Total AC & DC**
2008	$784.3	$421.1	$220.7	$0.0	$0.0	**$1,426.1**
2009	$1,916.4	$785.1	$2,467.7	$0.0	$0.0	**$5,169.2**
2010	$932.6	$1,346.7	$3,061.4	$0.0	$2,280.9	**$7,621.5**
2011	$816.9	$0.0	$2,662.3	$0.0	$0.0	**$3,479.2**
2012	$1,008.3	$3,776.1	$3,654.4	$0.0	$0.0	**$8,438.8**
2013	$79.0	$427.0	$2,151.2	$0.0	$0.0	**$2,657.2**
2014	$113.2	$607.1	$10.1	$0.0	$0.0	**$730.4**
2015	$176.9	$2,423.0	$410.8	$0.0	$0.0	**$3,010.7**
Total (2008-2015)	**$5,827.6**	**$9,786.1**	**$14,638.7**	**$0.0**	**$2,280.9**	**$32,533.2**

Note: Totals may not equal sum of components due to independent rounding.

Source: Brattle Group

Recent Unit Transmission Costs
2008 Dollars

Voltage (kV)	Cost (Thousands of Dollars/Mile)	Capacity (MW)*	Cost (Millions of Dollars/GW-Mile)*
230	$2,076.5	500	$5.46
345	$2,539.4	967	$2.85
500	$4,328.2	2,040	$1.45
765	$6,577.6	5,000	$1.32

Assumptions, Sources, and Notes:

Source is EEI's "Transmission Projects at a Glance," January 2008.

Projects that use underground lines, have more than three segments, or have significantly mixed voltage levels are excluded.

The cost of projects is assumed to be given in 2007 dollars unless specified, and has been adjusted using the 2007 to 2008 percentage change in the Handy-Whitman Index.

*Based on a subset of projects where capacity was reported. Gigawatt miles are calculated by multiplying the capacity of the line (in GW) times the length of the line (in miles).

Source: Brattle Group

Rebuilding an Aging Infrastructure

- If the electric grid is to be considered a critical part of the national infrastructure – and treated as such – there is an example of how such a Federal/state partnership might work…


National Highway System

Rebuilding an Aging Infrastructure

- But there are significant challenges in building both intra-state and inter-state transmission lines.

- Case Study: **New York Regional Interconnect (NYRI)**

NYRI: Hearings for a proposed 190-mile in-state investor-owned transmission line to move upstate electricity to New York City drew 1,700 people…out of 370 public statements made during the hearings, only 5 were in favor.

Creating a Smart Grid

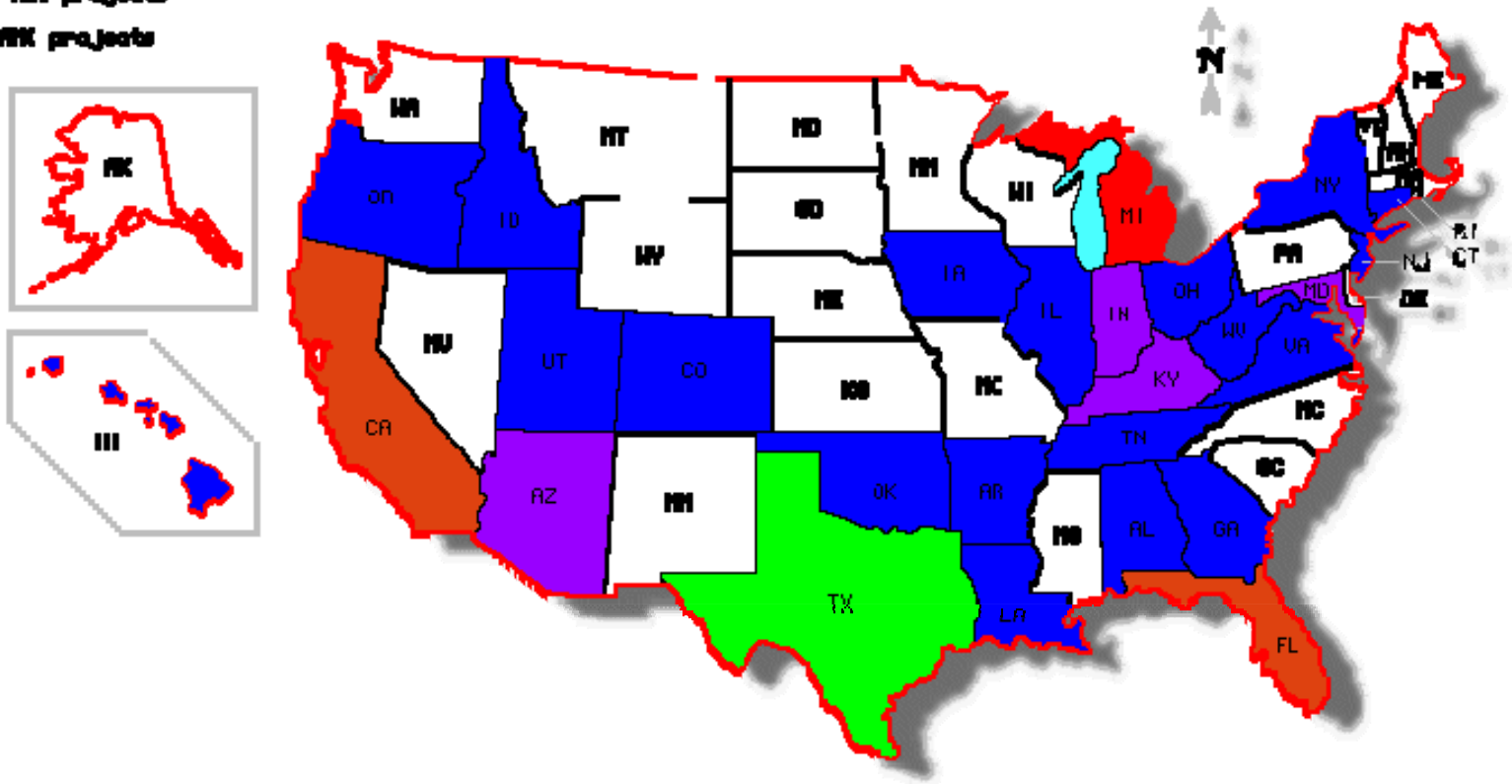
- "Smart Grid": Everyone is for it, but what exactly does it mean?
- Electric meters have never been asked to do much other than to accurately record the flow of electricity, and in some cases measure the customer's demand requirements.
- Technology available to meter and communicate electricity usage data has evolved dramatically in the past few years.

Creating a Smart Grid

- According to KEMA, there are 70 Advanced Metering Infrastructure (AMI) projects in various stages of implementation in the U.S. that potentially involve changing out nearly 50 million meters.

AMI Projects and Meters

- 1-2 MM projects
- 3-4 MM projects
- 5-6 MM projects
- 7-8 MM projects
- 9-10MM projects



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Source: KEMA

Creating a Smart Grid

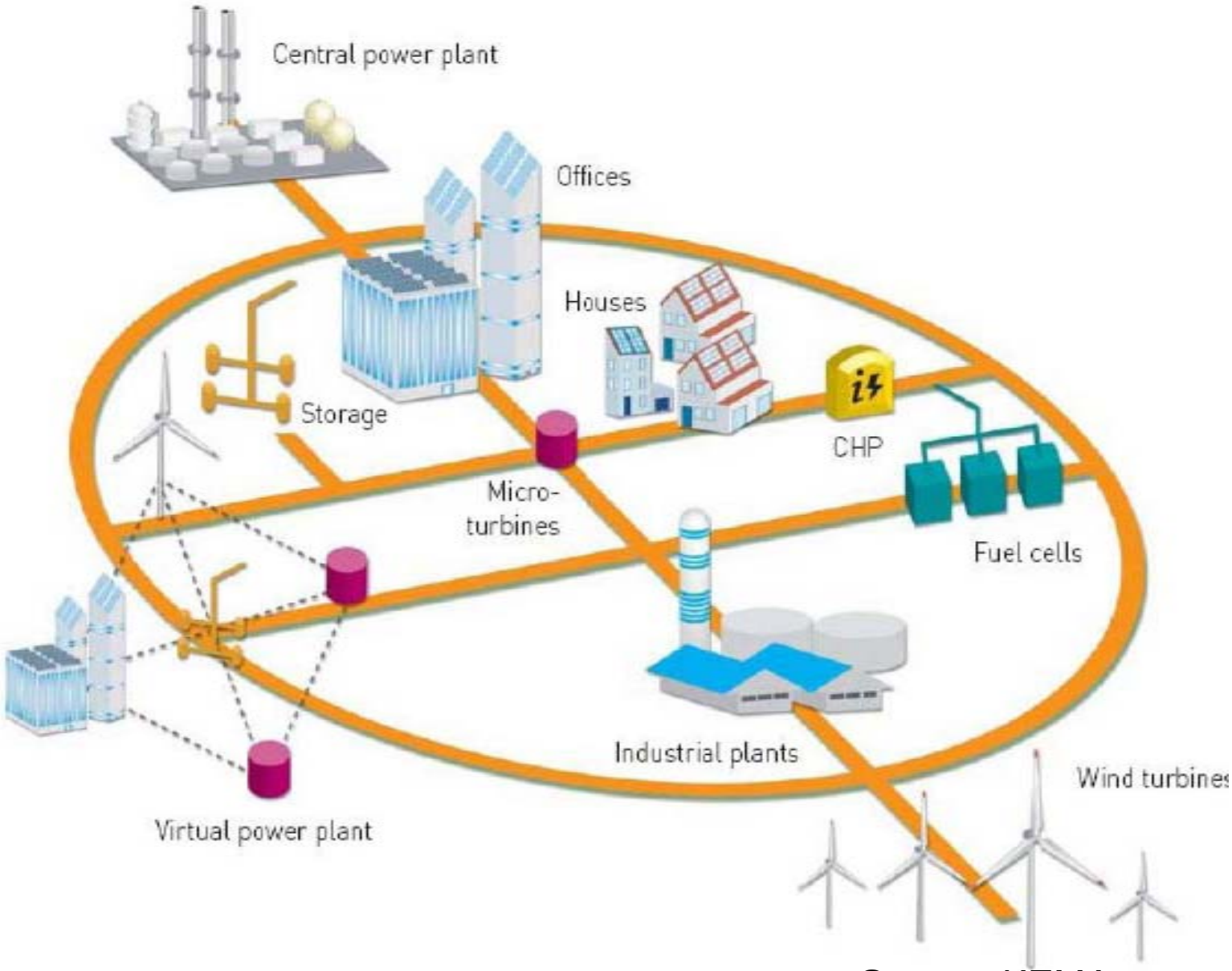
- Smart metering can provide utilities with better information about the nature and extent of outages, which when integrated into the utility's operation procedures, may reduce the duration, or perhaps even the frequency, of outages.
- Numerous systems and protocols are being tested and piloted. Will we miss out on larger opportunities through the creation of a Byzantine structure?

Creating a Smart Grid

- Benefits are realized by those customers who enjoy shorter outages. However, all customers benefit from faster restoration of service over the technology's expected asset lifetime.
- Investments in smart metering substantially alter the nature of electric services. It involves invoking judgments about how consumers use and value electricity.

Creating a Smart Grid

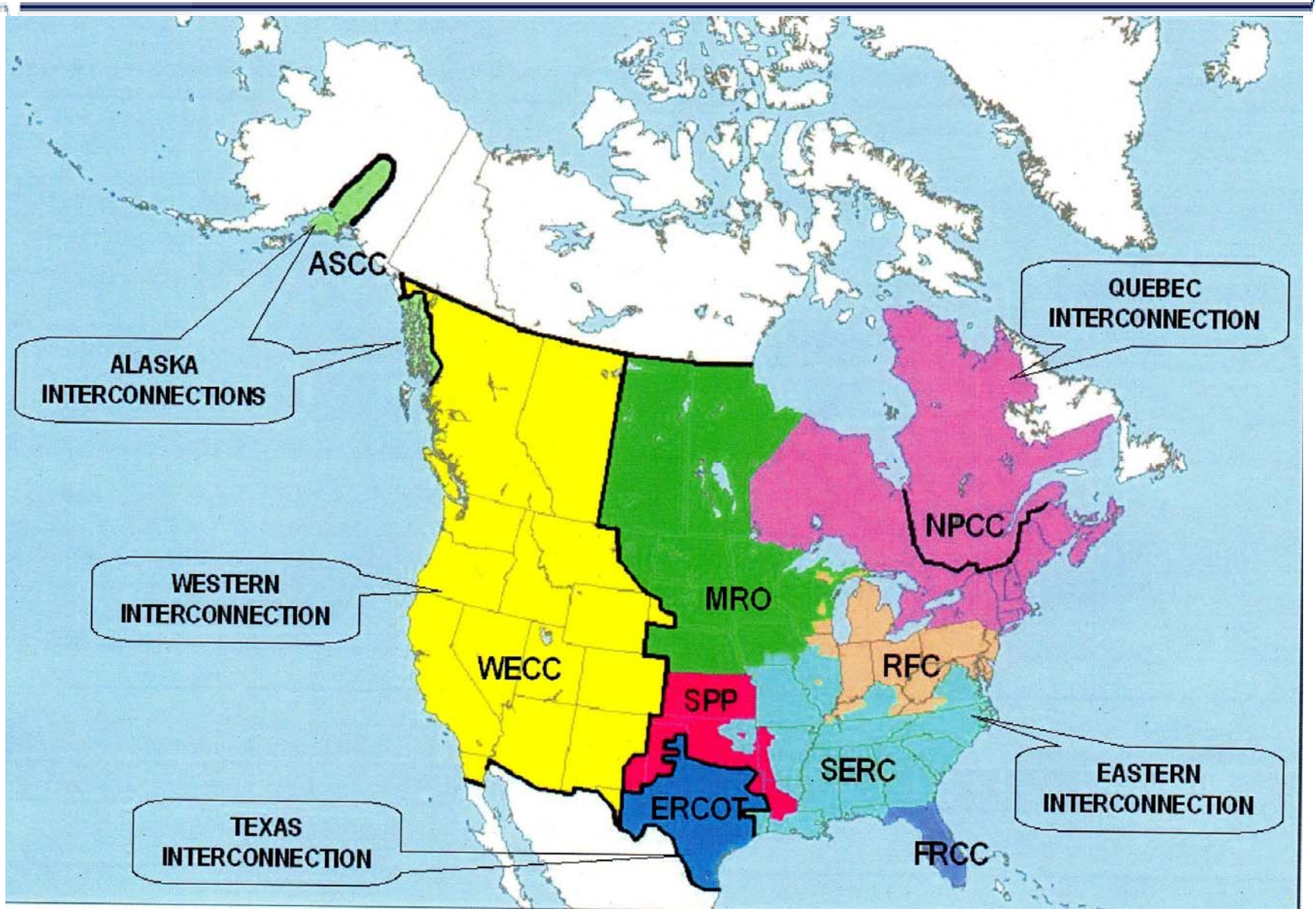
- Smart metering may foster growth of plug-in hybrid vehicles.
- It provides a way to impose varying pricing schemes that are consistent with minimizing environmental impacts.
- Word to the wise: You don’t want smart meters and dumb electricity rates.


Central power plant
Offices
Houses
Storage
CHP
Micro-
turbines
Fuel cells
Industrial plants
Wind turbines
Virtual power plant

Source: KEMA

A Unified Electric System Already Exists

- The Eastern Interconnection: the largest, most complex machine in the world…
  - 34 states, 7 provinces
  - 56 regulatory commissions
  - 13 control organizations
  - 100s of power providers
- Frustratingly, the state-by-state regulatory system doesn't mimic physics…electrons can't read maps.


ASCC
ALASKA INTERCONNECTIONS
QUEBEC INTERCONNECTION
NPCC
WESTERN INTERCONNECTION
MRO
WECC
RFC
SPP
SERC
EASTERN INTERCONNECTION
ERCOT
TEXAS INTERCONNECTION
FRCC

Conclusions

- First, be very careful what you wish for…
- What's called for is a Federal/State two-way street approach, not a one-way thoroughfare.
- Examples exist, e.g. FERC's granting the ability for states to establish their own reliability rules as long as it's not lower than FERC standards.

Conclusions

- One of the major values of organized markets has been to add a more regional perspective.
- A coherent energy policy can't be developed under the auspices of 50+ regulatory bodies.
- There are appropriate roles and responsibilities for both state and Federal entities.
- Finally, balancing appropriate state rule with a need for a national solution is critical.