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Energy Regulation in Vermont: Purpose, Means, History, Trends

House Committee on Energy and Technology

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Why do we focus on power?

- Electricity is the defining feature of a modern economy
- The industry is undergoing terrific change
 - Technological changes
 - Changing economics of energy, and
 - Urgent environmental challenges
- Some of this is absolute (technology, costs, consumer choices) and will happen regardless of policy
- Some of this seems imperative (address environmental issues, retain fairness) but is a policy choice
- To meet today's challenges we must: align the private interest with the public good, and balance regulation with market forces

Vermont Matters

A state, even a little one,
can make a difference.

Exports:

- Computer chips, maple syrup
- Efficiency and integrated resource planning
- *Efficiency Vermont*
- The Regional Greenhouse Gas Initiative
 - Allowance auctions and revenues “recycled” into clean energy investment
- Leadership on energy, environment, and climate policy (among other things)



WHAT HAPPENS IN
VERMONT
GOES GLOBAL!

Who is RAP?

- Non-profit, non-partisan NGO
- Former utility and environmental regulators, consumer advocates, industry officials, and policymakers
- Mission: To help governments develop policies that will ensure the long-term economic and environmental sustainability of the power, gas, and energy sectors
- Not advocates:
 - We don't take positions in regulatory or other litigated proceedings
 - Work directly with decision-makers in government and industry
- Global perspective: programs in the US, China, Europe, and India

Frederick Weston: RAP's Policy Director, formerly China Program Director. Economist and Hearing Officer at the VT PSB (now PUC) for 11 years, consultant on energy policy in Boston, with AIG in the Middle East, holds advanced degree from the Fletcher School of Law and Diplomacy.

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The Purpose of Regulation

Promoting the Public Good



What is a utility and what is its role?

- It operates under a franchise granted by the state
- Most are **natural monopolies**; all provide an essential service
- It has “an obligation to serve”
- It must provide service at posted prices, available to all who qualify for them
 - “Undue discrimination” is illegal
- A utility performs an important function in a society, which is not entirely commercial:
 - Striking a sound balance between its public service role and its compensation enables capital to flow at reasonable costs, and consumer expectations to be reasonably met

What is economic regulation?

- An exercise of the police power of the state
 - Constrained by the state and federal Constitutions
 - Takings and due process
- It is not a contract with the regulated entity
 - There is no “regulatory compact”
 - Not necessarily true in other countries, where the terms of regulation are often set out in contracts
- Fundamental objectives:
 - Preventing abuses of monopoly power by industries “affected with the public good”
 - Efficiency and fairness

The regulator's role

- Extensions of legislatures, executing powers and oversight originally exercised by legislatures
- Independent
 - Removed from the political process to a significant degree, empowered to make decisions that appropriately balance competing interests: they make the hard decisions
- Expert bodies
- Quasi-judicial, not merely tribunals for dispute resolution, but charged with “promoting the public good”
 - They can look forward, anticipate issues and directions, and clarify and, in so doing, minimize risk
 - They can open investigations on their own motion

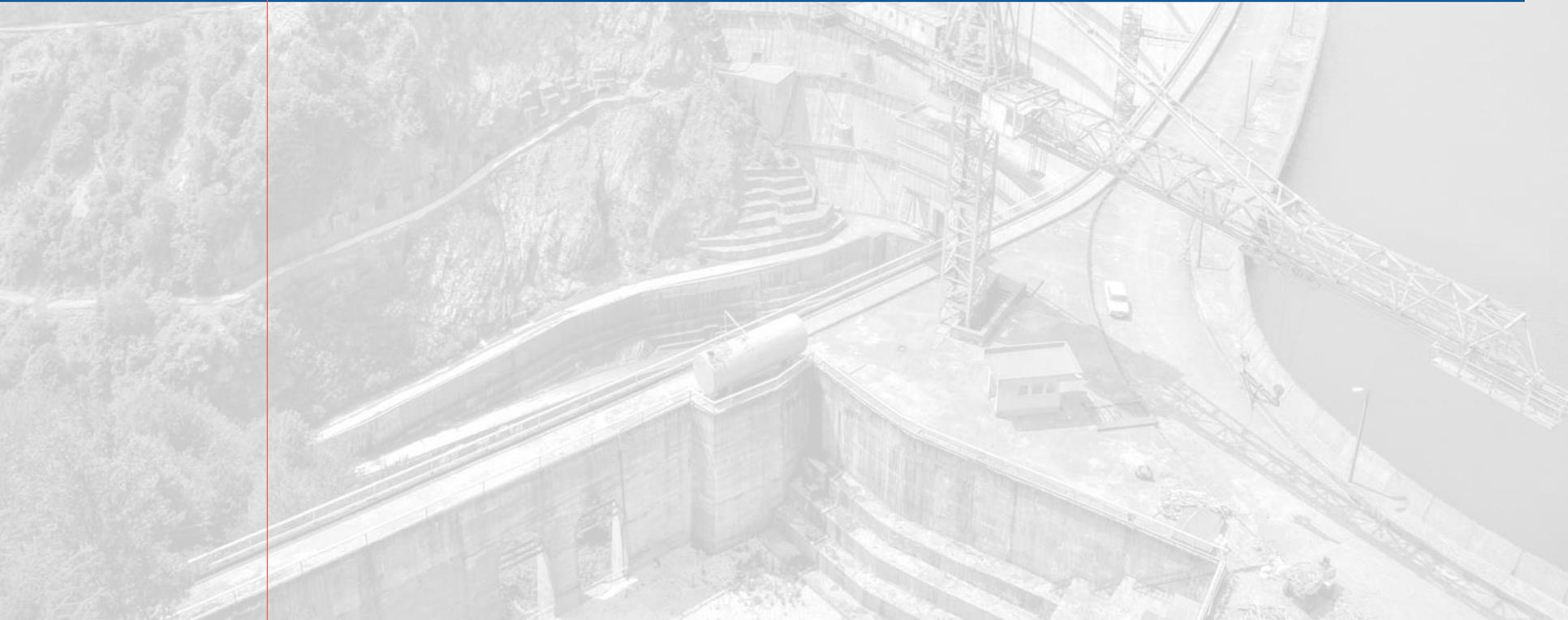
The regulator's role

- Process is important
 - Provides notice
 - Fair: decisions based on evidence
 - Access
 - Affected parties can participate
 - Visible to the public and press
 - Disciplined: process obeyed and decisions are made
- Regulation is not a popularity contest, and sometimes unpopular choices are in the best public interest
- There are inherent dilemmas in regulation, balance is typical. **Courage, leavened with realism, is essential.**

2

Ratemaking: The Essential Regulatory Act

Just and Reasonable Prices



Objectives of Economic Regulation

- Economic efficiency
- Fair prices
 - To consumers and revenue adequacy for the utility
- Reasonable service, with nondiscriminatory access for all
- Adequate quality and reliability
- Other policy considerations

Pricing: Efficient and Fair

- “Just and reasonable” rates
 - Posted tariffs
 - Fair, equitable, based on the general principle that the cost-causer pays
 - Rates sufficient but no more than necessary to cover the costs of meeting demand, including investment and return on investment
 - Most efficient if rates send proper economic signals to end-users, who are making usage and investment decisions routinely
 - “Efficient” means that the cumulative result of regulated prices drives investment by the utility and the consumer that is best for the state as a whole, however “best” is defined (overall cost, or cost plus other factors)
- Rate design
 - Structure and periodicity of prices

3 The Evolving Power Sector and its Regulation

Lowest societal cost over the long-run



Evolution of the Regulatory Model

- Realization that the entire network, from fuel to end-use, constitutes the thing that is “affected with the public interest” and should be the object of public policy
- Investment and expenditure decisions should be subject to a rigorous public review
 - Before or after?
- 1980s-90s: Integrated Resource Planning
 - 30 VSA §218c(a)(1)
- More recently – Performance-Based Regulation

All regulation is incentive regulation!

The trick is to understand what the incentives are and how they affect behavior

How Do Utilities Make Money under Traditional Regulation?

- Under traditional regulation:

$$\text{Price} = \text{Cost of Service/sales}$$

- But:

$$\text{Actual Revenues} = \text{Price} * \text{Quantity}$$

Where: Quantity = actual sales

- Which means that:

$$\text{Net income (profit)} = \text{Actual Revenues} - \text{Actual Costs}$$

- The utility makes money by:
 - Reducing costs and
 - Increasing sales

Alternative regulatory methods: “Decoupling” and Performance- Based Ratemaking (PBR)

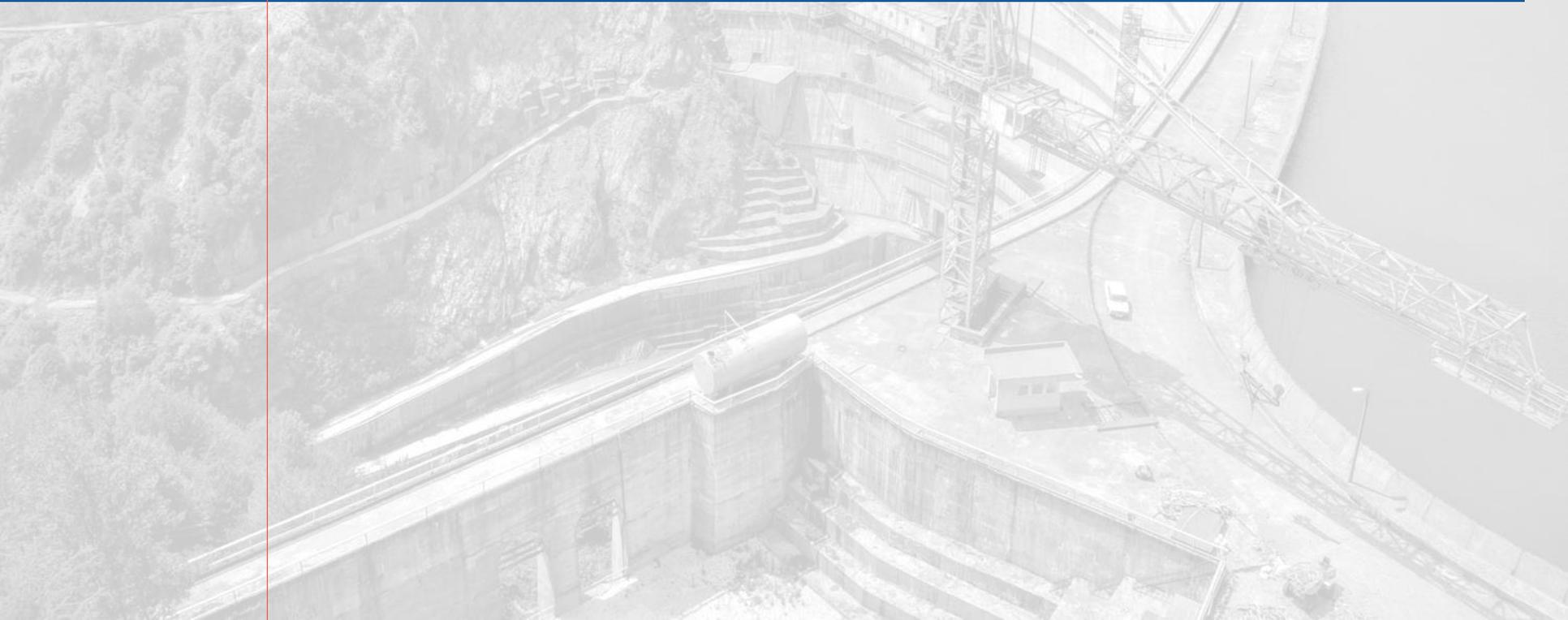
- PBR is not a new concept: It refers to any variation on traditional (price-based) regulation that aims to encourage, by the application of specific rewards and penalties, identified outcomes and behavior
 - Used extensively in telecom regulation
- “Decoupling”: a foundation for PBR
 - Breaking the link between profits and sales
 - GMP and VGS both operate under PBRs that decouple cost recovery of the network (wires and pipes) from sales of kWhs and therms

Illustrative performance metrics under PBR

- Typically, overlaid on a decoupling regulatory plan
 - In various forms, used in more than half the states and in Europe and Latin America
- Financial incentives (penalties) for achievement (failure to achieve) specified outcomes, e.g.:
 - Service quality (outages, response times, complaints)
 - Operational cost savings/smart grid investment
 - Line loss reductions
 - Power cost savings
 - Increased end-use efficiency
 - Renewables and distributed energy resources
 - Emissions reductions (per MWh)
 - Demand response participation

4 Regulation in Vermont

Institutions and History



Public Utility Commission (PUC)

- Origins in legislative attempts to regulate railroads, then Railroad Commission
- “Public good” mandate across various regulated utilities (energy, water, telco, other)
- Quasi-judicial body, 3 Members with 6-year terms, screened by the Judicial Nominating Board
- Can open investigations on its own motion
- Can proceed via rulemakings, contested cases, or via informal proceedings (workshops, stakeholder dialogues, etc.)

Department of Public Service (DPS)

- Executive Branch Utility Policy
- Statewide Planning
 - And data analysis
- Public Advocacy
 - With staff experts and bill-back authority
- Consumer Affairs (answering the 800-line)
- State Energy Office (liaison to US DOE)
- Safety

DPS and PSB (PUC) assumed current structure in 1981 – Why?

- **Gov. Snelling instigated the change. He wanted:**
 - Accountability for state's positions in regulatory matters, as the state's top elected official
 - Rather than a special council attorney making the decisions on how to represent the state
 - Bring together key utility functions for synergies, post Oil Embargo
 - PSB (PUC) would remain independent

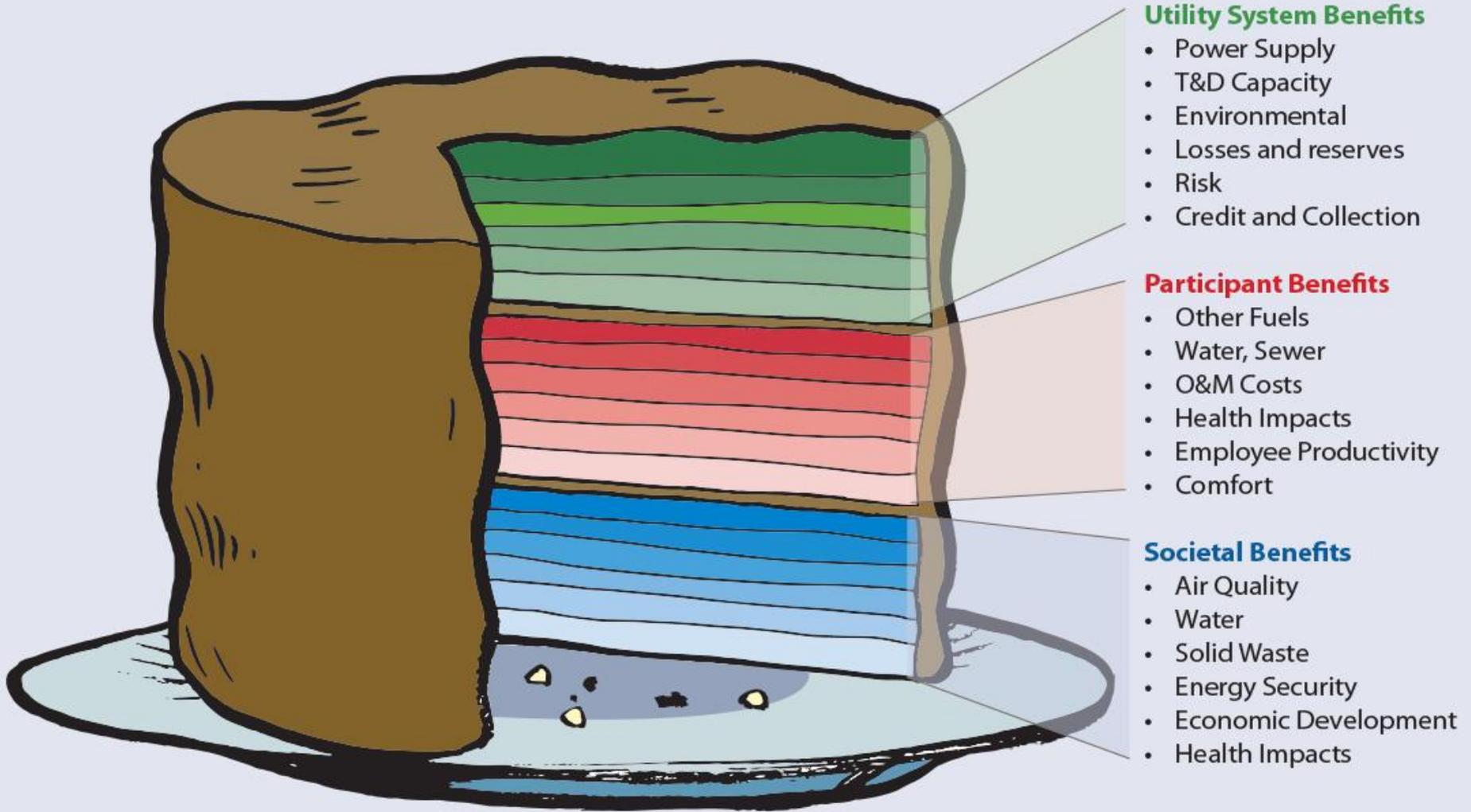
Evolution of the Vermont power mix

- Early days – hydro and Village systems
- Fossil fuels critical for growth (Moran)
- Nuclear arrives
- Canadian hydropower
- Energy Efficiency and Renewables
- Natural Gas
- “Resource of the Decade”

Integrated Resource Planning (IRP) and Efficiency (EE) as a Resource

- Docket 5270 opened 2/88; Order issued 4/90
 - Required all utilities to engage in IRP and to implement programs to acquire all cost-effective EE resources, as identified by the IRP
 - IRPs to be reviewed and approved by PSB
 - Prescribed ratemaking treatment for adverse financial impacts on utilities from EE
 - Potential rewards for superior performance
- Early to mid-1990s
 - Utility EE performance varied

A Layer Cake of Benefits from Investments in System Resources



IRP and EE in Industry Restructuring

1995-96: Restructuring debate

- Docket 5854: Report to Legislature
- Who should deliver EE in a restructured industry?
 - PSB concluded 3rd-party “energy efficiency utility”
 - Not government: political and budgetary entanglements
 - Not distribution utilities, given performance to date and the large number of small companies
 - 3rd party EEU: State-wide single purpose entity

Efficiency Vermont

- 1997-1999: Docket 5980
 - 2½-year investigation
 - Board order establishment of EVT in 9/99
- 2000: EVT established
 - Performance-based contract, since evolved into performance-based franchise
- Globally-significant model for delivering EE as a money-saving resource

The sweep of history

- Things change -- “resource of the decade”
- A hydro- and fossil-based power sector evolves to one dominated by natural gas regionally (49%)
- Nuclear power still important but declining (regionally)
- Wind and solar are growing exponentially, but remain a small fraction
- Economies of scale drove bigger plants for decades; this is now turning around
- And energy efficiency is lowering costs and minimizing supply risk
- Next: cost-effective electrification of heating and transportation

History Lessons – Recurring Resource Battles

- Hydro and public power battles since the 1920s
- Churchill Falls vs. Vermont Yankee
- Seabrook, Millstone, and the era of nuclear cost overruns
- NYPA and the DPS role in power sales
- Hydro Quebec, HVDC line, and utility contracts
- Energy efficiency & integrated resource planning

History Lessons: Challenges of today's resource choices

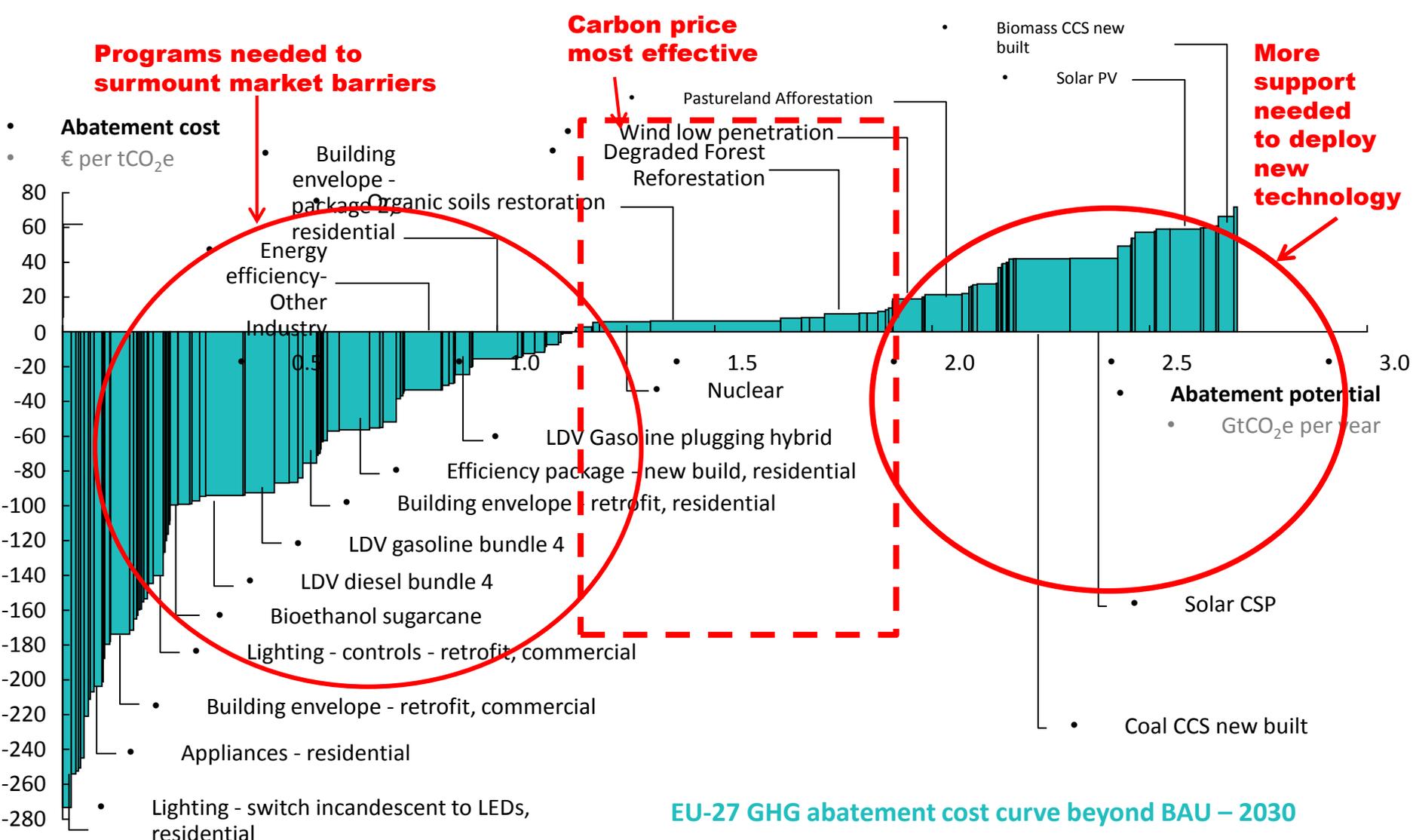
- Searsburg and utility-scale wind
- PV and net metering
- Diversity as an issue – the challenge of too much gas-fired power
- ISO-New England's transmission expansion process; socializing reliability

5 Climate Change and the Power Sector

The Logic of “Carbon Revenue Recycling”



Carbon prices/taxes alone will deliver only a part of the abatement needed



EU-27 GHG abatement cost curve beyond BAU – 2030

Where do power sector emissions reductions actually come from?

Four main possibilities:

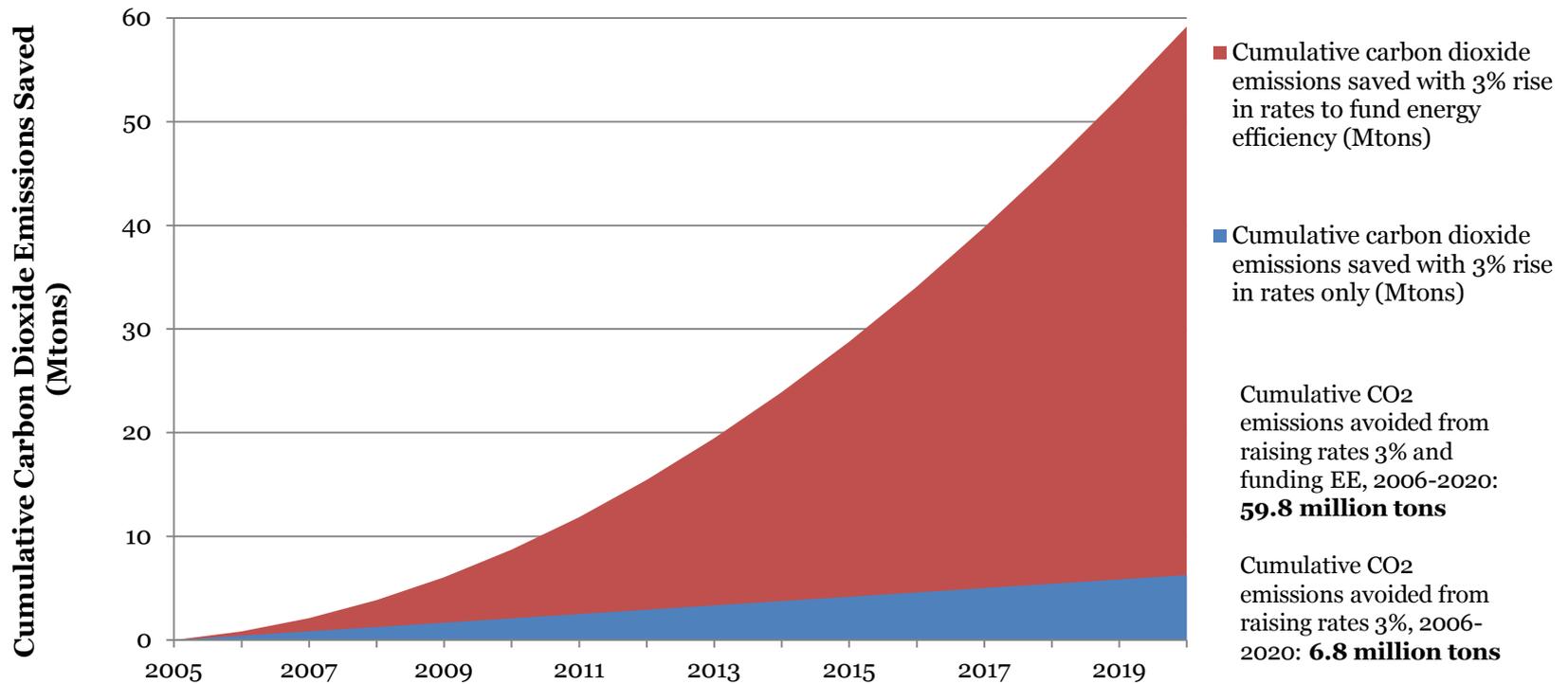
- Reduce **consumption**
- **Re-dispatch** the existing fleet and/or
- **Shut down** high-carbon units
- Lower the emission profile of **new generation** (including repowering)

For each opportunity, ask:

1. How many tons will it avoid?
2. How much will it cost society (*or, cost consumers per ton*)?
3. What tools – including what kind of carbon caps -- get the best results on #1 & #2 ?

Efficiency Programmes Save 9x More Carbon Per Consumer GBP Than Carbon Taxes Or Prices

Cumulative CO₂ Emissions Saved by: Increasing Rates 3%; and Increasing Rates 3% to Fund Energy Efficiency (UK Example)



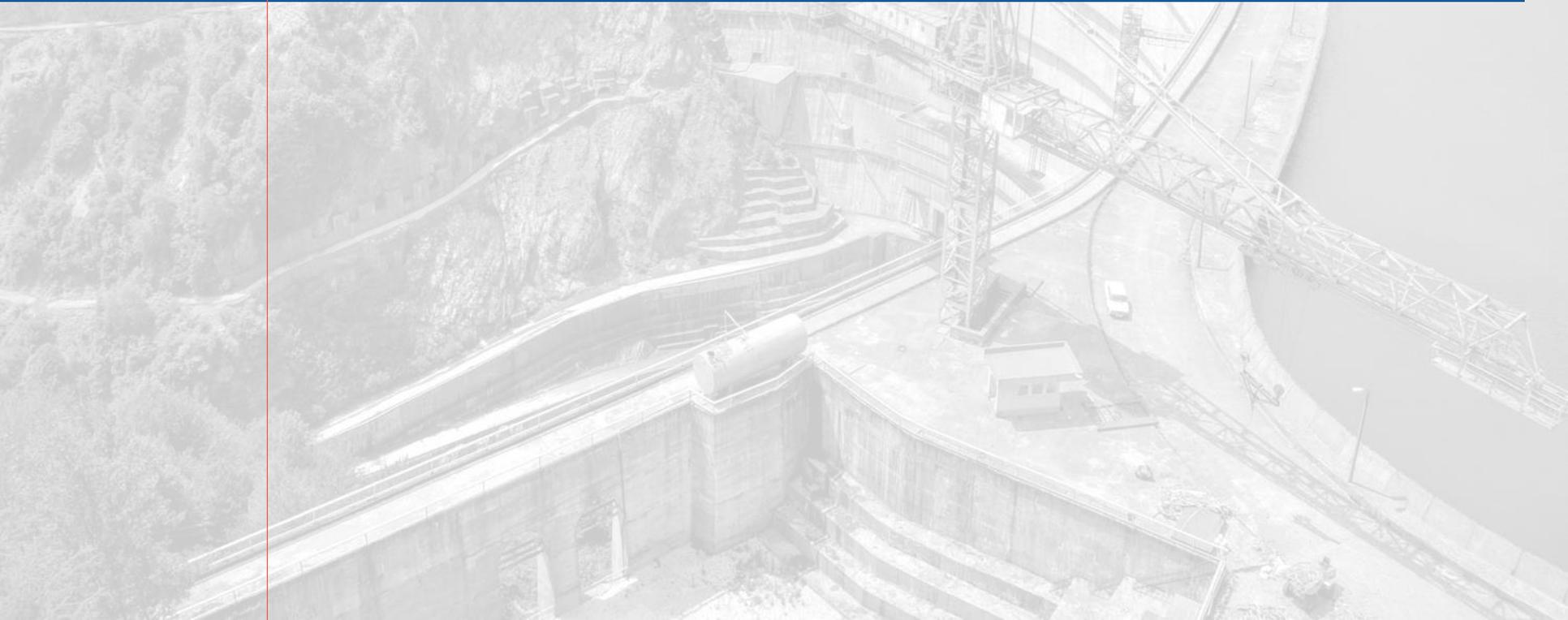
Carbon revenues are a powerful tool to leverage carbon price

- Key idea: Sell allowances, invest carbon revenue in low-cost carbon reduction—especially EE
- Northeast US: 9 RGGI states now dedicate >80% of allowance value to clean energy (~55% to EE)
- Even with low (~\$3/ton) CO₂ prices, RGGI has raised over \$500 million for EE programs—avoiding CO₂ at a cost of (minus) -\$73 per ton!
- So far: adding \$1.6 billion to the regional economy, and supporting 16,000 new jobs
- Political lesson: RGGI renewed 2013, cap lowered. Lowered again in 2018
- Germany, France, Czech Republic – have programs and/or plans to invest substantial carbon revenues in EE

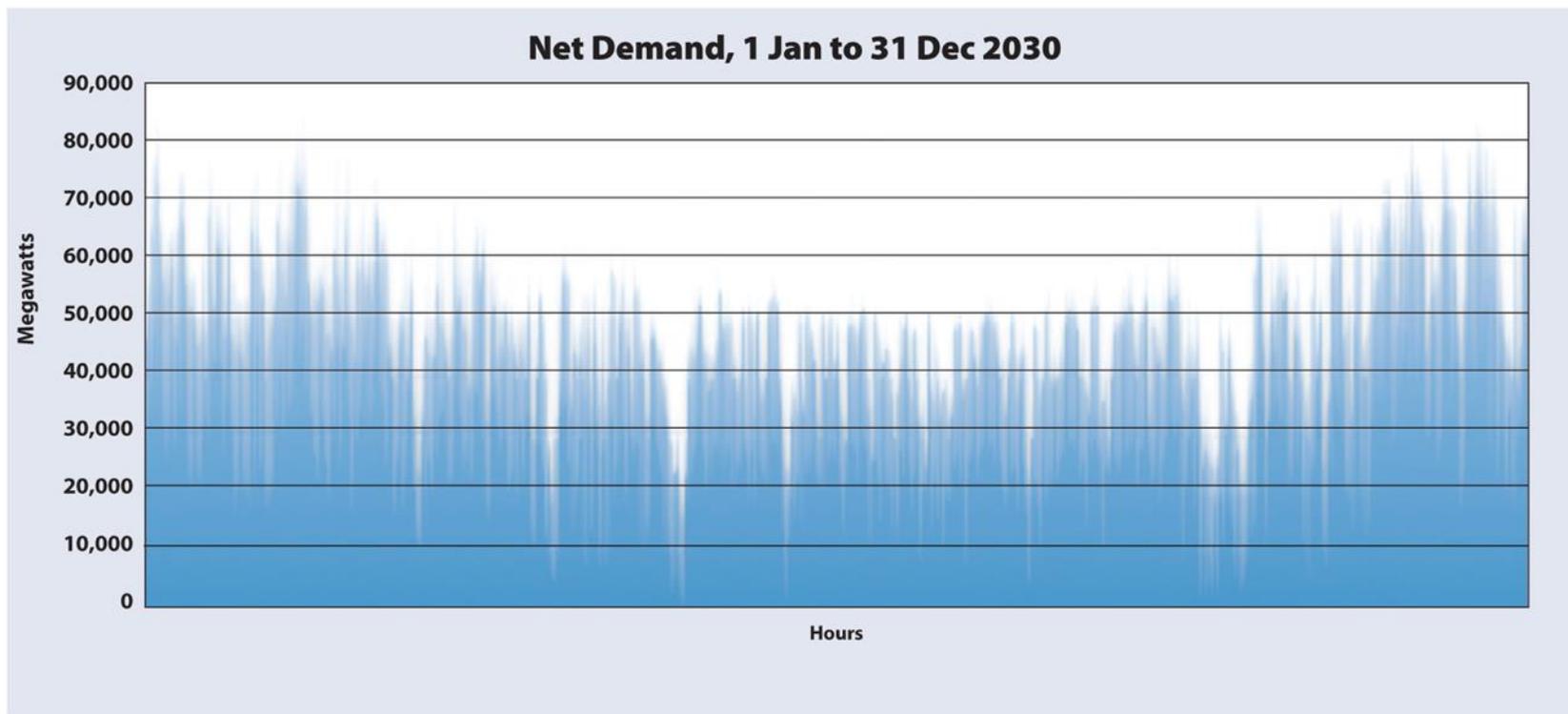
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Climate Change and the Power Sector

Integrating Renewables

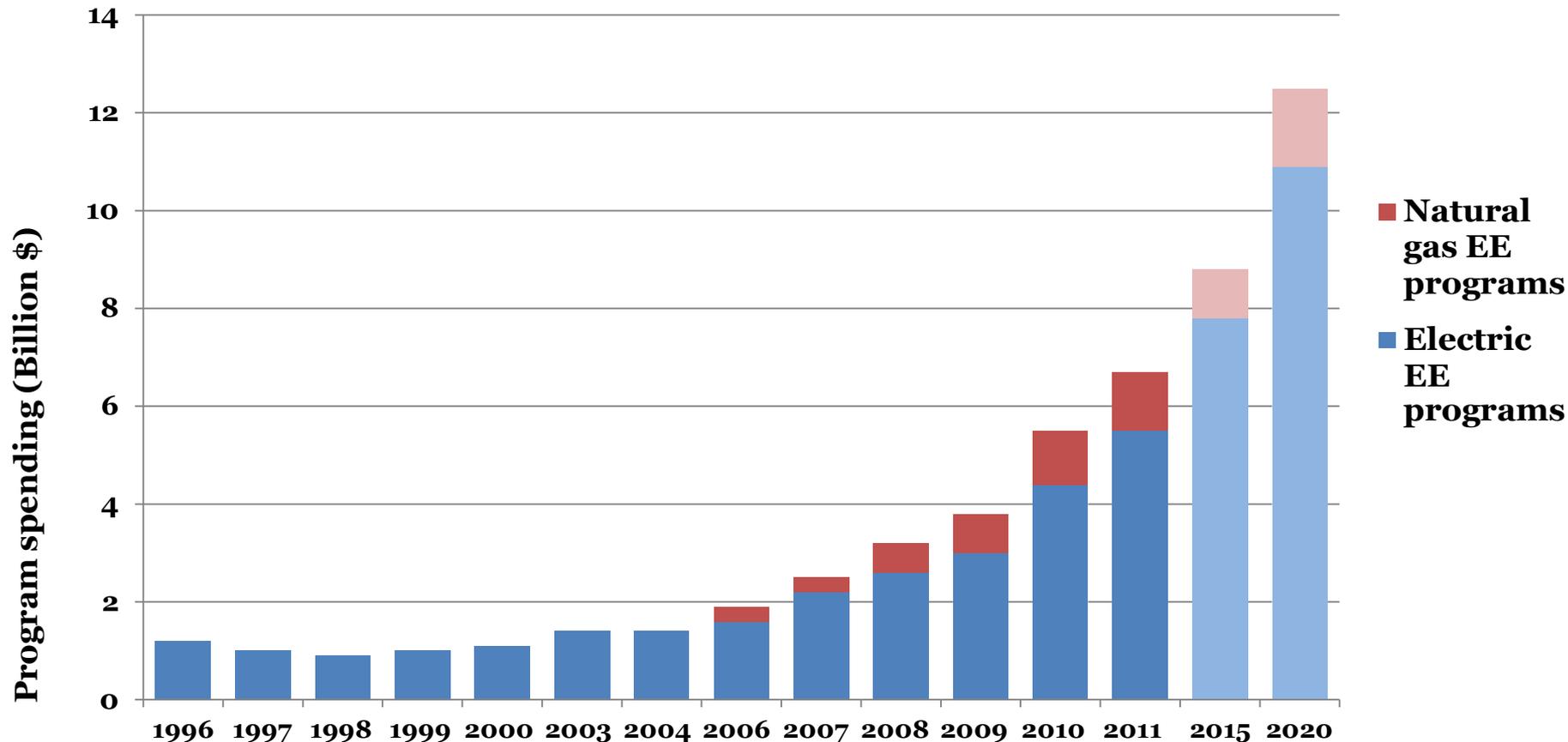


The Challenge: RE Variability



Net demand = gross demand minus demand effectively served by low-marginal-cost, variable RES supply. <Southern UK 2030 w 28% PV & wind>

U.S. Utility EE Program Spending Now Over \$7 Billion/Year and Still Growing



Note: 1993 - 2008 represents spending; 2009 represents spending among CEE members reporting to CEE; 2010 and 2011 represent budgets of CEE members reporting to CEE; 2015 and 2020 represent LBNL "high case" projections

Sources: ACEEE, *The 2010 State Energy Efficiency Scorecard*, October 2010; CEE, *State of the Efficiency Program Industry*, December 10, 2010, and March 14, 2012; LBNL, *The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S.*, 2009.

What Makes Electrification Beneficial?

Three Criteria: Achieve At Least One Without Adversely Impacting The Others



1. Saves Customers Money Long-Term; New Services



2. Reduces Environmental Impacts



3. Enables Better Grid Management

About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org



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