



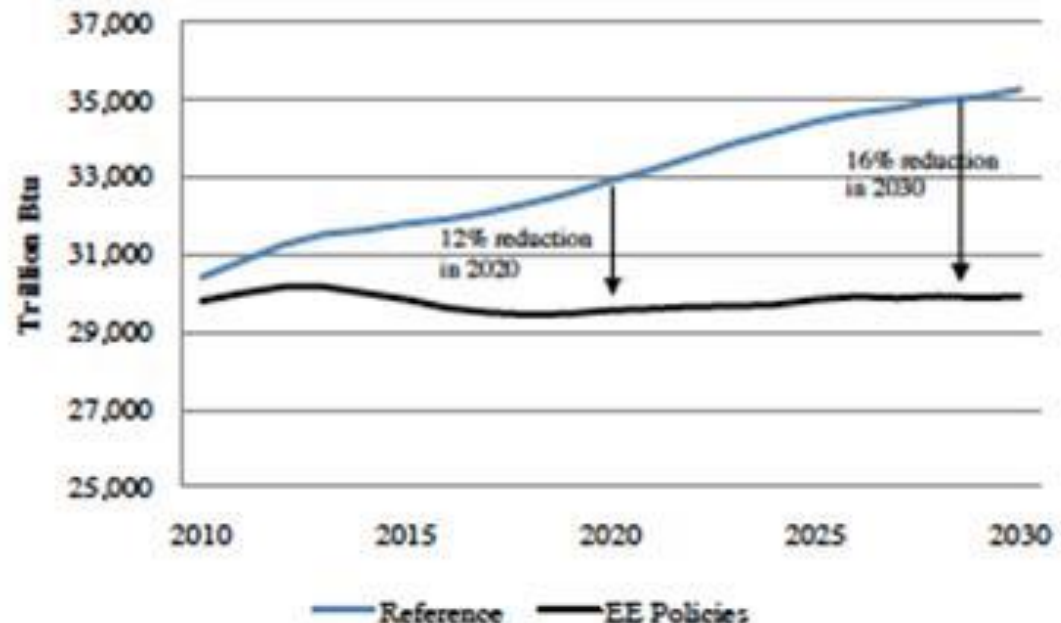
Energy Efficiency and 111(d)

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Energy Efficiency is not a Requirement

- 111(d) creates the opportunity to include energy efficiency in SIP
 - 6% reduction in demand in EPA target (GA)
 - ~ 9 – 10% electricity sales reduction across SE
- Large potential from policy packages
- Difficult to accomplish
 - Economics
 - Politics



There are lots of policies aimed at energy efficiency

- 125 Federal policies & programs
- > 200 policies in the 13 states that comprise Appalachia
- Wide variance in scope, intent, & level of support
- South spends just \$7/capita on energy efficiency (\$19/capita nationwide)

Market Failures and Energy Efficiency

- Information asymmetries
 - Where one party (the manufacturer / builder etc) has more information than the consumer
- Labeling initiatives / energy disclosure
- Commercial building benchmarking
- Energy bill disclosures



Soft Costs & Energy Efficiency

- Transaction costs
 - Search Costs
 - Permitting Costs
 - Specialized, unique solutions!
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- Accessibility of BCA tools
 - Improving predictions of energy costs & benefits



Principal – Agent Problems & Monopolies

- Mal-alignment of incentives & ability to monitor
- Builders vs. Owners
- Owners vs. Tenants
- Electric Utility vs. Customers
- Electric Utility vs. the States
- Builders may lack incentives for energy efficient improvements
- Principals (owners) don't provide energy efficiency to tenants
- Utilities are (currently) encouraged to increase “throughput” to recover capital investments
- Utilities lack incentives for energy efficiency

Policy solutions to address principal agent problems

- Building & appliance codes
- Decoupling utility profits from electricity sales
 - Separate transmission & distribution from generation
 - Rate “reconciliations” to recover fixed costs
 - Compensate electric utilities for efficiency program expenditures & stranded capital
 - Allow profit generation from efficiency initiatives
- Rate reform; separate transmission & distribution from generation



Electric Decoupling in the US

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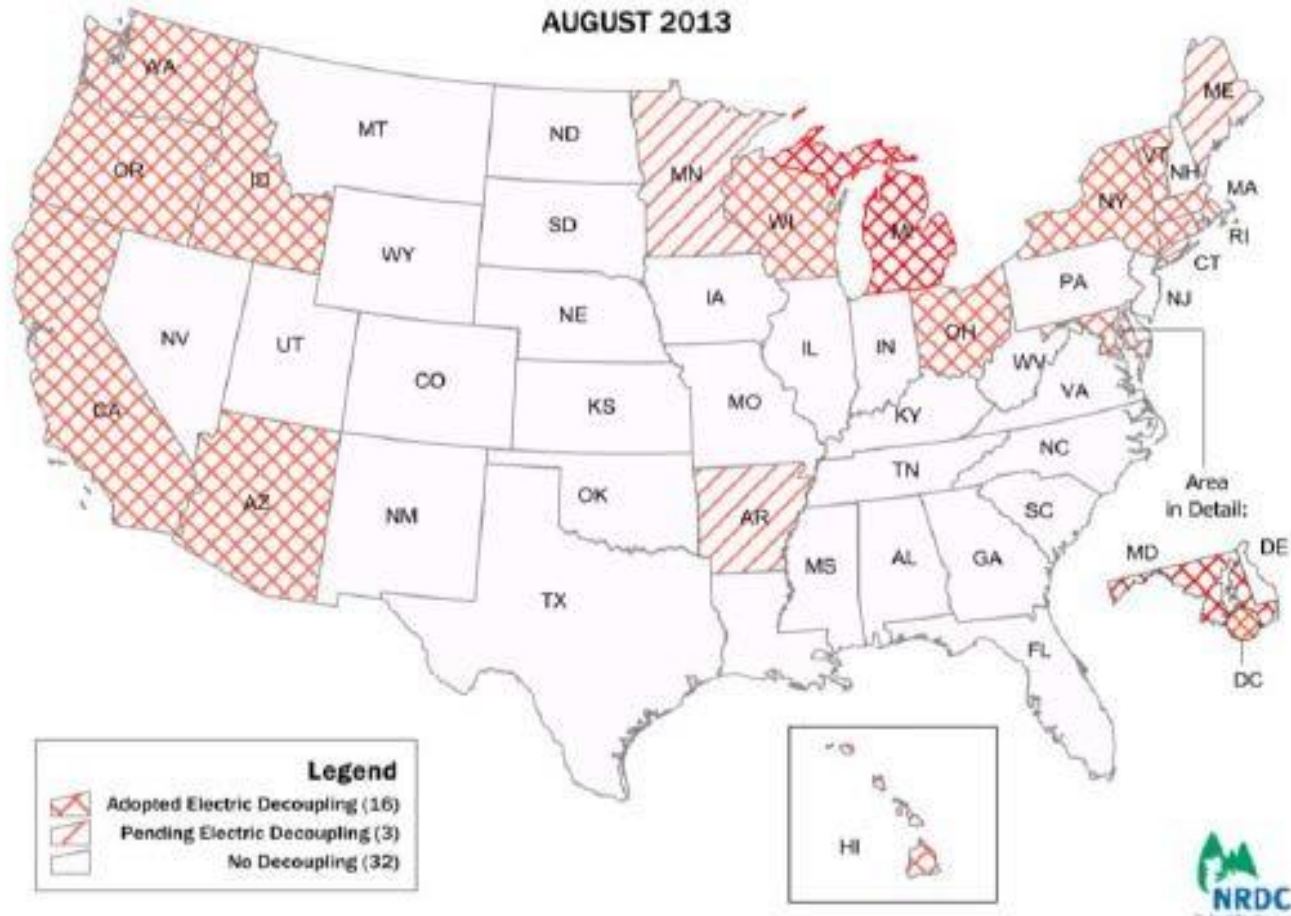


Figure 22. States with Electricity Decoupling

<http://www.nrdc.org/energy/decoupling/files/Gas-and-Electric-Decoupling-Maps.pdf>

Market Barriers are not Market Failures

- Policy justification is much more limited
- Economists don't believe that consumers are myopic
- Nevertheless:
 - High Discount Rates
 - Hurdle Rates
- Why? What's going on?



Market Barriers and Energy Efficiency

- Illiquid investments
- Difficult to value
- Not valued in appraisals or mortgage rates
- Uncertain costs and benefits
- Soft costs
- Capital scarcity (expand market share vs. reduce energy use!)

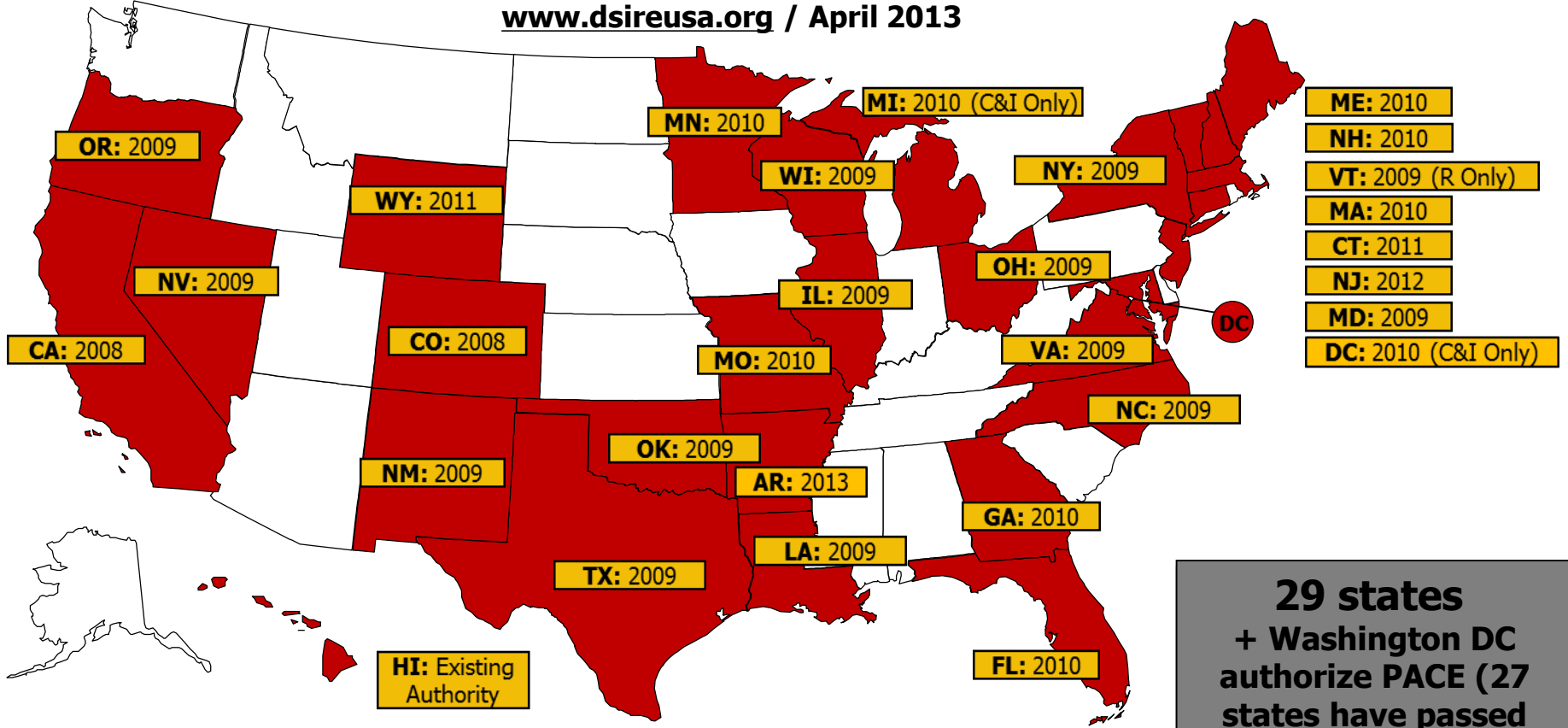
Some potential solutions

- Energy Efficiency Resource Standards
- PACE (Property Assessed Clean Energy) financing
 - Finances clean energy improvements through tax or utility bills
 - Allows for long term financing of energy efficiency
 - Very limited in Georgia & South
 - Ygrene runs programs in GA & FL
 - Laws on the books, but...
 - Major issues with PACE programs...
- Loan subsidies for appliance efficiency upgrades



Property Assessed Clean Energy (PACE)

www.dsireusa.org / April 2013



29 states + Washington DC authorize PACE (27 states have passed legislation and HI permits it based on existing law)

*The Federal Housing Financing Agency (FHFA) issued a [statement](#) in July 2010 concerning the senior lien status associated with most PACE programs. In response to the FHFA statement, most local PACE programs have been suspended until further clarification is provided.

Political barriers

- #1 driver in adoption of energy policies at the state level is political liberalism!
- The politics of energy efficiency are more difficult than for renewable energy
- Concentrated costs, distributed benefits
 - Costs fall heavily on electric utilities
 - Benefits accrue across society

Table 6.6 Total Resource Cost Tests by Sector (Million 07\$)

<i>Residential Sector Policies</i>			
	NPV Cost	NPV Benefit	B/C Ratio
Building Codes with Third-Party Verification	\$10,000	\$41,400	4.1
Appliance Incentives and Standards	\$25,500	\$7,060	0.3
Expanded Weatherization Assistance Program	\$5,840	\$6,420	1.1
Residential Retrofit and Equipment Standards	\$86,600	\$119,000	1.4
Combined Policies	\$115,000	\$143,000	1.3
<i>Commercial Sector Policies</i>			
	NPV Cost	NPV Benefit	B/C Ratio
Tighter Commercial Appliance Standards	\$26,300	\$109,000	4.6
Commercial Retrofit Incentives	\$8,540	\$20,900	2.4
Combined Policies	\$31,500	\$126,000	4.0
<i>Industrial Sector Policies</i>			
	NPV Cost	NPV Benefit	B/C Ratio
Industrial Plant Utility Upgrades	\$10,800	\$48,400	4.5
Industrial Process Improvement Policy	\$36,000	\$128,811	3.6
Combined Heat and Power Incentives	\$16,900	\$11,400 \$17,600*	0.67 1.04*
Combined Policies	\$53,200	\$179,000	3.4

* Includes the environmental benefits from CO₂ emissions avoided by CHP systems.

Some final thoughts

- Programs are piecemeal (though, potentially some large improvements)
- Don't be constrained by the EPA model
- Accounting issues!
 - How do we account for electricity reduction? And how is that translated to CO₂ reduction?
- Empirical energy efficiency costs have been greater than modeled
 - Make sure we're doing right by the ratepayer / taxpayer
 - Avoiding government failures through smart policy design
- HUGE capital requirements to make this happen ~\$200 billion over 20 years
 - Public-private partnerships to overcome market barriers & reduce soft costs
- Major regulatory changes needed:
 - Energy service providers – rather than electricity generators
 - Decoupling electricity sales from transmission, distribution, and efficiency
- How do we compare new generation in renewables vs. efficiency?
 - GET THE PRICES RIGHT!!!
 - Carbon tax, or piecemeal using BCA with a “shadow” carbon price