Policy Innovations to "Scale Up" Energy Efficiency

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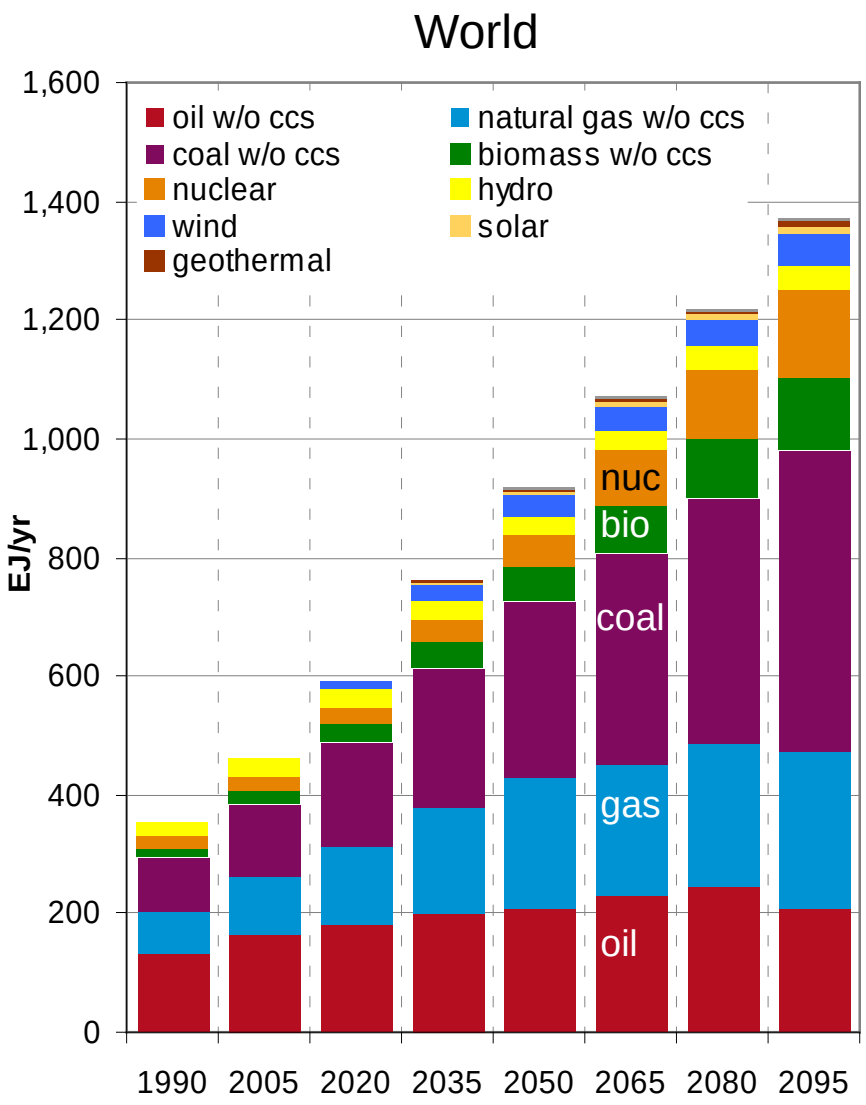
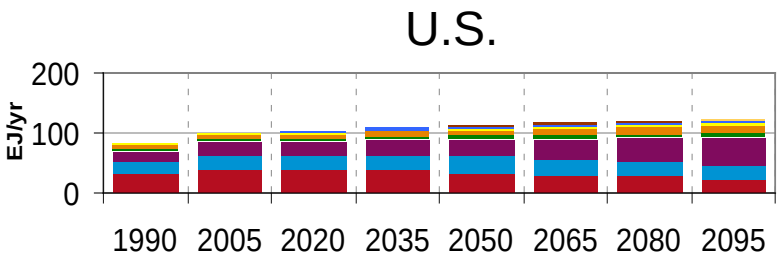
Energy and climate change are defining challenges of our time

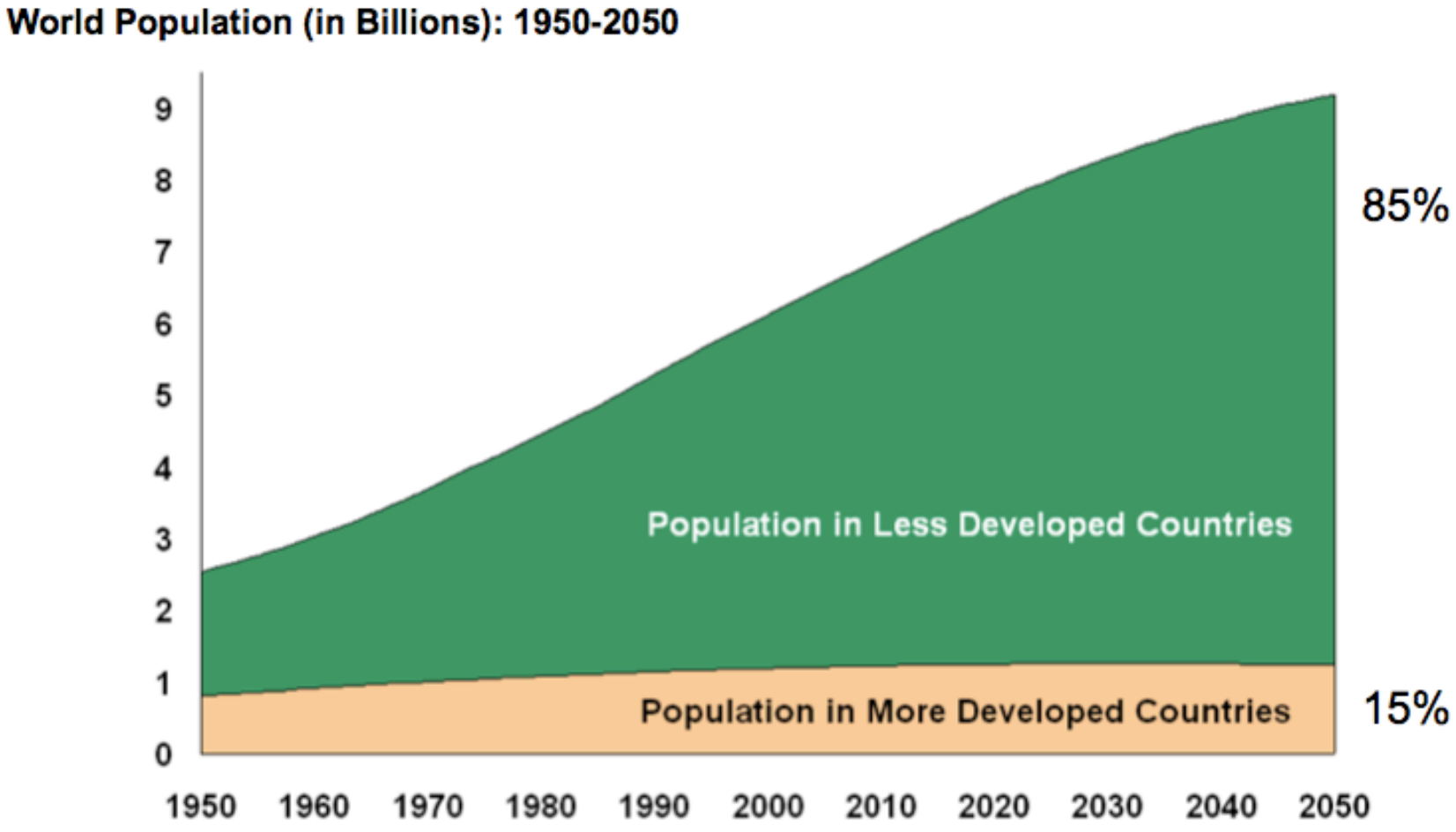
World Energy Demand Could Grow Three-Fold by 2100



- U.S. energy demand is growing much more slowly than the rest of the world
- Today we consume almost 25% of the world's energy production; in 2100 the U.S. will consume less than 10%

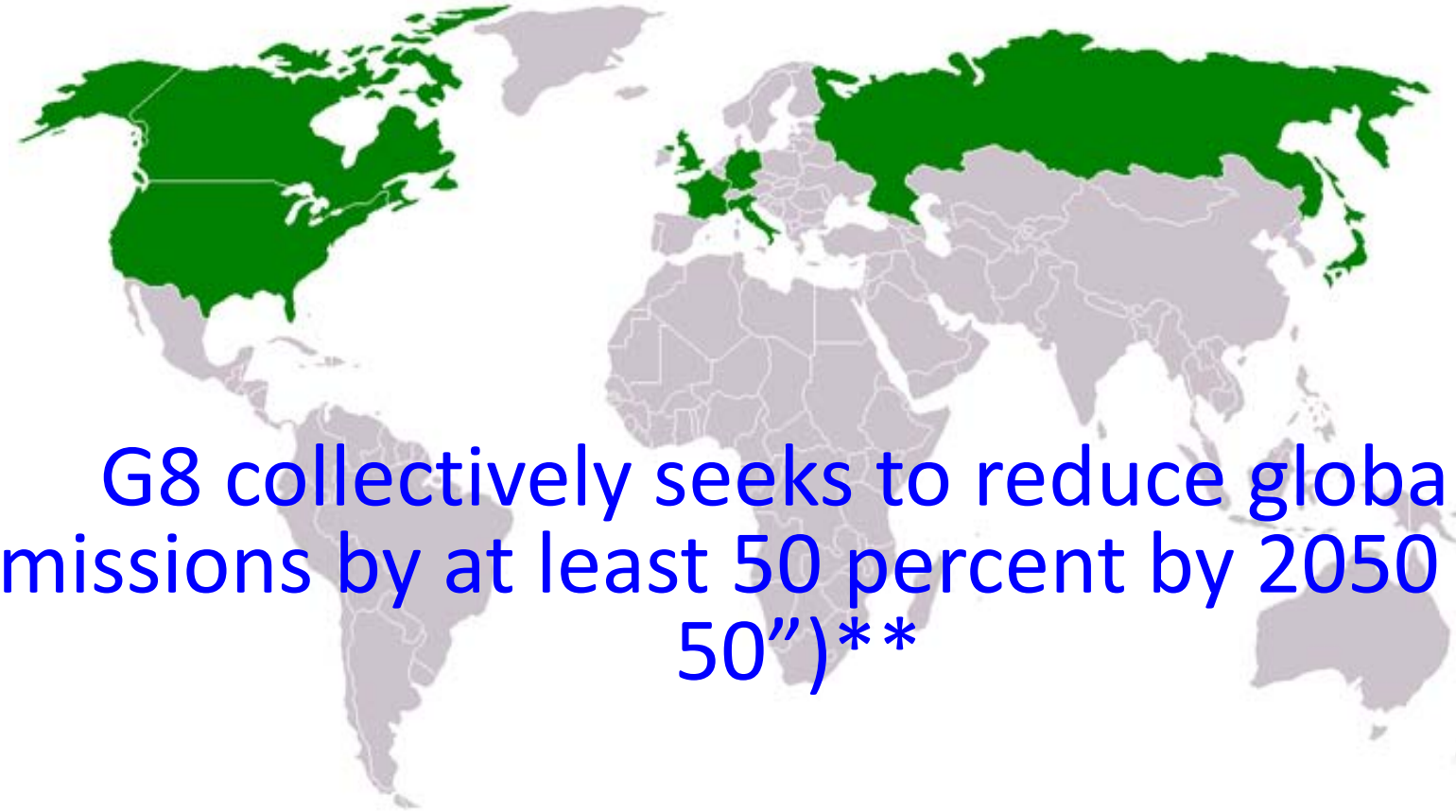


Developing Countries Need Alternative Development Options



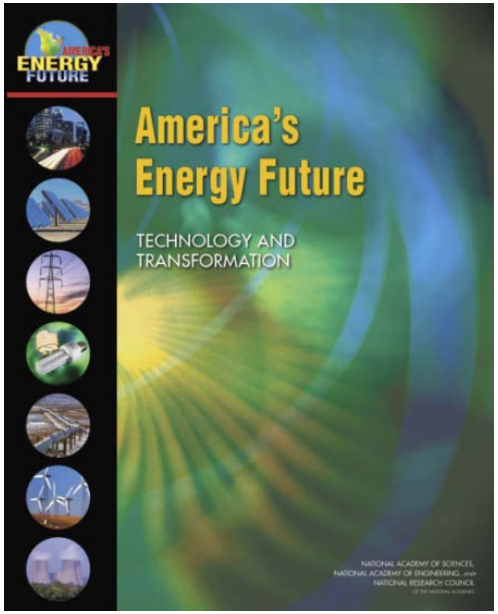
Source: United Nations Population Division, *World Population Prospects: The 2006 Revision.*

The G8 Commitment



G8 collectively seeks to reduce global emissions by at least 50 percent by 2050 (“50-50”)**

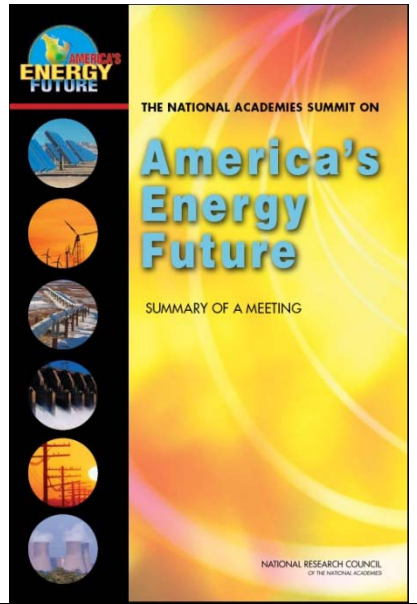
** With all nations participating (G8 Leaders Declaration, July 2009, Aguila, Italy)

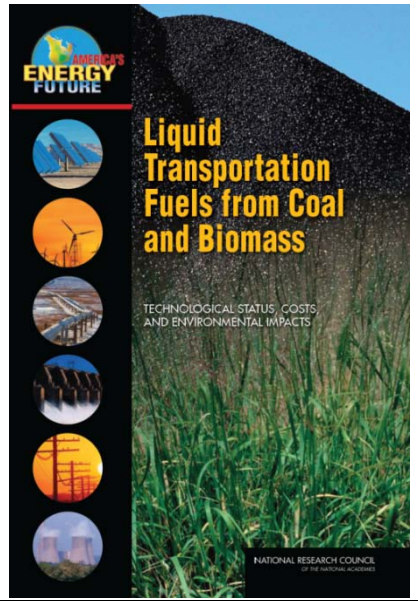


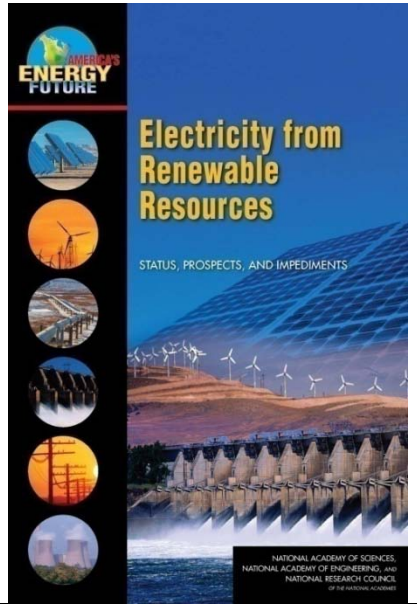
America's Energy Future

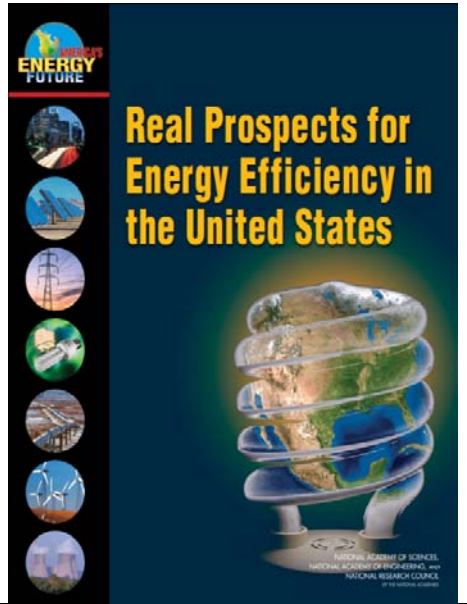
http://www.nationalacademies.org/energy

An NRC series of studies that examined the technical potential for expanding use of efficiency, renewable electricity and fuels, CCS, and nuclear energy.



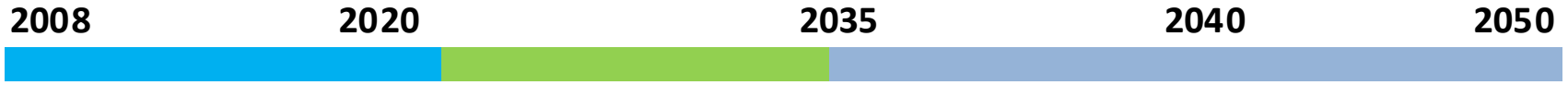






Energy Efficiency Potential:

The deployment of existing energy-efficiency technologies is the nearest-term and lowest-cost option for moderating our nation's demand for energy, especially over the next decade.



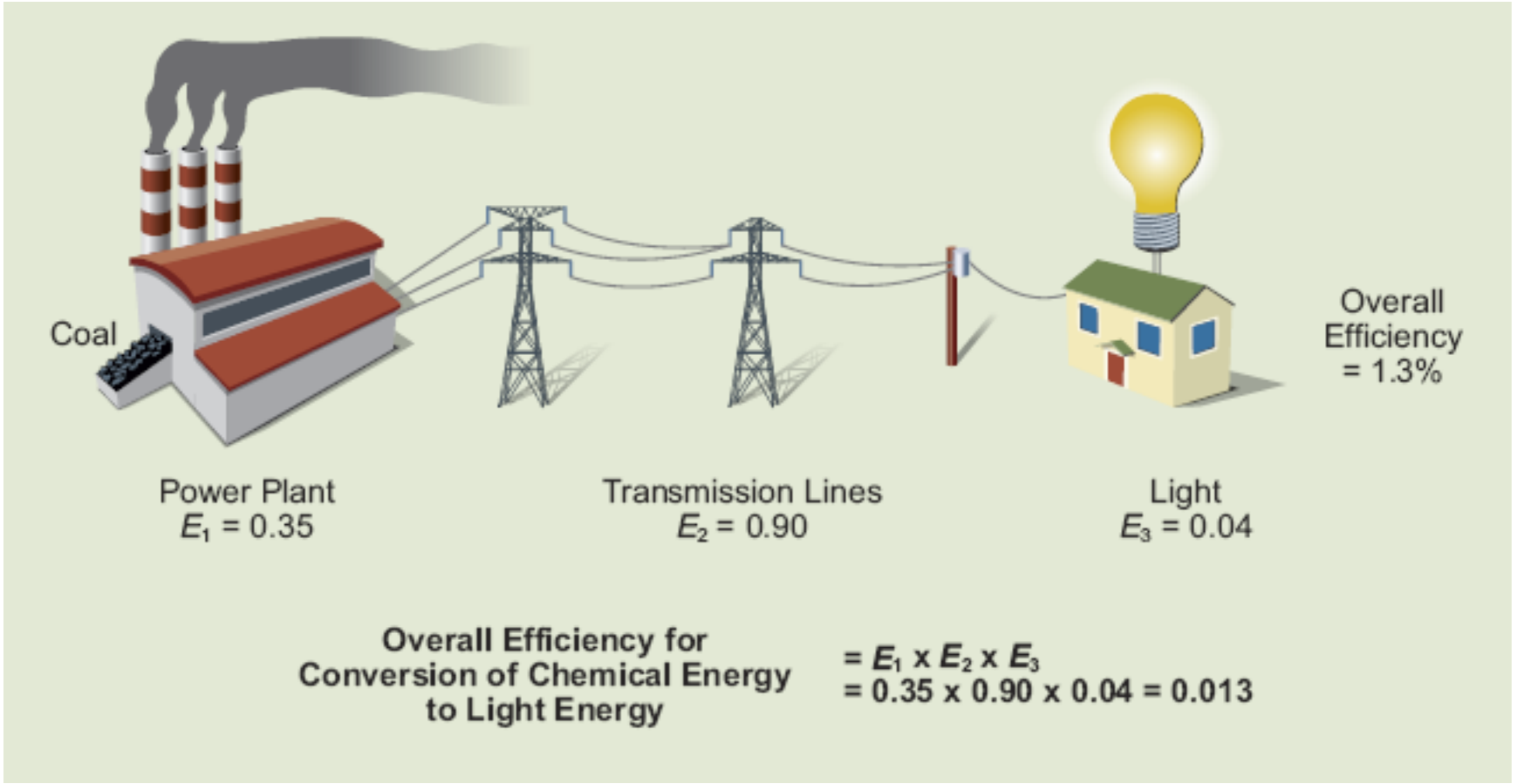
15 Percent (15-17 Quads) by 2020

30 Percent (32-35 Quads) by 2030

NOTE: Even greater savings would be possible with more aggressive policies and incentives.

AMERICA'S ENERGY FUTURE

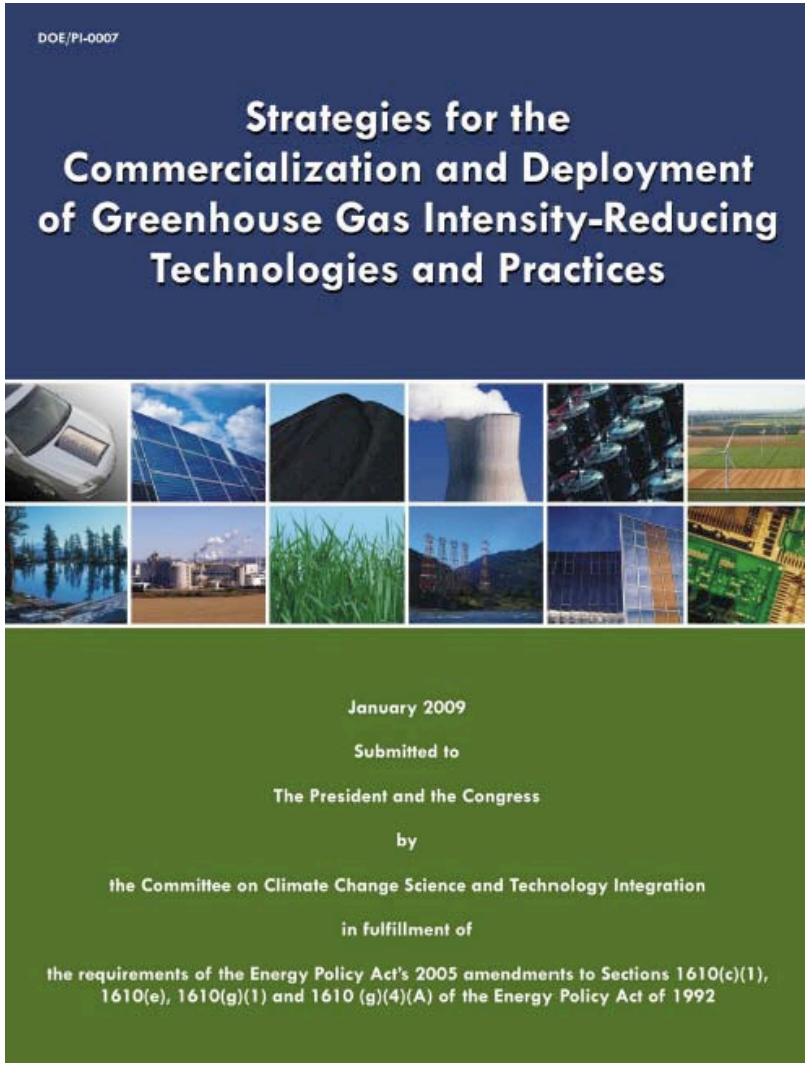
Our Current Energy System is Highly Inefficient



Source of calculations: Suplee, Curt, Allen Bard, Marilyn Brown, Mike Corradini, and Jeremy Mark. 2008. "What you Need to Know About Energy," National Academy of Sciences, http://sites.nationalacademies.org/energy/Energy_043338

NPV-positive investments in energy efficiency face numerous barriers.

This report has an excellent description of these.

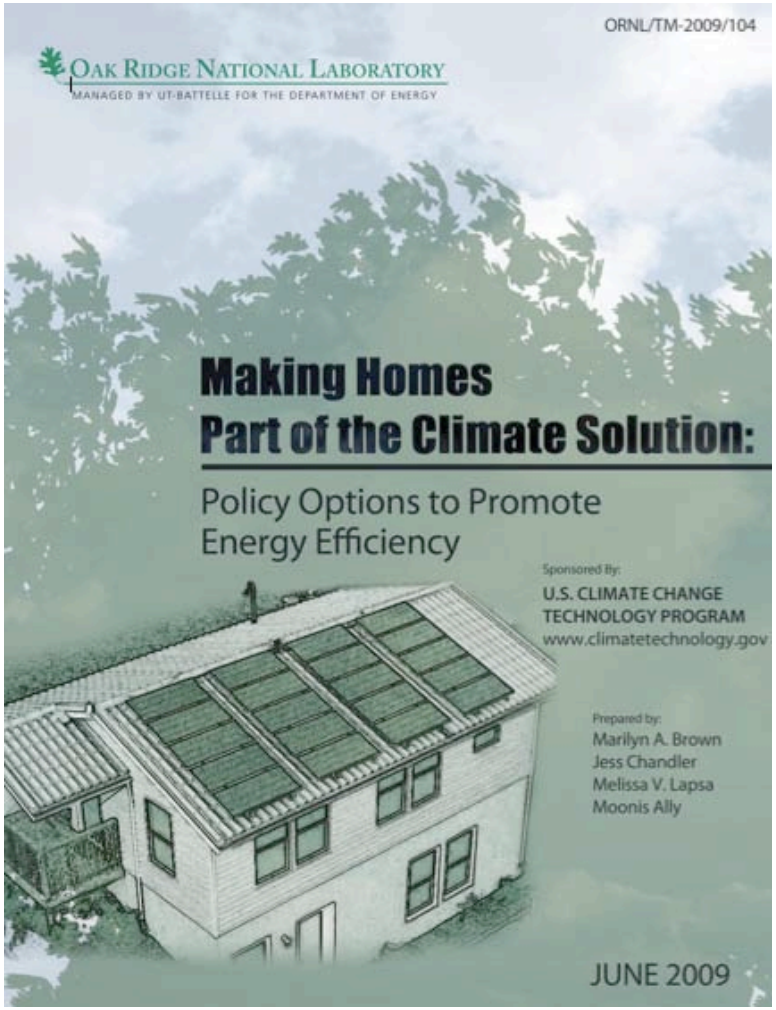


For further details, see:

Brown, Marilyn A. and Sharon (Jess) Chandler, 2008. "Governing Confusion: How Statutes, Fiscal Policy, and Regulations Impede Clean Energy Technologies," *Stanford Law and Policy Review, (19) 3: 472-509.*

Making Homes Part of the Climate Solution

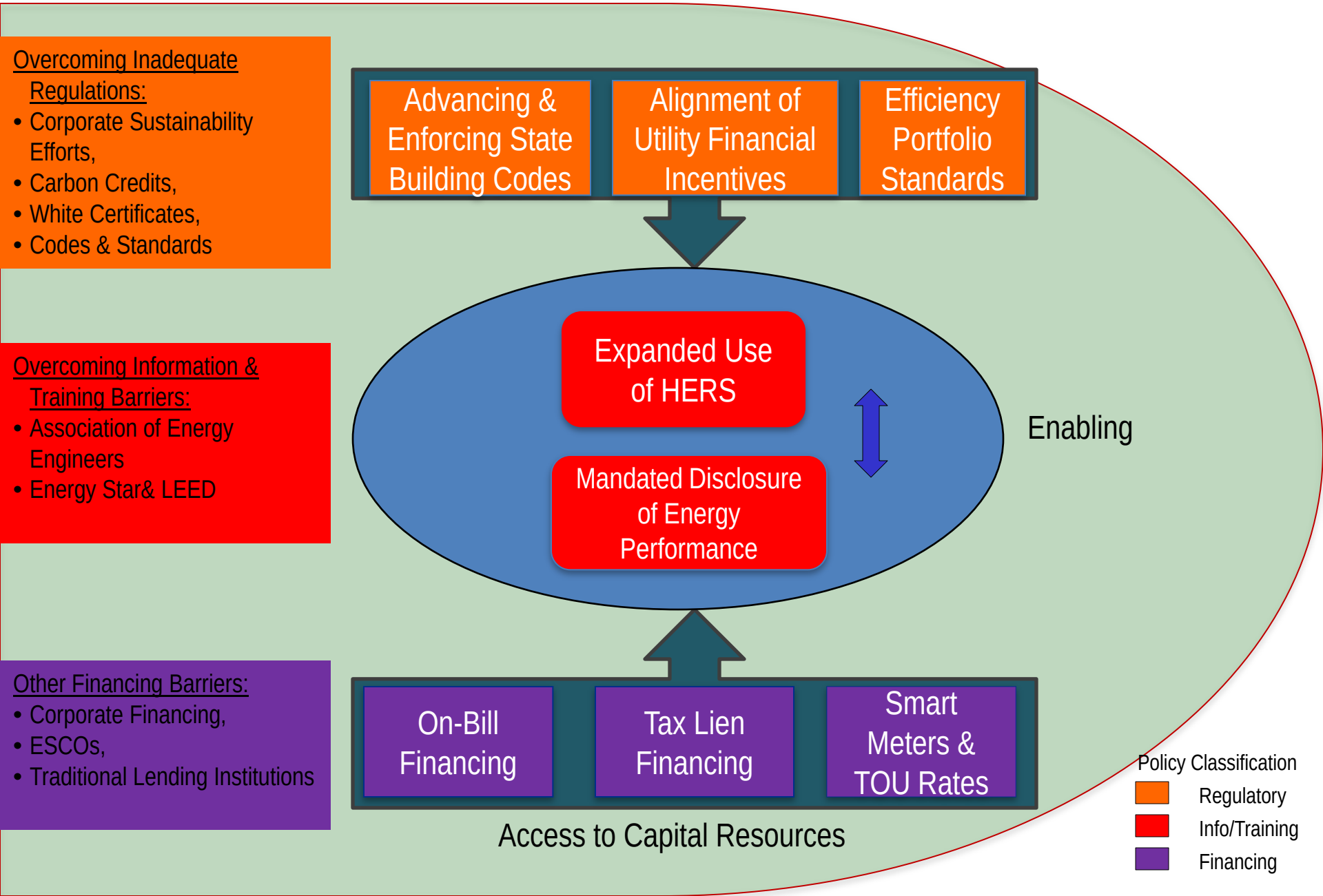
Marilyn A. Brown, Jess Chandler, Melissa Lapsa, and Moonis Ally. 2009. *Making Homes Part of the Climate Solution.* Oak Ridge National Laboratory, ORNL/TM-2009/104, June, http://www.ornl.gov/sci/eere/PDFs/CCTP_PolicyOptions_200906.pdf.



Motivation

- A large “energy efficiency gap” appears to exist in residential markets, and it has been difficult to narrow the gap.
- A broad understanding of socio-economic aspects of energy consumption, including insights from behavioral research, will allow the formulation of more informed strategies for improving energy efficiency and mitigating GHG emissions.
- Insights from work in this area can inform DOE, broadly, and the technology development and deployment strategies of the CCTP, in particular, about enabling informed consumer and business actions to save energy and reduce emissions.
  - Is R&D the only lever to deliver the needed energy efficiency for addressing climate change?
  - How can we get more out of the current efforts?
  - Where are the remaining opportunities?

Some Innovative Policies

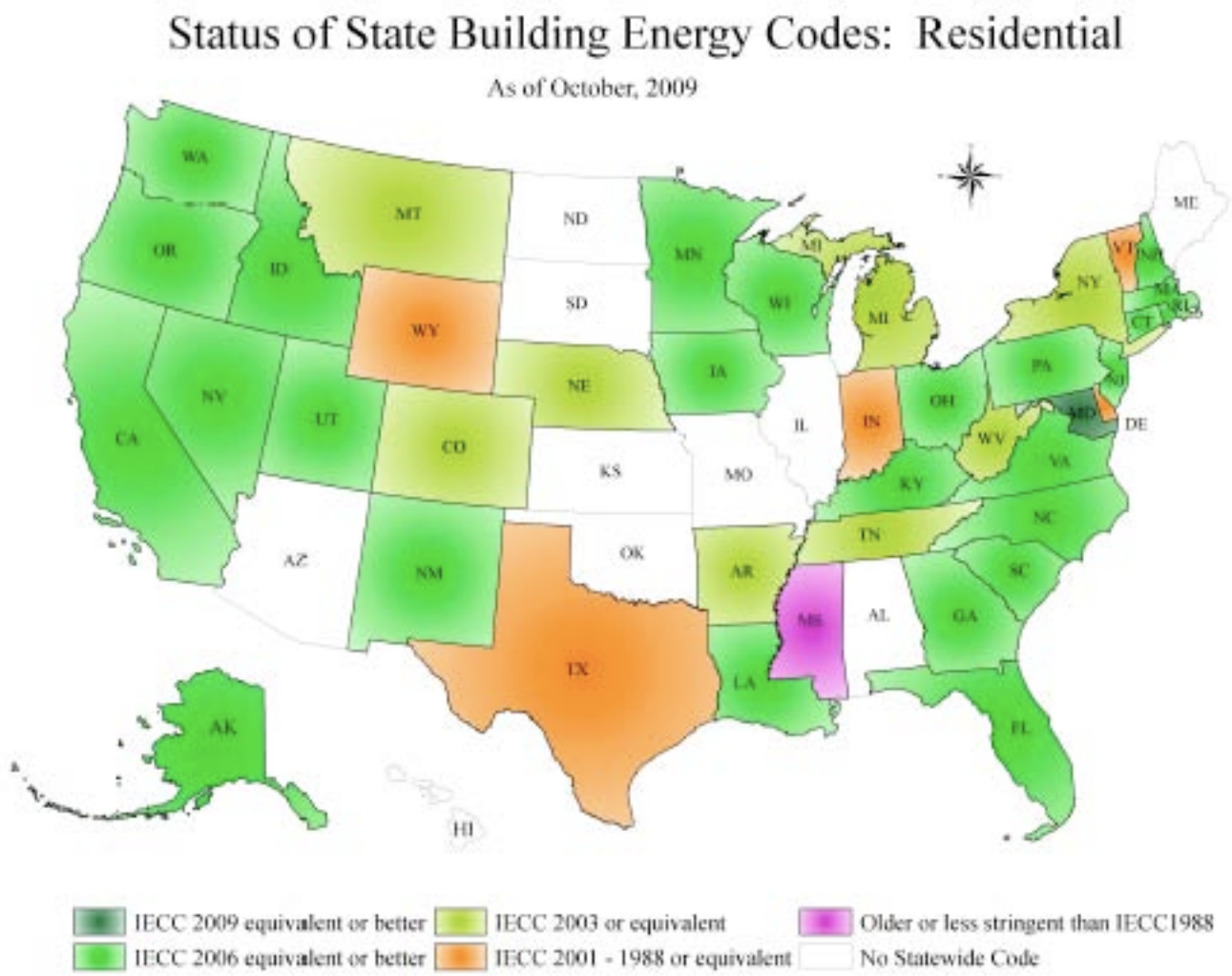


Advancing and Enforcing State Building Energy Codes

Recommended Federal Action: Expand technical assistance to States to accelerate their adoption of advanced building energy codes. Subject to available funds, provide financial assistance to establish and expand training and certification programs focused on third-party verification of building energy code compliance.

- Avoid “lost opportunities”
- Building Codes Assistance Program (BCAP) can be expanded to provide states with code advocacy assistance
- State and local agencies have limited building code enforcement staff, suggesting the need for third-party verifiers to enforce codes

Advancing and Enforcing State Building Energy Codes



Expanded Use of Home Energy Performance Ratings

Recommended Federal Action: Provide technical and financial assistance to States to develop policies that incorporate home energy performance ratings and ensure a qualified home energy performance rating workforce.

- Provides *market transformable* information (policies and market decisions made when energy performance of homes is a *known value*)
- Enables a multitude of policies – from verification of building code compliance to mandatory disclosure of home energy performance at sale to identification of cost-effective improvements
- Nonprofit groups already have experience training and certifying raters
- Rating system already developed and in use

Mandated Disclosure of Energy Performance Information

Recommended Federal Action: Require disclosure of home energy consumption or home energy performance at the point of sale or lease of a residential unit.

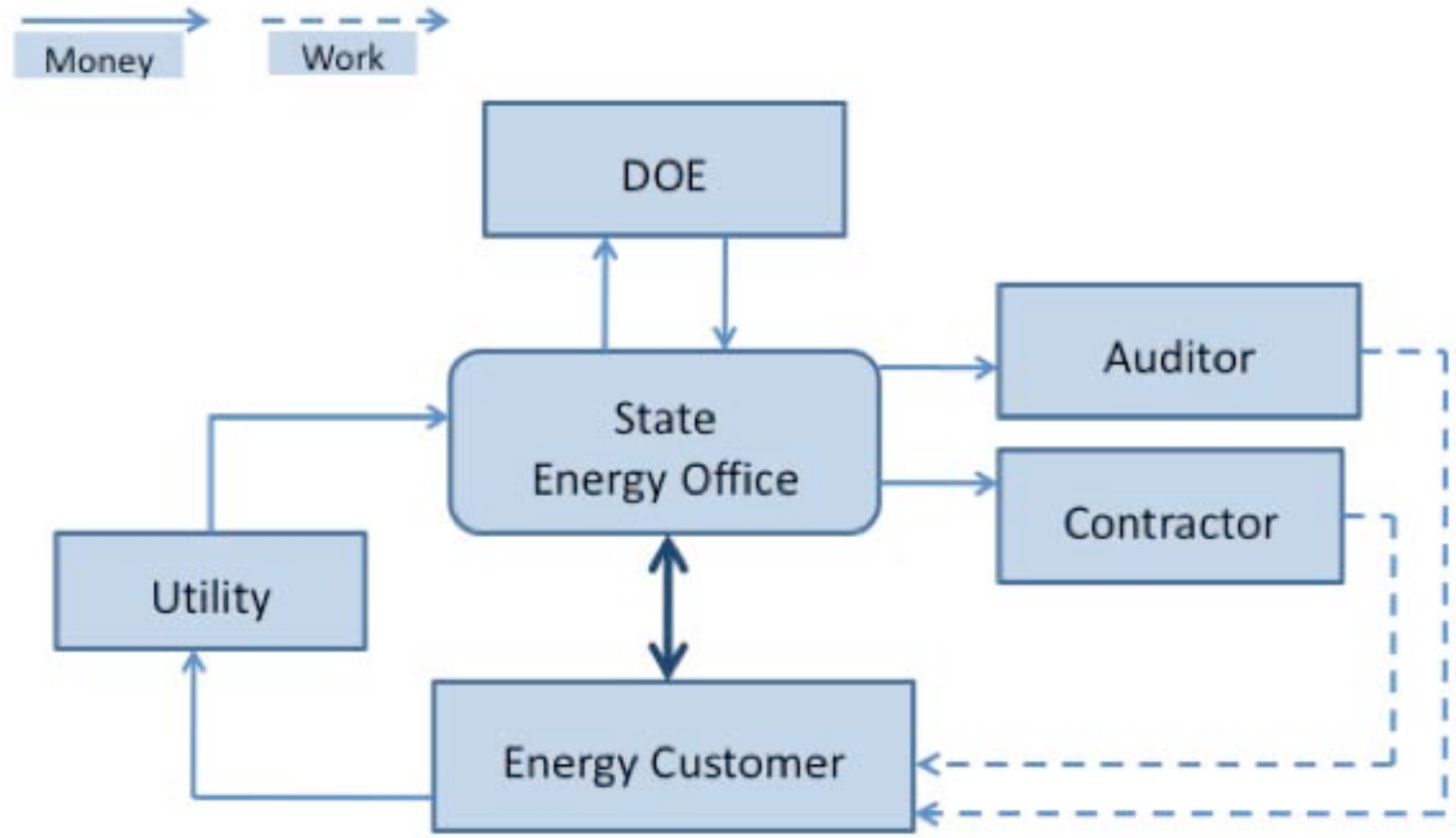
- Mandated disclosure of energy usage or performance for housing units advertised for resale or rent
- Addresses *asymmetric information, information gaps,* and *misplaced incentives* that pervade the existing housing market
- Encourages demand for more energy efficient homes – leading to improvements in existing building stock

On-Bill Financing

Recommended Federal Action: Provide financial assistance to State Energy Offices to establish revolving loan funds to enable on-bill utility financing of energy-efficiency improvements without up-front capital costs to the building owner.

- Overcomes the cash-flow barrier confronted by many homeowners and small businesses
- Loans are made by the utility company and are repaid by adding a charge to the utility bill
- A revolving loan fund could extend the positive impact of the Stimulus Bill by many years

Conceptual Organization of an On-Bill Financing Program

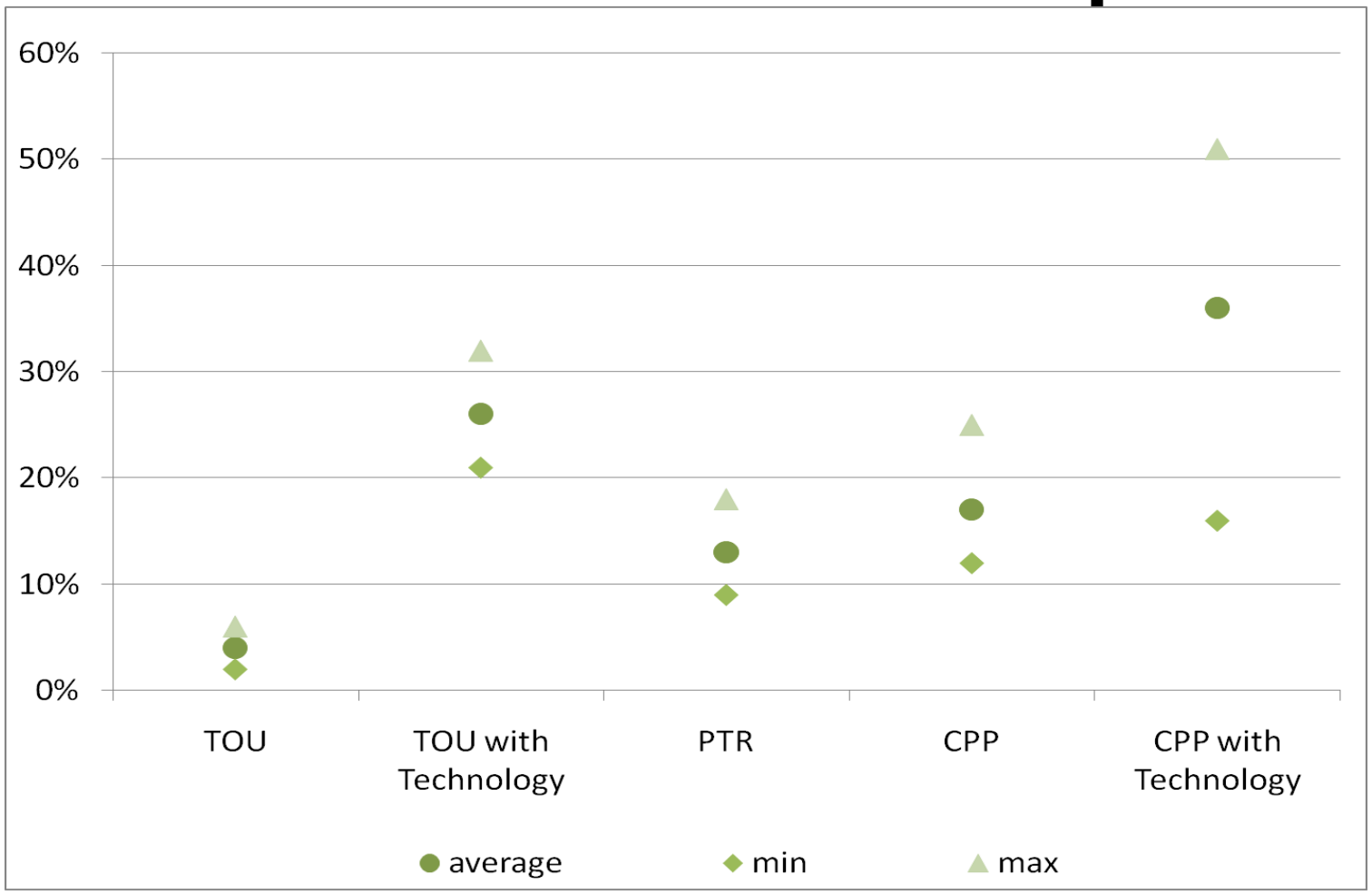


Smart Meters and TOU Rates

Recommended Federal Action: Define performance specifications for "smart meters" that limit use of the label to devices with customer read-outs. Provide technical and financial assistance to States and utilities to provide for expanded demand response of residential electric loads through smart metering technologies and pricing schemes.

- Ensures that meters using the label "smart meter" have the capability to both "listen" and "talk" preventing market confusion.
- *Internalizes the higher costs of meeting peaks* and provides *feedback on consumption* – reducing information gaps
- Create savings immediately following implementation - without construction or stock turnover delays
- Reduce peak load – avoiding the construction of plants used less than 100 hours per year. Peak savings of 21% to 51% have been found in pilots with smart meters and dynamic pricing

Performance Specifications for Smart Meters and Demand Response



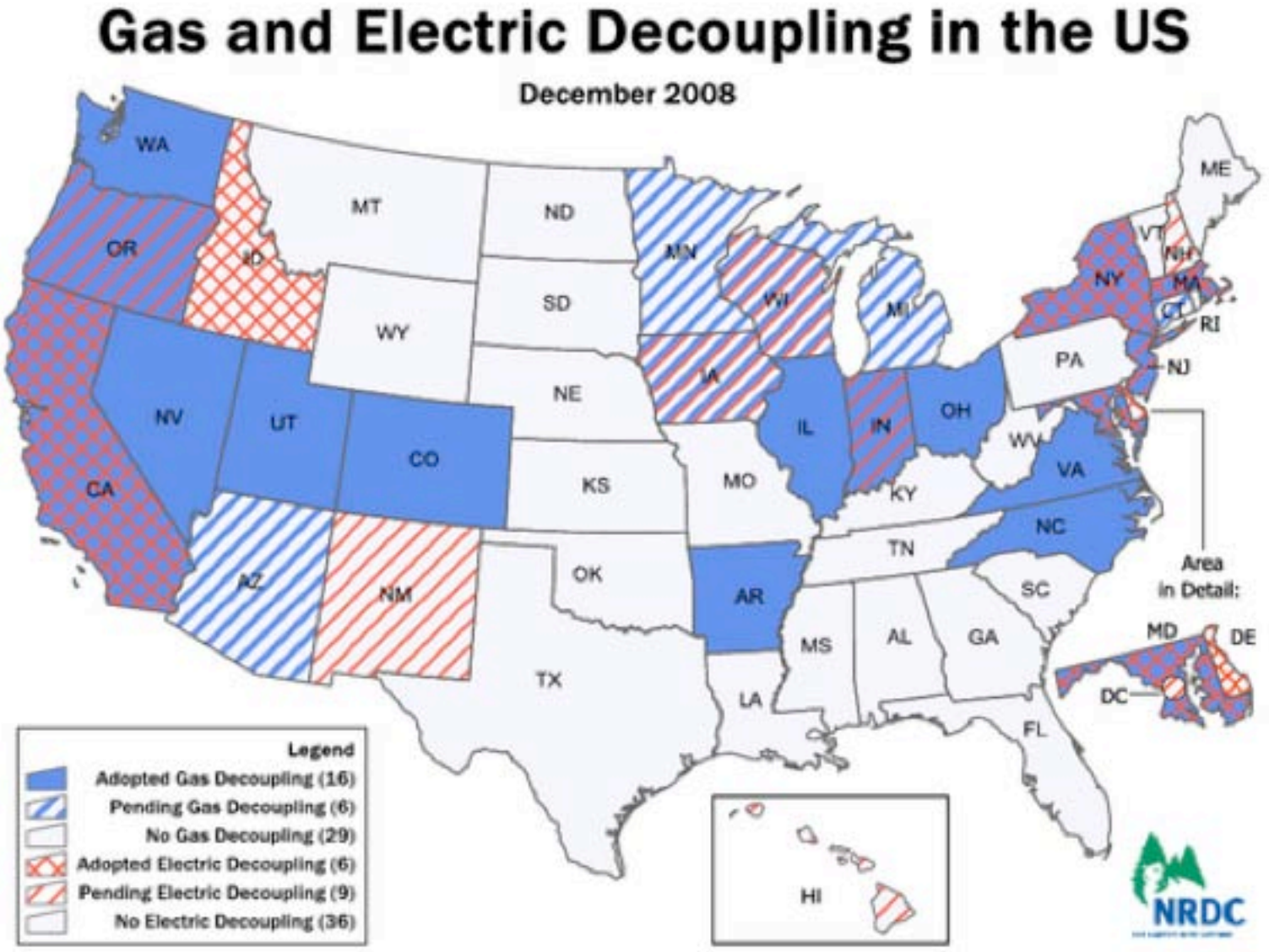
Summary of Pricing Pilot Savings (Faruqui and Sergici, 2009 Table 31 p. 43)

Alignment of Utility Financial Incentives with Customer Energy Efficiency

Recommended Federal Action: Ensure DOE's strict enforcement of the 2009 American Recovery and Reinvestment Act requiring that disbursement of funds to States be contingent on Governor assurances that financial incentives will be established for utilities that help customers use energy more efficiently. Also, expand the federal Regulatory Assistance Program to help States design appropriate financial incentives for energy-efficiency programs.

- Traditional rate-of-return utility regulations discourage utilities from investing in programs that help customers use energy more efficiently
- Policy reform could reposition utilities as powerful enablers of a more efficient end-use energy infrastructure

Alignment of Utility Financial Incentives with Customer Energy Efficiency

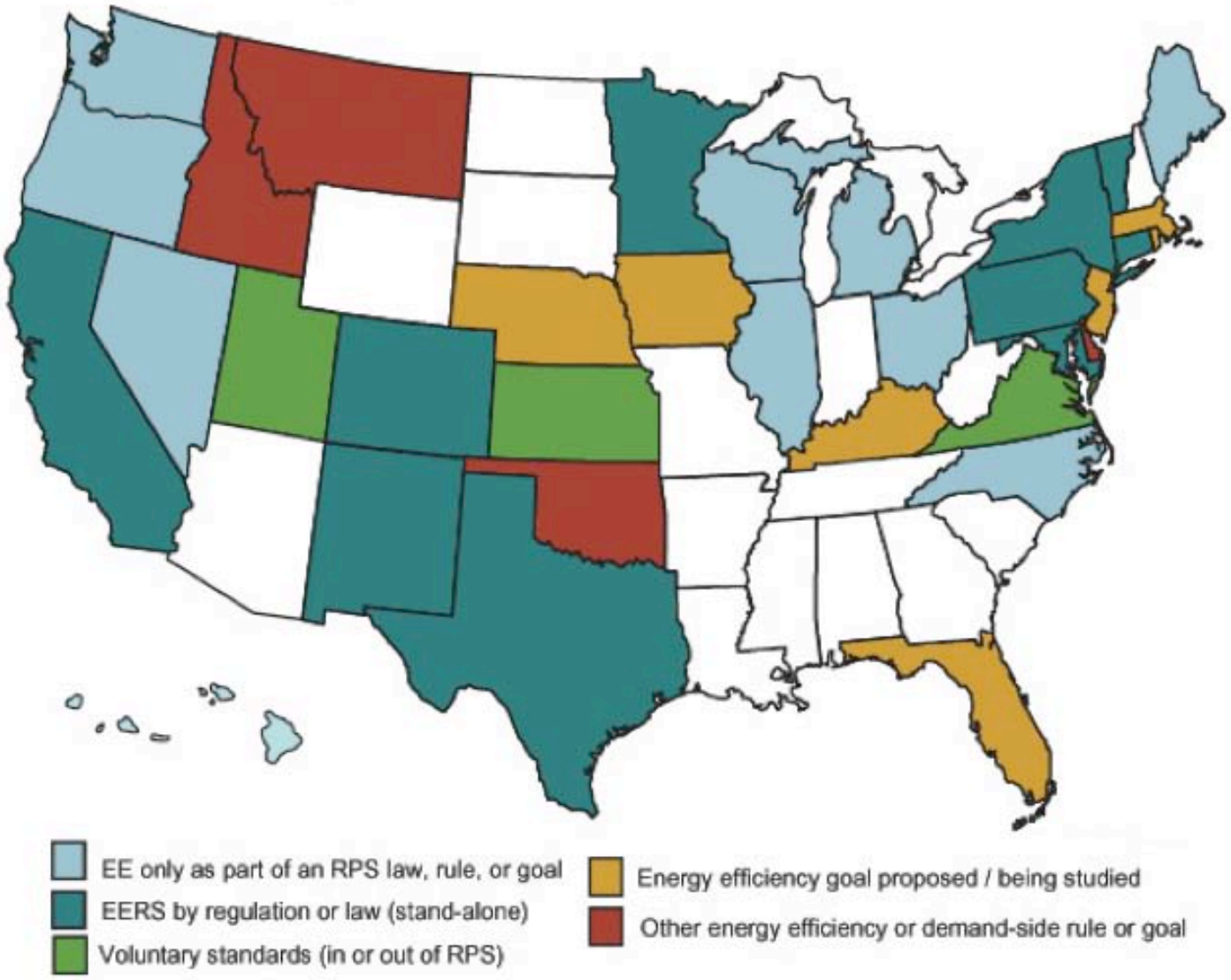


Federal Energy Efficiency Resource Standard

Recommended Federal Action: Promulgate rules such that electric and natural gas utilities are required to meet an energy efficiency resource standard (EERS); concurrently establish a national market for trading energy savings credits.

- Reduce electricity demand by 15 percent and natural gas demand by 10 percent by 2020 – as included in the Save American Energy Act
- Allow trading of credits to reach lowest cost savings first
- Attempts to provide a place in the supply market for efficiency
- Pieces together patchwork of state policies

Federal Energy Efficiency Resource Standard



Policy Options to Promote Industrial Energy Efficiency

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OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

Results of a DOE Workshop Focused on Industrial Energy-Efficiency Policies

Three types of policies are needed to address barriers and market failures:

- **Market-Based Regulations**
- **Information/Training Tools**
- **Financial Tools**

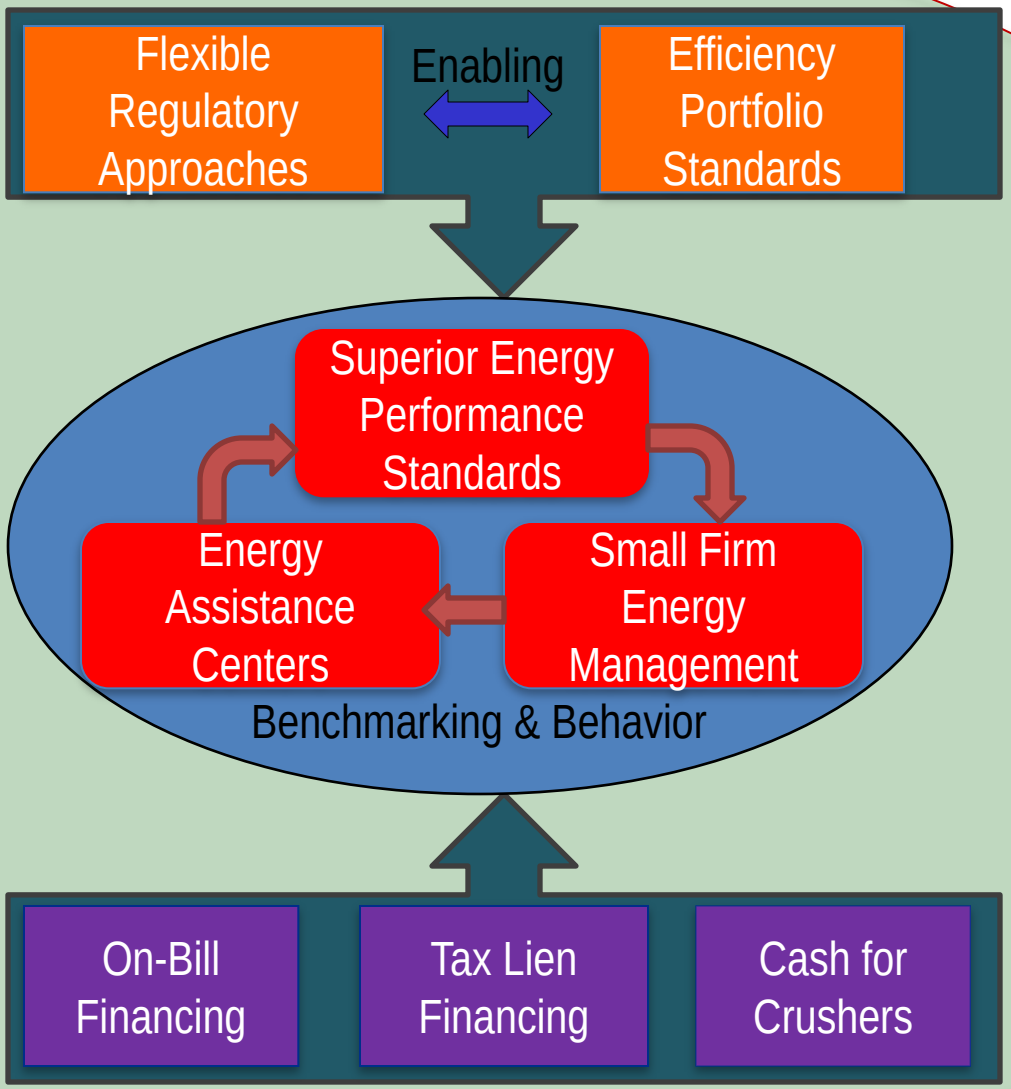
Fifteen specific policy options were identified, and we evaluated eight of these.

Some Innovative Policies

Overcoming Inadequate Regulations::
- Corporate Sustainability Efforts,
- Carbon Credits,
- White Certificates,
- NSR Reform

Overcoming Information & Training Barriers:
- Industrial Assessment Centers,
- Save Energy Now,
- Association of Energy Engineers
- MEPs

Other Financing Barriers:
- Corporate Financing,
- ESCOs,
- Traditional Lending Institutions,
- Loan Guarantees



Policy Classification
- Regulatory
- Info/Training
- Financing

POLICY OPTION 1: ENERGY ASSESSMENT AND IMPLEMENTATION ASSISTANCE

Appropriate necessary funding to create and support Industrial Energy Assistance Centers (IEACs), in addition to increasing the current funding level for DOE IAC and SEN programs

Elements of the Approach

- Increase quantity of IAC and SEN energy assessments completed
- Create IEACs near or at universities with existing IACs that could leverage existing relationships between industrial facilities, financial institutions, and engineering firms to increase implementation of energy saving measures
- IEACs would work with local financial institutions and engineering firms to provide capital and technical expertise for energy efficiency projects

Barriers Addressed

- DOE assessments only address a small portion of the eligible industrial market due to funding
- Large quantities of DOE energy saving recommendations with short payback times and acceptable process/equipment changes are not implemented
- Lack of capital and technical personnel are primary barriers to implementation of energy saving recommendations

Historical Experience and Lessons Learned

- Since 2000, IAC and SEN audits have recommended almost $2 billion in savings
- Every $1 invested in the IAC has generated approximately $5.5 in annual savings
- For every $1 of annual savings generated from IAC energy assessments, $2 have in savings have been foregone
- Energy saving programs that achieve high implementation of savings offer a tiered approach that includes opportunity identification, technology identification and project design, project financing, and installation assistance

Stakeholders and Constituencies

- Industrial facilities
- Local engineering firms
- Lending institutions
- State and Federal government
- Department of Energy
- Department of Commerce
- Equipment suppliers
- Gas and electric utilities
- General Public

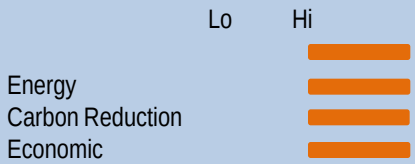
Rationale for Federal Involvement

- IAC and SEN energy assessments identify significant energy savings per facility
- Implementation of IAC and SEN identified energy savings can be increased significantly by implementation assistance
- IEACs train next-generation industry managers
- IEACs increase the implementation energy efficiency projects which foster job creation in local economies

Broad Applicability

- Applies primarily to mid and large industrial facilities

Potential Benefits



Cost Effectiveness

- The implementation percentage of energy savings from SEN assessments will increase from 39% to 58% and from 33% to 52% for IAC assessments

Technology Readiness

- New technology is not needed

Administrative Feasibility

- Moderate administrative costs

Additionality

- This policy facilitates the availability of capital, and technical personnel and expertise to implement energy efficiency projects fostered by other policies

POLICY OPTION 2: FLEXIBLE REGULATORY APPROACHES

Incentivize the adoption of flexible regulatory approaches by State environmental agencies

Elements of the Approach

- Couple an incentive such as State Energy Conservation Program funding or expanded credit towards a national RES with the adoption of flexible regulatory approaches
- A flexible regulatory approach could include output-based emissions standards and adoption of the 2002 New Source Review Rules

Barriers Addressed

- Regulatory barriers to efficiency from input-based emissions calculations
- Regulatory uncertainty (both real and perceived)

Historical Experience and Lessons Learned

- Output-based emission standards account for pollution avoided through energy efficiency
- 12+ states use output-based emission standards, with significant increases in the implementation of efficient technologies after regulatory reform
- The 2002 NSR rules can alleviate concerns surrounding upgrades with flexible air permitting and plantwide applicability limits

Stakeholders and Constituencies

- US EPA
- State Environmental Agencies/Regulators
- US Industry
- Environmentalists
- Electric utilities
- General public

Rationale for Federal Involvement

- Flexible Regulatory Approaches represent a modification in the implementation of the Clean Air Act, a key Federal environmental policy

Broad Applicability

- Flexible Regulatory Approaches could have a broad, national impact

Significant Potential Benefits

Average Annual Benefits (2010 – 2020, CHP):
Energy Savings: 60.2 TBtu
Carbon Reduction: 3.625 MMTCO2
Jobs: ?
Total Costs: $1.7B in private investment
Total Benefits: $3.825B in private investment
Total B:C = 2.25

Cost Effectiveness

- Broader implementation of industrial energy efficiency measures should be cost-effective

Technology Readiness

- No new technologies are required for this policy option

Administrative Feasibility

- The US EPA is already familiar with output-based emission standards; overall administrative costs should be minor

Additionality

- Impacts most states; most do not currently use flexible regulatory approaches.

POLICY OPTION 3: INCENTIVIZE SUPERIOR ENERGY PERFORMANCE

Establish stronger incentives for the adoption of Superior Energy Performance

Elements of the Approach

- Allow verified energy savings from certified SEP facilities to be counted as energy efficiency credits in compliance with meeting Energy Efficiency Resource Standards
- Give partial grants to facilities for adoption costs and energy manager training
- Include an additional allotment of carbon allowances
- Provide recognition programs for certified facilities

Barriers Addressed

- The failure of energy efficiency upgrades to adequately compete for financing and attention by corporate leaders and facility managers
- The lack of specialized skills and workforce knowledge
- The inability to sustain savings from energy efficient improvements
- The inability of countries without strong incentives to achieve significant penetration of energy management standards in industry

Historical Experience and Lessons Learned

- In the United States, energy management standards have achieved a market penetration of less than 5%
- Countries that incentivize the adoption of energy management standards such as Denmark and Sweden achieve a market penetration of roughly 50% or greater
- Companies that foster an energy management culture report energy intensity improvements of 20% or greater in less than a decade

Stakeholders and Constituencies

- ESCOs
- Industrial facilities
- State and Federal government
- Lending institutions
- Department of Energy
- Equipment suppliers
- Gas and electric utilities
- General Public

Rationale for Federal Involvement

- SEP fosters a facility culture that supports "whole plant" energy efficiency
- SEP promote a continuous improvement philosophy with regard to energy efficiency
- Industrial energy intensity reductions benefit the public good by reducing environmental pollution and decreasing energy costs

Broad Applicability

- Initially targets larger industrial firms which comprise 67% of industrial energy use

Potential Benefits

Average Annual Benefits (2010-2020)
Energy Savings= 4,183 TBtu (1.4%)
Carbon Reduction = 272 MMT CO_2
Jobs: ??
Total Costs of Financial Incentives =$19M
Total NPV Benefits=$8.3 billion
Total Benefit:Cost Ratio: TBD (need estimate of private investment requirements)

Cost Effectiveness

- $26.6 million in financial incentives can facilitate 59,700 TBtu in annual energy savings by 2040

Technology Readiness

- New technology is not needed

Administrative Feasibility

- Moderate but declining administrative costs as the SEP initiative takes hold

Additionality

This policy option encourages efficient energy management in the industrial sector and does not target specific technologies, regulatory policies, or financial and workforce barriers

POLICY OPTION 4: NATIONAL EERS WITH COMBINED HEAT AND POWER

Promulgate federal legislation requiring electric and gas distributors to meet a portfolio standard that qualifies industrial energy efficiency improvements including CHP; foster a national market for trading energy efficiency credits

Elements of the Approach

- National EERS that explicitly qualifies CHP
  - National market for trading energy efficiency credits

Barriers Addressed

- Policy Uncertainty
- Financial Risks and Uncertainties
- Industrial Structure and Management Philosophies
- Lack of Developed Business Case for Energy Efficiency

Historical Experience and Lessons Learned

- 20 states have an EERS/RES that includes industrial efficiency
- Many EERS states have offered subsidies for industrial upgrades
- States with large amounts of installed CHP but without an EERS/RES still find that these markets are policy driven.

Stakeholders & Constituencies

- Electric and gas distributors
- Industrial energy-efficiency suppliers
- ESCOs
- Policymakers
- General public

Rationale for Federal Involvement

- Sets goal but does not prescribe specific market response
- Provides incentive for those most able to make efficiency upgrades to do so

Broad Applicability

- Applies to the industrial sector nationwide

Significant Potential Benefits

	Lo	Hi
Energy Savings:		
Carbon Reduction:		
Economic: High		
Other: Increased industrial energy productivity		

Cost Effectiveness

- Energy efficiency is cheaper than creating new energy sources, on the order of 3¢/kwh

Technology Readiness

- New technology is not required

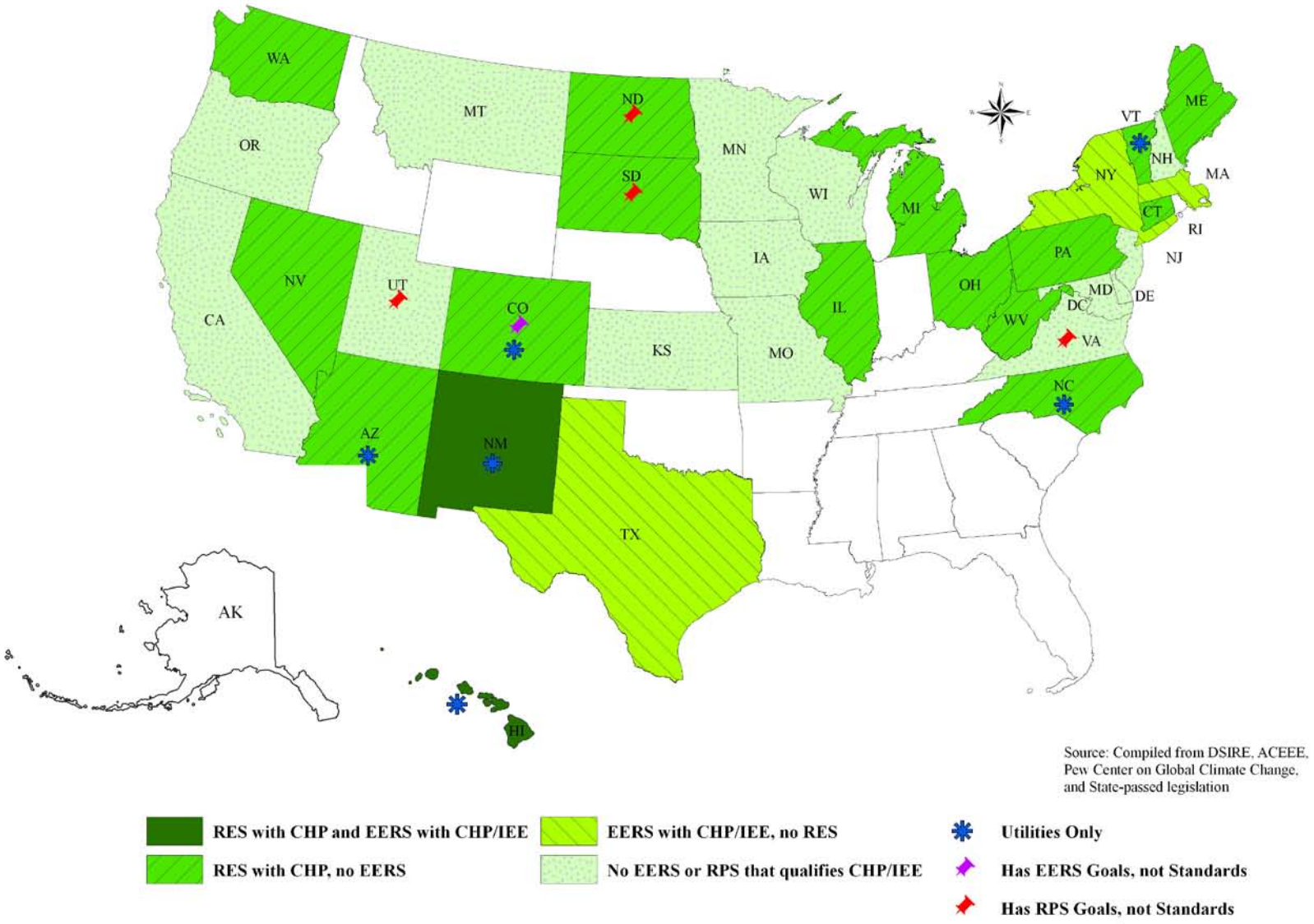
Administrative Feasibility

- Administrative costs are anticipated to be moderate, due in part to M&V requirements

Additionality

- Impacts 30 states that do not have an EERS or an RES that allows efficiency to qualify to meet the goal

State RES/EERS Qualifying Industrial Energy Efficiency



POLICY OPTION 5: PROPERTY TAX LIEN FINANCING

Pass enabling legislation to allow municipalities to establish clean energy taxation districts, which can issue tax-free bonds for certified energy efficiency projects. Have the Department of Energy offer Federal loan guarantees

Elements of the Approach

- Enabling Federal legislation
- Municipal special taxation district formation
- Municipal bond issuance with Federal loan guarantee
- Property owner applies for funds
- Certified contractor installs upgrade
- Funds repaid through property taxes

Barriers Addressed

- Regulatory (Sarbanes-Oxley Act of 2002)
- Lack of Available Capital, Financial Risks and Uncertainties
- High Costs and Misplaced Incentives
- Policy Uncertainty

Historical Experience and Lessons Learned

- Babylon, NY; Boulder CO; Palm Desert, CA; 18 states have enabling legislation
- Require quality assurance and oversight measures
- Small and medium sized business most likely to use financing
- Approve cash-flow positive projects

Stakeholders and Constituencies

- Property Owners
- Municipalities
- Federal Government
- Bond Investors/Lenders
- National Politicians
- ESCOs
- Environmental Groups
- Mortgage Lenders
- Shareholder Rights Advocates
- General Public

Rationale for Federal Involvement

- HR 2454 passed enabling legislation
- Dept. of Energy experienced with loan guarantees
- Addresses Federal regulatory barrier

Broad Applicability

- Provides low-cost financing for efficiency upgrades across industry
- Federal loan guarantee provides standardization and security

Significant Benefits

Average Annual Benefits (2010 – 2020):
Energy Savings: 13552 TBtus (3.9%)
Carbon Reduction: 880 MMTCO2
Jobs: ?
Total Costs: $57M in admin costs, paid by municipalities, plus private investment.
Total Benefits: $6.16B
Total B:C >1, since projects must be cash-flow positive to receive financing. Exact ratio depends on the quality of projects.

Cost Effectiveness

- Senior debt insures government investment
- Cash-flow positive projects secure repayment

Technology Readiness

- Not dependent on new technologies

Administrative Feasibility

- Dept. of Energy is experienced with loan guarantee programs

Additionality

- This policy addresses very specific regulatory issues in energy efficiency

POLICY OPTION 6: CASH FOR CRUSHERS

Authorize and appropriate funding for DOE to implement a program to provide industrial firms with rebates for purchases of certified high efficiency motors, as well as additional incentives to manufacturers of efficient motors. Prioritize motor replacement to companies actively engaged in energy efficiency program and provide technical resources to firms for optimizing performance of their new motors

Elements of the Approach

- Help firms to identify large, aging, inefficient motors in their industrial processes
- Provide a direct cash payment to firms that replace outmoded motors with new, highly-efficient motors

Barriers Addressed

- The failure of energy efficiency upgrades to adequately compete for financing and attention by corporate leaders and facility managers
- Failure of firms to invest in capital upgrades to save on operating costs
- High Costs and Misplaced Incentives
- Minimal information on energy-intensive motors

Historical Experience and Lessons Learned

- Cash for Clunkers from the Recovery Act was extremely popular and removed high mile-per-gallon automobiles from the transportation sector
- Previous efforts at motor replacement, such as the ITP Motor Challenge, have generated enthusiasm, but left many inefficient motors in the nation's manufacturing systems

Stakeholders & Constituencies

- Motor producers and operators
- Firms across the industrial sector
- US EPA and DOE Industrial Technologies Program
- Policymakers
- General Public

Rationale for Federal Involvement

- Precedent and experience from previous "Cash for" Recovery Act programs
- Requires federal financial resources.
- Consistent nationwide implementation

Broad Applicability

- Applies to the entire US industrial sector

Potential Benefits

Average Annual Benefits (2010-2025)
Energy Savings= 3.4 billion KWh (xx%)
Carbon Reduction= 2.4 MMT CO_2
Jobs: 2,300
Total Costs=$350 million
Total NPV Benefits=$3.3 billion
Total Benefit:Cost Ratio: 8:1

Cost Effectiveness

- Motor operation is high cost and replacement provides significant operation savings

Technology Readiness

- Technology is available

Administrative Feasibility

- Implementation must be transparent but will have moderate administrative costs

Additionality

- Augments other policies through specific incentives for motors.

POLICY OPTION 7: SMALL FIRM ENERGY MANAGEMENT

Provide small industries with technical support to conduct energy management plans, and follow up to apply for IAC assessments and financial support to invest in energy efficiency plans.

Elements of the Approach

- Use workshops to show cost-effective methods to reduce energy use in small industry and aid in implementing energy management (EM) in small firms
- Design and distribute an EM software application to be used by small firms to learn efficient energy use and identify potential energy savings
- Small firms with high potential energy savings can be prioritized for IAC assessments

Barriers Addressed

- Small firms have not integrated in DOE energy management programs such as IAC and SENA
- Small firms that do not practice energy management often lack the knowledge to implement energy efficient programs

Historical Experience and Lessons Learned

- International experience has shown that small firms' lack of time and energy managers reduces their ability to exploit external knowledge, representing a barrier to the adoption of energy-saving measures

Stakeholders and Constituencies

- Small Industrial facilities
- State and Federal government
- Lending institutions
- Equipment suppliers
- Gas and electric utilities
- General public

Rationale for Federal Involvement

- Small firms generally have not received attention from Federal Energy Management programs. These firms represent 70% of total industrial sites in US but only 7% of energy use
- The relative economic impact of energy savings for small firms is likely greater than that of large firms
- Small firms lack the resources to implement energy management plans independently

Broad Applicability

- Applies to 70% of US industrial sites

Potential Benefits

Average Annual Benefits (2010-2020)
Energy Savings= 200 TBtu
Carbon Reduction = MMT CO_2
Jobs: ??
Total Public cost = 22 million
Total NPV Benefits=$ 5.51 billion
Benefit:Cost Ratio: TBD (need estimate of private investment requirements)

Cost Effectiveness

- This policy would assist small firms find and implement cost-effective energy savings measures that have historically been overlooked.

Technology Readiness

- New technology is not needed

Administrative Feasibility

- Moderate to low administrative costs

Additionality

- This policy focuses on the needs of small industrial firms, which are not a focus of current energy-efficiency policy.

POLICY OPTION 8: ON-BILL FINANCING

Provide financial assistance to State Energy Offices to establish revolving loan funds to enable on-bill utility financing of energy-efficiency improvements without up-front capital costs to the industrial facility.

Elements of the Approach

- Loans are made by the utility company and are repaid by adding a charge to the utility bill
- A revolving loan fund could extend the positive impact of the Stimulus Bill by many years

Barriers Addressed

- The failure of energy efficiency upgrades to adequately compete for financing and attention by corporate leaders and facility managers
- High up-front costs and failure of firms to invest in capital upgrades to save on operating costs

Historical Experience and Lessons Learned

Provides low-cost financing for efficiency upgrades across industry.
At least 18 on-bill financing programs are in operation across the country.
Capital for these programs came from a variety of sources including lender funds, internal utility funds, and public benefits charges.

Stakeholders and Constituencies

- Industrial facilities
- Local engineering firms
- Lending institutions
- State and Federal government
- Department of Energy
- Department of Commerce
- Equipment suppliers
- Gas and electric utilities
- General Public

Rationale for Federal Involvement

- Compatible with the establishment of an EERS

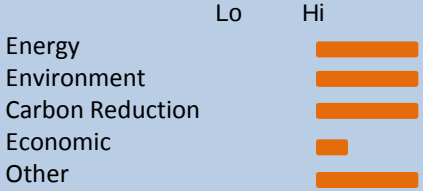
Broad Applicability

Broad applicability to residential, commercial and possibly industrial building owners

Additionality

Offers a financing mechanism to meet a state or federal EERS

Potential Benefits



Cost Effectiveness

On-bill financing has proved cost-effective enough that some utilities have chosen to offer it without government support. Smaller utilities without access to enough capital cannot do this without assistance.

Administrative Feasibility

- To enable the creation of revolving loan funds in States using Stimulus Bill revenues, DOE must deem the funds as being spent as the energy-efficiency upgrades occur

Summary

- **Common strengths of policy innovations**: cost-effectiveness, potential benefits, broad applicability, and technology readiness
- Even for those policies that have medium or long time horizons, *savings begin to accrue shortly after adoption and build up over time*.

Summary (cont.)

- **Common weaknesses**: administrative practicability – because most of these policies are markedly different from existing policies and will *face implementation delays and resistance from stakeholders of incumbent technologies; need for appropriated resources*

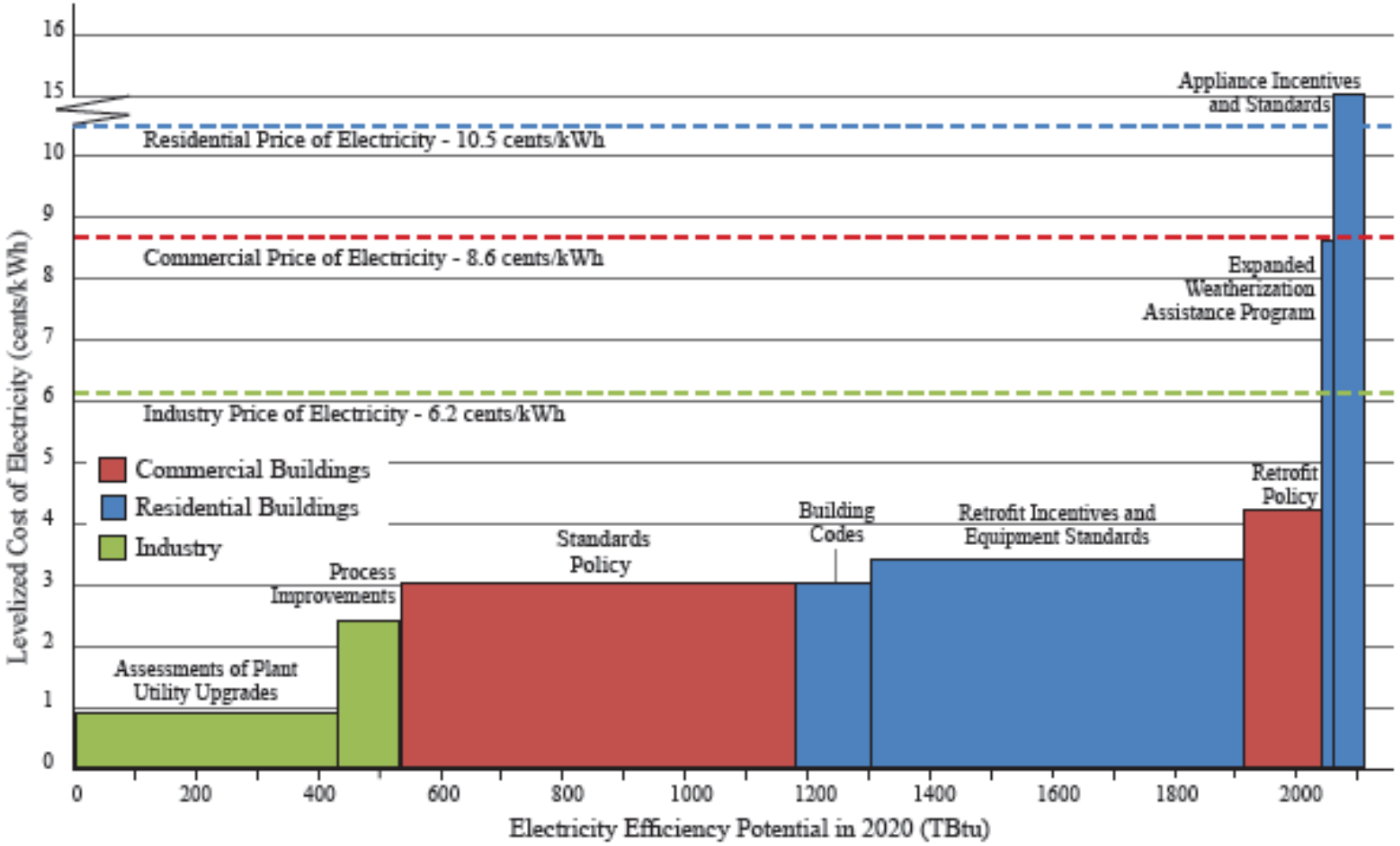
Policy Supply Curves Can Promote

Bottom-up *policy* supply curves can address some of the problems with *technology* supply curves. They

--can explicitly deal with barriers and drivers
--allow bundles of technologies to be modeled
--can be applied to suites of technology
--are amenable to the inclusion of program administration costs

See: Energy Efficiency in the South. 2010. *Marilyn Brown et al.* www.seealliance.org

Supply Curve for Electricity Efficiency in the South in 2020 (RCI Sectors)



Grounds for optimism

- Carbon emissions have just begun to be priced – “market signals” will spur innovation.
- Most of the 2050 physical plant is not yet built – with growth comes opportunity.
- Our current energy system could be made much more efficient – creating jobs and reducing imports.