Government Policies to Accelerate Technology Development & Market Deployment of Industrial Decarbonization Strategies

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The American Council for an Energy-Efficient Economy is a nonprofit 501(c)(3) founded in 1980. We act as a catalyst to advance energy efficiency policies, programs, technologies, investments, & behaviors.

Our research explores economic impacts, financing options, behavior changes, program design, and utility planning, as well as US national, state, & local policy.

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Areas to be addressed by policies

• Research into new technologies, processes, practices, materials and products
• Encouraging corporate investments that lead to a reduced carbon footprint
• Creating a trained workforce & address transition equity issues
Technologies and practices

• Cross cutting RD&D
  • Focus on cross cutting technologies such as smart manufacturing, electrification of process technologies,
  • Industry advised, co-funded academic research initiatives
  • Leverage government, industry & private sector funding

• Industry-specific RD&D
  • Focus on key industry-specific processes or material issues
  • Co-Funded by government, industry and private sector
  • Government involvement with trade associations address antitrust
  • Industry targets research to critical topics that respond to challenges and involvement allows them to accelerate adoption of new technologies
  • IOF model demonstrated to make substantive impacts, cost effectively with short time to market
Manufacturing USA

- DOE has established 14 manufacturing RD&D institutes to double energy productivity by 2030, with two-thirds of Fortune 50 represented and public/private match at 2-to-1:
  - Clean Energy Smart Manufacturing Innovation Institute (CESMII) - enabling smart manufacturing through integration of sensors, controls, platforms, and models with operational technologies
  - Rapid Advancement in Process intensification Deployment (RAPID) - improve energy efficiency & energy productivity through modular chemical process intensification
  - Reducing Embodied-energy & Decreasing Emissions Institute (RADEI) - apply early stage R&D to drive down energy & cost of recover, reuse, remanufacture, and recycle four classes of materials: metals, fibers, polymers, and e-waste
- Intent is for institutes to continue with private sector funding after 5 years of government seed funding
Industries of the Future Program

Starting in 1994 DOE sponsored industry-specific R&D with trade associations and their members to improve the energy efficiency, resource utilization, and competitiveness of participating industries. The research was conducted by universities.

• As of 2008, 127 projects has been initiated and over $161 million
• Industry more than matched federal and private funds
• Trade associations aggregated the funds
• Industry participation enabled:
  • Research that focused on key issues for industry
  • Familiarity with ongoing research allowed firms to implement result in on average 7 years
Demand side policies

• Focus on what we purchase
• Government & private sector purchasing specifications based on:
  • Carbon intensity
  • Recycled content & recyclability
  • Product life
• Public education & awareness
  • Labeling for sustainability by government, industry & NGOs
  • Publicity of case studies
  • Actionable consumer guidance
Material substitutions & feed stocks

• Support of research on material & product substitutions
  • Alternative material choices by integrator companies (e.g., construction, automotive)
  • Using ICT to reduce carbon intensity or extend product lives (e.g., streaming music, cloud-based control systems)

• Promote recycled feedstocks
  • Institute recycling practices that produce higher quality feedstock
  • Encourage design for recyclability
  • Research to address technical challenges in using recycled feedstocks

• Alternative feedstocks
  • Research into less carbon intensive feedstocks (e.g., bio-based materials)
  • Look for material substitutions with similar or better performance properties and reduced carbon (e.g., non-Portland concretes)
Encourage investments in modernization

*Policies options:*

- Industrial modernization fund
  - Revolving loan fund for industrial process investments
  - Loan-loss reserve or other credit enhancement for private sector leading
- Favorable tax treatment
  - Recent tax reforms have largely made this policy ineffective
- Recycling of carbon revenues to support process investments by industry

*Policy considerations:*

- Most firms have access to capital, but allocation issue
- Need to be sensitive to capital investment cycles
- Need to address stranded-asset issues
Corporate & industry commitments

**Voluntary commitment approaches:**
- Company investor-lead, science-based GHG reduction commitments
- Trade association, industry wide voluntary GHG reduction commitments

**Considerations:**
- Targets need to be intensity and capacity utilization adjusted
- Opportunity to make participation as prerequisite for access to private or public resources
- Most firms find scope 3 emissions challenging due to complex nature of supply chains
Economic policies

*Policies to provide price signal:*
  - Pricing carbon
  - Cap and trade
  - Tax incentives

*Policy considerations:*
  - Need to address impacts on energy-intensive trade exposed industries
  - Tax incentives may be ineffective in current environment
  - Need to understand industrial capital investment cycles
  - Impact of workforce & rural community impacts
Workforce

Aging workforce primary challenge for industry today—need to create next generation of industrial workers with appropriate skills:

• Engineering & technical training
  • Expand and extend the technical scope of IACs program
  • Extend model to community colleges, trade schools& union training programs
  • Extend model other disciplines (e.g., building sciences, agriculture)

• Establish apprenticeship programs
  • Expand university coop programs
  • Academic/industry partnerships
  • Engage trade unions in partnerships
Examples of workforce training

Industrial Assessment Centers:

• Established in 1976
• Centers at 28 Universities conduct assessments of small & medium manufacturers using faculty & students
• IACs train the next-generation of energy savvy engineers, more than 60 percent pursue energy-related careers upon graduation.

Apprenticeship initiatives:

• The Bosch Mechatronics Apprenticeship: Bosch & Trident Technical College in Charleston, SC partnered to offer a full-time training program. Apprentices will complete education and training assignments for a 2 year Mechatronics program and be placed into a skilled labor position
• Samsung Apprenticeship: Austin Community College students with degree specialization in Electronics and advanced technologies are eligible for paid part-time work while completing their degree and eligible for fulltime technician positions after graduation
Conclusions

• Industry is unique in that emissions are driven by customer demands
• No single solution exists — need to address all aspects of industrial GHG emissions
• Costs will be significant, but benefits can be large
• Industries already making major investments in modernization – incremental investments may not be as significant
• Need to be proactive on addressing equity issues—”Just Transition”
2018/2019 ACEEE Conferences

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