A COMPARISON OF US AND EU ENERGY POLICY IMPACTS IN THE MANUFACTURING SECTOR

Marvin J. Horowitz, Ph.D.
• Manufacturing: industries producing durable & non-durable goods.

• On average, manufacturing consumes over a third of national electricity & natural gas

• Energy efficiency policies differ between the US and EU
• Energy efficiency policies differ from state-to-state & MS-to-MS
• Energy efficiency policies differ between industries
## Examples of EU Programs

<table>
<thead>
<tr>
<th>Title</th>
<th>Avg Score</th>
<th>Type</th>
<th>Starting Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Environmental Support,</td>
<td>4.1</td>
<td>Financial</td>
<td>1986</td>
</tr>
<tr>
<td>Energy Tax, Industry</td>
<td>3.6</td>
<td>Cross-cutting with sector-specific characteristics</td>
<td>1996</td>
</tr>
<tr>
<td>Energy audits and feasibility studies subsidies</td>
<td>4.2</td>
<td>Financial</td>
<td>2003</td>
</tr>
<tr>
<td>Operational Programme Industry and Enterprise</td>
<td>3.2</td>
<td>Financial, Legislative/Normative</td>
<td>2004</td>
</tr>
<tr>
<td>Energy efficient companies</td>
<td>3.2</td>
<td>Information/Education/Training</td>
<td>2004</td>
</tr>
<tr>
<td>The Programme for Energy Efficiency in Industry</td>
<td>3.2</td>
<td>Co-operative Measures</td>
<td>2005</td>
</tr>
<tr>
<td>Energy audits for industry</td>
<td>4.0</td>
<td>Financial</td>
<td>2006</td>
</tr>
<tr>
<td>Operational Programme Industry and Innovation</td>
<td>3.2</td>
<td>Financial</td>
<td>2007</td>
</tr>
<tr>
<td>SME Energy Efficiency</td>
<td>3.1</td>
<td>Information/Education/Training</td>
<td>2007</td>
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<tr>
<td>Improvements co-financed by community funds</td>
<td>4.2</td>
<td>Financial</td>
<td>2007</td>
</tr>
<tr>
<td>Financial incentives for efficient electricity consumption</td>
<td>4.3</td>
<td>Financial</td>
<td>2008</td>
</tr>
<tr>
<td>Incentives for obligatory implementation of Energy Management Systems</td>
<td>3.6</td>
<td>Financial, Legislative/Informative</td>
<td>2008</td>
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<tr>
<td>Long Term Agreements with the industry, third phase</td>
<td>4.2</td>
<td>Co-operative Measures</td>
<td>2008</td>
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<tr>
<td>Tax Relief for Energy Saving Equipment - Accelerated Capital Allowance</td>
<td>3.2</td>
<td>Financial</td>
<td>2008</td>
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<tr>
<td>Energy Efficiency Agreement of Industry</td>
<td>4.2</td>
<td>Co-operative Measures</td>
<td>2008</td>
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<tr>
<td>Management of demand for energy and the drawing up of energy balance sheets</td>
<td>4.0</td>
<td>Legislative/Informative</td>
<td>2008</td>
</tr>
<tr>
<td>Mandatory Energy Efficiency Audits for Industrial enterprises</td>
<td>3.1</td>
<td>Legislative/Informative</td>
<td>2008</td>
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<tr>
<td>Special fund for energy efficiency in SME’s</td>
<td>3.7</td>
<td>Financial</td>
<td>2008</td>
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<tr>
<td>Energy efficiency networks for the industry</td>
<td>3.7</td>
<td>Co-operative Measures, Info/Educ/Training</td>
<td>2009</td>
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<tr>
<td>Distribution of the National Indicative Target under Energy Efficiency Law</td>
<td>3.2</td>
<td>Legislative/Normative</td>
<td>2009</td>
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<tr>
<td>Complex Solutions for GHG Emissions Reduction</td>
<td>4.2</td>
<td>Financial</td>
<td>2010</td>
</tr>
<tr>
<td>Loans for small and medium sized enterprises</td>
<td>3.6</td>
<td>Financial</td>
<td>2010</td>
</tr>
<tr>
<td>Special Programme for Climate Change improvement</td>
<td>3.2</td>
<td>Financial</td>
<td>2010</td>
</tr>
<tr>
<td>Promotion of voluntary agreements in industrial sector</td>
<td>3.4</td>
<td>Legislative Info/Educ/Training</td>
<td>2010</td>
</tr>
</tbody>
</table>

http://www.measures-odyssee-mure.eu
MAJOR US PROGRAMS

US EPA Energy Star

Plants achieve ENERGY STAR certification and reductions

Popular ENERGY STAR tools for the industrial sector include plant Energy Performance Indicators (EPIs), which provide companies with the information they need to make smart investment decisions. EPA provides ENERGY STAR certification for 19 types of manufacturing plants, and 100 plants earned ENERGY STAR certification for superior energy performance in 2018.

US DOE Advanced Manufacturing

Advanced Manufacturing: The Budget Request provides $82,000,000 in FY 2018 to support early-stage applied R&D focused on advancing and creating new understanding of underlying technologies, materials and processes relevant to the productive use of energy in manufacturing, as well as the competitive manufacturing of energy related products. The Budget for AMO reasserts the proper role of the Federal Government by reflecting an increased reliance on the private sector to fund later-stage research, development, and commercialization of energy technologies and focusing funding toward early-stage R&D. By fostering collaboration between National Laboratories, universities and companies (for-profit and not-for-profit), this budget will enhance the foundational knowledge base in materials and manufacturing processes, focusing on research challenges that present a significant degree of scientific or technical uncertainty and are beyond the horizon in terms of commercialization, making it unlikely that industry will pursue independently.

State and Local Programs

• administered by electric and gas utilities and/or not-for-profit organizations
• like all US programs, participation is voluntary
Recent peer-reviewed, published studies, one for the US and one for the EU, estimate aggregate or ‘top-down’ policy impacts.

**DATA COSTS**

$0,000,000

€0.000.000

(processing and analyzing not included)
Purchased energy and policy impacts in the US manufacturing sector

Marvin J. Horowitz

A harmonized calculation model for transforming EU bottom-up energy efficiency indicators into empirical estimates of policy impacts

Marvin J. Horowitz a,*, Paolo Bertoldi b

a Demand Research, LLC, Fairfax, VA, United States
b European Commission Joint Research Centre, Ispra, Italy
The two studies are like fraternal twins:

• same genetic origin
• same upbringing
• totally different
• fascinating to compare
**GENETIC ORIGIN, SAME UPBRINGING**

\[ Y_{it} = \alpha_i + R_t + X'_{it} + Z_{it} + \varepsilon_{it} \]

- \( Y_{it} \): consumer-per-period final energy use
  (consumer = industries, states, countries)
  (period = days, months, years)
- \( \alpha_i \): distinctive consumer
- \( R_t \): general (or consumer-specific) long-term trend
- \( X'_{it} \): consumer-per-period econ/demo/socio/demo/physical conditions
- \( Z_{it} \): energy efficiency policy-related variable (when unavailable, work with \( \varepsilon_{it} \))
DIFFERENT DATA

US (50 STATES)

• 5-digit NAICS, 184 industries

• 8 periods in estimation sample (2002-2009)

• Explaining:
  • MWH consumption
  • MWH expenditures
  • Other Fuel expenditures

EU (28 MEMBER STATES)

• 24 of 28 MS (na for Croatia, Cyprus, Greece, Malta)

• 12 periods in estimation sample (2000 to 2011)

• Explaining:
  • Electricity and Natural Gas consumption combined (Terajoules)
FASCINATING TO COMPARE

- MWH savings was 5.6% in 2010 (final consumption would have been 5.6% greater than actual in 2010 had there been no public programs since 2002)

- MWH expenditures were 2.6% lower in 2010 compared to what they would have been had there been no public programs since 2002

- OTHER FUEL expenditures were 5.7% lower in 2010 compared to what they would have been had there been no public programs since 2002

- Cumulative TJ savings was 5.8% in 2011 (final consumption would have been 5.8% greater than actual in 2011 had there been no public programs since 2000)
  
  - accuracy of TJ estimate is +/- 26% at the 90% confidence level.

- Magnitude of savings was similar in the 2000-2005 and the 2006-2011 period
  
  - accuracy was +/- 23% in early period, but +/- 47% in the later period
THANK YOU

Please call or email if you’d like to discuss any of these topics further:

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