



Pacific Northwest
NATIONAL LABORATORY

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PNNL Estimates the Economic Impacts of Federal R&D Investments

Research and development (R&D) leads to innovation and the creation of new products and services. This process of innovation generates new jobs and expands the economy as industries become more efficient and productive. One important consideration in the national discussion of such programs is the economic impacts resulting from R&D. Macroeconomic impacts include the creation of new jobs and income and increased industrial output, among other metrics. PNNL examines these impacts in support of the U.S. Department of Energy's (DOE's) program offices as they sponsor R&D activities across the nexus between energy, national security, and the environment.

PNNL Stewards Long-Standing and Diverse Capabilities in Economic Impact Analysis

For over 25 years, PNNL has been using and adapting the industry-standard IMPLAN model for a range of economic impact analyses. This commercially produced economic model is nationally recognized for its analytical flexibility and regular data updating. The model uses economic data generated for any level of geographic coverage from zip code to national to build impact models that estimate economic responses to any type of shock or disruption.

Several PNNL studies have estimated the macroeconomic impacts of energy-saving technology R&D activities. These studies have examined the building technologies research portfolio and the advanced manufacturing R&D activities of DOE's research offices. IMPLAN provided the basis for PNNL's customized models of the national economy developed to estimate the macroeconomic effects of energy-efficient technology adoption. These models are informed by sector-specific energy analyses, which derive the initial or direct effects used to estimate macroeconomic impacts. PNNL has adapted the IMPLAN model to develop many custom national and regional economic impact models.

PNNL recently estimated its regional economic impact on the State of Washington using a customized IMPLAN model. PNNL adapted IMPLAN data to develop the underlying regional structure for metropolitan area economies as part of a larger computable general equilibrium modeling project evaluating the impact of biofuel mandates in the Northwest. PNNL also developed regional models to estimate the effects of electric power marketing alternatives under consideration by the Western Area Power Administration. PNNL also has performed several economic impact analyses to support environmental impact assessments as part of National Environmental Policy Act reviews.

PNNL-Lead Assessment of Manufacturing Competitiveness

PNNL is an established leader in researching technological advances in the industrial sector and specifically for key manufacturing sectors. Recently selected as part of the Smart Manufacturing Leadership Coalition, PNNL will partner with several teams around the country to develop a 5-year, \$140 million, public-private research program directed at improving the nation's manufacturing competitiveness through targeted R&D and metrics analysis. PNNL also has developed several business case assessments for advanced fuel cell technologies. PNNL has an active technology tracking program that develops commercialization metrics and impacts for DOE's Office of Energy Efficiency and Renewable Energy programs.

About PNNL

Interdisciplinary teams at Pacific Northwest National Laboratory address many of America's most pressing issues in energy, the environment and national security through advances in basic and applied science. Founded in 1965, PNNL employs more than 4,000 staff and has an annual budget of approximately \$1 billion. It is managed by Battelle for the U.S. Department of Energy's Office of Science.

PNNL's Energy Economics team brings a diverse set of capabilities and tools to bear on the questions of market identification, technology characterization, energy impacts of new technology, and related economic and demographic impacts. Learn more: <http://epe.pnnl.gov/cc.asp>

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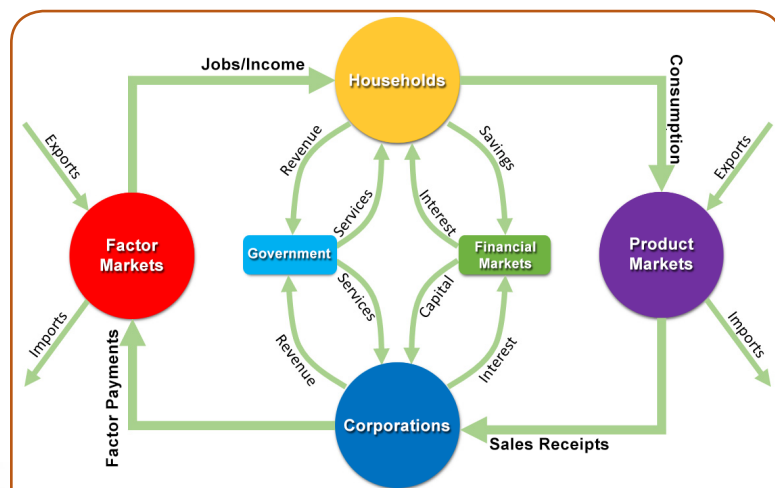


Image illustrates a simplified model of financial flows in the economy typically traced using economic impact models.

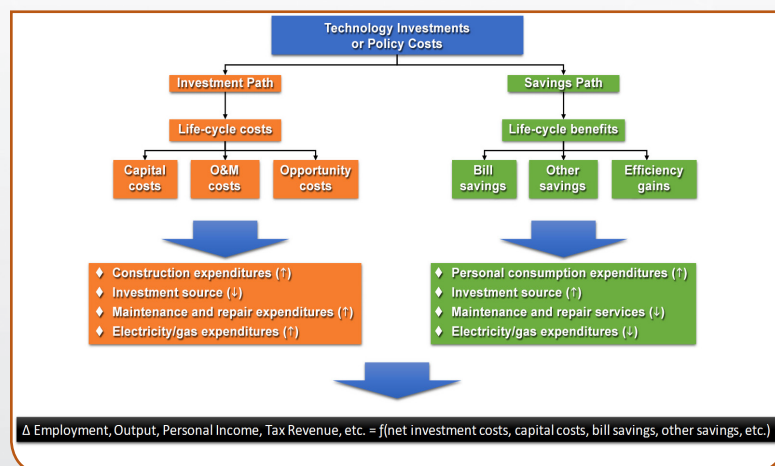


Chart depicts the modeling process used to identify the direct impacts of technology or policy alternatives. The direct impacts are used as inputs to models of the economic flows illustrated in Figure 1 to generate estimates of the macroeconomic effects of technology or policy choices.