Highlights from ATP's Economic Studies

Economic Assessment Office

ATP Helps Overcome Barriers to Green Technologies

- **ATP-funded green technologies reduce manufacturing costs, eliminating pollution at its source, improve energy security, and enhance product performance—while increasing industrial competitiveness—through:**

    - Reduced reliance on imported petroleum
    - Reduced reliance on imported industrial raw materials
    - Reduced industrial waste streams and reduced manufacturing energy required
    - Cost effective recycling of post-industrial and post-consumer wastes, and
    - Reduced harmful environmental emissions, including greenhouse gases

This view represents a radical change from the traditional perspective that industrial protection is a cost that undercuts competitiveness.

Preliminary results from a study of a cluster of ATP-funded green technology projects show substantial energy savings and considerable progress in overcoming barriers to technology development and successful commercialization. These projects are among approximately 40 ATP projects directed toward conservation of fossil energy sources through reduced use of fossil energy in buildings, industrial production, and transportation, with a total ATP investment of over $110 million.

- **ATP-funded Green Technologies Generate Energy Savings and Show Promise for Combining Economic Returns and Sustainability**

Progress toward sustainable green solutions has been hindered by markets failing to fully internalize the cost of harmful environmental emissions and growing petroleum import reliance. In addition, the high technical-risks and long time horizons of many promising green process technologies have inhibited private investment in their technical development and commercialization for large-scale industrial applications.

Sustainability through the use of green technologies anticipates that pollution can be avoided, and resources conserved, without imposing a cost burden or diminishing competitiveness. This view represents a change in perspective away from environmental protection and clean-up regulatory costs and penalties on competitiveness.

Central to this evolving paradigm shift is the emergence of green technologies as market-based solutions for controlling harmful industrial emissions and avoiding the inefficient use of valuable scarce resources. However, questions remain:

- Will industry be willing and able to assume the considerable technology and market risks associated with developing innovative green technology solutions?
- Can technology solutions generate significant impact without internalizing in market price mechanisms the costs of environmental emissions and growing U.S. dependence on imported petroleum?

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In-depth case studies quantify economic benefits and assess sustainability benefits from two ATP-funded green technology projects that have progressed to commercialization:

- The *Renewable Resource Based Plastics Manufacturing* project (Cargill Dow, now NatureWorks) developed an innovative process technology that uses U.S.-grown corn as feedstock for polylactic acid in plastics manufacturing, replacing the use of imported petroleum based feedstock. Commercially introduced in 2003, public benefits include:
    - Reduced energy requirements for manufacturing plastics and BTU savings
    - Reduced import reliance and feedstock security; greater and feedstock cost stability
    - Avoided land-filling of post consumer plastic wastes (which can be composted when plastic is made from corn-based feedstock), and
    - Reduced greenhouse gas emissions

  Quantifiable economic benefits (realized and projected) to U.S. industry and end users are estimated at over $10 for every dollar of ATP's investment.

- The *High Speed Identification and Sorting of Non-Ferrous Metal Scrap* project (wTe Corporation) increased recycling rates for valuable non-ferrous alloy scrap (titanium, superalloys, and aluminum) and thereby decreasing the cost of producing these non-ferrous metal alloys. A wide range of public benefits can be traced to this ATP-investment, including:
    - Upgraded mixed non-ferrous metal scraps to high value alloy production and avoiding the outright waste of some metal scrap that is currently unavailable for recycling in any form.
    - Reduced energy requirements for manufacturing of alloys
    - Reduced greenhouse gas emissions, and
    - Reduced import dependence for titanium and nickel metal concentrates for the primary production of titanium alloys and nickel-based superalloys (for aerospace and other demanding applications).

  Commercialization is underway. Economic benefits (realized and projected) to U.S. industry and end users are estimated at over $10 for every dollar of ATP's investment.

These case studies point to emerging patterns of success that show innovative green technologies can simultaneously provide economic benefits to innovators and society and also meet "green" objectives, even at market prices that do not internalize the costs of pollution and growing U.S. reliance on imported petroleum. If these externalities were successfully internalized in market price mechanisms, even higher levels of benefits could be traced to ATP-funded green technology solutions.

Without ATP, these technology development projects would not have been undertaken.

Source: Preliminary results from *Benefit-cost Analysis of a Cluster of ATP-funded Green **Technologies*** **by Thomas M. Pelsoci, Delta Research Co. NIST GCR. Forthcoming fall 2006.**

Factsheet B13 (Jeanne Powell, April 2006)