

The Advanced Technology Program: Overview and Program Impacts



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ATP Mission ...



*To accelerate the development of
innovative technologies for
broad national benefit through
partnerships with the private sector*

Fifteen Years of Innovation

- Since 1990, **6,924 proposals** submitted to **44 competitions**, requesting **\$14.7 billion** from ATP
- **768 projects awarded** with **1,511 participants** and an equal number of subcontractors
- **218 joint ventures** and **550 single companies**
- **\$4.4 billion** of **high-risk research** funded
 - *ATP share = \$2.3 billion*
 - *Industry share = \$2.1 billion*
- **66%** of projects are led by **small businesses**; nearly half of all small firms have fewer than 20 employees
- Over **170 universities** and over **30 national laboratories** participate



Fifteen Years of Innovation— cont'd

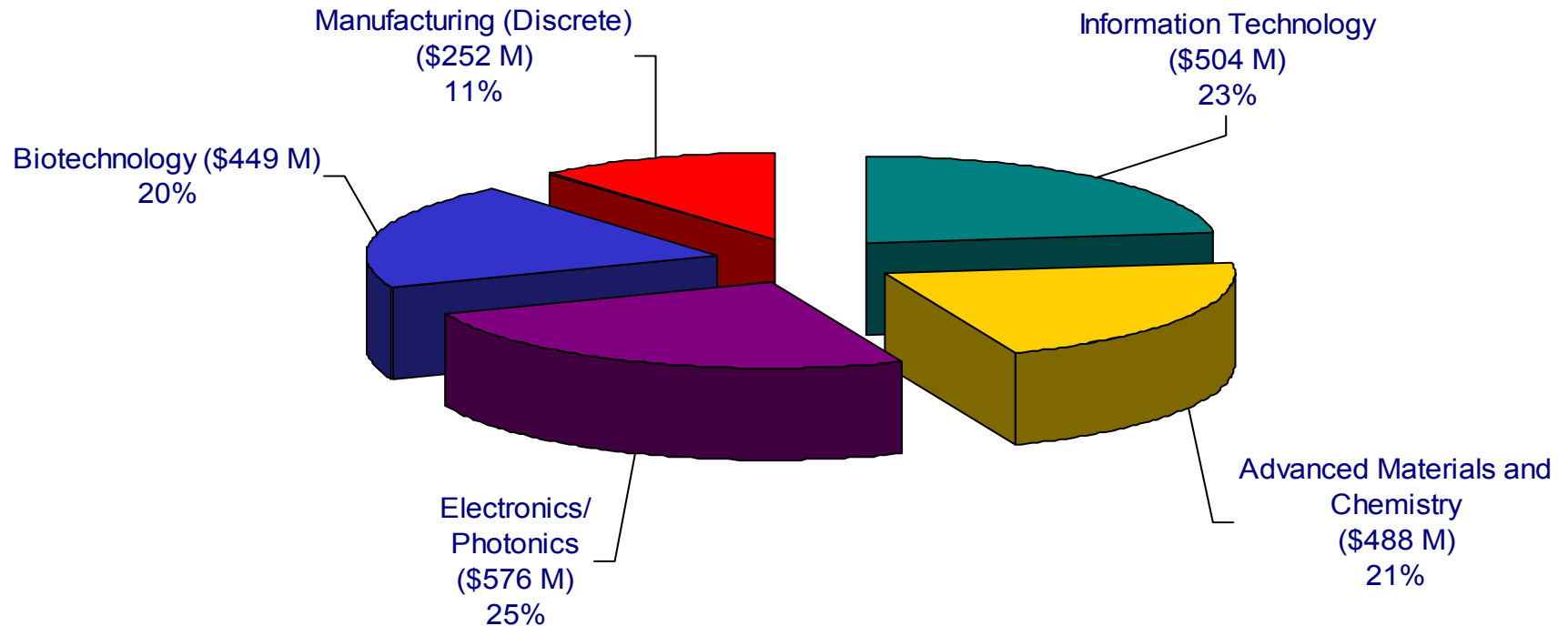
- Over **1,200 technical publications**
- Over **1,000 patents** generated
- Over **270 technologies** commercialized
- National participation mirrors regional clusters of innovative activity

Project Selection Criteria

- Scientific and Technological Merit (*50%*)
 - **Technical Rationale**
 - ✓ high technical risk & feasibility
 - ✓ technological innovation
 - **R&D Plan**
- Potential for Broad-Based Economic Benefits (*50%*)
 - **National Economic Benefits**
 - **Need for ATP Funding**
 - **Pathway to Economic Benefits**

768 ATP Awards by Technology Area

(As a Percent of \$2,269 M Awarded)



Forty Four Competitions (1990 – September 2004)



Key Features of the ATP

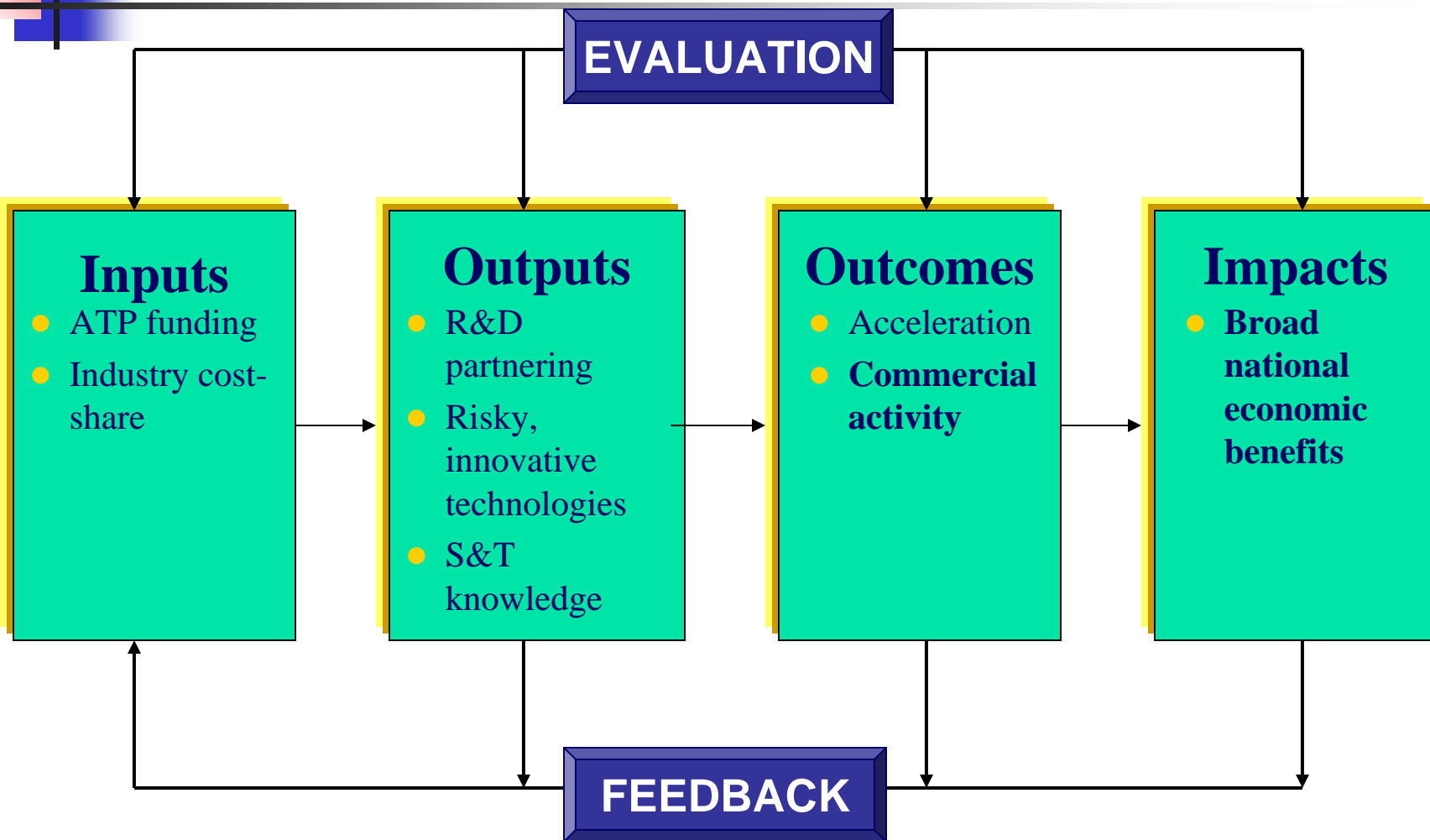
- Emphasis on innovation for broad national economic benefit
- Industry leadership in planning and implementing projects
- Project selection based on technical and economic merit
- Demonstrated need for ATP funding
- Requirement that projects have well-defined goals/sunset provisions
- Project selection rigorously competitive, based on peer review
- Program evaluation from the outset



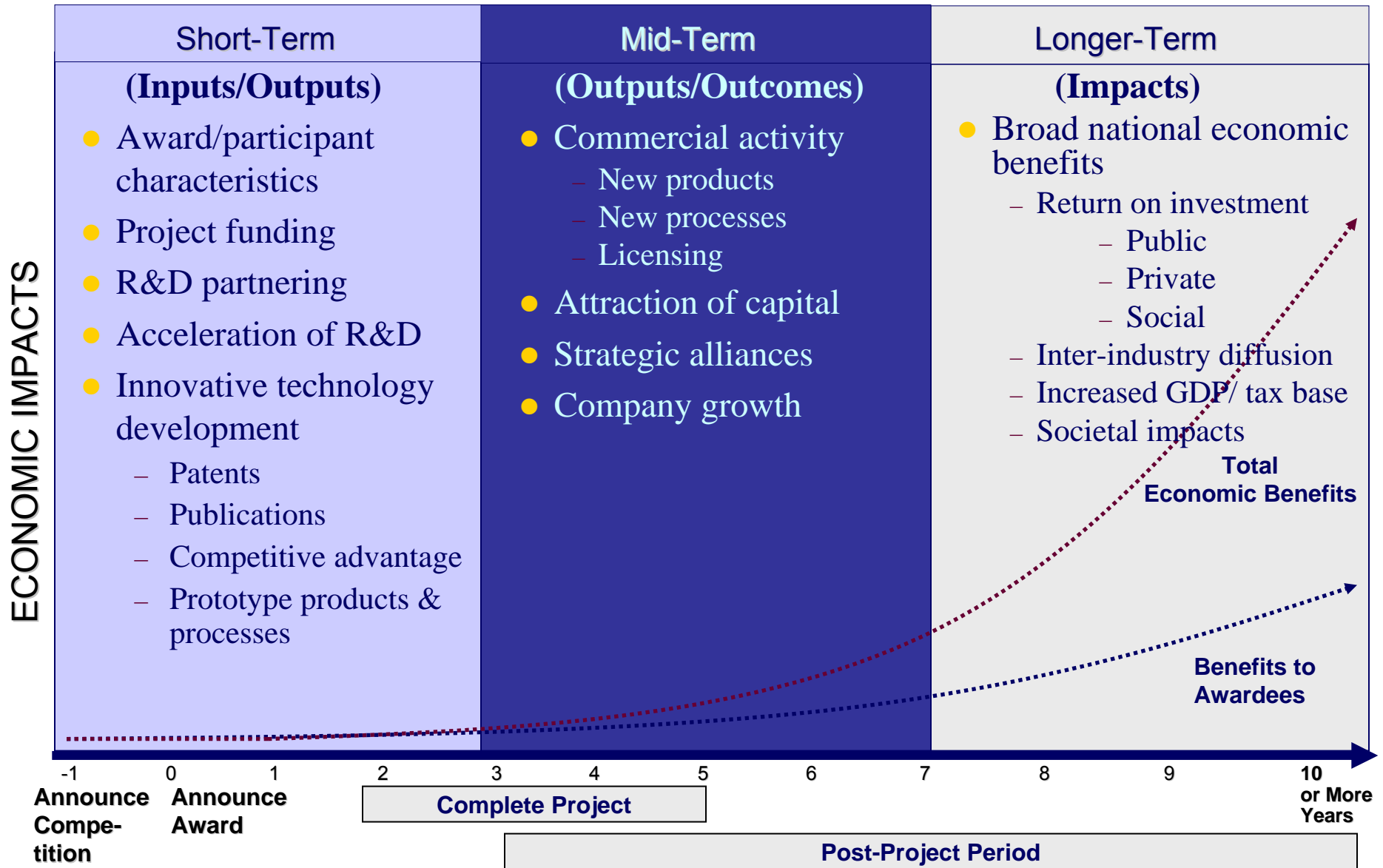
Evaluation From the Outset

- Evaluation activities began early
- Economic Assessment Office charged with measuring the impact of the program
- Evaluation results are used to:
 - Meet external stakeholder requests for program results
 - Manage program operations and increase effectiveness
 - Understand ATP's contribution to the U.S. innovation system
 - Develop innovative methodologies to measure the impact of public R&D investment

ATP Measures Against Mission



What We Measure When





Multiple Approaches to Evaluation

- **Statistical profiling of**
 - applicants
 - projects
 - participants
 - technologies
- **Real time monitoring of research and business activities**
 - ATP project teams
 - technical and business progress reports (e.g., Business Reporting System)
- **Progress measures from**
 - surveys
 - Business Reporting System
 - other databases
- **Status reports on completed projects**
 - star rating for portfolio analysis
- **In-depth case studies**
 - private and social returns
 - public returns (what difference does ATP make?)
- **Statistical and econometric analysis**
- **Policy studies**
- **Expert review**
 - NRC 1999 and 2001
- **Comparisons with foreign counterpart programs**



How We Measure

Short and Mid-Term

- Survey Tools
- Performance Measures
- Composite Performance Rating System
 - Individual project/participant analysis and mini-case studies
 - Portfolio-wide analysis

Longer Term

- In-depth Case Studies—Return on Investment
 - Rates of return
 - Net present value
 - Benefit-cost ratio
- Macroeconomic Analysis
- Econometric Analysis

Business Reporting System

Reporting Schedule

Baseline Quarterly Annual Close-out Post Project

- Business Plans

- ✓ Identification of applications
- ✓ Strategies for commercialization protection of IP, and dissemination of non-proprietary information

- Significant business developments

- Update of business plan and progress

- Collaboration experiences

- Attraction of new funding

- New IP

- Technology diffusion

- Company financial data

- Next 5 years--Technical & Business Goals

- Effects outside your organization





Status Reports on Completed Projects

- Point-in-time case studies that examine the technical and commercial success of a project
- Project outputs determine a “star” rating (0 – 4 stars)
- Outputs include:
 - Knowledge creation and dissemination (patents, awards, publications)
 - Commercialization (products/processes, attraction of additional capital, commercial outlook)

ATP-EAO Studies by Topic

(studies are categorized in multiple topic areas)

- Modeling underlying program theory (28 studies)
- Impacts on private firms (20 studies)
 - financing gap, halo effect, acceleration, firm productivity, small firm participation, commercialization, company growth, private returns
- Collaboration (10 studies)
- Spillover effects (11 studies)
- State and foreign programs (5 studies)
- Overall ATP performance measures (15 studies)

Source: Ruegg and Feller, *A Toolkit for Evaluating Public R&D Investment*,
NIST-GCR 03-857

Benefit-Cost Studies of ATP Projects

- Microeconomic analytical framework using a multidisciplinary approach
 - technology assessment; industry structure; competitive dynamics; microeconomic analysis; and corporate finance measures
- Focuses on benefits to the nation, not to awardees
 - Private return, public return, social returns
- Calculates net present values, internal rates of return, and benefit-cost ratios
- Assesses minimum impact of entire portfolio (conservative approach)



Measuring Against Mission

Evidence from ATP Studies Show ATP is *Meeting Its Mission*. We are seeing ...

- Commercialization of products and processes by U.S. companies
- Refinement of manufacturing processes
- Acceleration of R&D
- Increased collaborations
- Strong small business participation
- Large spillovers, leading to broadly distributed economic benefits



Commercialization Results

ATP technologies are generating “spillover” benefits to customers and users across multiple industries

- Products resulting from ATP technologies are finding their way into a host of downstream products
- Over 8 out of 10 products reduce their customers' cost of production
- On average, products have over 250 customers
- Half of companies with products have customers outside their own industry

Source: ATP Fact Sheet: Customers Across Many Industries Enjoy Significant Benefits

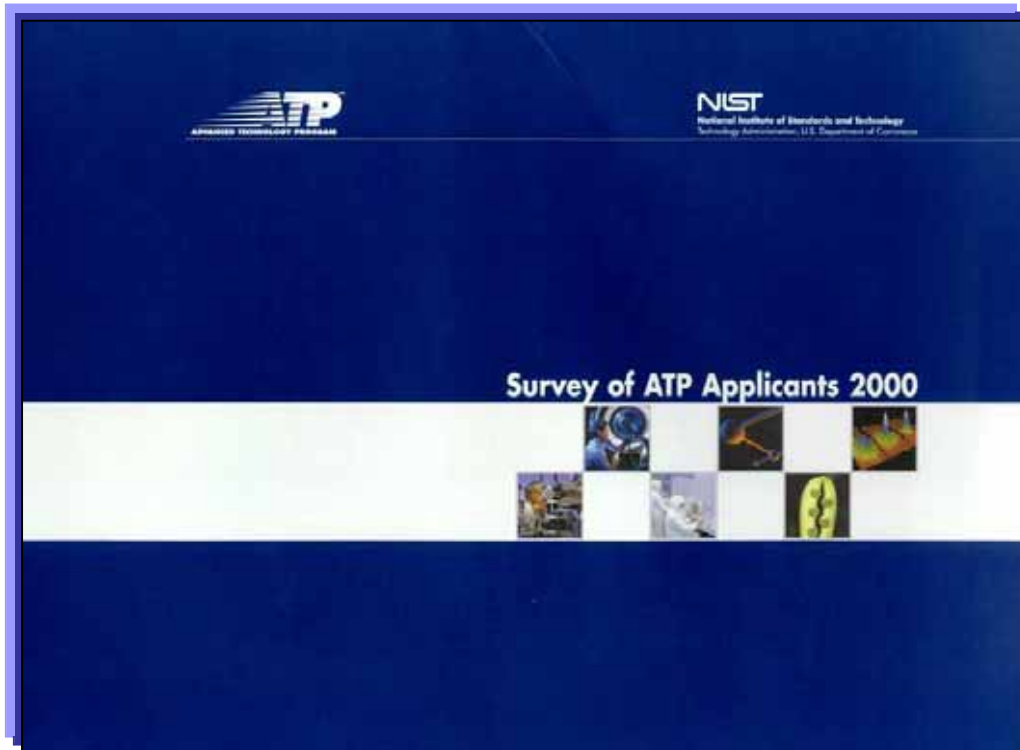


Acceleration Results

- **9 out of 10 organizations indicate that ATP funding accelerated their R&D cycle.** Of those organizations indicating they were *ahead* in the R&D cycle
 - 13% indicate they are ahead by a year
 - 53% indicate that they are ahead by one to three years
 - 7% indicate that they are more than three years ahead

Source: ATP Business Reporting System (BRS) survey data from 673 organizations in 347 ATP projects funded from 1993-1998 – for projects with one or more years of ATP funding.

Collaboration Results

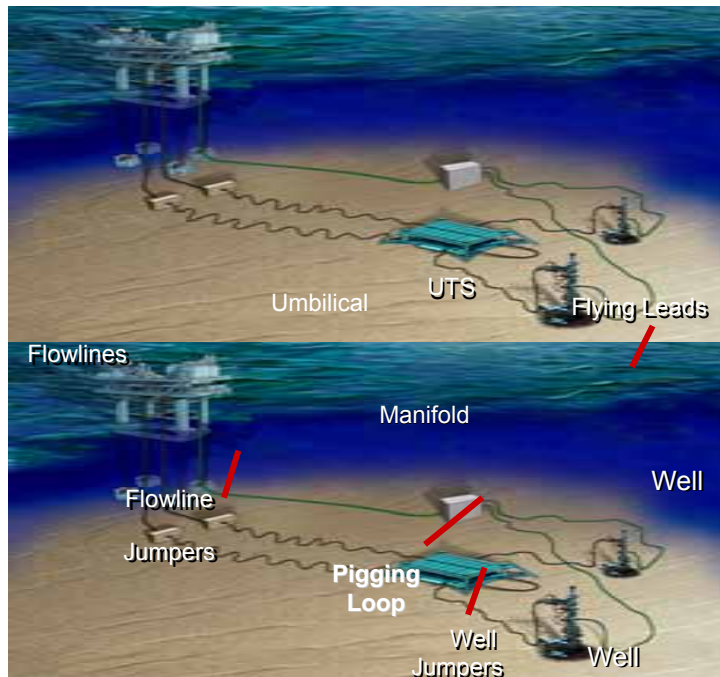


Key Findings:

- ATP awards attract additional funding ("halo effect")
- ATP fosters new R&D directions and partnerships
- ATP fosters collaboration between companies and universities

Deepwater Flowlines

Luna Innovations Incorporated, Blacksburg, VA



Project Objective

Develop a fiber optic sensor suite for real-time, state-of-health monitoring of corrosion and flow assurance parameters in carbon steel flowlines used in deep water oil and gas production.

Potential Impacts

- True condition-based maintenance, lowering production costs (up to \$6M/well/yr) through remote sensing measurements of:
 - Distributed pressure
 - Shear stress and temperature
- Substantial reduction in potential for environmental damage from failure of unmonitored flowlines
- Possible spillover applications for the technology in aerospace and chemical plant operations
- Increased oil production: up to 350K barrels/well/year

October 2001 to September 2004
 Total Project Budget: \$2,056k
 ATP Cost Share: \$1,428k

Composite Production Risers

Project Objective:

- Design, develop, manufacture, test, and qualify tension leg platform (TLP) production risers using composite materials that both cost effective and reliable

Core Innovations:

- Advanced design methodology
- Sensor monitoring technique
- Reliability assessment
- Low-cost manufacturing

Key Technical Challenges:

- Reliability for long-term degradation
- Design criteria for system
- Quality of manufacturing process
- Monitoring for reliability and structural performance



Participants: Lincoln Composites,
Shell, Amoco, Conoco,
Hydril, Stress Engineering, Brown &
Root, Univ of Houston-CEAC, Cullen
Foundation

Engineering Research Start/End
Dates: 8/1/95-7/31/00

ATP Funds: \$3,565k

Spoolable Composite Tubing

Project Objective: Develop continuous lengths of high-performance, spoolable composite tubing as a cost-effective replacement for deepwater oil reserves.

**The Spoolable Composite Tubing JV
Hydril Company (Principal Partner)**

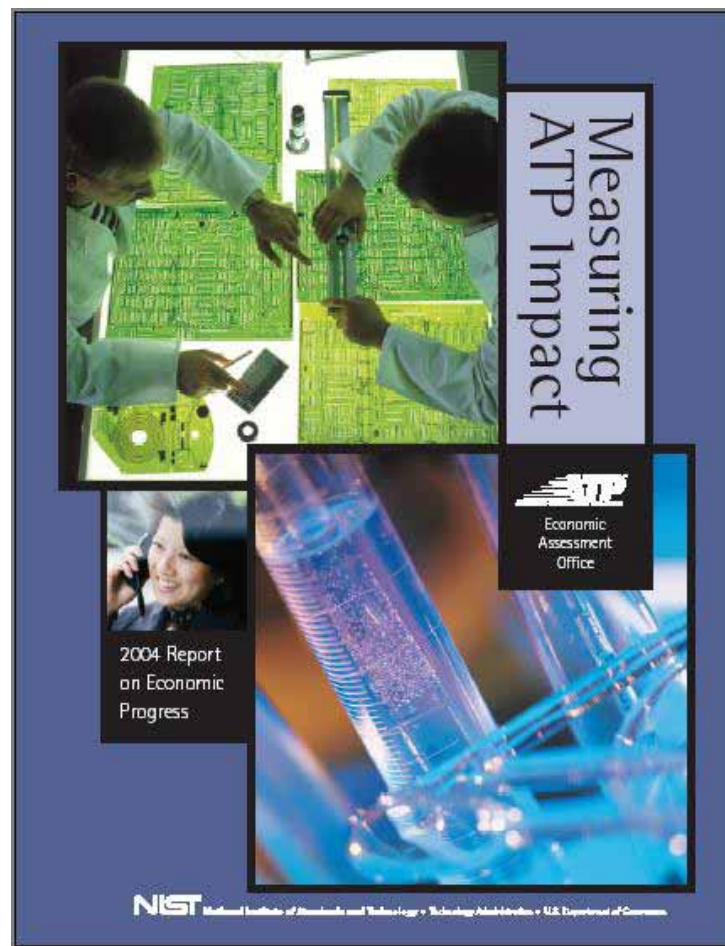
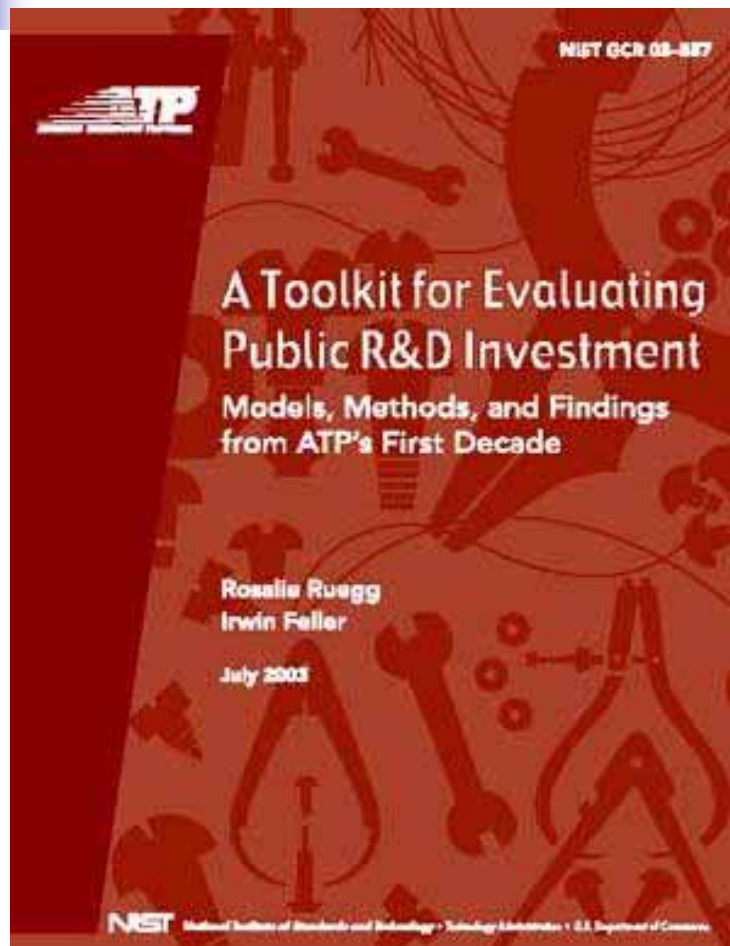
- Project duration: 6/5/1995 - 6/4/2000
- Total project (est.): \$5,015K
- Requested ATP funds: \$2,500K



Outcome:

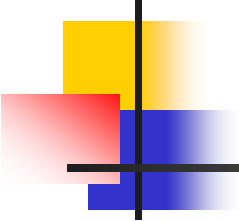
- Project will meet or exceed goals for pipeline remediation and environmentally-friendly repair
 - 40% reduction in installation costs realized *vs.* steel
 - Projected product value greater than \$100M/yr.
- Penetrated oil field markets with flow lines

For More Information On Our Evaluation...



http://www.atp.nist.gov/eao/eao_pubs.htm

Outside Assessments



“The Committee finds that the Advanced Technology Program is an effective federal partnership program. The selection criteria applied by the program enable it to meet broad national needs and help ensure that the benefits of successful awards extend across firms and industries.”

-National Research Council

Board on Science, Technology, and Economic Policy

In “The Advanced Technology Program: Assessing Outcomes” (2001)



For Info on ATP and to Join Our Mailing List . . .

- Call toll-free: 1-800-ATP-FUND
(1-800-287-3863)
- Fax your name and address to: 301-926-9524
- Send e-mail to: *atp@nist.gov*
- Visit ATP's website: *www.atp.nist.gov*