# NYSERDA Benefits Assessment

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# Evaluation Activities

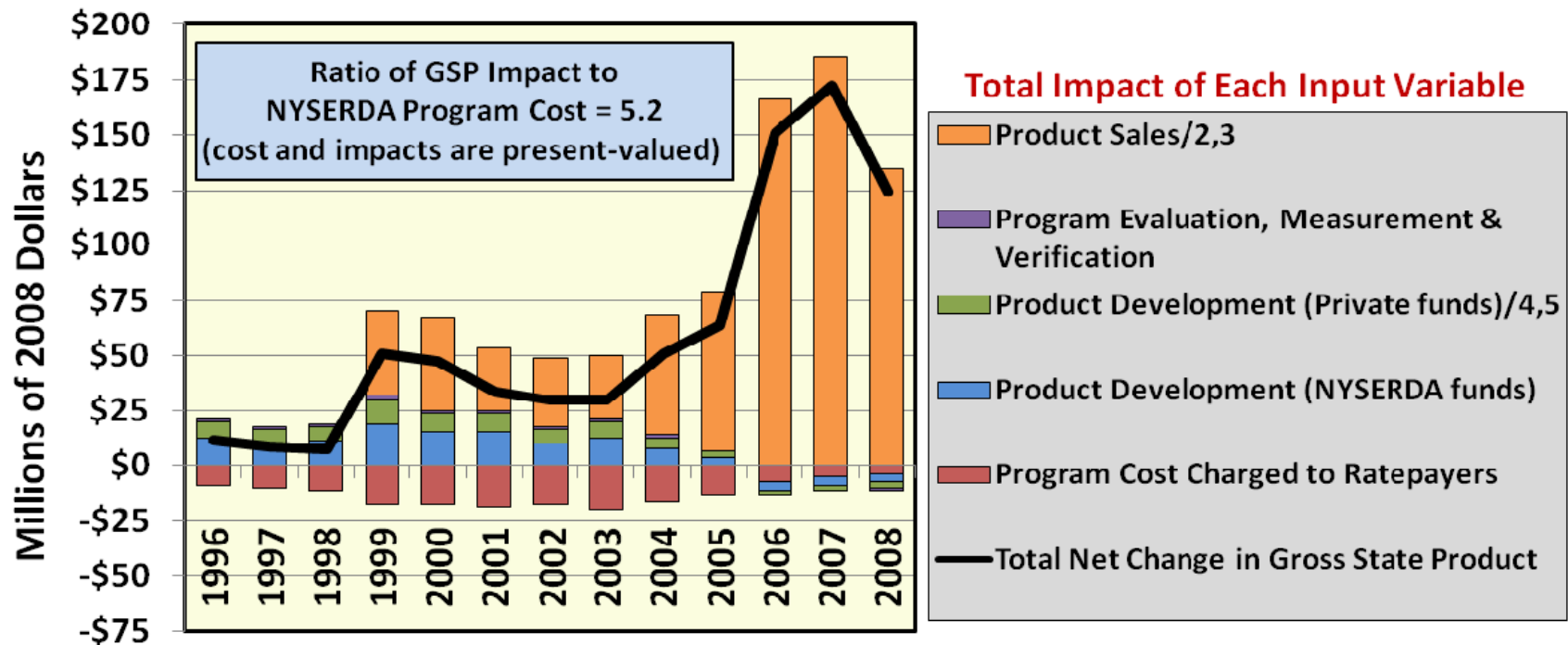## Macroeconomic Analysis

### Objective:

- NYSERDA modeled the impact of new product sales using an econometric input-output model, Policy Insight, which generates year-by-year estimates of the total regional effects of specific policy initiatives.

### Key Findings:

- Three years of analysis complete, a result of NYSERDA's product development activities:
  - The ratio between NYSERDA funding and change in GSP is 5.2
  - Over 750 net jobs and 5,400 job years were created or saved as a result of the Product Development related activities
  - For the 13-year period from 1996 through 2008, GSP rose by $785 million (2008$)

# Change in GSP as a Result of R&D Product Development[1]

Ratio of GSP Impact to
NYSERDA Program Cost = 5.2
(cost and impacts are present-valued)

**Total Impact of Each Input Variable**

- Product Sales/2,3
- Program Evaluation, Measurement & Verification
- Product Development (Private funds)/4,5
- Product Development (NYSERDA funds)
- Program Cost Charged to Ratepayers
- Total Net Change in Gross State Product

[1]Analysis includes only those projects with recoupment contracts with NYSERDA, and estimates impacts of product sales through 2008 as a result of program investments made from 1996 through 2005.

[2]Historical sales estimates are included. Future product sales would generate additional macroeconomic benefits for New York State which are not shown here.

[3]Sales inputs are reduced by 29 percent to account for an estimated portion of products sold that were manufactured out of state.

[4]Projects achieving sales have their investments and expenditures in product development embedded in the "Product Sales" input variable.

[5]Inputs are reduced by 20 percent to reflect the preliminary estimated impact of "free ridership".

# Evaluation Activities

Product Development Survey

## Objectives:

- Understand the full scope of benefits associated with product development efforts.

- Prove assumptions tied to other evaluation efforts

## Key Findings:

- Results highly favorable, proved NYSERDA's influence to:
  - Reduce the period of time required to bring innovative products to market
  - Provide funding at the critical time of product development
  - Assist NY companies in developing and securing the intellectual property necessary to create the next generation of high-technologies
  - Create and retain jobs in New York

# Evaluation Activities

## Demonstration Project Survey

## Objective:

- To realize the qualitative and quantitative benefits of demonstration projects (power production, process improvement & product demonstration) and any attributable replication to understand the total benefit to the NYS economy.

## Key Findings:

- 74% of the respondents reported that they have replicated the technology or process, mostly in a similar market or application
- 49% of the respondents reported replicating the technology or process in NY, suggesting that the program is achieving impacts both inside and outside the State

# Evaluation Activities

## In-Depth Economic Case Studies

## Objective:

- To prioritize the R&D product development projects by expected size of the benefits and develop case studies for the largest projects.
- The primary impacts to be assessed are the energy and economic benefits.

## Key Findings:

- Four completed to date (Power Management Device, Mobilized Film Technology (MFTSM) for wastewater treatment, HEV Drive Train, Wind mapping tool)
- All case studies have shown that the benefits as a result of these product developed have far outweighed program costs.

# The Solution

Build a database that can:

- Track progress & outcomes of research projects
- Quickly and accurately produce reports
- Provide information for a Benefit/Cost ratio for all of R&D's programs
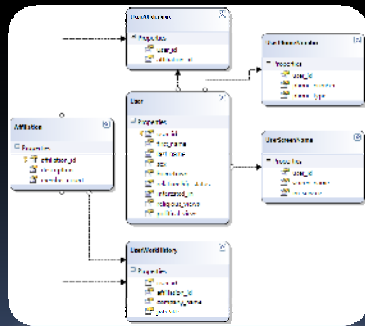
# Key Concepts

## Technology Taxonomy

- Dynamic lists that allow users to characterize the technology applicable to their projects

- Dependant on project types

- Enables search and aggregation based on technologies e.g.:

  - All projects related to batteries

  - Distribution of dollars spent on technologies in Electric power supply product development

  - Total annual energy savings for Building Systems

# Key Concepts

## Project Group

*A project group is a collection of project types with similar outcomes. It is used to identify which metrics tabs appear in the database, and consequently which metrics will be collected for the project.*

## New Sector List

*The Metrics Database uses an abbreviated NAICS list.*

## Keyword List

*A way to tag contracts with a term that captures the essence of the topic that is not already a term in the technology taxonomy or in other characterizations.*

# Key Concepts

## Resource Lists

*The resource lists are the types of resources used or saved in demonstration projects and products developed. It is a series of interdependent lists.*

- Resource type 1: Energy, Non-Energy and Air Emissions.
- Resource Type 2: the discrete types of resources under each resource type 1.
- Unit type: the unit of measure used for each resource type 2.
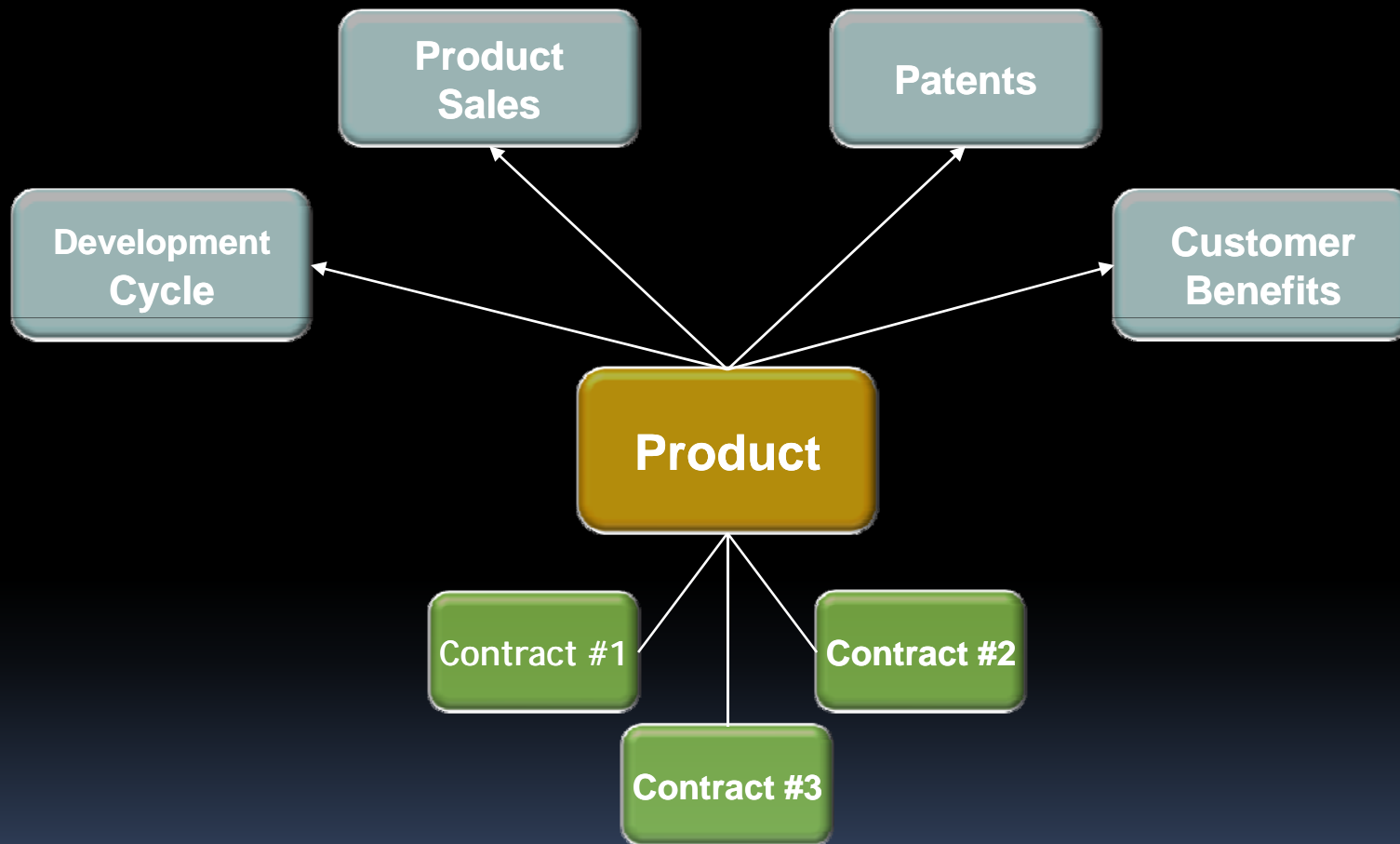
# Product Metrics

- Product Sales

- Investments

- Patent information

- Product development stage

- Resource savings

- End-use sector

- Licenses, certifications, UL listings, etc.

# Demonstration Metrics

- Energy, Non-Energy & Emissions savings
- Fuel switching
- Job retention/creation
- Replications
- Status & scale of project
- Power production
- System size
- Capacity factor

# Information Metrics

- Publications
- Citations
- Policy influence
- Conferences
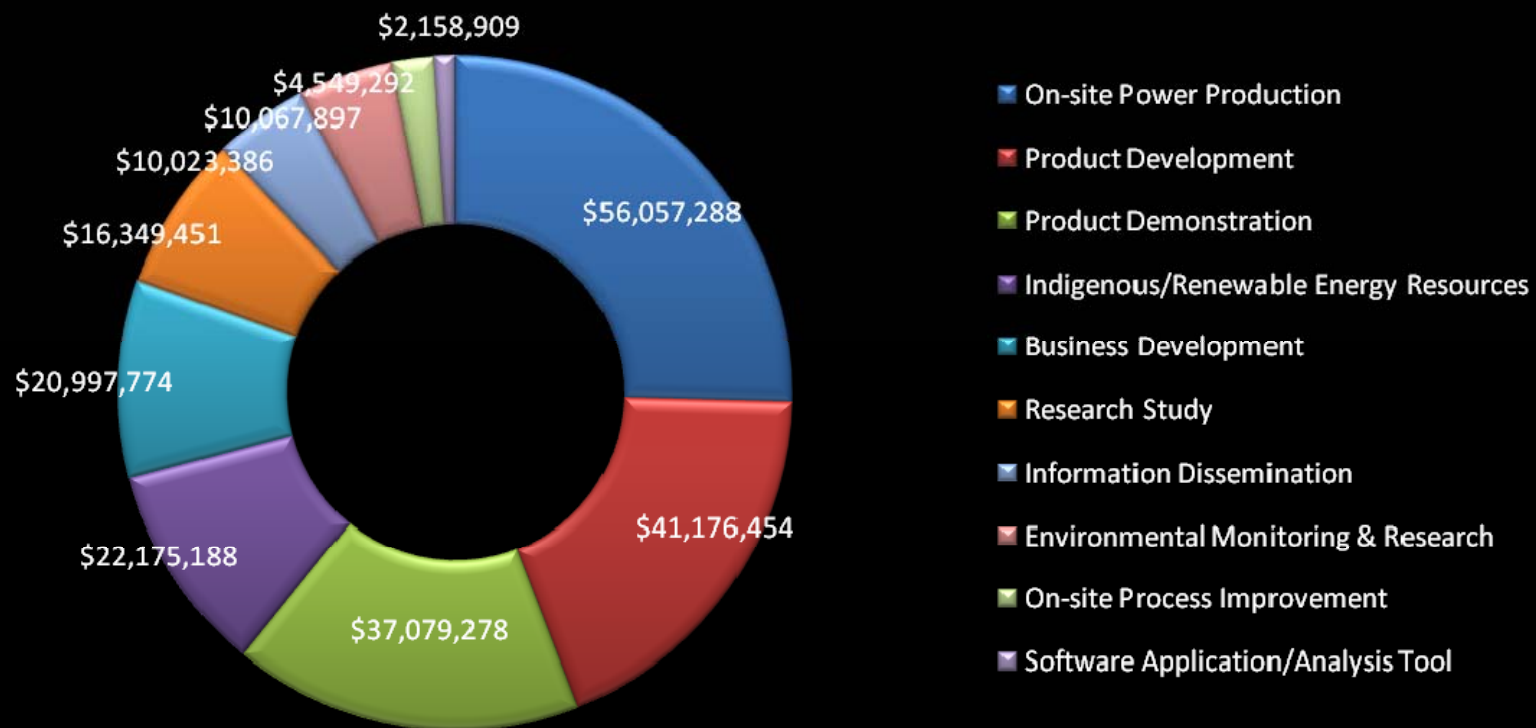- Workshops
- Trainings
- Websites
- Media Events

# Business Development Metrics

- Sales
- FTEs
- FTE income
- Investment
- Incubator clients
- Incubator graduates
- Increased capacity
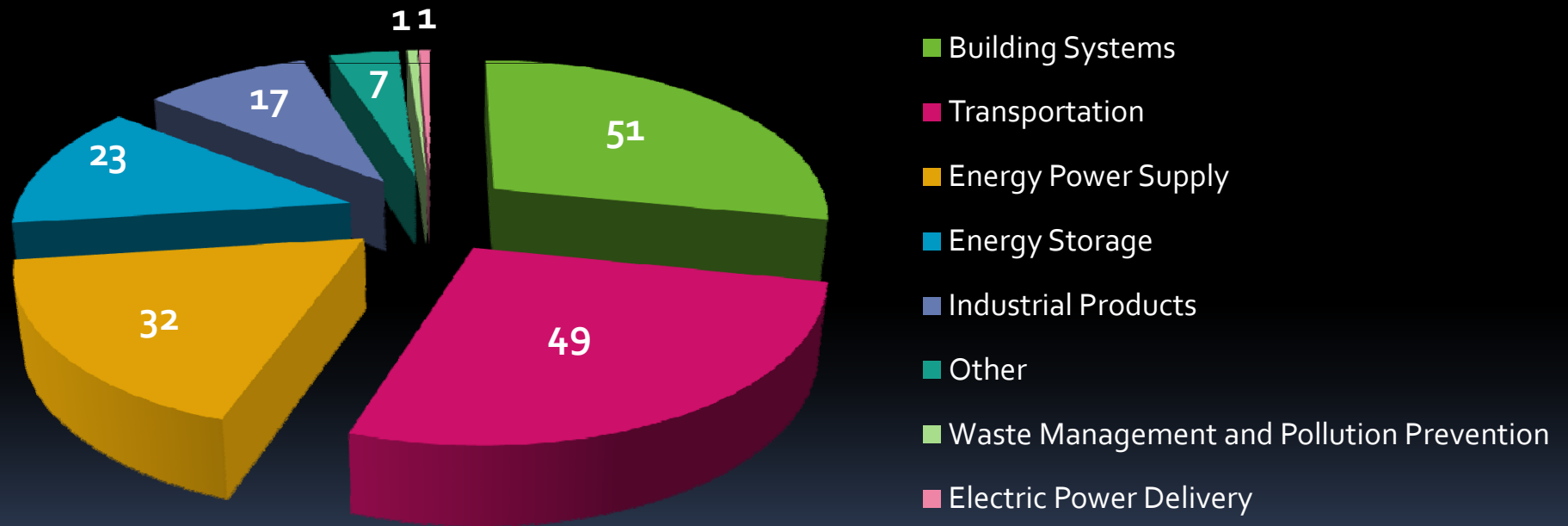- Executives transitioned to clean energy businesses

# Portfolio Management

## Products Under Development by Technology Area
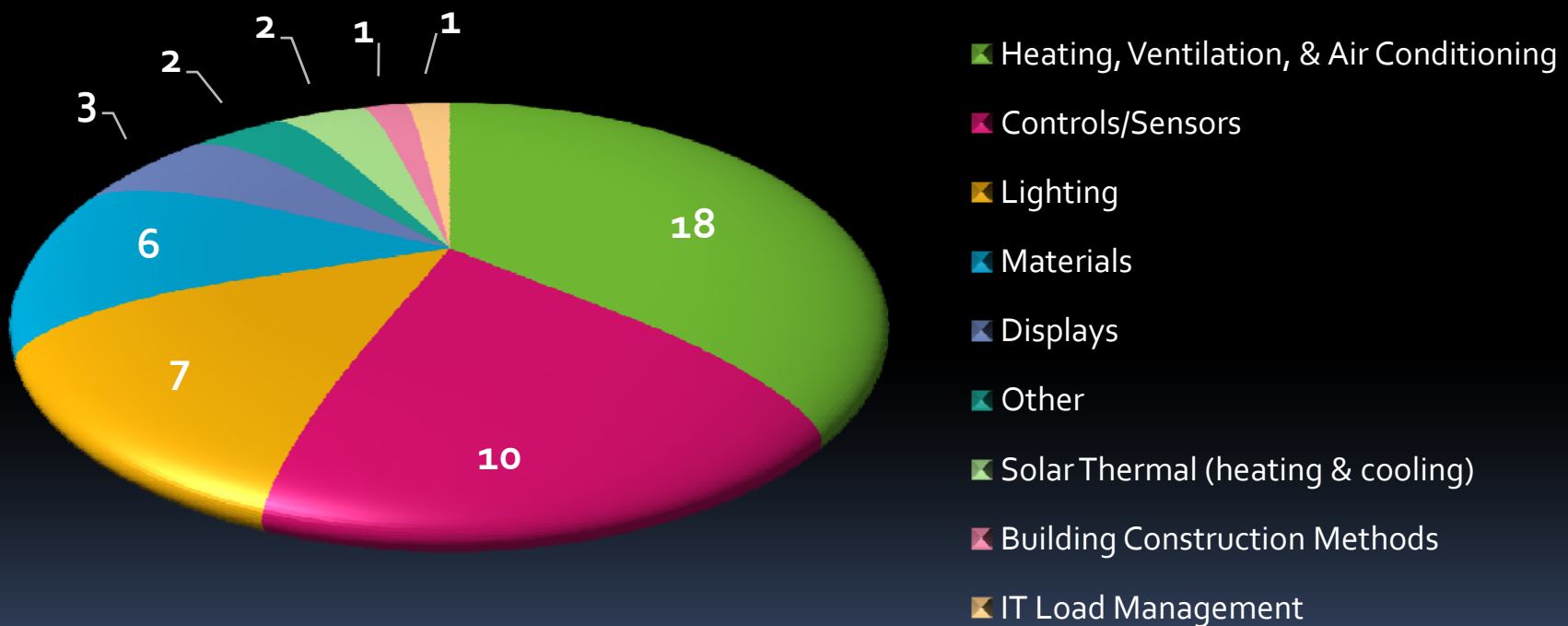
- Building Systems
- Transportation
- Energy Power Supply
- Energy Storage
- Industrial Products
- Other
- Waste Management and Pollution Prevention
- Electric Power Delivery

51, 49, 32, 23, 17, 7, 1, 1

# Portfolio Management

## On-Site Power Production Projects
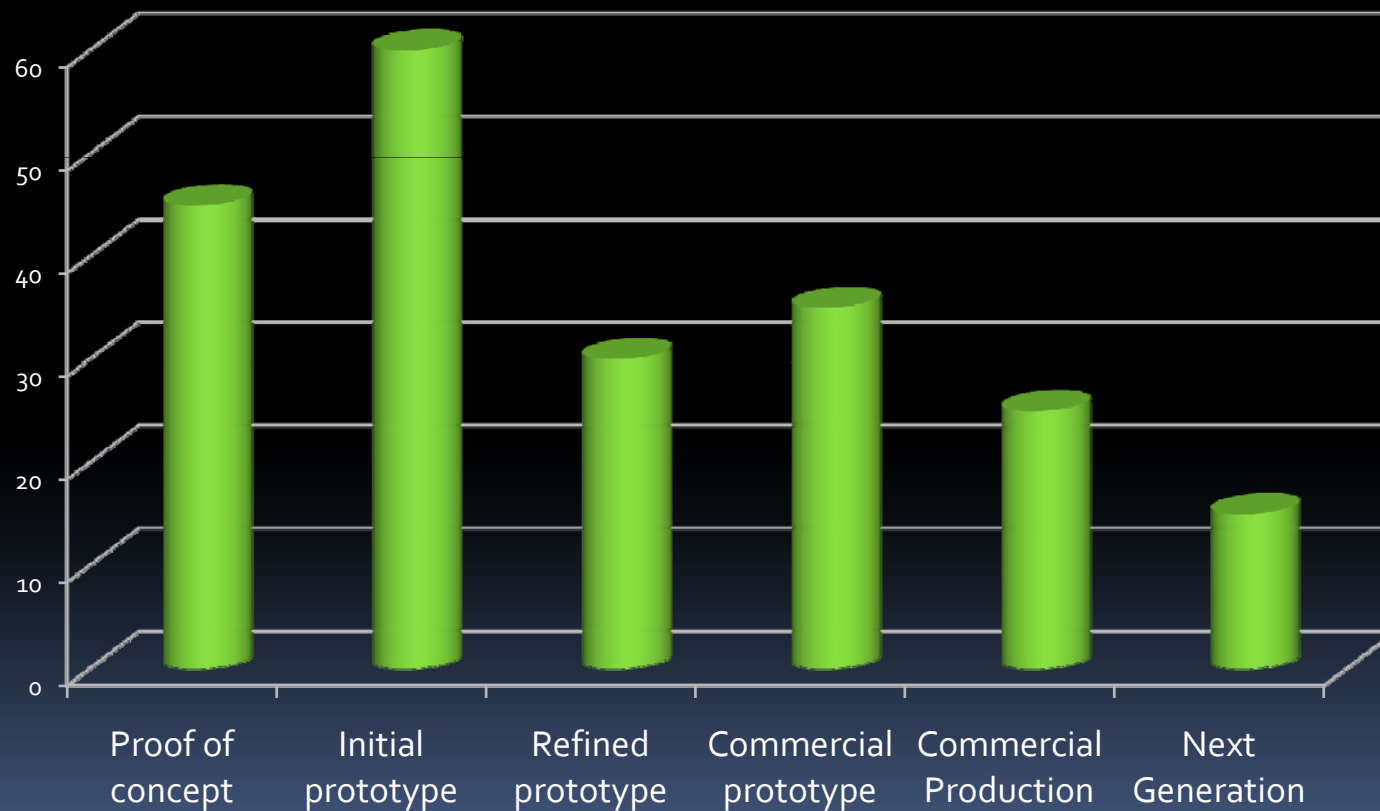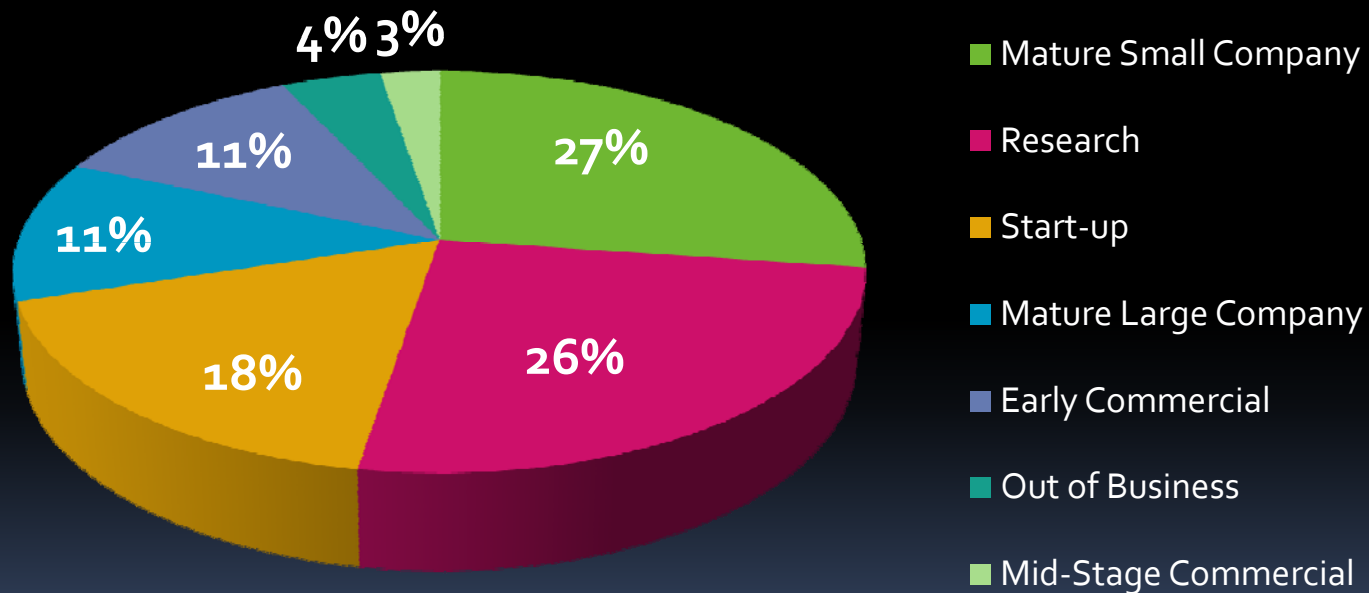
# Portfolio Management

**Transportation Program Company Partners by Sector**

- Professional and technical services: 49
- Miscellaneous manufacturing: 24
- Other transportation equipment..: 18
- Educational services: 16
- Motor vehicles, bodies & trailers, and..: 16
- State and local government: 15
- Electrical equipment and appliance..: 10
- Computer and electronic product..: 7
- Other services, except public..: 7
- Miscellaneous: 34
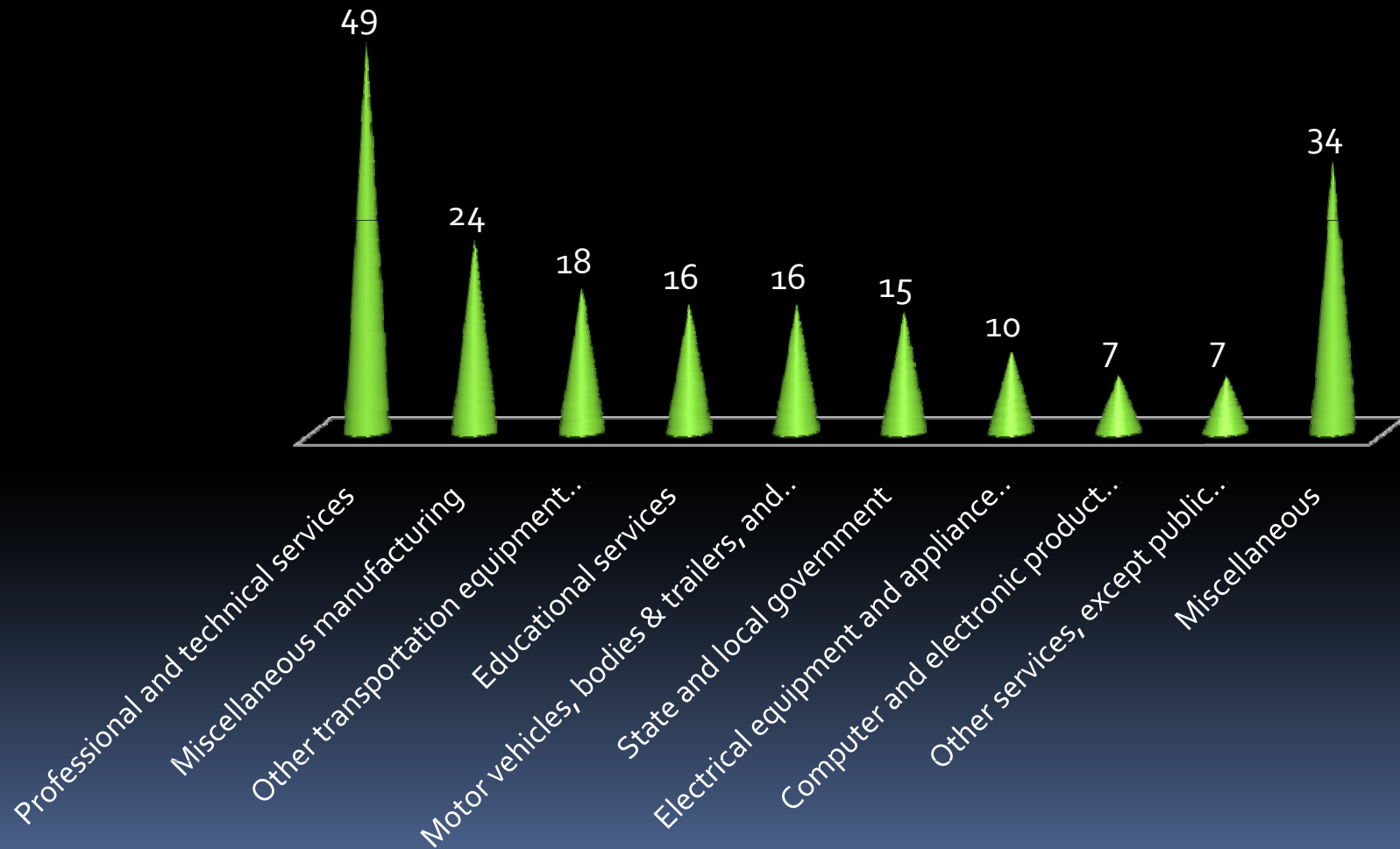
# Outcome Metrics

## Annual Product Sales



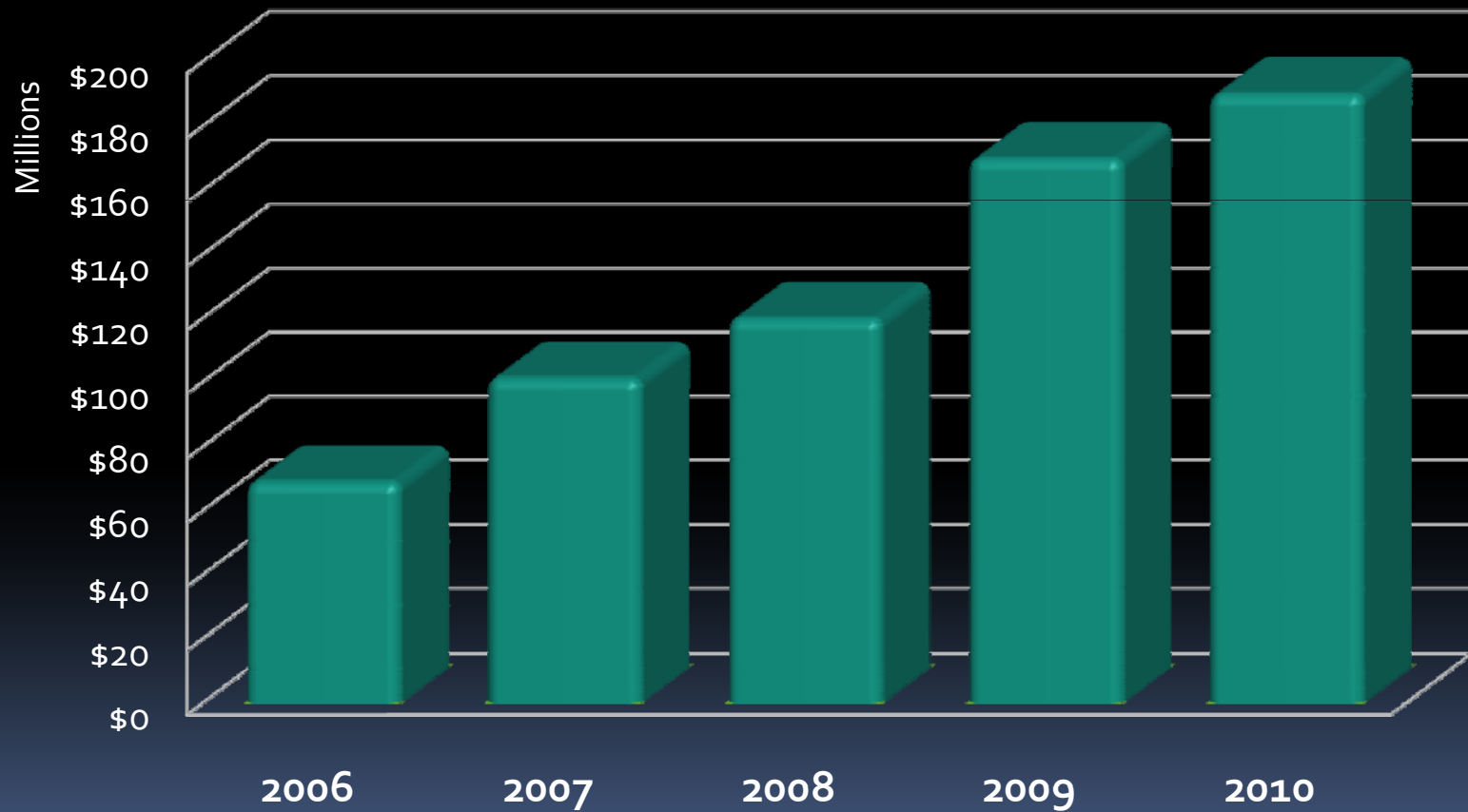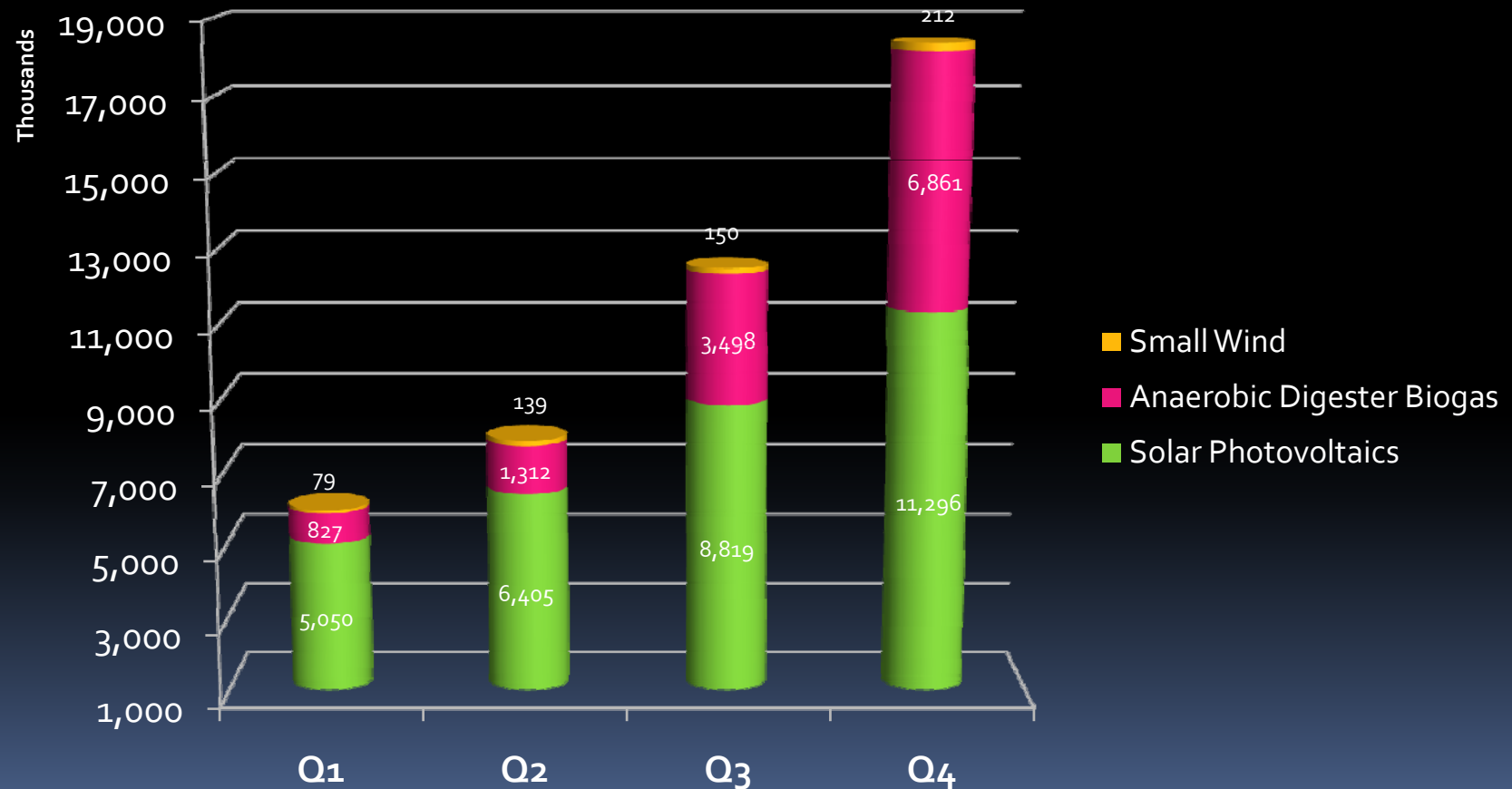|  | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Series1 | $50,60 | $38,77 | $41,59 | $43,27 | $82,51 | $111,1 | $200,7 | $249,6 | $214, | $212, |
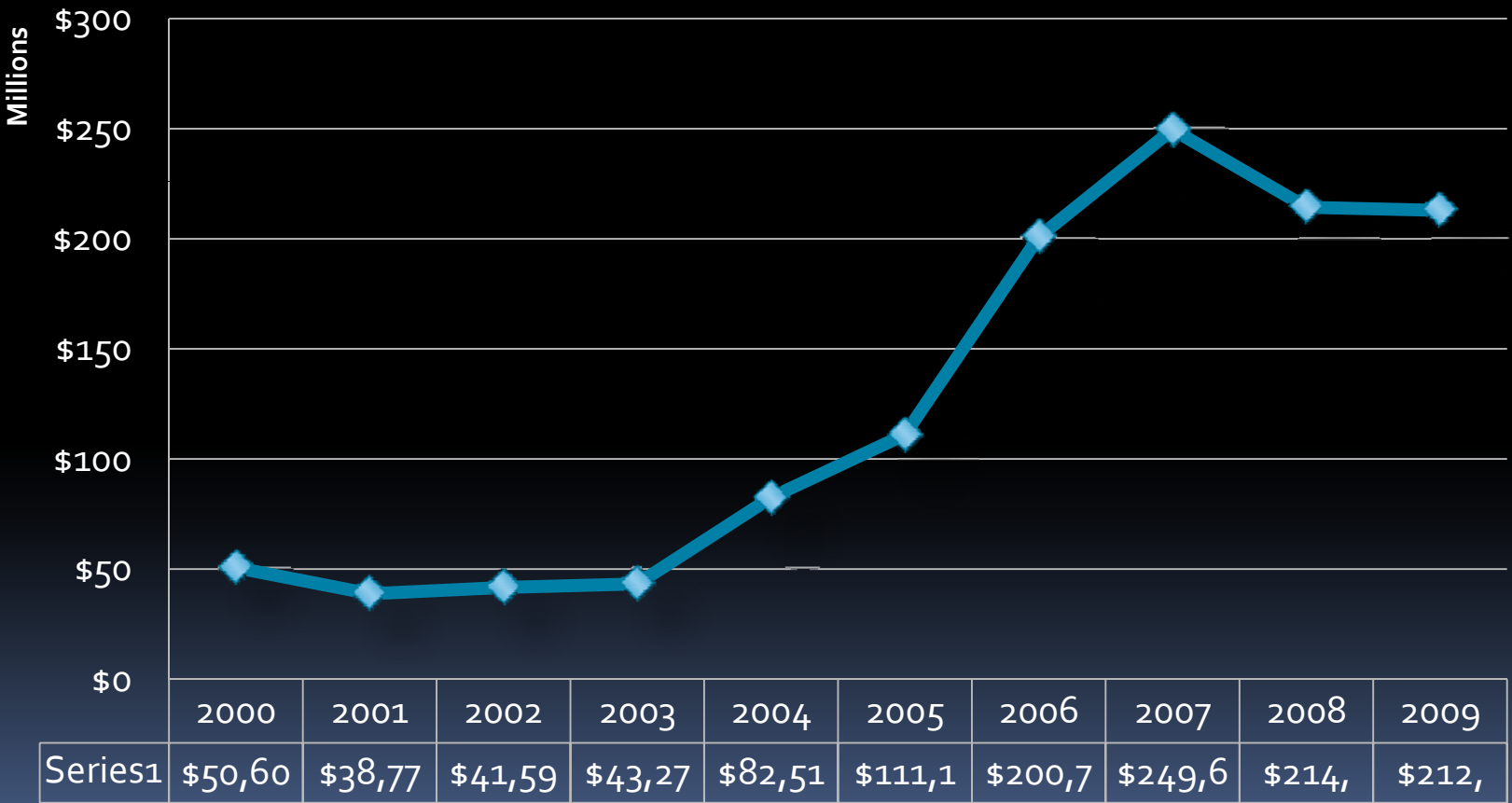
# Outcome Metrics



Cost Sharing for Business Development Projects

Outcome Metrics — Cumulative Renewable Energy Production

# Performance Metrics

## Efficient Use of Energy

Electricity (MWh) saved due to improved energy efficiency in New York's buildings and facilities

Fossil Fuels (MMBtu) saved due to improved energy efficiency in New York's buildings and facilities

Number of New York Households served

Number of Commercial and Industrial Customers served

## Renewable & Diverse Energy Supplies

Electricity (MWh) Produced from Renewable Sources

Number of Operating Renewable Resource Installations

Electricity (kWh) Produced from Combined Heat and Power (CHP) sources
Number of Operating CHP installations

Petroleum Displacement (gallons) in Transportation Sector

## Clean Energy Economy

Number of products in the market as a result of previous technology and business development investment

Annual Product Sales

Number of patents, UL Listing certifications, license agreements, copyrights and other knowledge certifications

Number of jobs created or retained as a result of the net macroeconomic activity stimulated by NYSERDA's energy efficiency, renewable energy, and R&D product development activities

Change in GSP as a Result of R&D Product Development, expressed as a ratio of GSP impact to NYSERDA investment in R&D product development

Number of Clean Energy Businesses receiving financial assistance

Dollars invested by NYSERDA in business development activities

Dollars invested by businesses receiving financial assistance

## A Cleaner Environment

$CO_2$ equivalent emission reductions (tons)

Reduced Air Pollutant $NO_x$ Emissions (tons)

Reduced Air Pollutant $SO_2$ Emissions (tons)

Number of Workers Trained in Clean Energy Sectors

## Satisfied Customers

Contract Processing Time – Median time to process:
(1) Contracts awarded from solicitations
(2) Open enrollment incentives
(3) Direct contracts
(4) Modifications / Task Orders

Percent of Payments made within 30 days

# The Challenges

- Getting data from contractors

- Whole program analysis

- Evaluation of smart grid, storage & other leading activities

- Measurement of environmental impacts translation to economic development potential

- Understanding the relationship between technology & business development

# Future Evaluation

- Key Performance Indicators

- Track replications of demonstration projects

- Add energy savings to macro-economic model

- Continue conducting surveys

# Questions?



"BASED ON THESE R.O.I. CALCULATIONS YOU'VE PROVIDED, DAVIS, I'D SAY YES, YOU CAN GO TO THE BATHROOM."