NASEO/ASERTTI
Energy Policy & Technology Outlook Conference
February 2012

Moving Clean Energy Innovations to Market While Managing Risk

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NYSERDA History

NYSERDA (1975)

- Created to mitigate supply security and price volatility in petroleum markets
- $30m/yr, 100 staff, rate based
- Focus on technology development
- Expectation that technologies will have market pull
- Recoupment to avoid “undue enrichment”
- Preference for role as minority co-funder

Partial Deregulation Electric Utilities (1999)

- Expectation of benefits from competition
- Increased end-user exposure to energy and demand pricing
- Helped define value propositions for technology investment decisions

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NYSERDA History

Systems Benefit Charge (2000)

- Expanded mission, emphasis on electricity
- Develop competitive markets for energy efficiency
- Produce economic and environmental benefits
- Established explicit goals for incentive based programs
- $150m/yr (R&D, Deployment), 200 staff
- Relationship between energy values, technology and value propositions is clarified by data
- R&D examines mechanics of market pull, business formation, portfolio performance

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NYSERDA History

Energy Efficiency Portfolio Standard (2005)

- Pure deployment program (No R&D), $200m/yr
- Increased emphasis on electricity reduction
- Must consider dynamics of market penetration in program design
- Program expenditures subject to Total Resource Cost (TRC) test
- Sharpens expectations on the R&D function
- New technologies must be relevant to TRC and the market

NYSERDA History

Renewable Portfolio Standard (2004)

- Increase renewable energy in the State's electricity generation mix
- Centralized procurement model , $180m/yr
- Market valuation of alternative energy

Regional Greenhouse Gas Initiative (2008)

- Cap and trade program for CO_2 reduction
- Market valuation of environmental externalities

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Economic Variables Exposed!

- Deregulation : Market prices of energy, capacity & delivery ($/Mwh, $/Mw/Month).
- EEPS: Total Resource Cost, $/Mw to save Vs. $/Mw to produce
- RPS: $/Mw premium to avoid supply and price volatility
- RGGI: $/CO2 emitted, value of the externality

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Risk & Yield

- Risk

  Probability (Technical Failure)

  x

  Probability (Business Failure)

  =

  Expected Loss

- Yield

  Expected Gains / Program Costs should be large

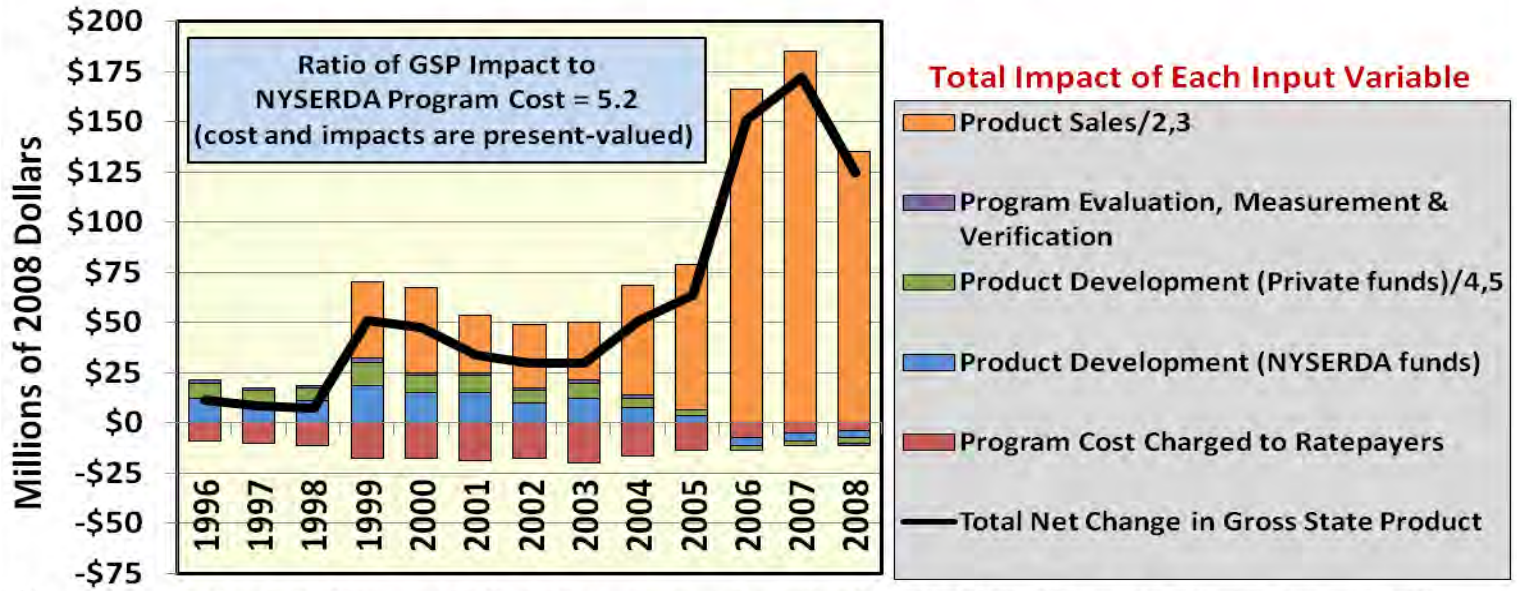
Observations

Historical Impact on R&D function

- 4,000 projects, $1b in rate-based costs, over 35 years
- Requirements to link program expenditures to commercial introduction and realization of benefits
- Accumulated experience, institutional knowledge and networks
- Deeper understanding and quantification of clean technology markets and relevant economic variables
- Better ability to characterize project and portfolio risks

Observations

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



[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".

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Observations

- Large number of projects
- Small, measured project “bets”
- Different technologies & development stages
- Distribution of outcomes, including technical and financial failures
- Portfolio shows net benefits
- Collection and interpretation of project metrics essential to assessing yield and risk

Business Innovation

- Increased emphasis on entrepreneur and business formation
- Help refine value propositions, business models and “pitches”
- Improve effectiveness in communications and attracting private capital
- Incubators, Proof-Of-Concept, Social Network Platforms
- Develop appropriate metrics – funds raised, capital investment, jobs, sales

Business Innovation

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Clean-Energy Business Incubators

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Incubator Company Examples

Incubator	Company	Inception	Product	Value Proposition	Development Stage	Current or Target Customers
NYC-ACRE	Sollega, Inc.	2009	Low cost PV roof rack	Simpler, faster array mounting	Fully developed. First installation June 2011.	Over $1 million in sales; 9000 units delivered.
NYC-ACRE	Wind Analytics	2008	Software to estimate site specific power output	Optimize placement of small wind turbines	Software in beta testing	Preliminary sales to US Army and other private companies.
iCLEAN	Battery Energy Storage Systems	2010	Nanostructured silicon-based anodes for lithium batteries	Greater charge storage.	Performing extended cycle testing. Provisional patent filed Nov. 2010.	Target customers are full battery suppliers.
NYC-ACRE	Rentricity	2003	Flow-Wire Turbine	30-350kW hydropower from municipal water systems.	Commercial.	Installed at 2 sites.

Business Innovation

Impact of Business Innovation and Business Development Programs								
	Clients/Companies	New Products	Funds Raised	Capital Investment	Sales Forecast	Jobs Forecasts	Program Expenditures	Program Leverage
	#	#	$,M	$,M	$,M	#	$,M	#
Pre-Revenue, Start-Ups	117	26	11	0			3	4
Existing Companies	37	37	41	157	1,600	1,055	22	9

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…Qualifications

- Energy value in end-use products and services can be small
- Incumbant market structures, tariffs and pricing still present significant barriers for power producing technology
- Market demand propped up by government subsidies requires investment caution
- Many technologies see rapid obsolescence
- Programs can create “moral hazard” by being too generous in funding and too forgiving in enforcement of obligations
- Program outcomes are chaotic and episodic
- Data collection and credible analysis can be costly in terms of program overhead

Conclusions

To move clean technology to markets while managing risk:

- Maintain institutional knowledge and experience base on relevant energy and environmental science and technology
- Balance focus on technology, entrepreneur and business model
- Collect and interpret program metrics
- Use project and portfolio perspectives
- Relate rate-payer costs to net private and public benefits

Thank You

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