

# Procurement for RPS Compliance: *Anticipating REC Costs*

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# Agenda

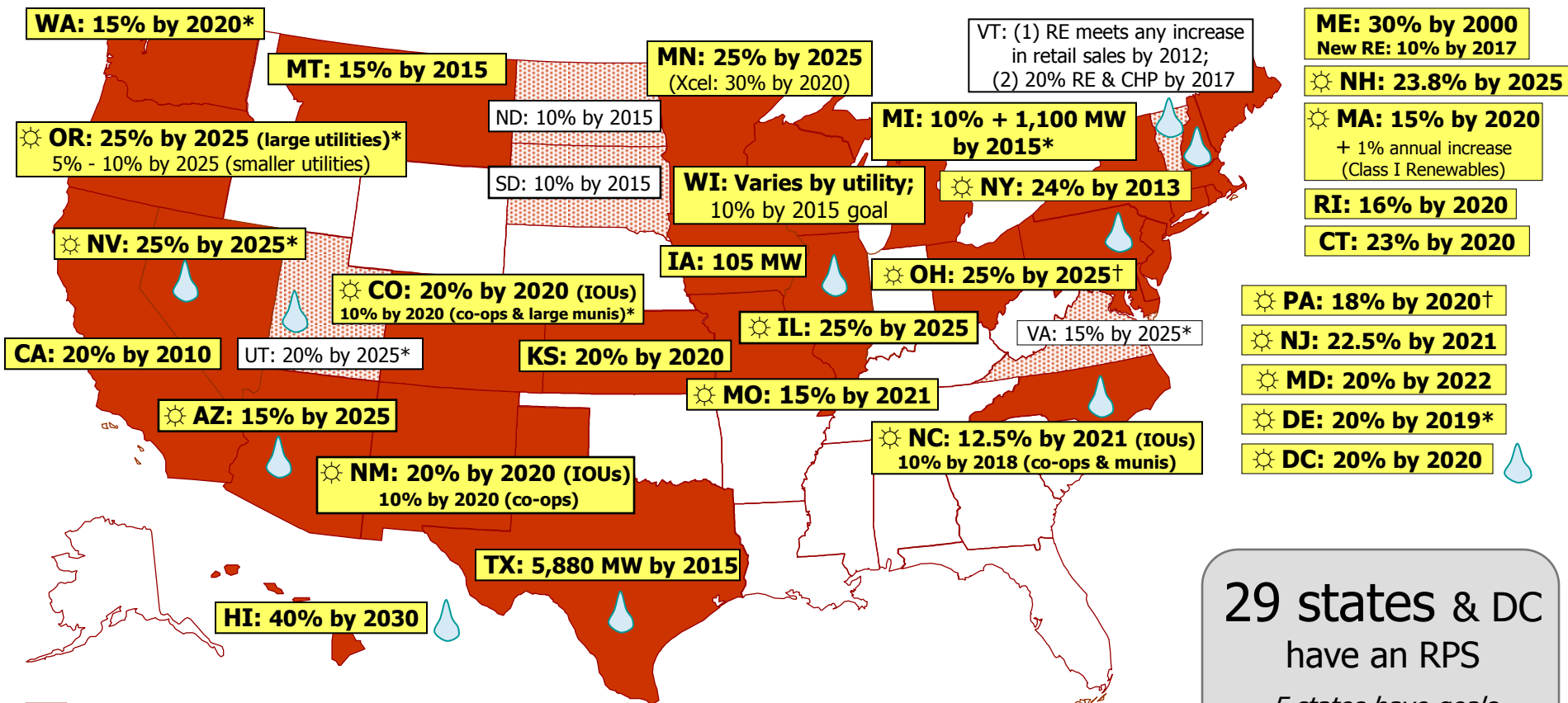
- RECs v. Bundled Energy for RPS Compliance
- RPS Market Frameworks: Typical, New York
- Determining REC Prices
  - > Fundamentals
  - > Some Influencing Factors
    - Policy Drivers
    - Installed Costs
    - Cost of Capital
- Forecasting the Cost of Compliance

# Bundled v. Unbundled RECs for RPS Compliance




- Unbundled RECs = more flexibility (geographic, deal structures, temporal)
  - Flexibility benefits those with compliance obligations and RE generators
- Can help drive RE development to facilitate RPS compliance
- Tracking and Trading Systems facilitate active REC market (both compliance and voluntary)
- RECs for RPS compliance allowed in most states.




# Renewable Portfolio Standards

[www.dsireusa.org](http://www.dsireusa.org) / September 2009

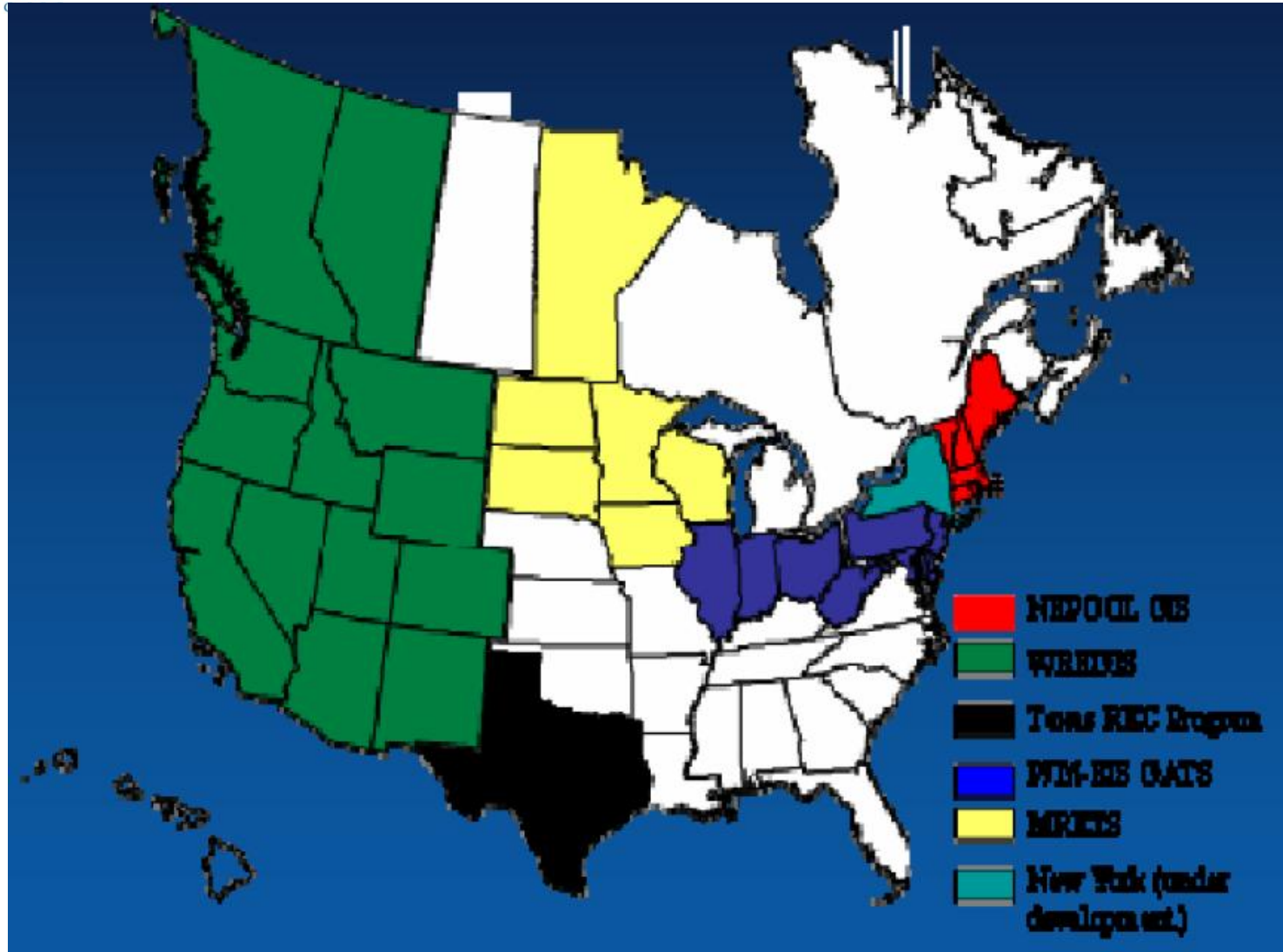


29 states & DC  
have an RPS  
*5 states have goals*

-  State renewable portfolio standard
-  State renewable portfolio goal
-  Solar water heating eligible

-  Minimum solar or customer-sited requirement
-  Extra credit for solar or customer-sited renewables
-  Includes separate tier of non-renewable alternative resources

# REC Tracking Systems

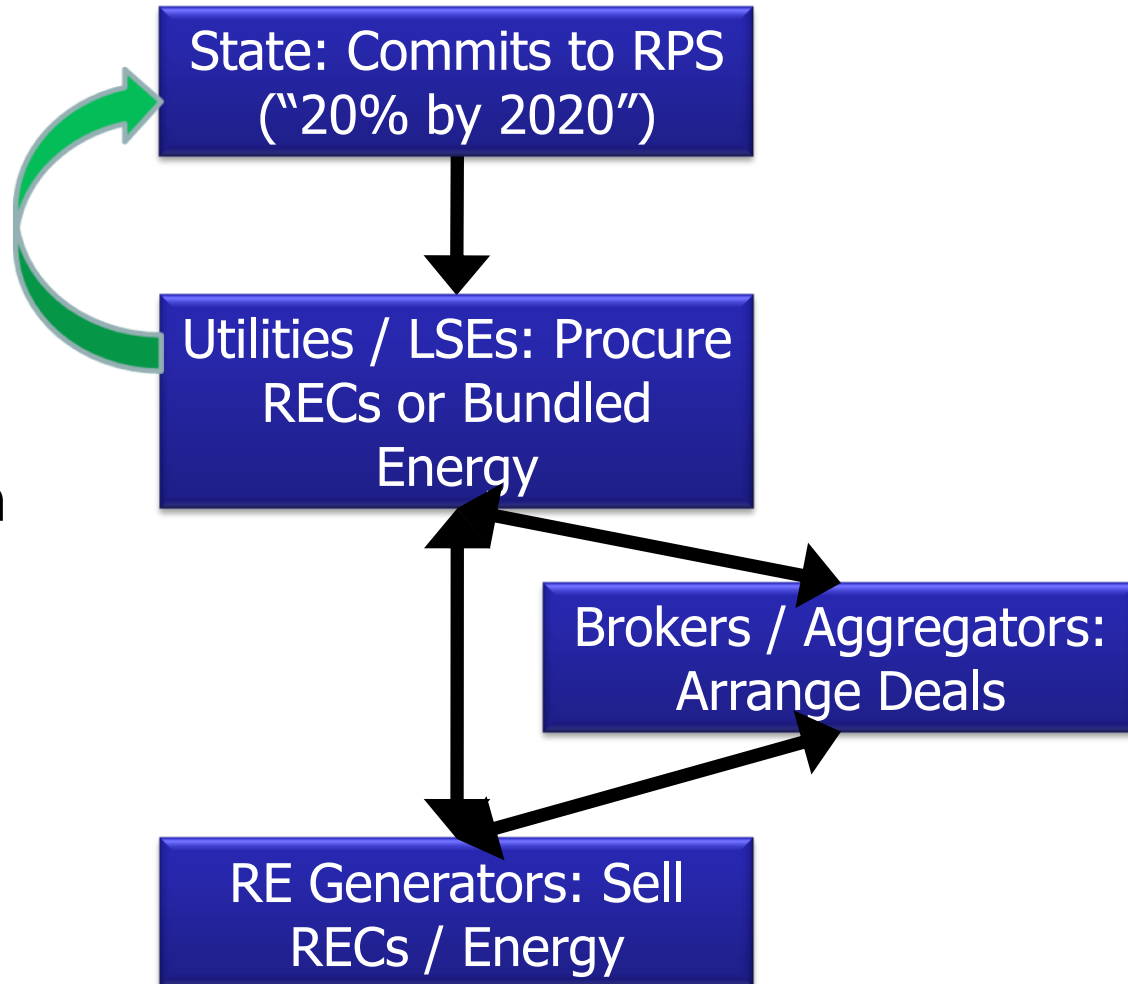


Source: Lori Bird, NREL, 2008

# RPS Market Framework: Typical

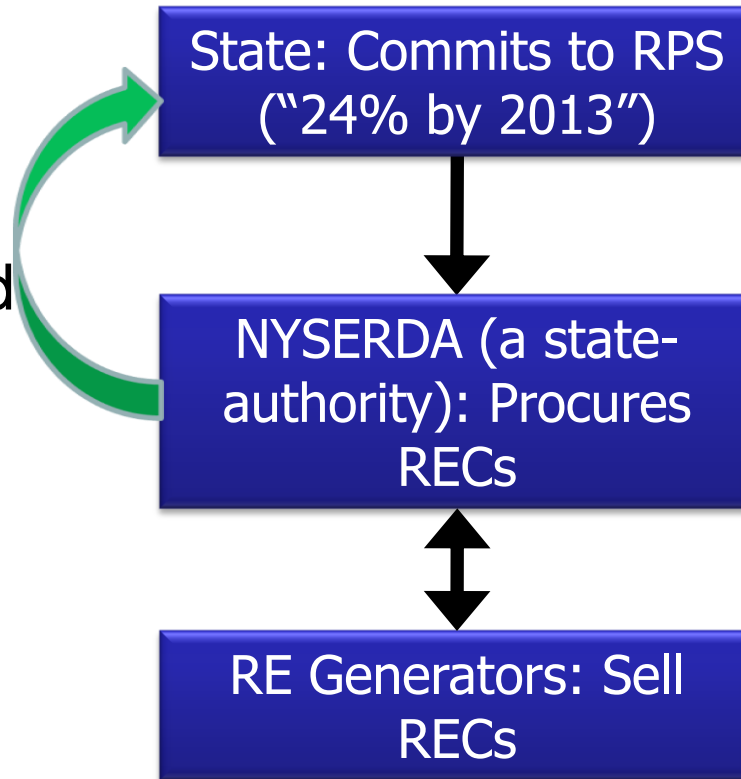
- Utilities report back to state PUC on progress toward compliance obligations.

- Shortfalls often result in penalty payments (Alternative Compliance Payments)



# RPS Market Framework: New York

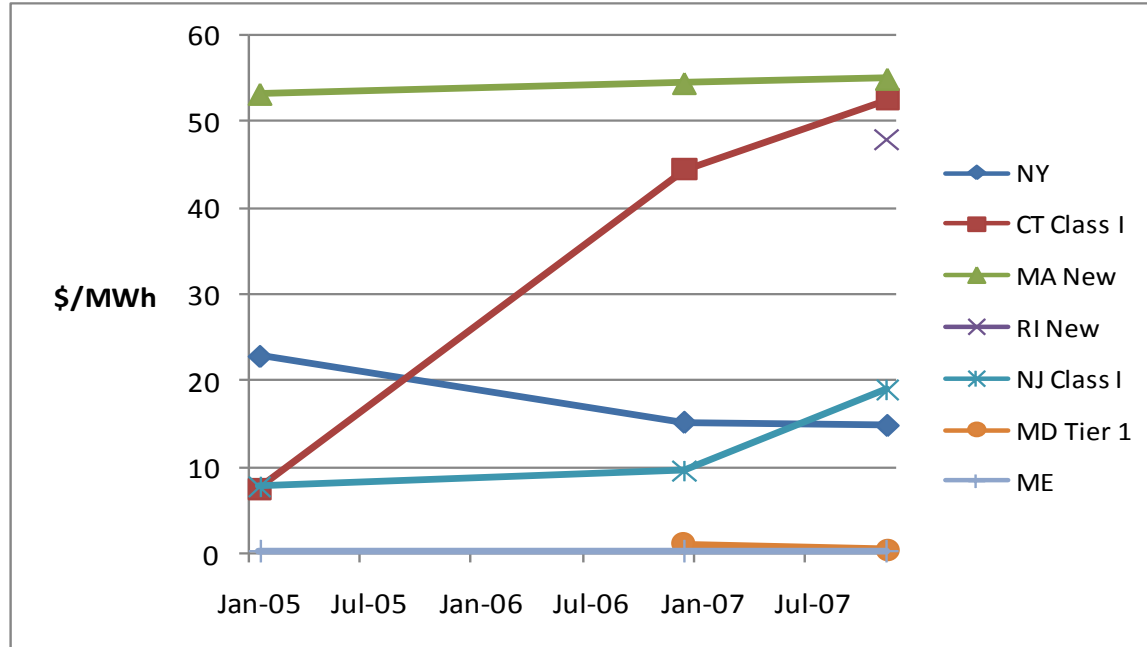
- NYSERDA reports back to state PSC on progress toward targets.



- NYSERDA holds periodic REC procurement solicitations-sealed bids
- Winning RE generators sell RECs through long-term contracts at bid price

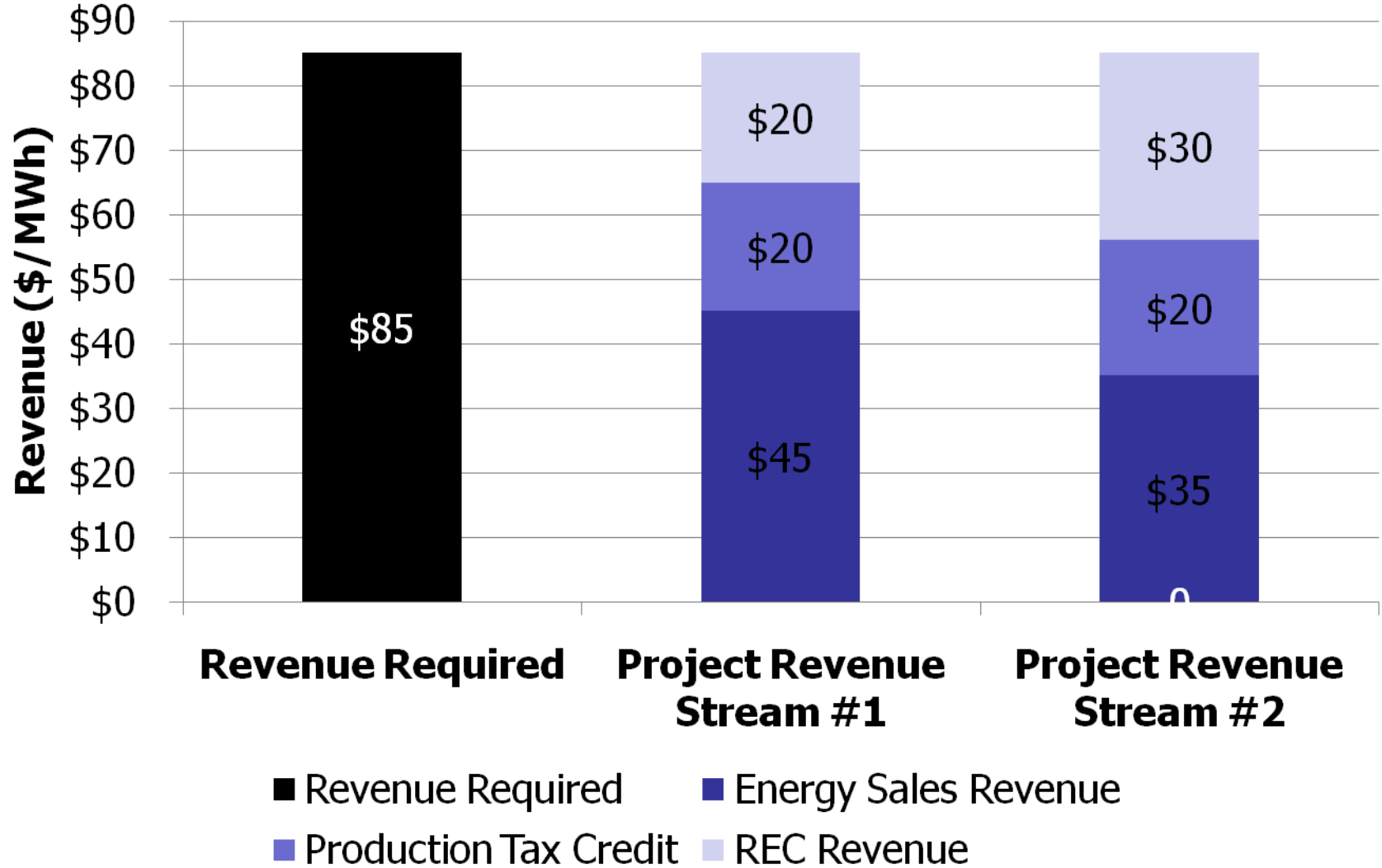
# REC Pricing Comparison Across Key RPS States

- NY relatively low. Factors affecting differences:
  - > RPS goals / strict adherence
  - > Resource potential
  - > Program / policy design features: eligibility / deliverability requirements (vintage, geography, etc.)



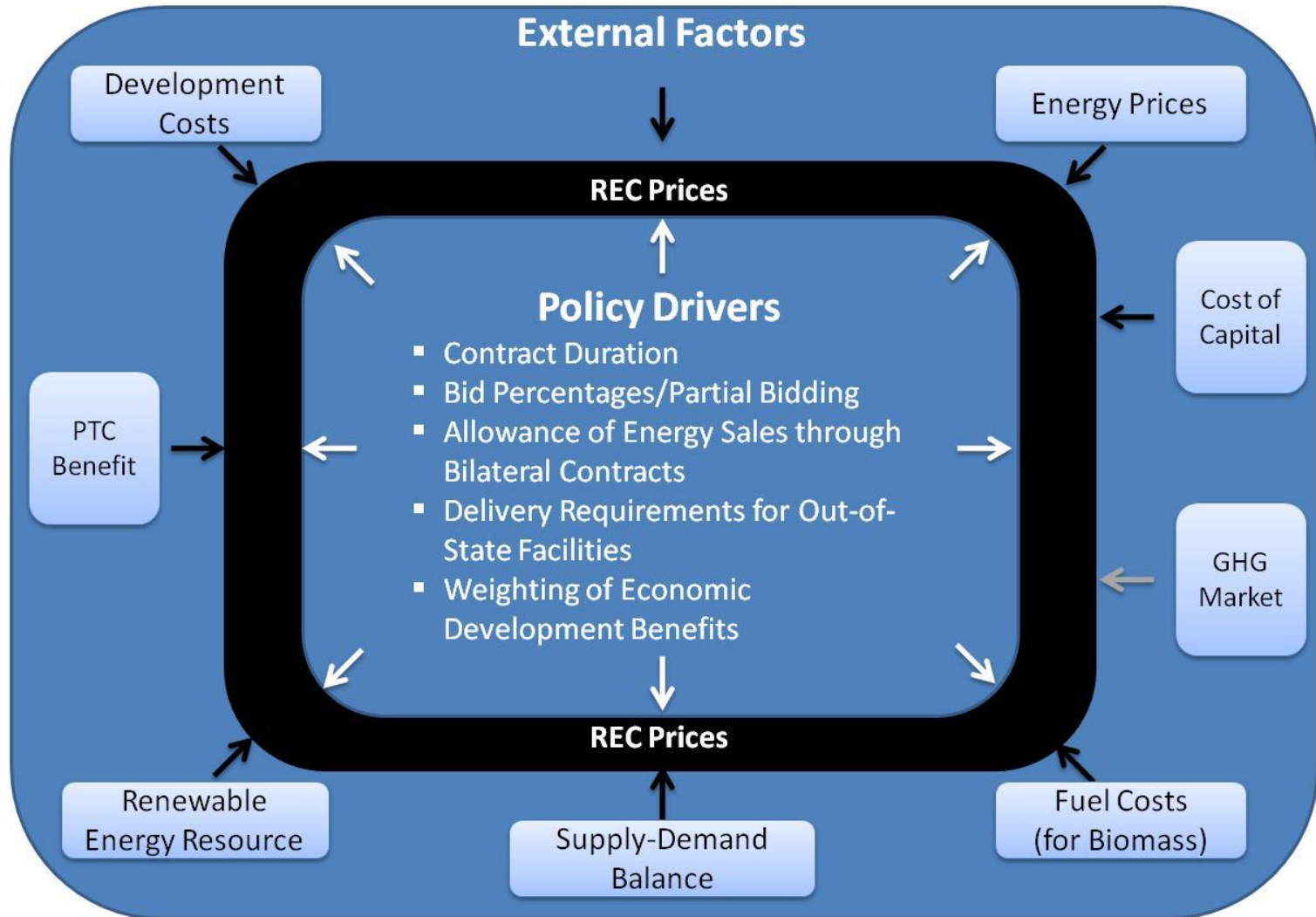


# Determining REC Price Fundamentals



# Determining REC Price

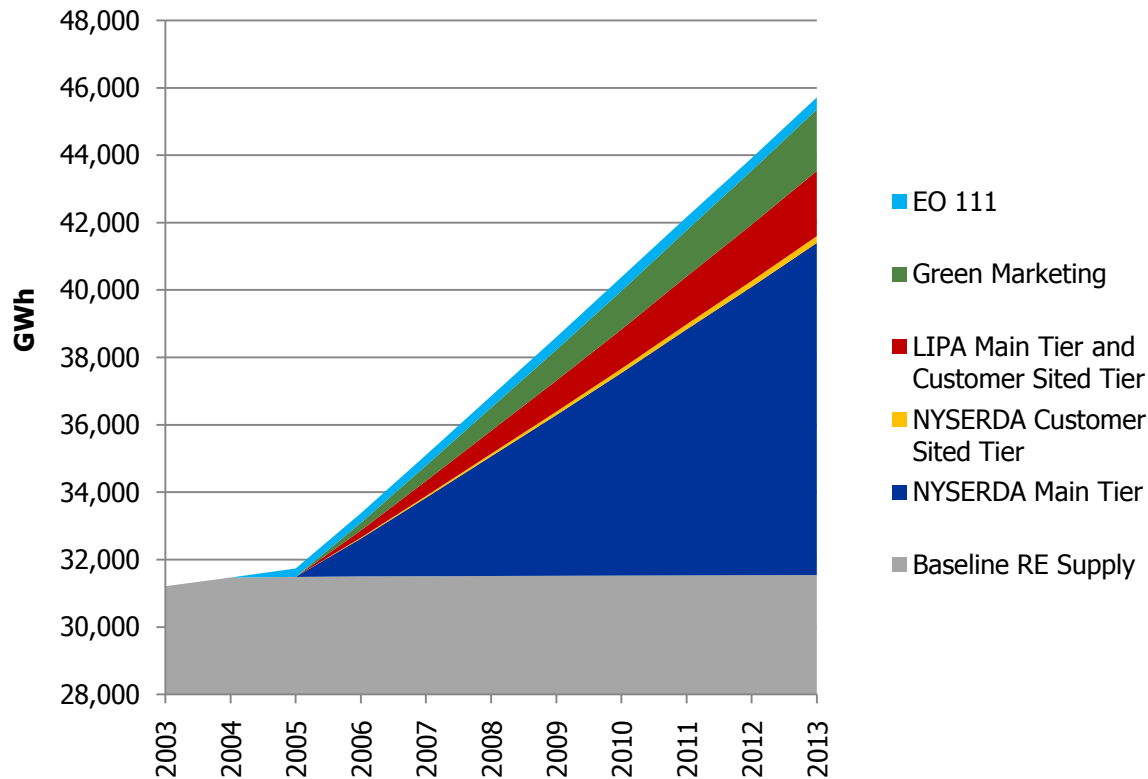
## Influential Factors: New York Findings



# Determining REC Price

## Influential Factors: NY Policy Drivers

### NY RPS Targets



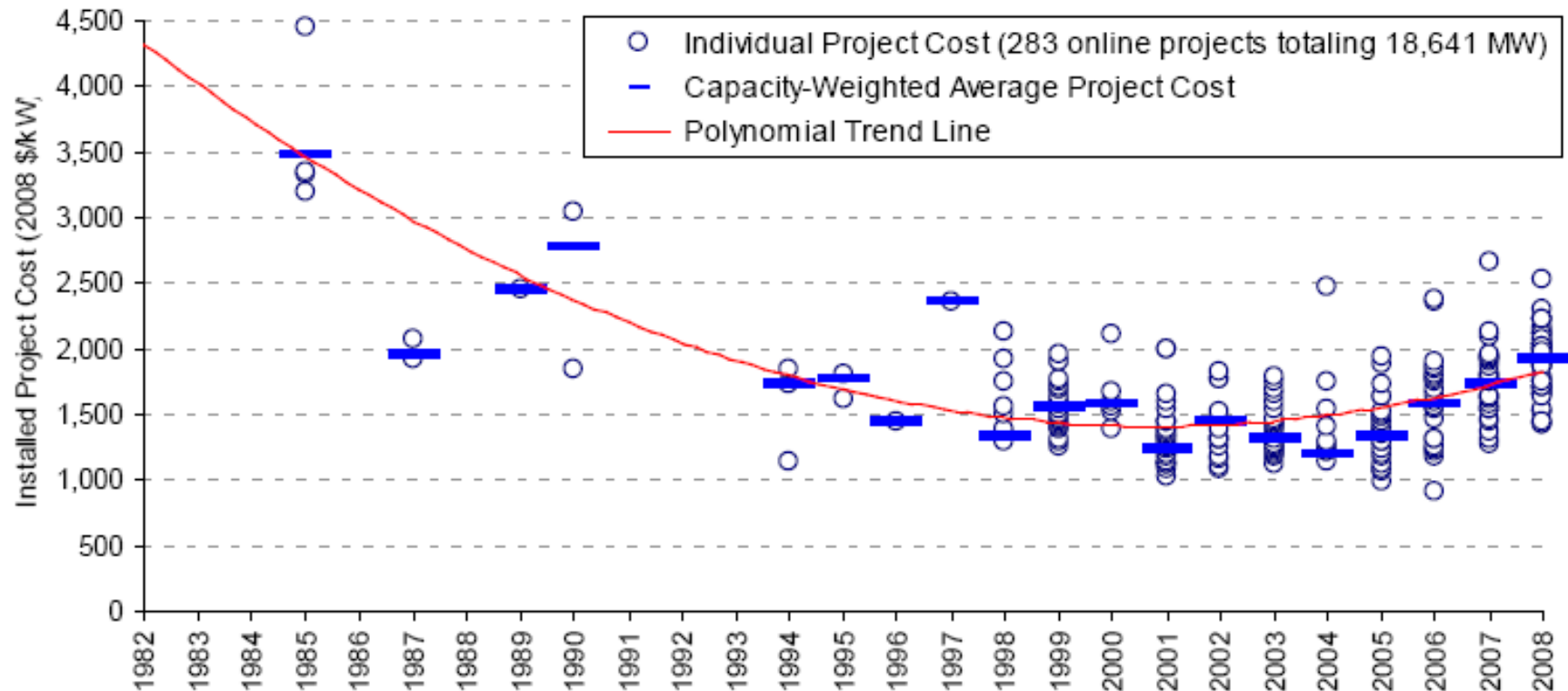
- Central Procurement (one buyer)- a buyer's market
- Long-term contracts
- Vintage: previously allowed all post-2002 projects
- No ACP putting pressure on market as in other locations.

Source: Summit Blue Consulting based on RPS targets specified in PSC Order, 9/04

# Determining REC Price

## Influential Factors: Equipment/Development Costs

### Installed Wind Project Costs Over Time



Source: Berkeley Lab database (some data points suppressed to protect confidentiality)

Wiser, R., M. Bolinger. 2009. *2008 Wind Technologies Market Report*.

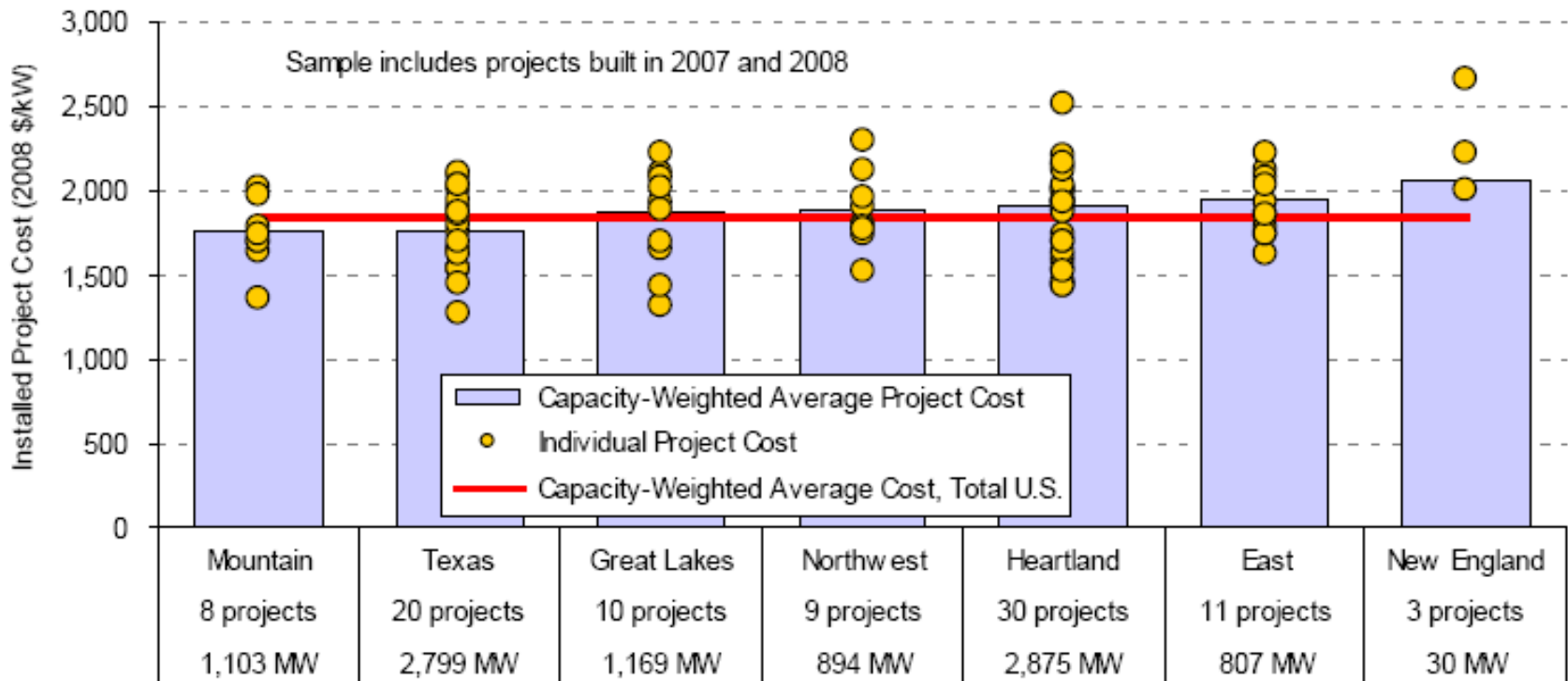
U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy

# Determining REC Price

## Influential Factors: Development Costs

- Variation in regional development costs: siting and permitting, transportation, construction costs

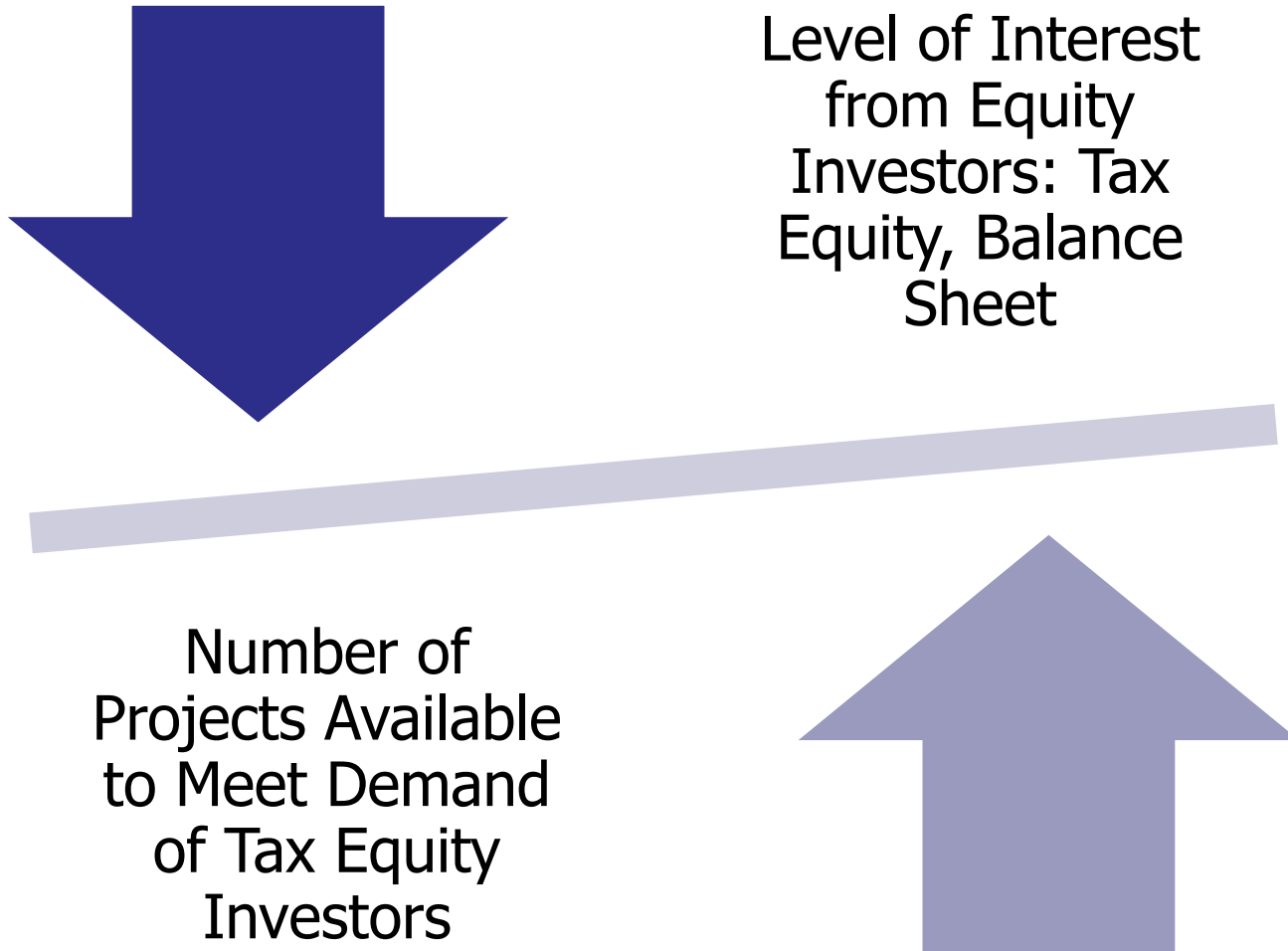
### Installed Wind Project Costs by Region, 2007-2008 Projects



Source: Berkeley Lab database

# Determining REC Price

## Influential Factors: Cost of Capital



**Supply and Demand Balance of Available Capital**

# Putting it Together




Understand factors affecting the market


Quantify factors affecting market prices for RECs

Plan to meet RPS targets:  
Forecast cost of compliance  
Identify cost-competitive technologies  
Determine ratepayer impact

# Forecasting the Cost of Compliance



**RE-Sim™**  
Renewable Energy Market Simulator  
Large-Scale Module



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**Key Input** More Input

**Technology Cost Inputs**

Tech Installed Cost (Base Year \$/kW) Determta

Base Year for Tech Installed Costs (Year) 2007

Technology Specific Inputs (click variable in list) Calc mid

Bid/REC Cost Choice Edit Tabl

Input Bid/REC Cost (\$/kWh) Edit Tabl

**Economic Assumptions**

Cost of Debt (%) DetermT

Debt Ratio (%) DetermT

Cost of Equity (%) DetermT

WACC Calc mid

**Reserved Projects**

	Utility Scale	Large Comm
Project Names	<span style="border: 1px solid orange; border-radius: 5px; padding: 2px 5px;">List</span>	<span style="border: 1px solid orange; border-radius: 5px; padding: 2px 5px;">List</span>
Project Data	<span style="border: 1px solid orange; border-radius: 5px; padding: 2px 5px;">SubTabl</span>	<span style="border: 1px solid orange; border-radius: 5px; padding: 2px 5px;">SubTabl</span>
Online Date	<span style="border: 1px solid orange; border-radius: 5px; padding: 2px 5px;">SubTabl</span>	<span style="border: 1px solid orange; border-radius: 5px; padding: 2px 5px;">SubTabl</span>

**General**

Compliance Year (Year) 2008

CO2 Cost Choice Without CO2 Cost ▼

Bid/REC Contract Term (Years) 20

ITC Eligibility (1 (eligible), 0 (inelig)) DetermT

PTC Eligibility (1 (eligible), 0 (inelig)) DetermT

Auto-Calc Compliance Addns? (1 (Yes), 0 (No)) DetermT

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**Key Output** Model Details Other Outputs

**Cost of Compliance**

Bid Price (Utility) or REC Price (Lg Comm) (\$/kWh) Calc mid

Annual Cost per kWh (REC price) (\$/kWh) Calc mid

Annual PBI Costs (\$/yr) Calc mid

NPV of Total REC Costs by Technology (\$) Calc mid

NPV of Total REC Costs (\$) Calc mid

Total REST Rate Impact (\$/kWh) Calc mid

**Energy and Demand**

RECs For Least Cost Compliance (kWh/yr) Calc mid

RE Capacity to Acquire (kW) Calc mid

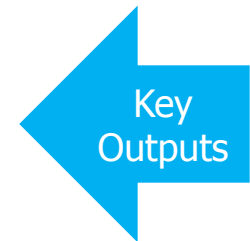
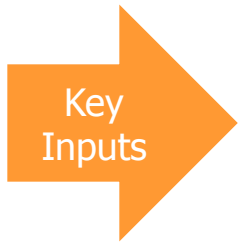
Total RECs by Tech (kWh/yr) Calc mid

Current, Res, Bank, Manuf, Compliance RECs (kWh/yr) Calc mid

Util/Comm REC Accounting (kWh/yr) Calc mid

Tax Credit Type Applied (ITC or PTC) Calc mid

REC Bank Account (kWh) Calc mid

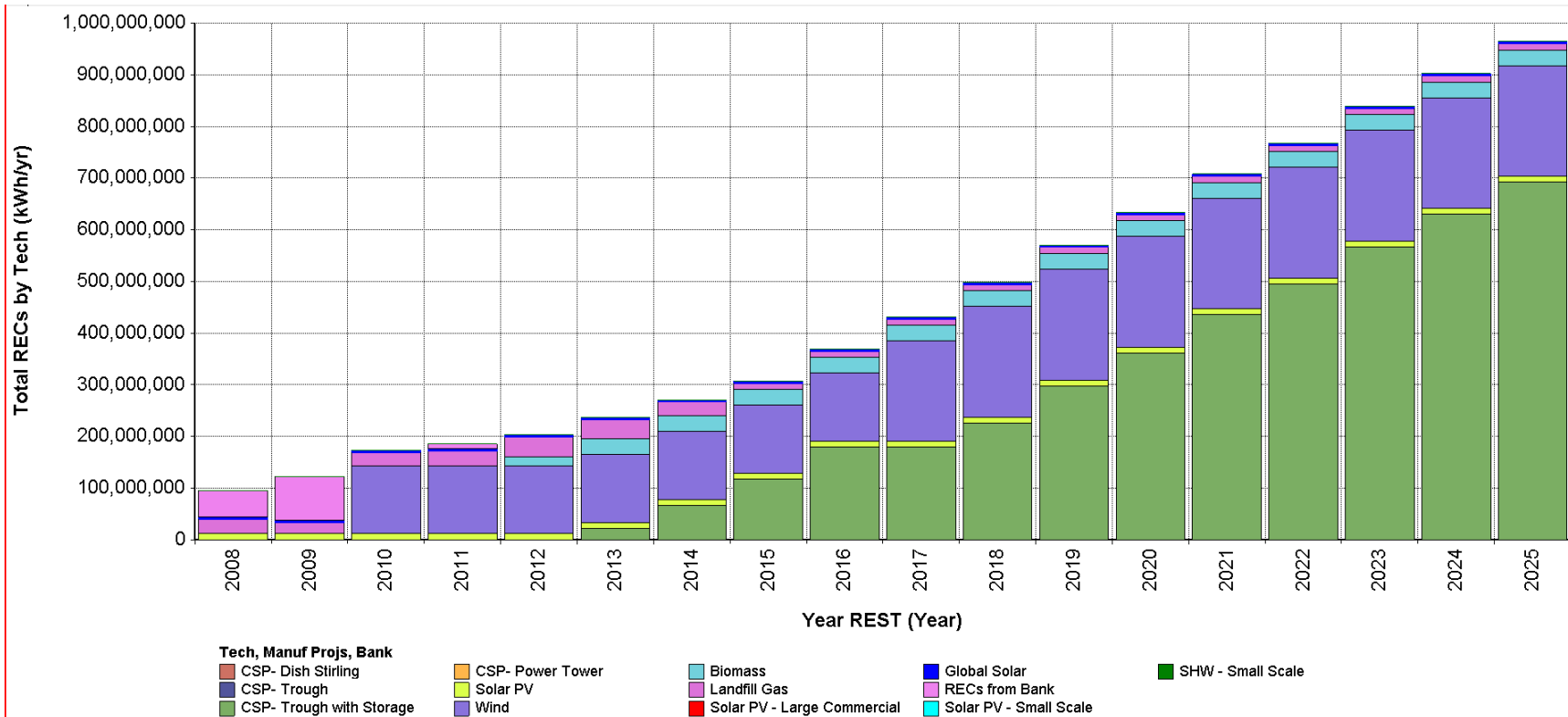


Note: Discounted Cash Flow (DCF) Analysis Used to Determine REC Prices



# Forecasting the Cost of Compliance

## Sample Output: Sources of Utility-Scale RECs



### Notes:

- Results are highly dependent on inputs
- Some inputs were changed to protect confidential data

# Contact Information

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