Renewable Energy Financing: The Role of Policy And Economics

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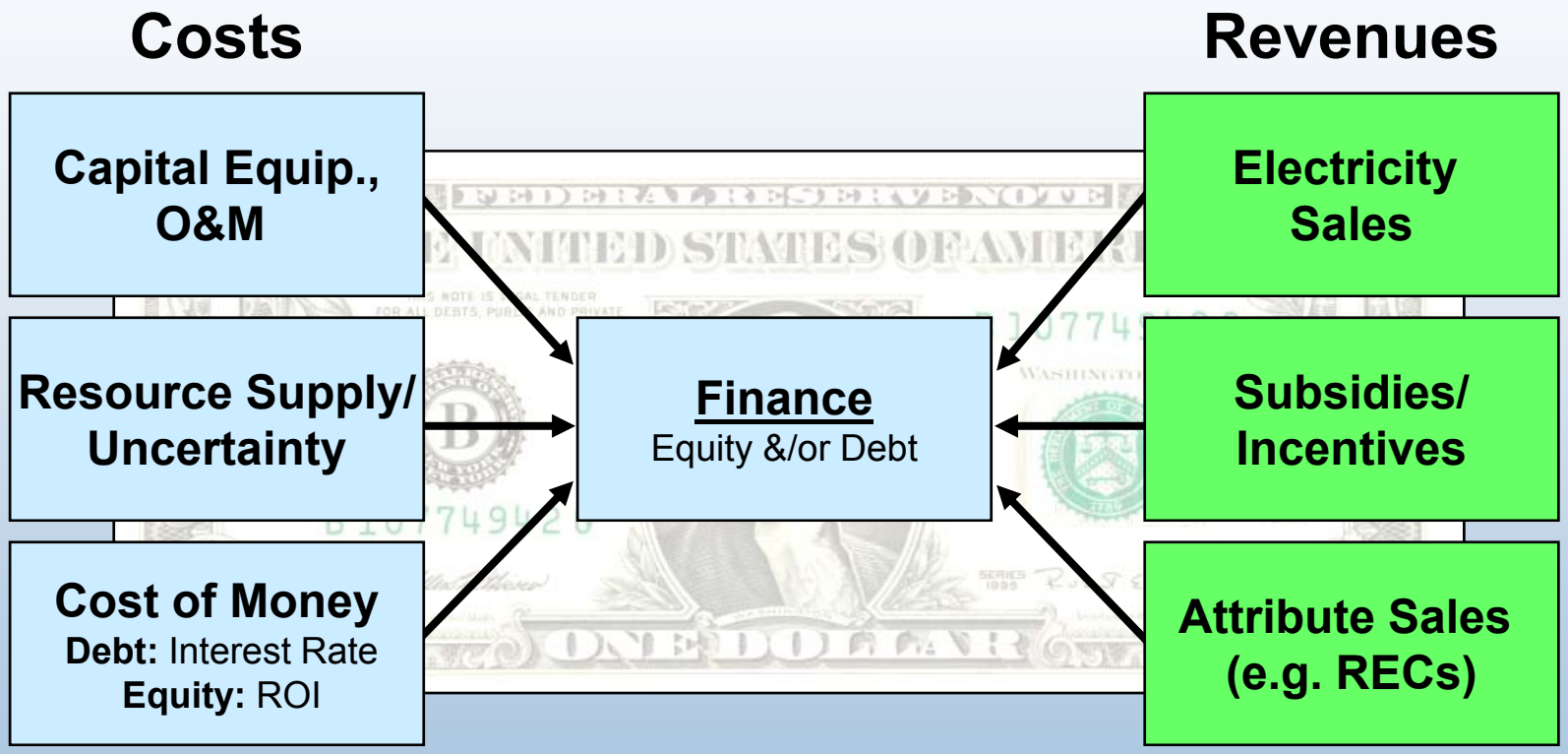
Overview

- Renewable Energy (RE) Valuation
- Federal and State Incentives
- The role of RECs in financing RE
  - How Policy Impacts RE Valuation
- Financing Challenges

Renewable Project Costs & Revenues



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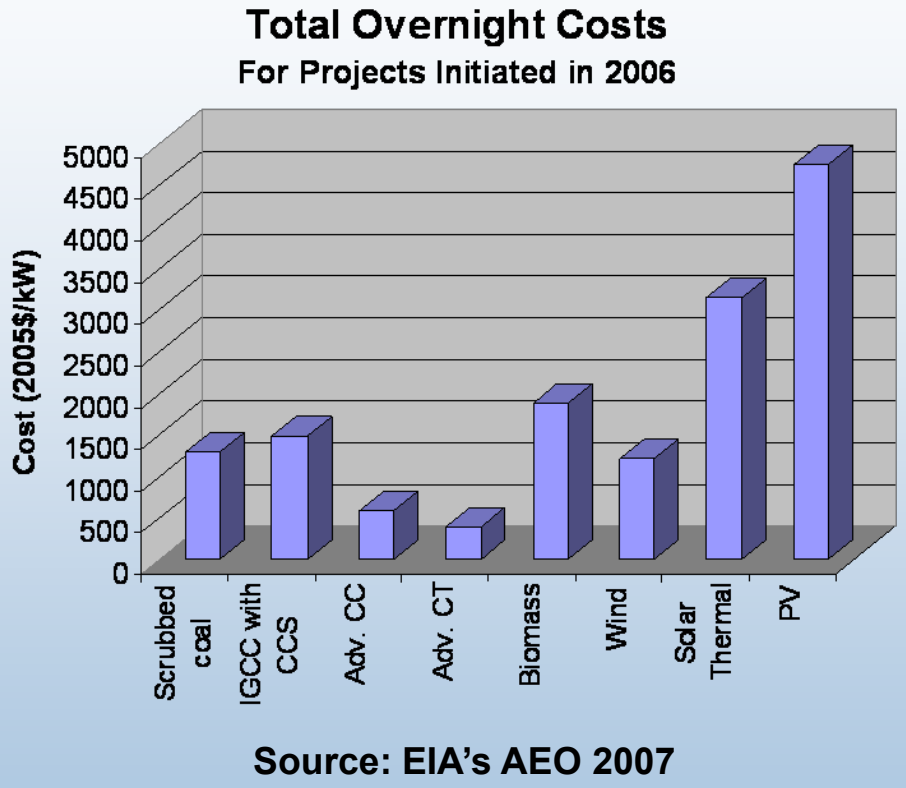
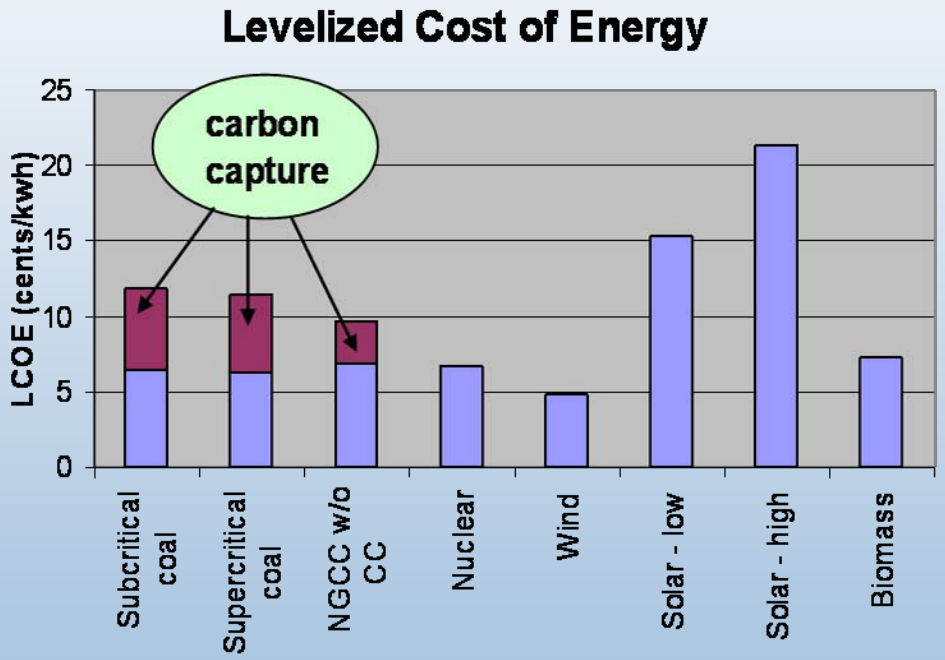
Electric Generation – Cost Comparison



Source: EIA's AEO 2007



Source: OH OCC (2007)
Orig. sources: DOE, MIT, Solar Buzz, NREL

Federal Incentives

- Investment Tax Credit (ITC)
  - 30% for solar and fuel cells* from 1/1/06 through 12/31/08
  - Reverts to 10% (current level for geothermal electric)
- Production Tax Credit (PTC)
  - Based on production in first 10 years of operation
  - 2.0¢/kWh for wind, geothermal, closed-loop biomass
  - 1.0¢/kWh for LFG, open-loop biomass, hydro (including small irrigation), MSW
- Modified Accelerated Cost Recovery System (MACRS)
  - Accelerated depreciation of specific equipment costs
  - Generally, ~90% of equipment costs (not including transmission)
- Every project can use MACRS, but if eligible for both PTC and ITC, the project can only claim one credit

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*** At least 0.5 kW fuel cell and up to $500 per 0.5 kW**

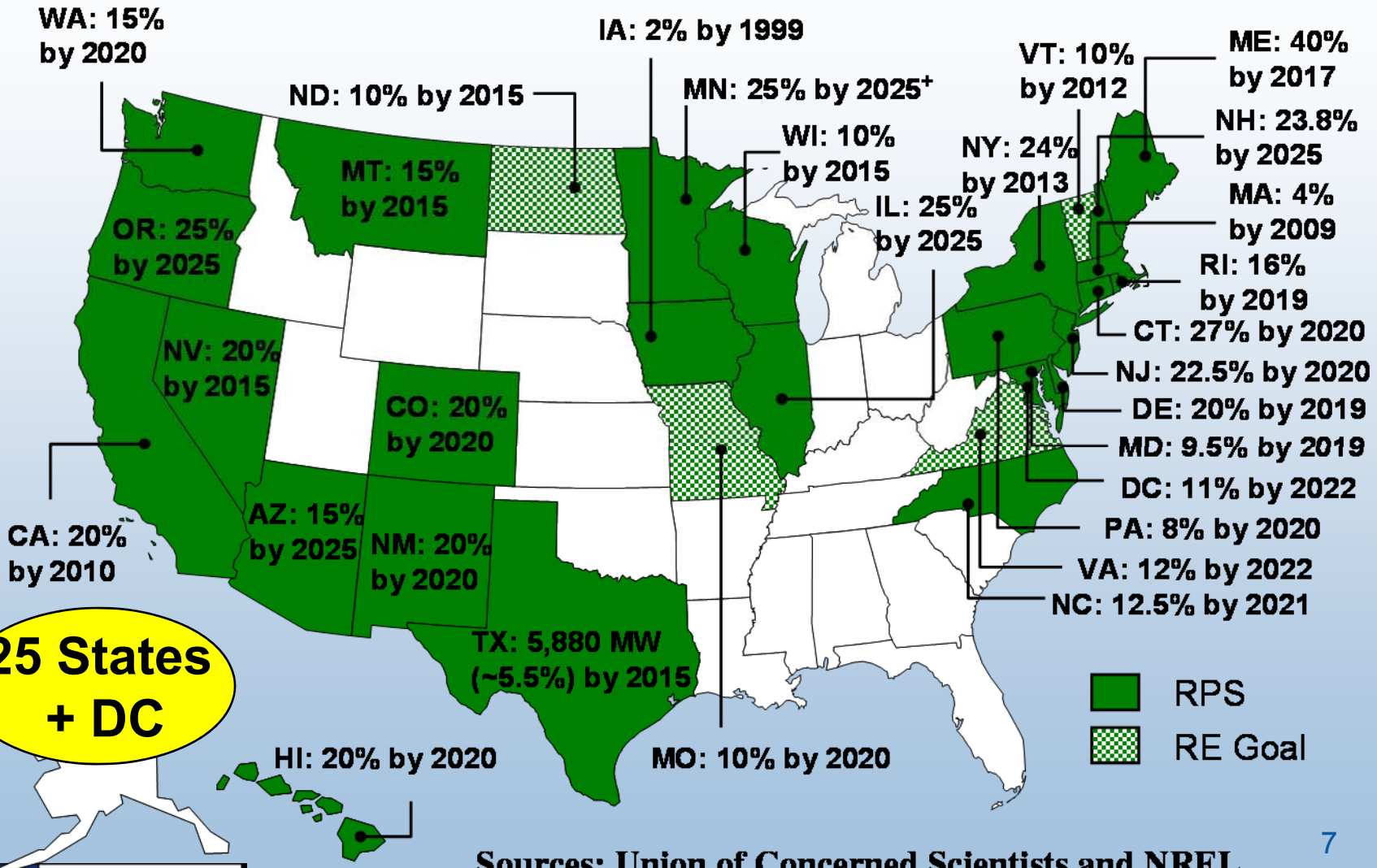
Source: DSIRE

State Incentives

- System Benefit Charge for renewables
  - 17 funds expected to total $6.8 billion between 1998-2017
  - Programs for end-users, developers, industry
- State ITC
- State PTC
- Tax Exemptions (State, County, City)
  - Sales
  - Property
- Net metering and Interconnection
  - Not uniformly applied
  - Important for small, distributed systems

Source: DSIRE (www.dsireusa.org)

State Policy: Renewable Portfolio Standards



Sources: Union of Concerned Scientists and NREL

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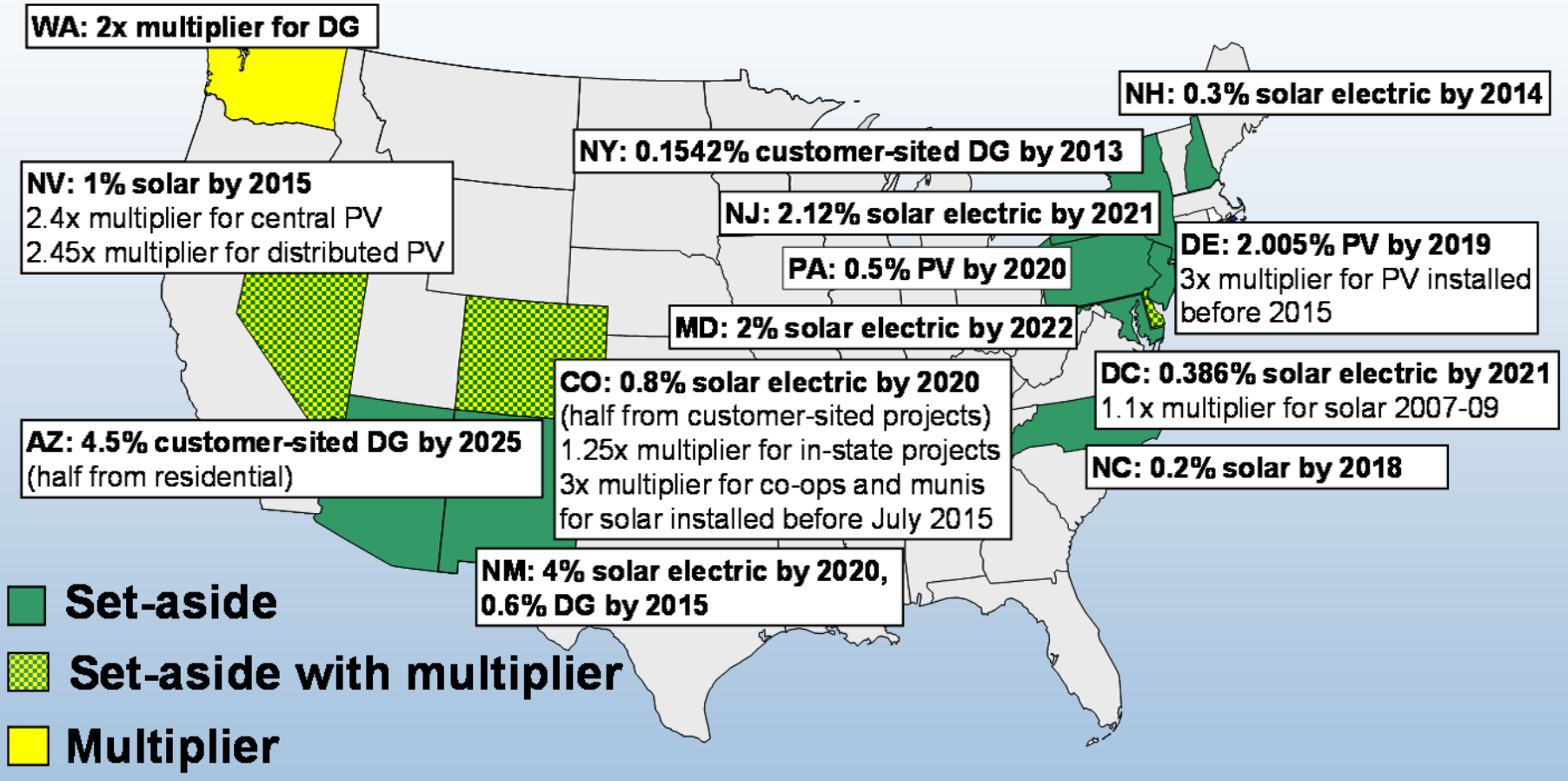
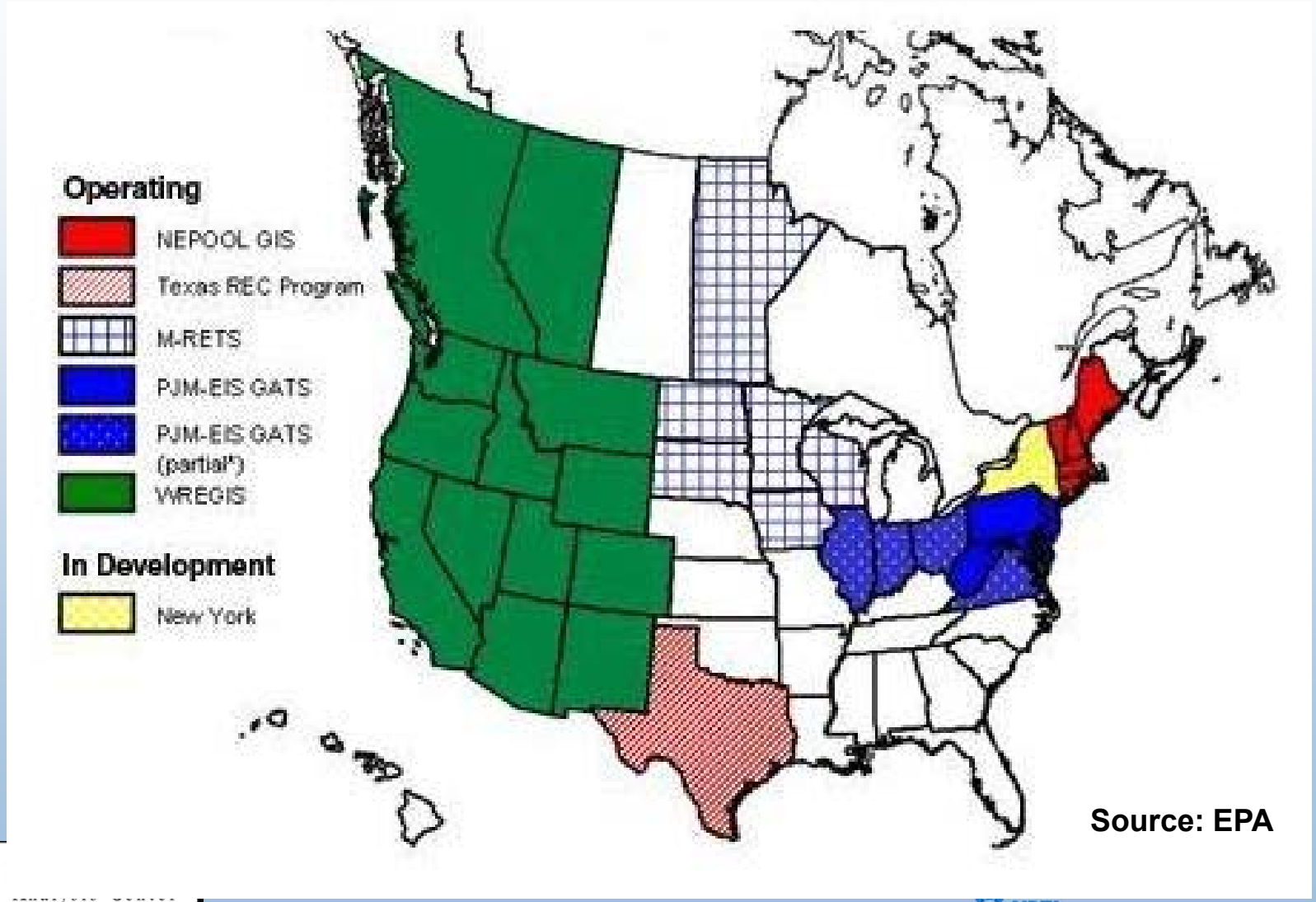
State Policy – Specific RPS Provisions Promote Solar and DG



Source: LBNL

REC Tracking Systems



Source: EPA

REC Market Value Factors

- Compliance vs. voluntary market
- Regional Issues
  - Quality of resource
  - Incremental cost of development above energy market
  - REC supply-demand balance
- Long-term policy stability/uncertainty
- Other market rules/conditions (e.g. price cap)

	RECs	Solar RECs
Voluntary	$1-7*/MWh	$18-21/MWh
RPS	$3-22/MWh	$205-265/MWh**
RPS (shortage)	$48-56/MWh	**???**

NJ SREC cap: $711/MWh

Sources: Evolution Markets, NREL, Xcel, NJ Clean Energy Program

** Not counting biomass ** NJ and CO only*

High REC Prices are Great…

Investors Face Many Risks

1. **Investment risk** is reduced by…
   - A higher return on investment
   - Long-term contracts w/creditworthy entities
   - Tax incentives used to increase project cash flow
   - Risk shared with other investors
2. **Energy resource risk** is key concern
   - How much wind/water/biomass is available?
   - Biomass concerns: small suppliers, short-term contracts
3. **Environmental risk** (siting and permitting)
4. **Technology risk –** commercial preferred, not emerging
5. **Portfolio diversity** helps reduce risk
   - Invest in several different geographic regions
   - Long-term contracts with several different off-takers

REC Value for Project Financing

- Ability for electricity revenues and incentives to cover large portion of project costs
- REC financing value can depend on:
  - Ability to secure "favorable" REC contracts/hedges
  - Perspective of investors
- Equity investors:
  - Greater appetite for risk
  - Some investing in wind projects without REC contracts,
    - Particularly if there are neighboring/other markets in which to sell RECs (RPS, voluntary)
  - Looks for disparities between REC spot market and long-term REC prices
- Debt lenders: generally, unwilling to lend without PPA that covers costs with creditworthy entity

Key Financing Challenges
by Renewable Technology

- Wind
  - Investment returns
    - PTC expiration
    - Competing capital resulting in lower IRRs
  - Resource risk
  - O&M costs
- Solar PV
  - Upfront capital costs and resulting investment return
  - ITC expiration
- Biomass
  - Resource risk (unreliable fuel supply)
  - Environmental risks
- Geothermal
  - Resource risk (temperature decline, fouling)
  - Environmental risk (well blowouts)

Adopted from Jerry Peters, TDBanknorth

Conclusions

- Renewable Energy Valuation Depends on:
  - Value of federal and state incentives
  - Resulting incremental cost above regional electricity revenues (if any)
  - Ability to secure attribute/REC revenues to cover incremental cost and desired return
    - Better for RPS eligible technologies
    - Particularly if there is a set-aside (e.g. solar or DG)
- REC Valuation Depends on Investors
  - Debt lenders want REC PPAs with creditworthy entities
  - Equity investor willing to take more risk, for certain tech.
- Financing Challenges are Technology Specific

Thank you for your attention!

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