

# Integrating High Levels of Wind and Solar Energy in PJM



**John Moore**

**Energy Policy Roundtable In the PJM Footprint**

**March 30, 2016**

**Sustainable **FERC** Project**

Policies for a Clean Electric Grid



# Summary

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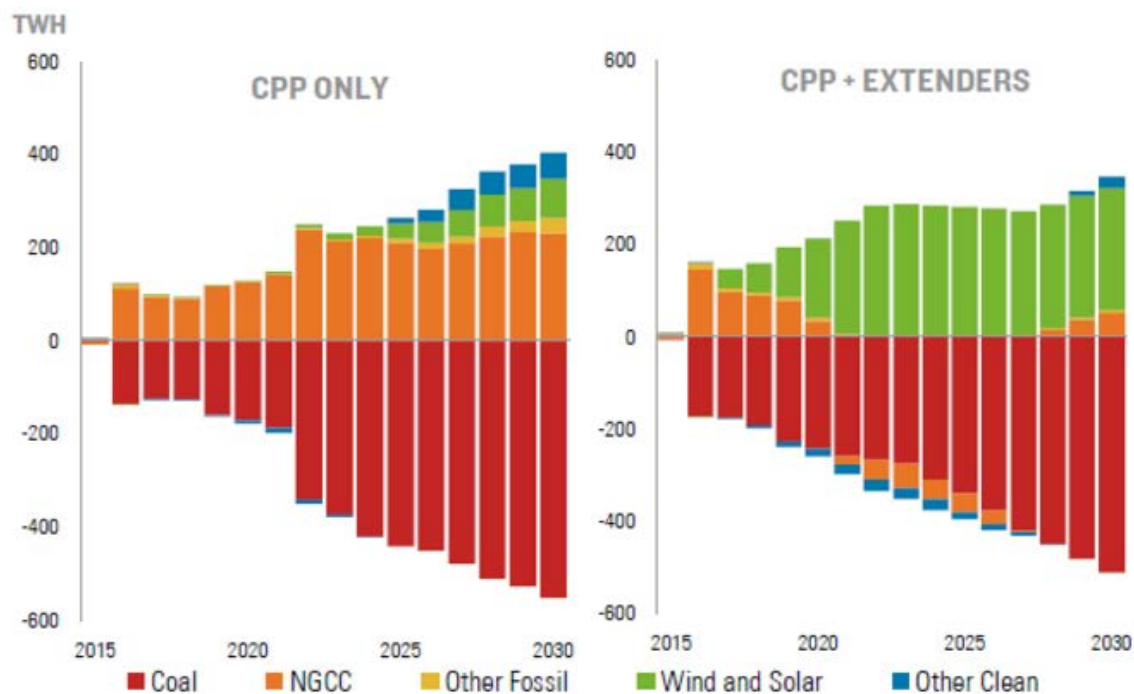
- Plan for system needs driven by Clean Power Plan and other public policies
- Strengthen interregional planning to facilitate renewables integration
- More comprehensively value wind and solar in markets and planning.



# Context – The Evolving Grid

# Plan Ahead for Higher RE Levels

**Rhodium Study: PTC/ITC will drive utility scale wind and solar throughout the CPP compliance period at the expense of gas.**

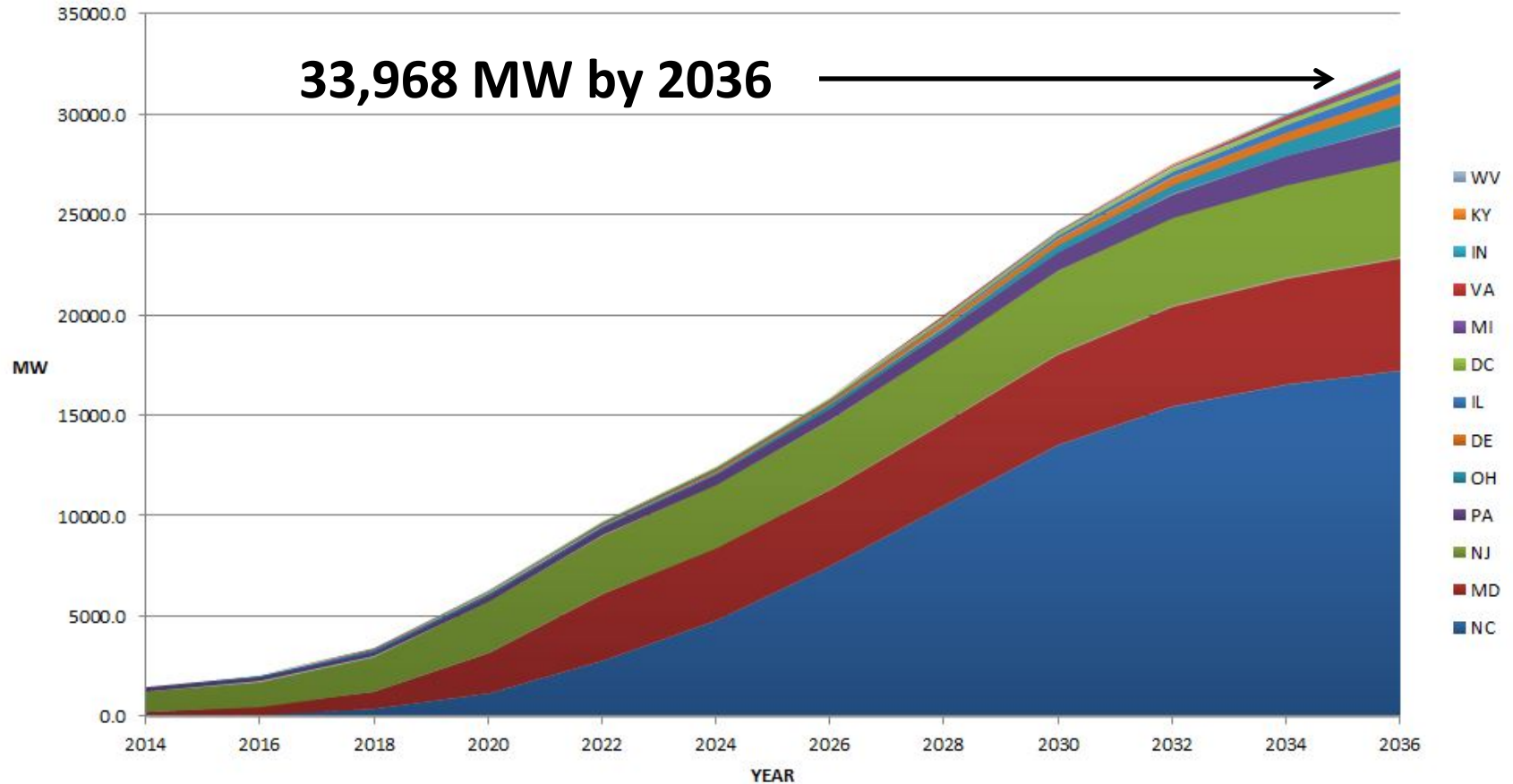


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# NREL Study - Rooftop Solar in PJM

(\$25/ton carbon value)



Data excerpted from *Distributed PV Adoption – Sensitivity to Market Factors* (NREL 2016)

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# Interregional HVDC Projects

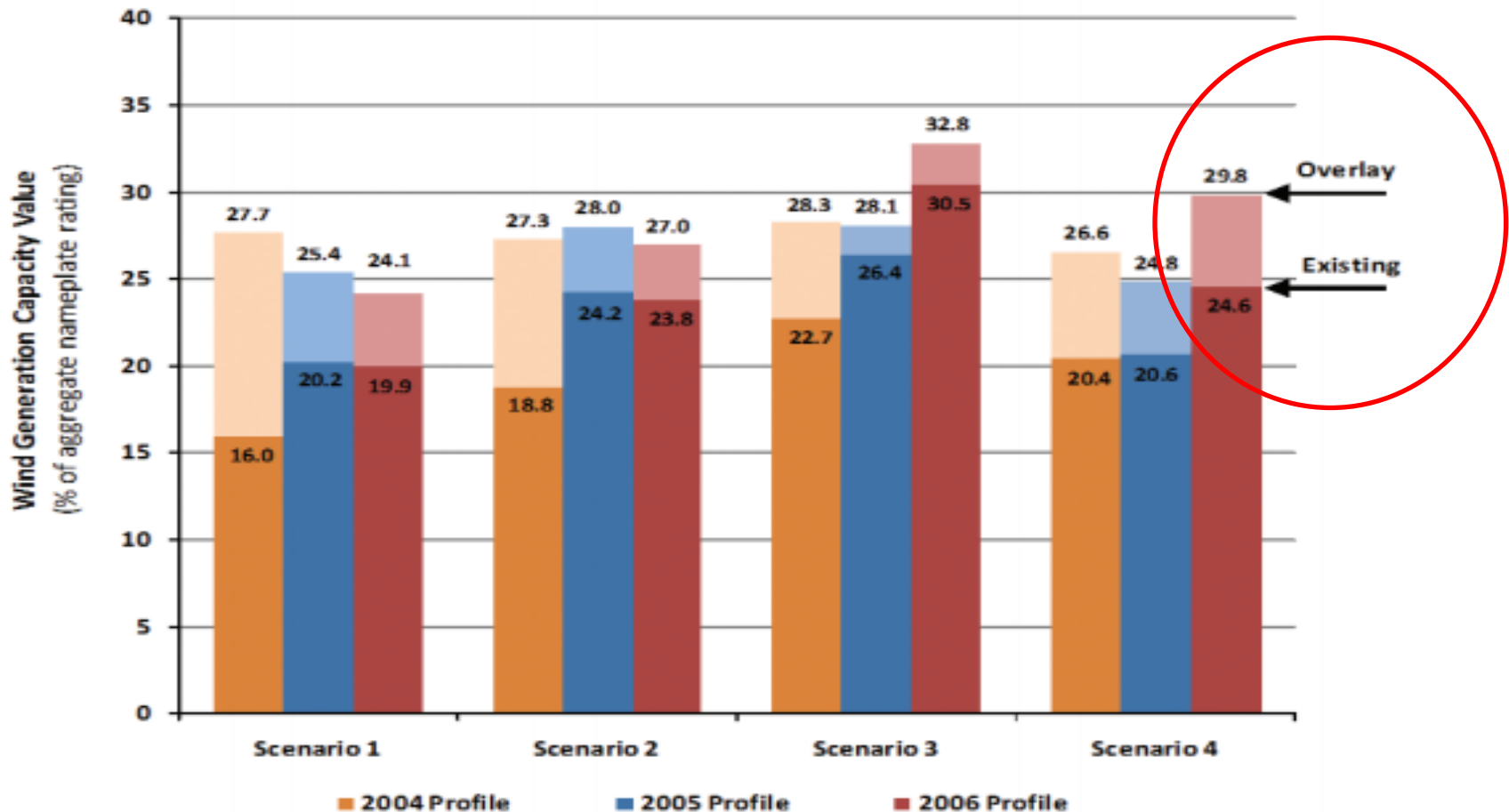
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# Transmission Increases VER Capacity Factors



EWITS Study (2011)

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# **Clean Power Plan, Interregional Planning, and Markets**



# Clean Power Plan – Knowledge Is Power

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- Our recommendations:

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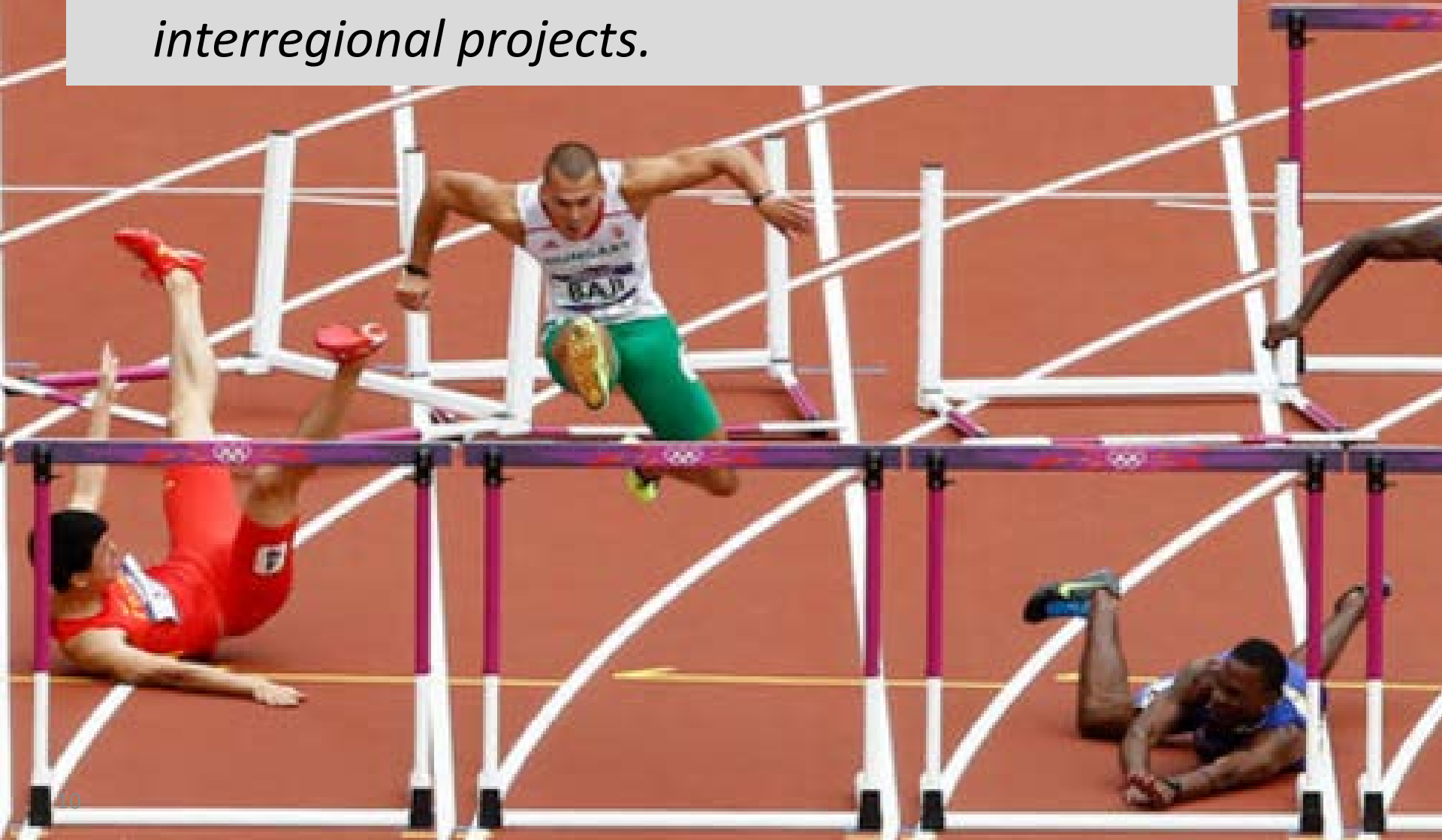
- *Account for and address leakage*
  - *Examine high clean energy futures*
  - *Include reasonable efficiency levels (savings of 1.5% to 2% annually)*
  - *Reflect carbon reinvestment value*
  - *Reflect impacts of more transmission*
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**Modeling**

- Integrate into RTEP
- Work with states and other stakeholders

# Triple Hurdle of 3 Planning Approvals

*Solution: Create new project category for interregional projects.*



# One or two metrics miss important benefits

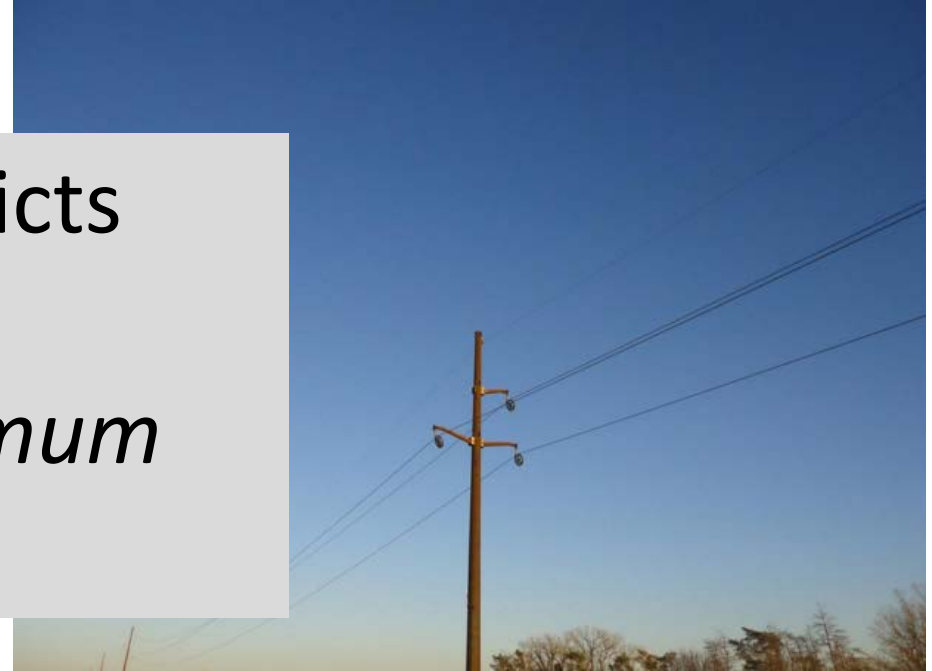
*Solution: Expand benefit metrics.*



# small is Beautiful



345 kV threshold restricts  
selection of solutions  
*Solution: Reduce minimum  
size to 115 kV.*



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# PJM Market Design Issues

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- Capacity Factors for wind and solar
- Seasonal resources
- Capacity Injection Rights

# Wind Performance in Polar Vortex



**COMPLETED:** Action Item # 21:  
How did wind perform in the winter?



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# Questions?