

SHAPING THE FUTURE...THROUGH

INNOVATION

2011 SUMMER SEMINAR

EPRI

ELECTRIC POWER
RESEARCH INSTITUTE

Prism 2.0: *The Value of Innovation*

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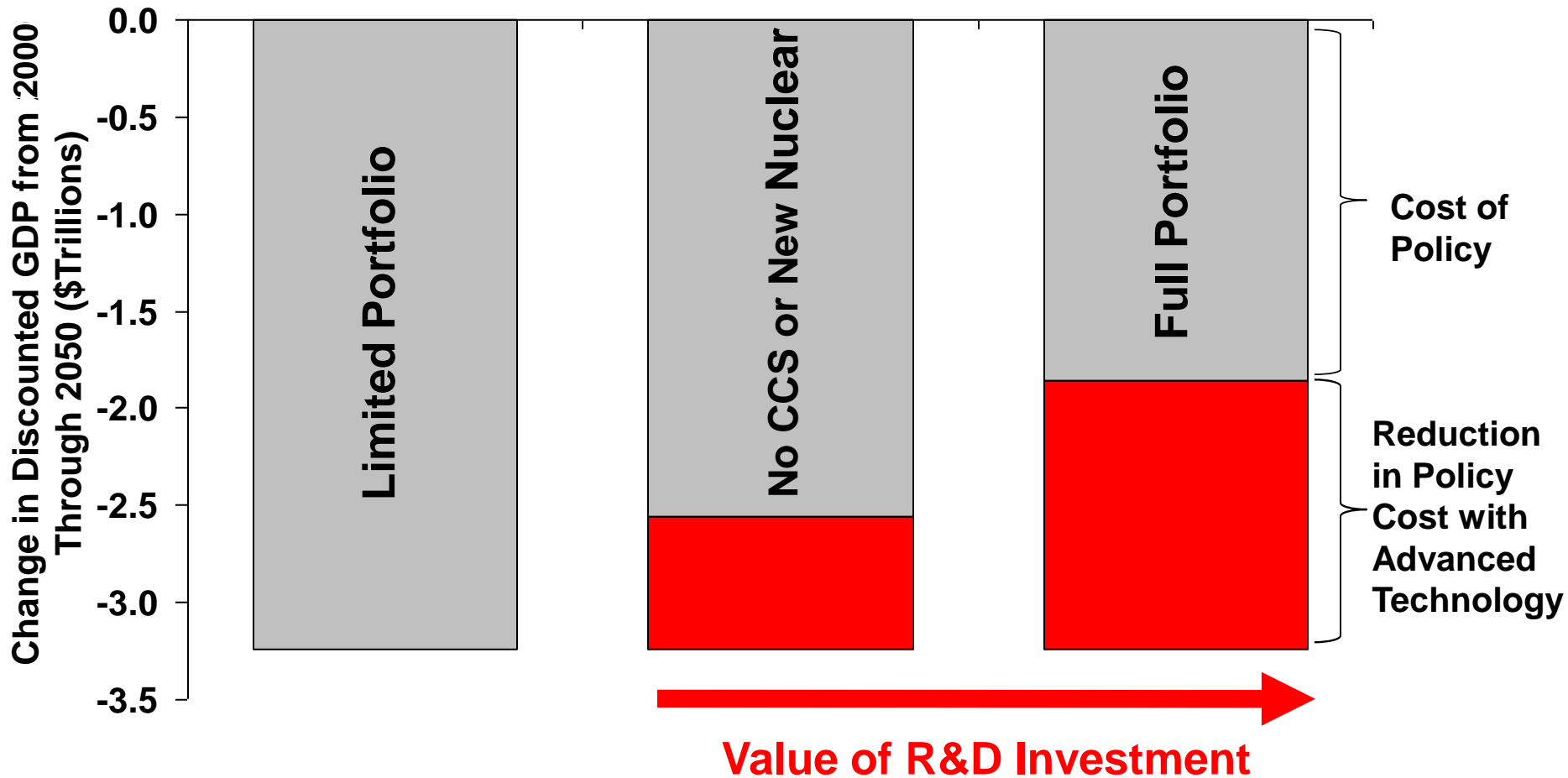
2011 Summer Seminar

August 1, 2011

Looking Back... Prism/MERGE



Technology can reduce policy cost by ~45%



Looking Forward... Prism 2.0



Building upon previous EPRI Prism...

- **U.S. economy-wide model incorporating regional detail**
- **Improved treatment of renewables**
 - *High-resolution wind and solar resource data*
 - *Improved treatment of integration costs of variable generation*
 - *Integrated biomass model with resource competition*
- **Full complement of environmental regulations**
- **Expanded demand-side detail by region**
 - *Energy efficiency, demand response, and distributed resources*

The New York Times

Business Day
Energy & Environment

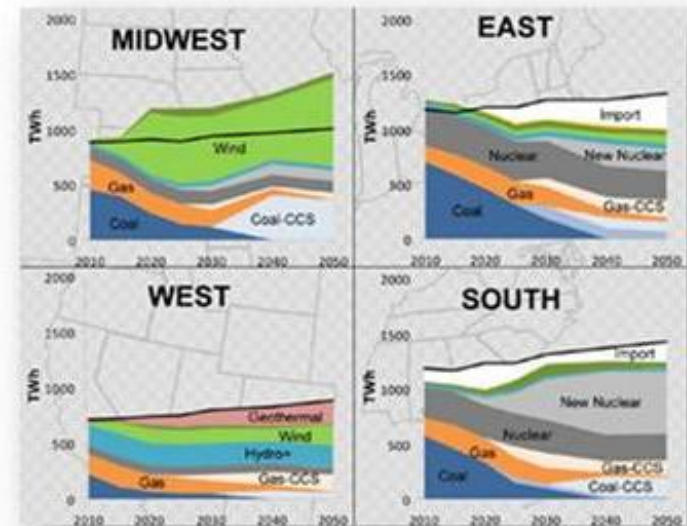
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A New EPRI Computer Model Makes the Case for Regional Climate Solutions

By PETER BEHR of [ClimateWire](#)
Published: August 19, 2010

The utility industry's top research group is making the case that regional solutions to the nation's climate policy challenges offer the best deal for consumers.



What is the Value of Innovation?



Policy Scenarios	Technology Cases	
	Limited Portfolio	Full Portfolio
Reference	•	•
CO ₂ Controls	•	•
Clean Energy Standard	•	•

Results are *illustrative*, not polished scenarios!!!

Technology Cases



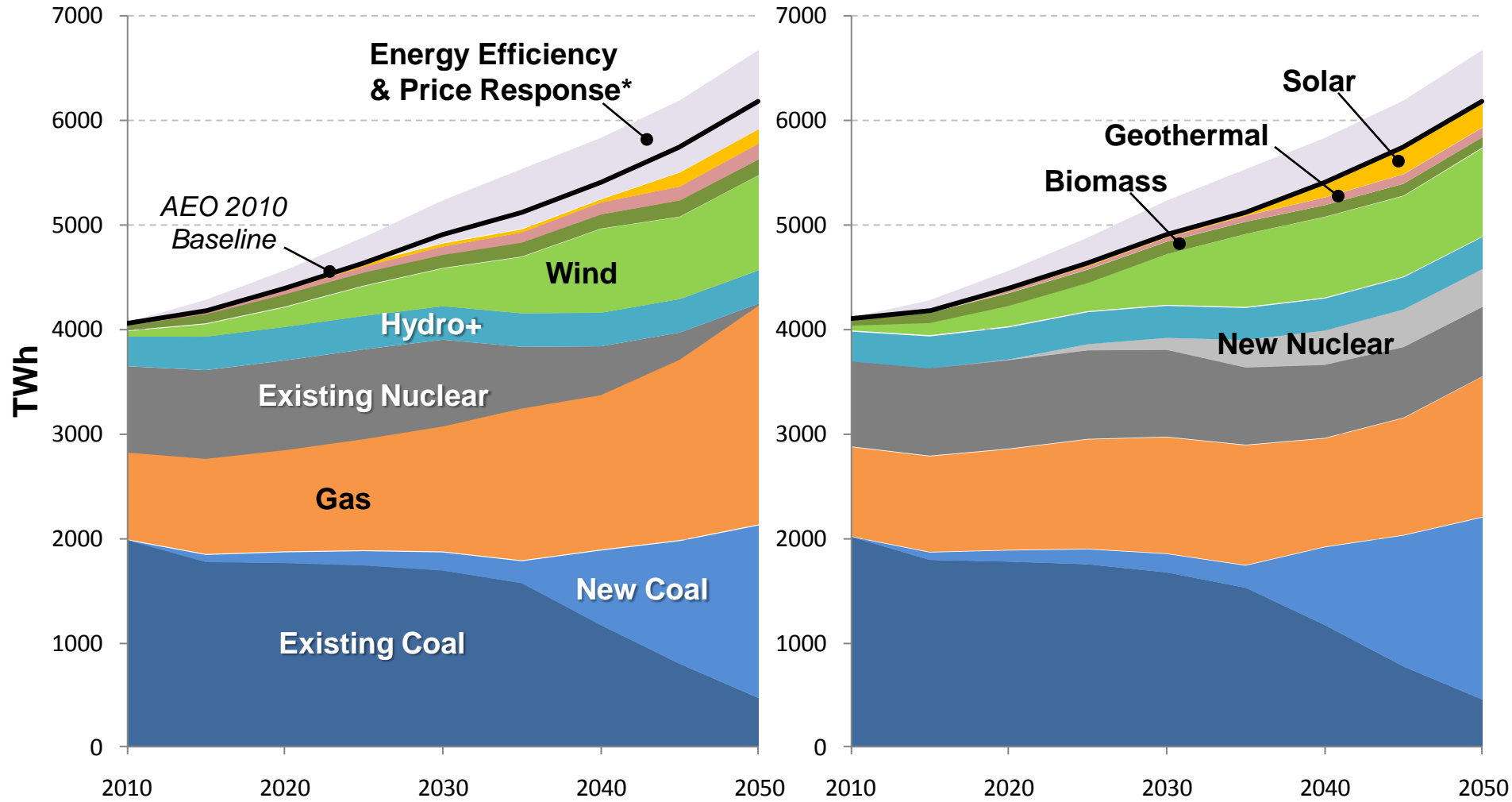
	Limited Portfolio	Full Portfolio
Efficiency	Capital – energy elasticity of substitution = 0.2	Capital – energy elasticity of substitution = 0.5
Renewables	EPRI ETAC estimates	Improved cost and performance (20-50%)
Inter-Region Transmission	Existing capacity only, no new builds	New builds allowed at \$3.85M per mile
Nuclear	No capacity extends license to 80 years; no new units	80% of capacity can extend to 80 years; new units ok
Natural Gas	AEO 2010; supply increases more slowly as prices rise	AEO 2010; supply increases more quickly as prices rise
CCS	Not available	90% capture for gas and coal available after 2020

National Generation Mix: Reference Scenario



Limited Portfolio

Full Portfolio



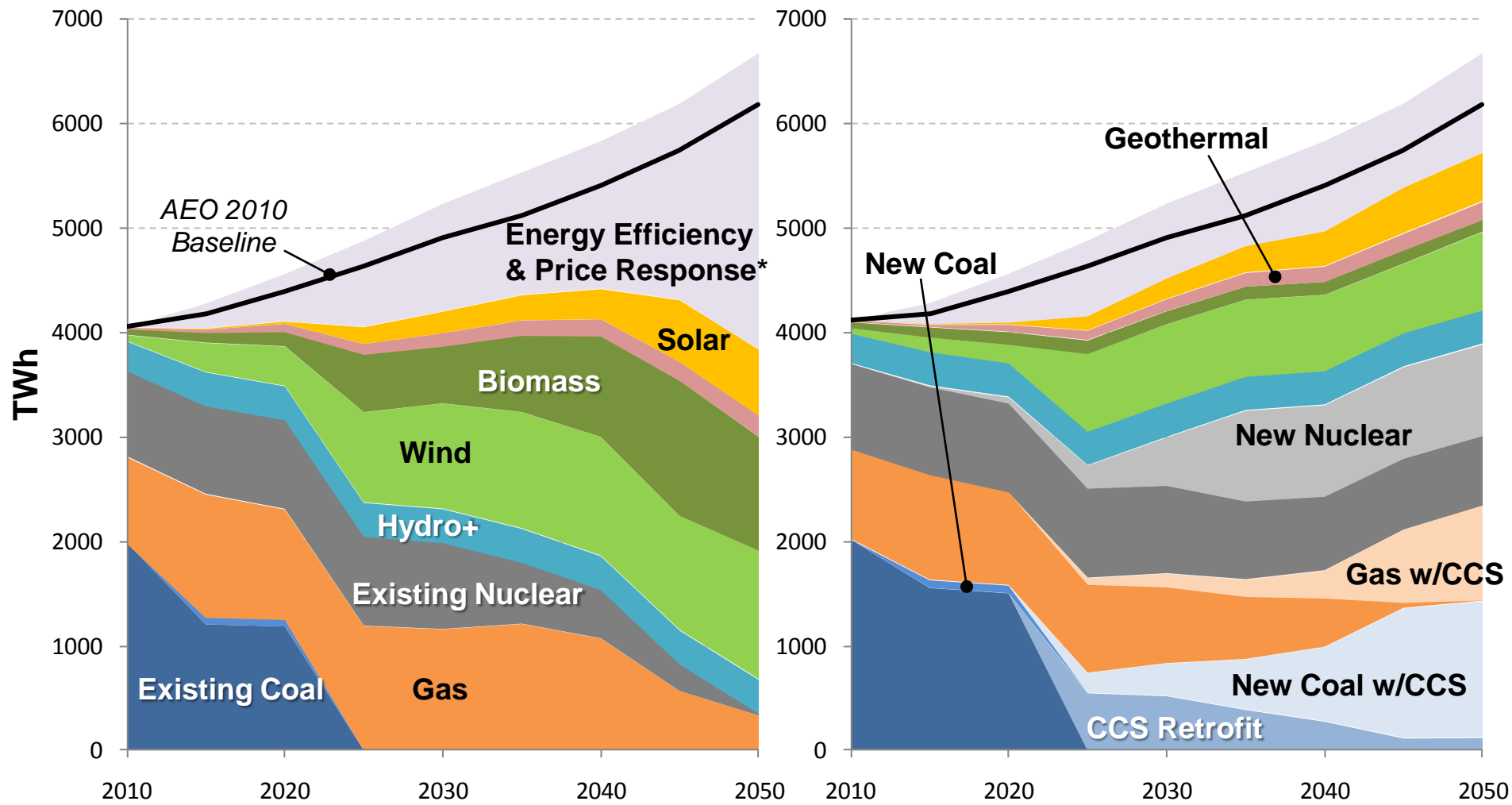
* Above the black line reflects embedded EE in the AEO 2010 Reference Case

National Generation Mix: CO₂ Controls



Limited Portfolio

Full Portfolio



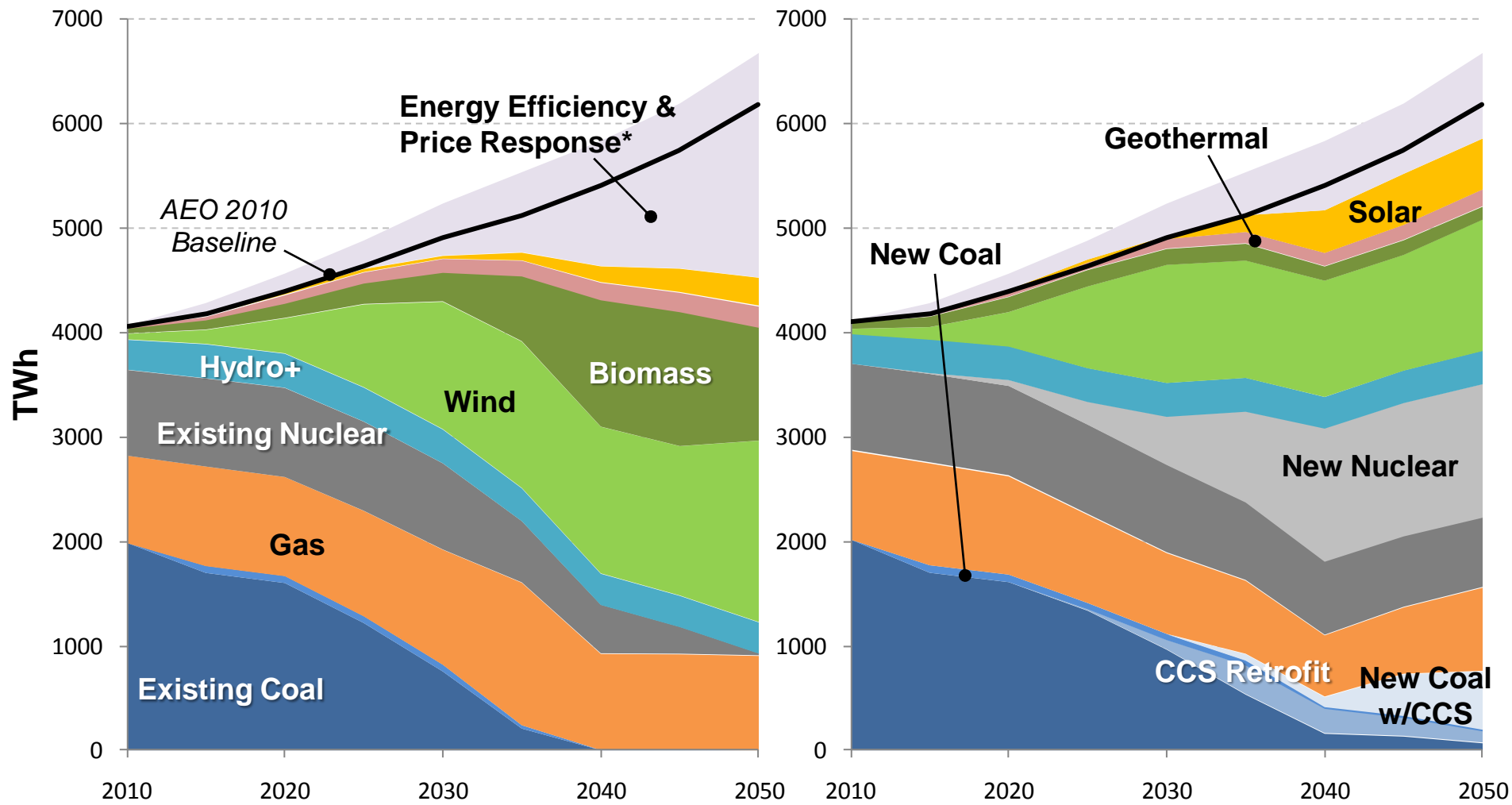
* Above the black line reflects embedded EE in the AEO 2010 Reference Case

National Generation Mix: Clean Energy Standard



Limited Portfolio

Full Portfolio

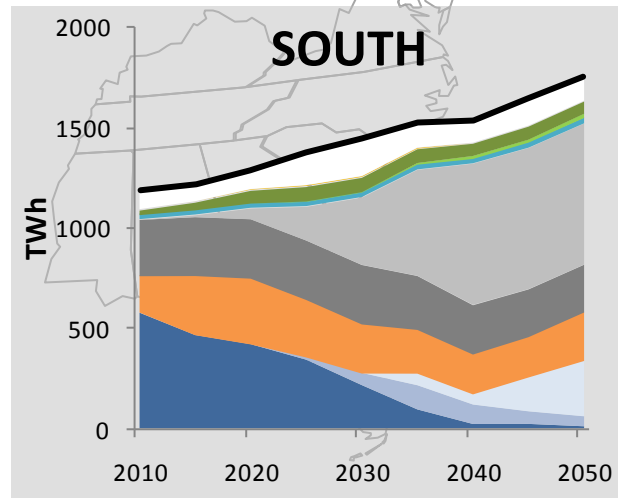
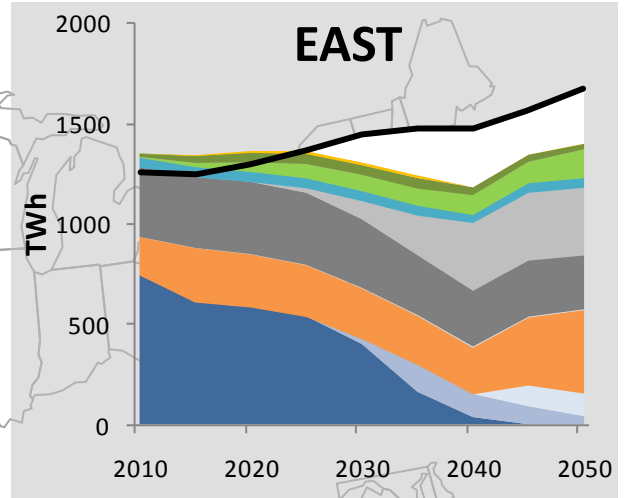
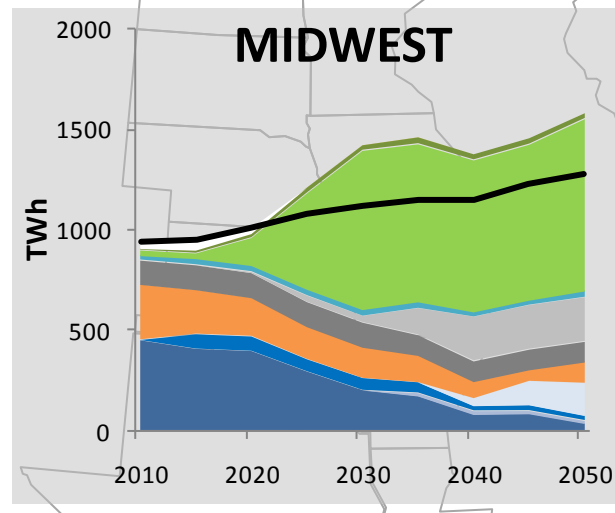
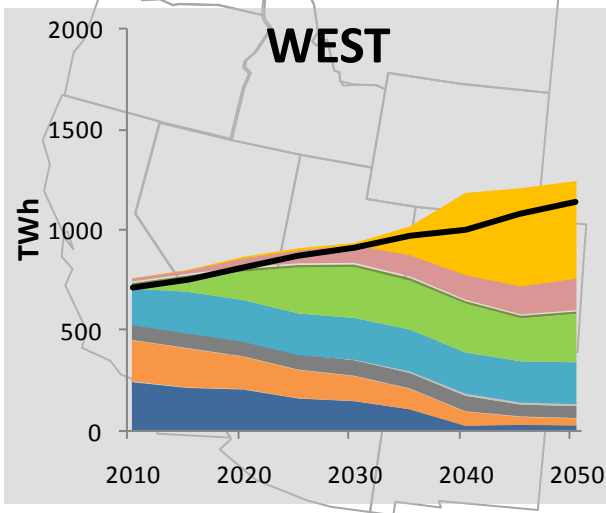


* Above the black line reflects embedded EE in the AEO 2010 Reference Case

Regional Generation Mix: Clean Energy Standard



- New Coal w/CCS
- Hydro+
- Imports
- Total Energy for Load
- New Coal
- Nuclear (New)
- Solar
- Gas w/CCS
- Nuclear (Existing)
- Geothermal
- Biomass
- Existing Coal
- Gas
- Wind

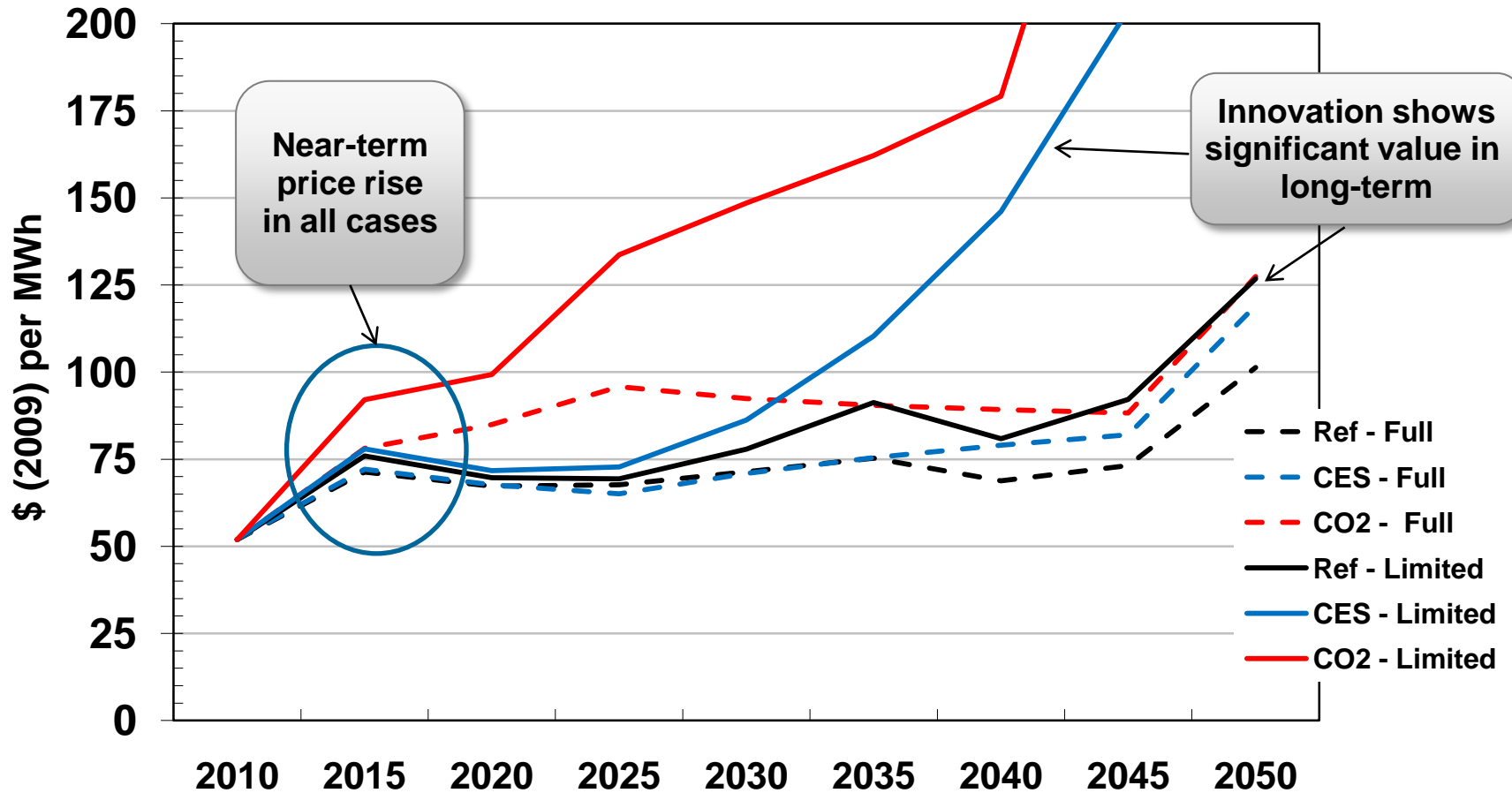


Clean Energy Standard
Full Portfolio

Wholesale Electricity Prices



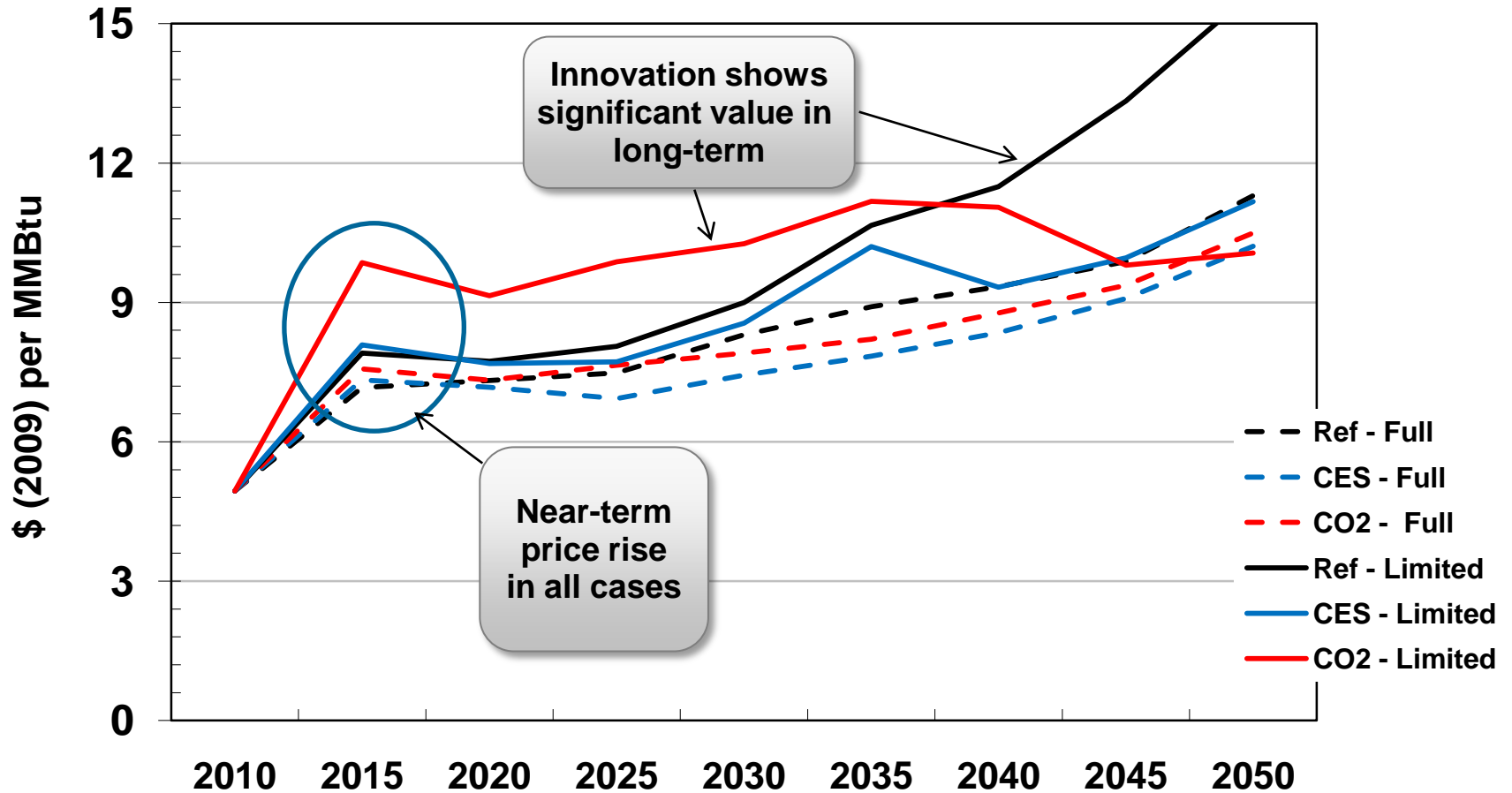
National Average Wholesale Electricity Prices



Wholesale Natural Gas Prices



National Average Wholesale Natural Gas Prices



Summary...



Innovation is valuable

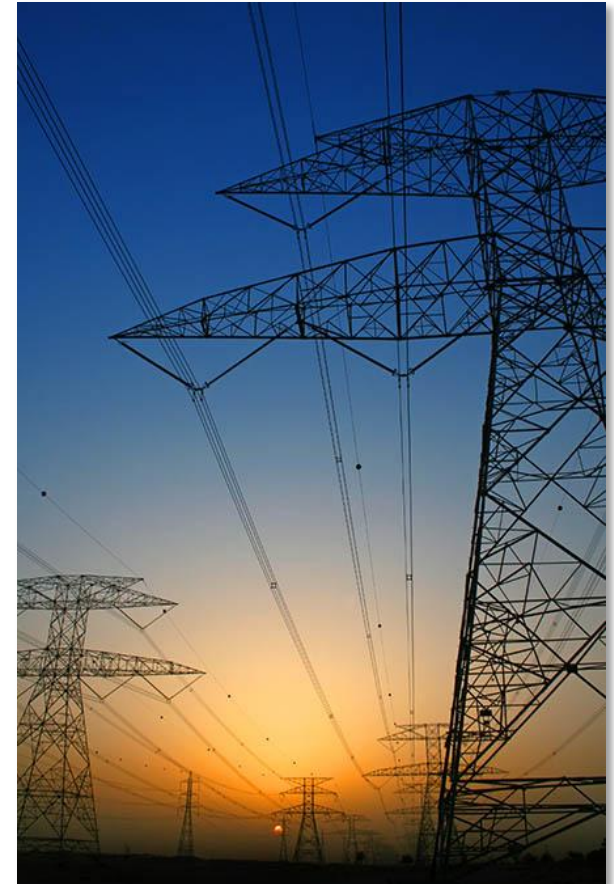
- Lower prices for electricity, gas

Innovation is robust

- Consistent across all scenarios studied here

Innovation is diverse

- Each region will use different tools at different times



In a world of uncertainty, innovation is key