Market and Economic Impacts of a Renewable Portfolio Standard

USAEE/ACORE Webinar on
Renewable Energy Economics

January 27, 2010

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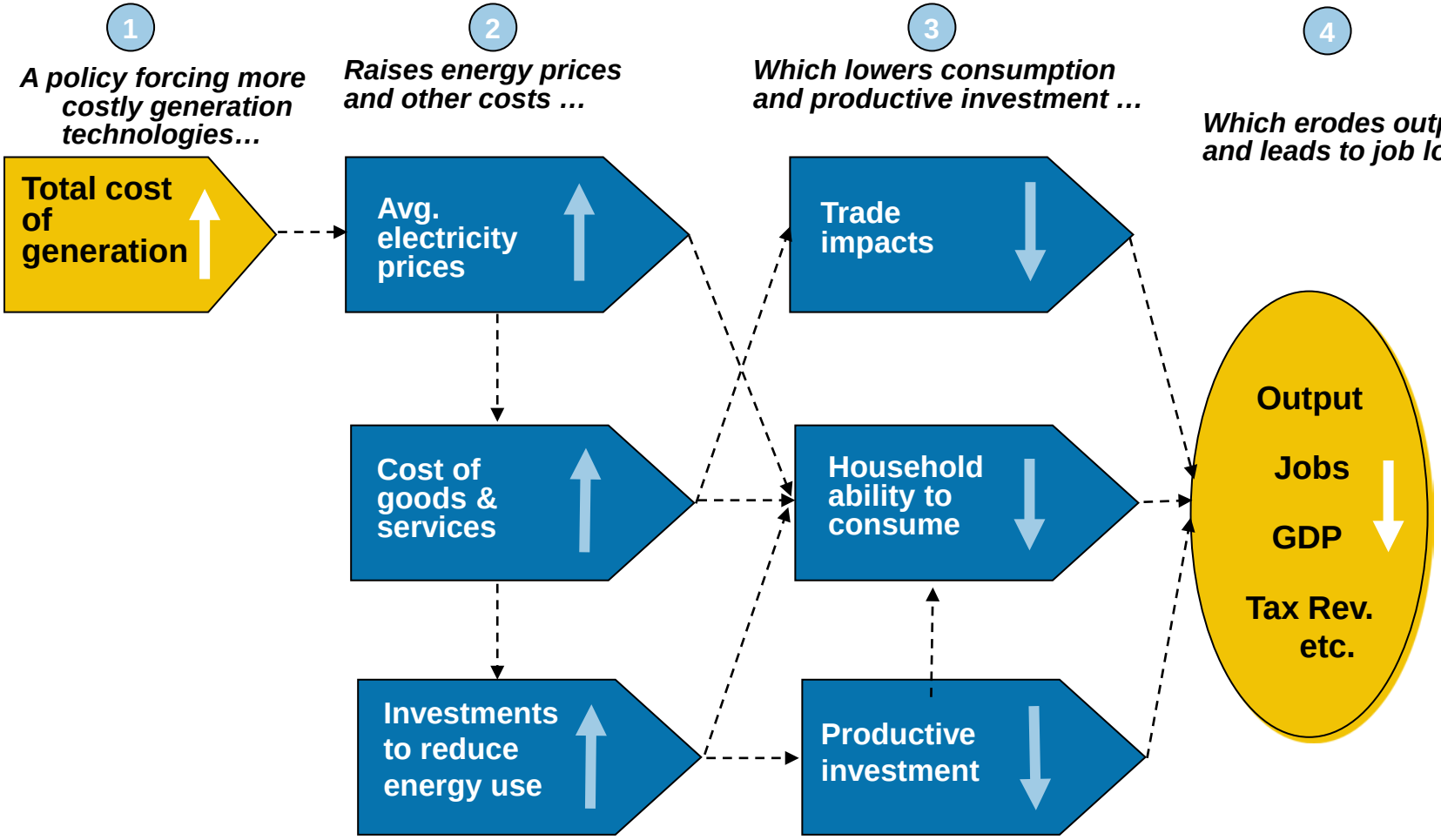
Issues highlighted in this presentation

- The chain of events to account for when estimating economic impacts of a Renewable Portfolio Standard (RPS)
- Role of Baseline assumptions in assessing “economic impact”
- Federal RPS compared to a carbon cap
- Distributional impacts of a Federal RPS

Conceptual framework for macroeconomic impacts



Requires use of general equilibrium models of the full economy that account for labor and capital productivity.

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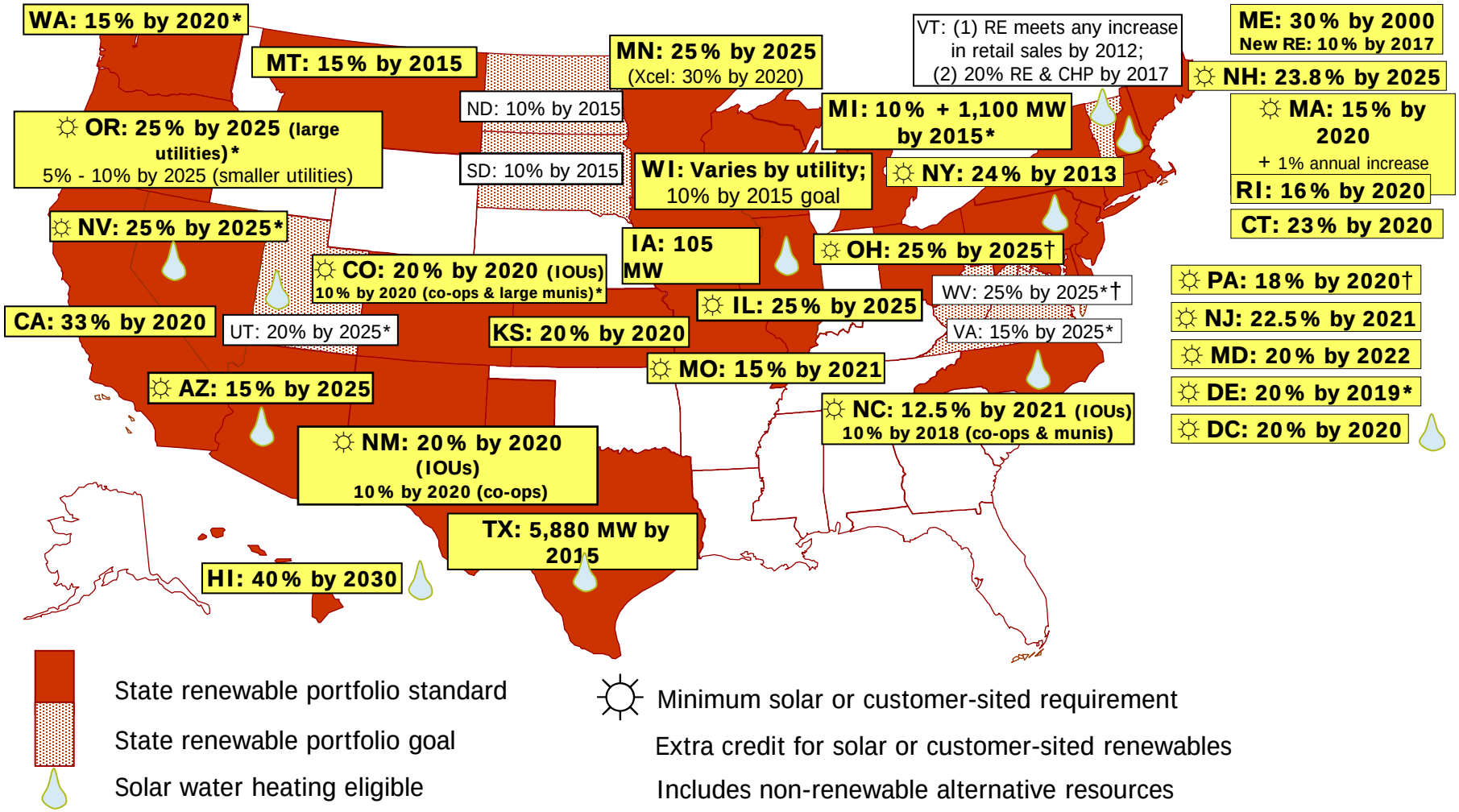
Outline of the impacts chain associated with policies forcing investments in renewables generation

Chain of Market and Macro Impacts	Effects
Renewables generation displaces some of the baseline fossil-fired generation	• Expect more displacement of gas-fired than coal-fired generation
Since renewable generation has higher lifecycle costs than the fossil-fired alternatives, the renewables-forcing policy has higher total costs to meet load	• Because this comes at a higher capital cost, average electricity costs will rise (cost-of-service increases) • At the same time, displacement of natural gas-fired generation lowers marginal (wholesale) price of electricity
Observable job & output increases along the renewable generation supply chain.	• Due to the lower overall productivity resulting from producing the same commodity (i.e., electricity) from higher cost technologies, there is no logical basis to assume that the direct output increases will be larger than the total output reduction
The higher total resource cost to meet electricity demand places a net drag on the macro-economy, but in indirect ways	• Reduction in overall economic productivity from capital • Reduction in overall labor productivity • Reduction in output and jobs will be spread across non-energy sectors, and not directly observable (ie, a reduction relative to an unobserved no-RPS world)

What happens without a Federal RPS? – The “Baseline”

- Economic impacts can only be estimated as a change from a defined “Baseline”
  - If most of the action occurs in the Baseline, estimated costs of the policy can be small, even if overall costs of the policy approach are not small
- Many policies already exist that affect renewable generation in the Baseline:
  - Over half of all U.S. states have an RPS in place
  - Economic stimulus bill (ARRA)

Over half of U.S states have RPSs, with varying stringencies and dates



Source: www.dsireusa.org / November 2009

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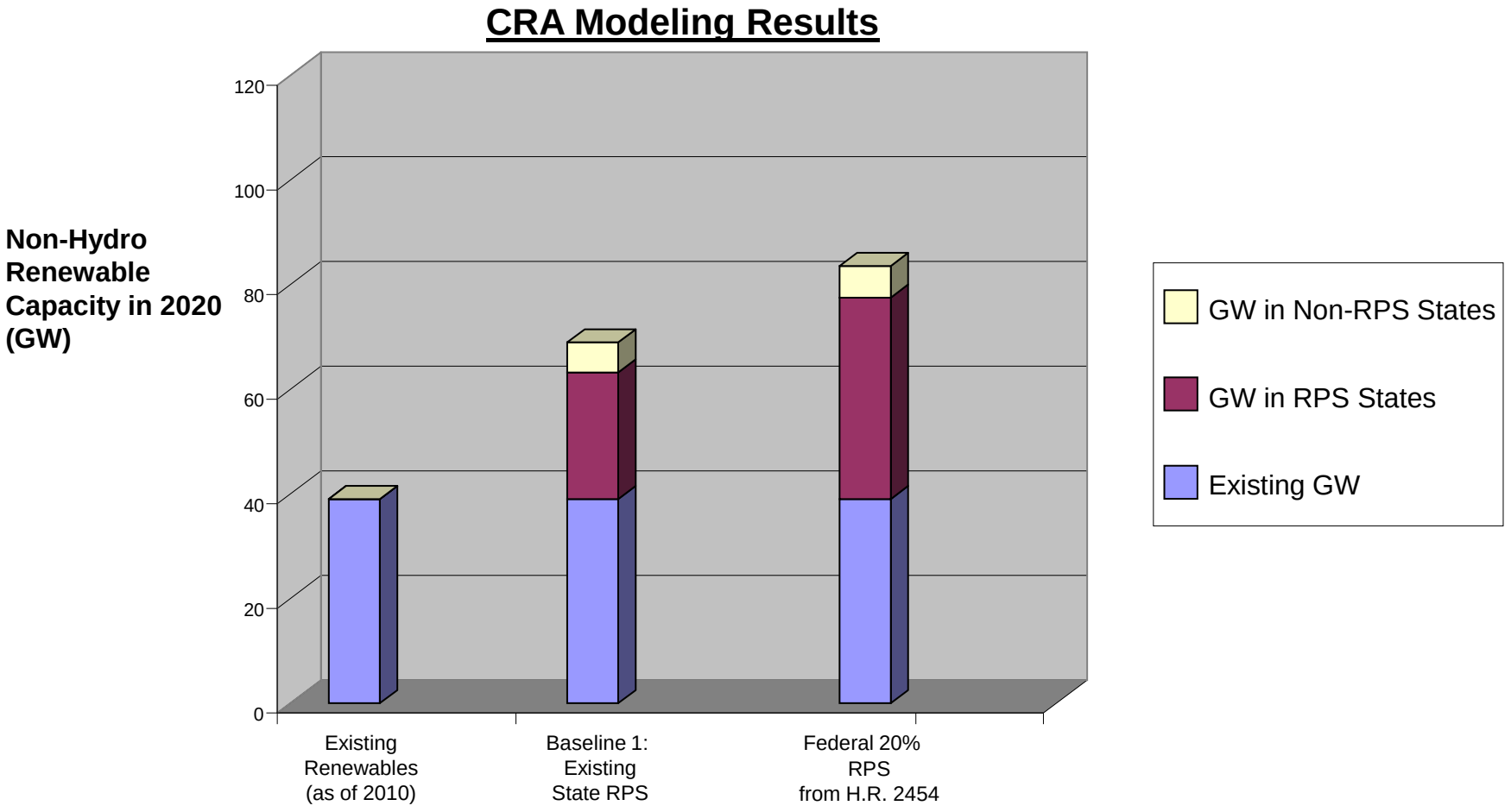
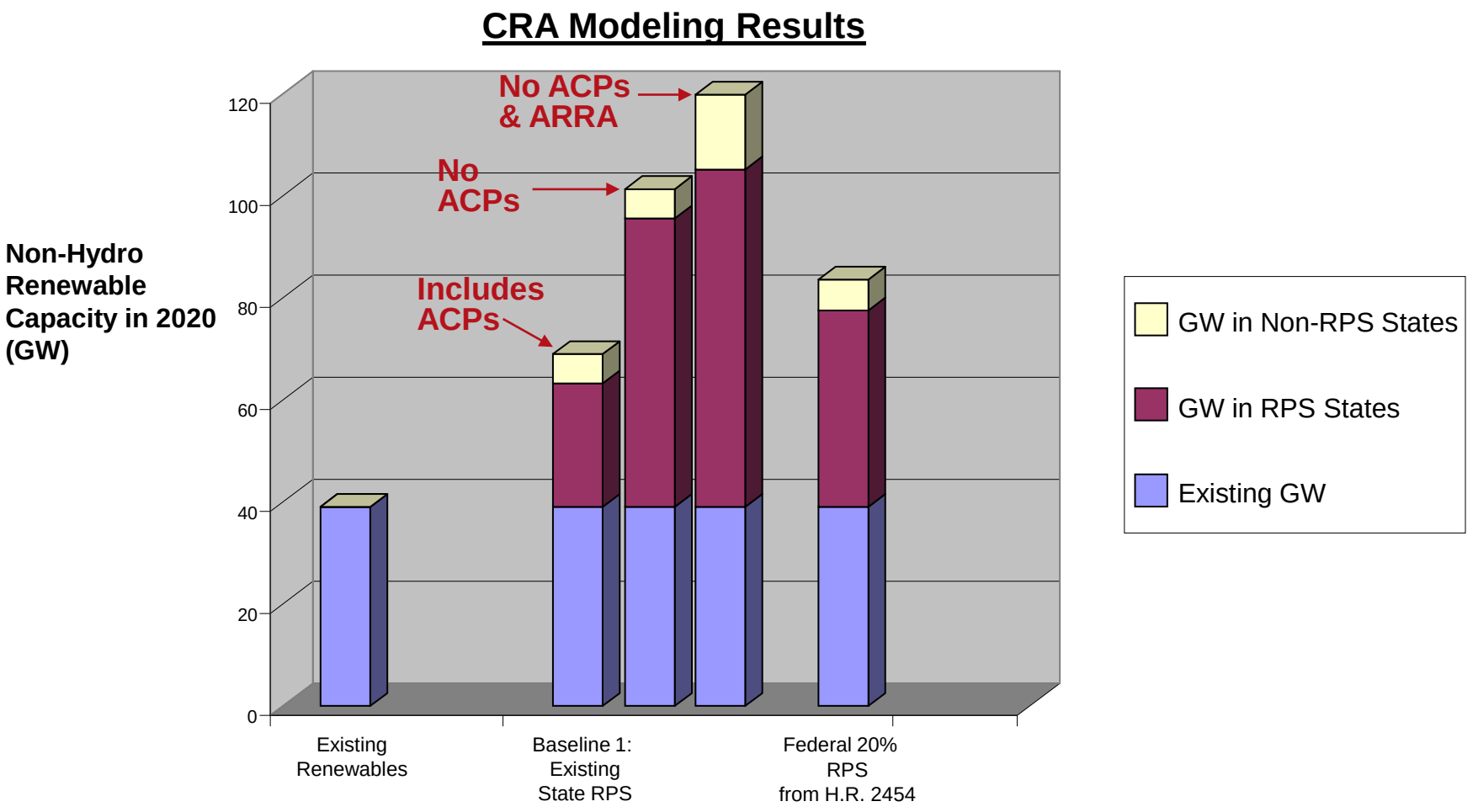
Existing state RPS programs may produce a majority of the renewables needed to meet a Federal 20%-by-2020 RPS



-- Federal 20% case is modeled after RPS in HR 2454 (see appendix)

-- Both model runs were performed without effects of Stimulus Bill ("ARRA") in Baseline

Other views about Baseline conditions can further reduce the apparent incremental impact of a Federal 20%-by-2020 RPS



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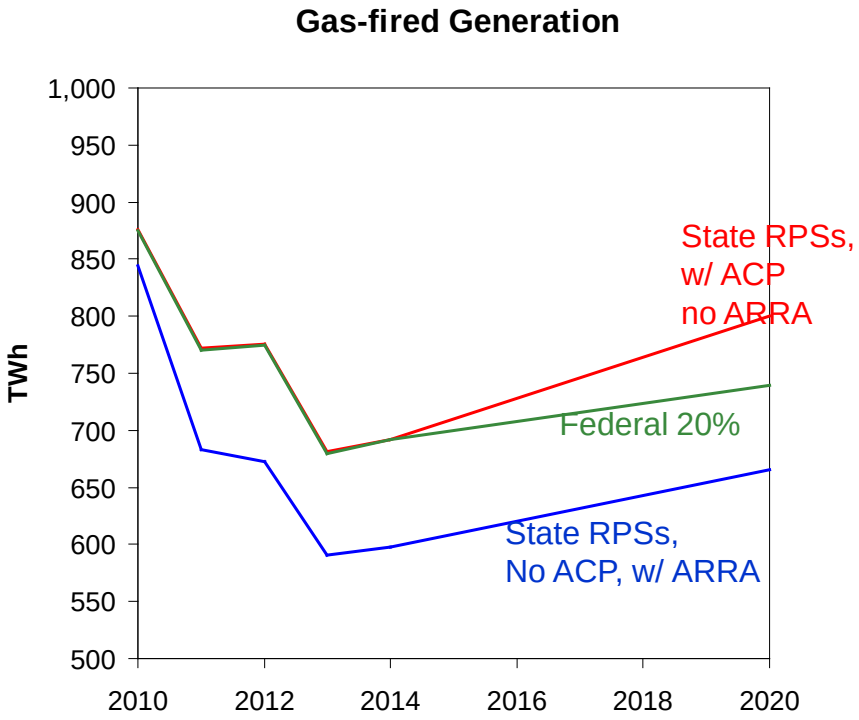
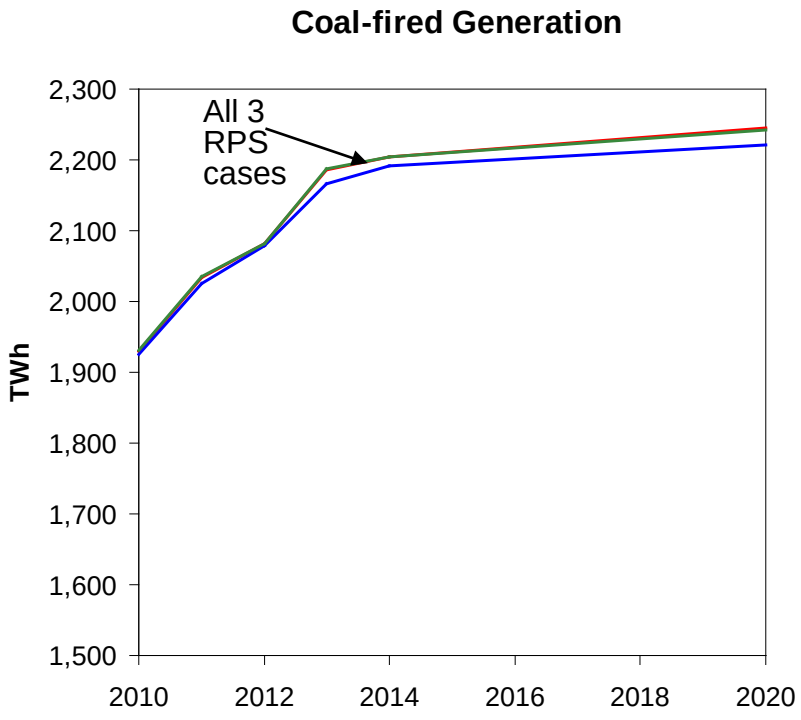
RPSs displace gas-fired generation more than coal-fired generation





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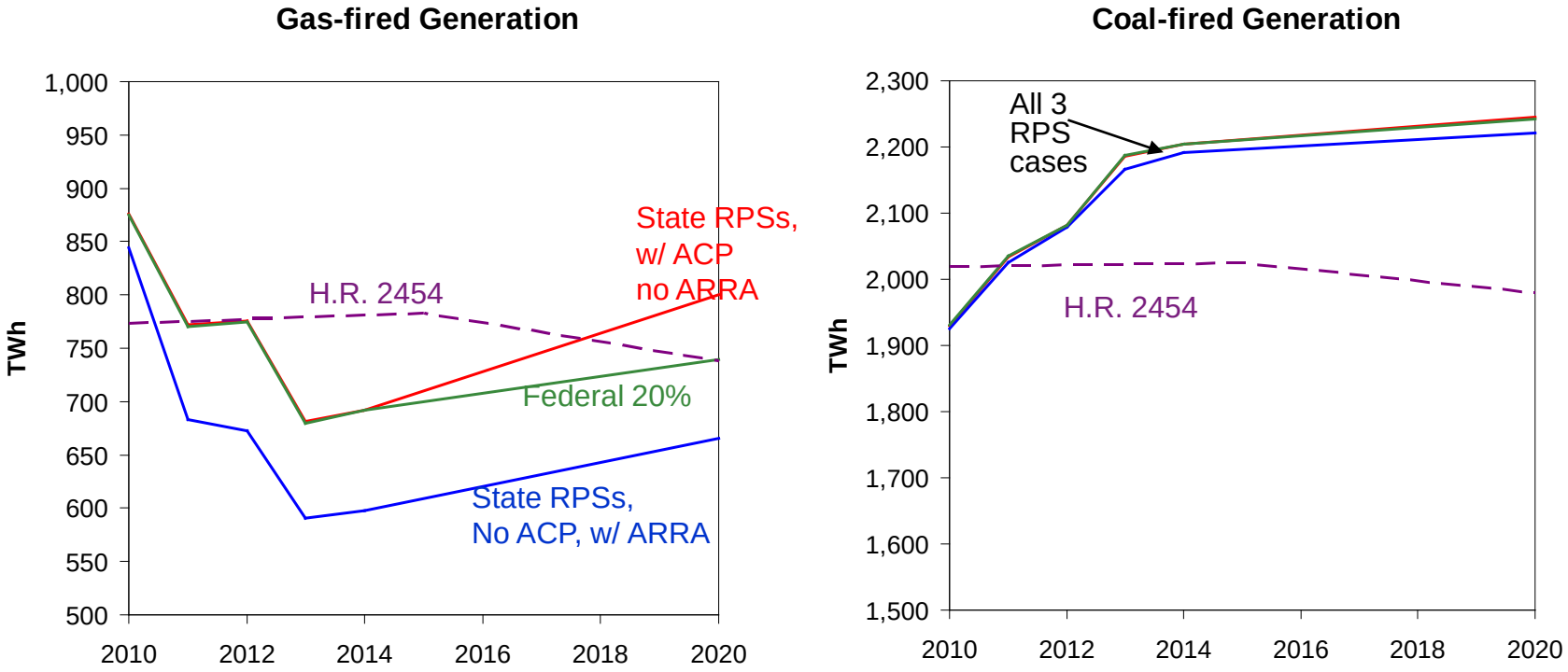
GHG caps would promote renewables too, but with the opposite impact on natural gas and coal usage expected from an RPS



- A carbon policy will have larger economic impacts than an RPS that produces the same quantity of renewables because it drives out the cheaper of the fossil fuels and it marginal electricity prices up rather than down.
- <u>But</u> it has more effect on GHG emissions for a given quantity of renewables that it promotes

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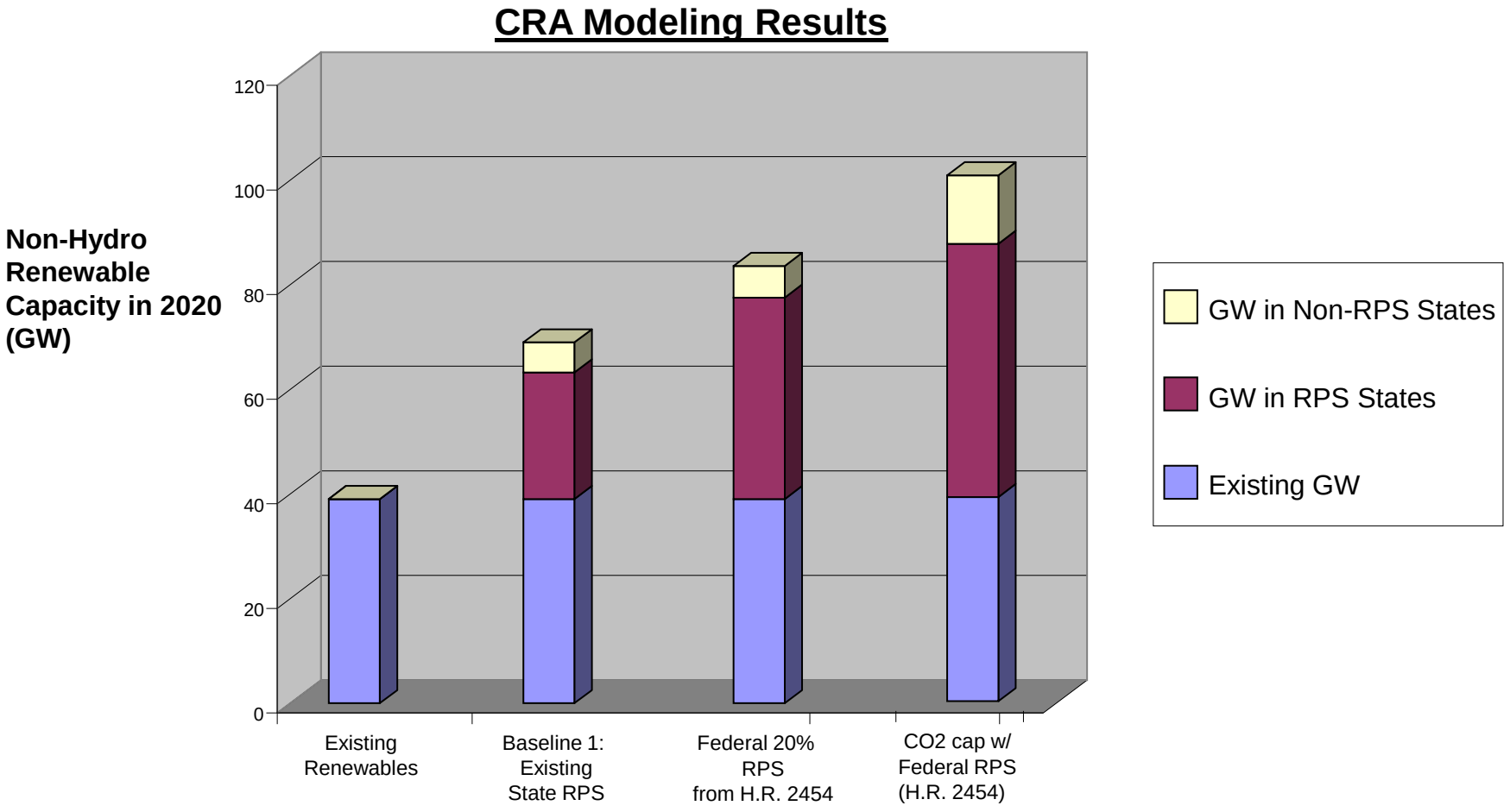
GHG caps not only have more effect on emissions, but also can promotes renewables to a greater extent than a 20% Federal RPS



Note: The 3 model runs in the chart above have same input assumptions except for their RPS and GHG cap policies. All assume state ACPs are in effect, and none include ARRA incentives.

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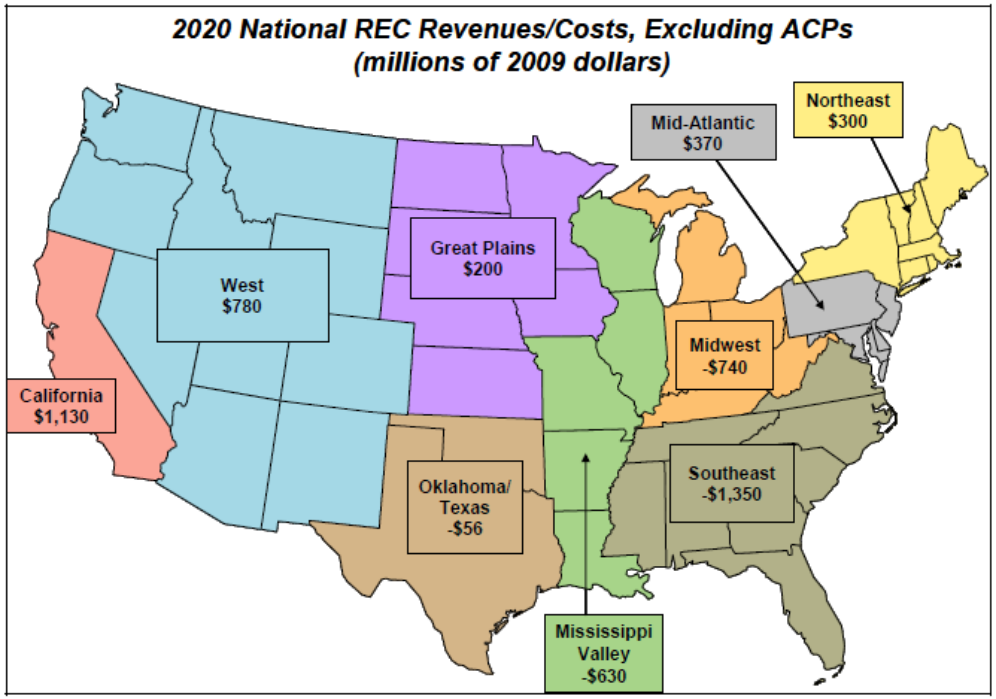
Federal RPS distributional impacts: renewables-poor regions transfer wealth to renewables-rich regions, largely to pay for renewable builds already required under existing state RPSs



- By 2020, under this Federal 20% RPS scenario, 3 regions (Southeast, Mississippi Valley, and Midwest) are estimated to spend:
  - $2.7 billion to purchase RECs from other regions (primarily from states that already have RPSs in place)
  - Plus an additional $1.5 billion of payments to Federal government for ACPs

[11] Source: Neimeyer, Bloomberg and Ditzel, *USAEE Dialogue*, 17(2) August 2009, pp. 17-20.

Acknowledgement and thanks

This presentation, and the analyses in it, reflect a compilation of work by many members of CRA's Climate & Sustainability Group:

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Appendix: The Federal RPS of 20% by 2020 in HR2454

RES Requirements under H.R. 2454

Year	% Requirement of Combined Standard	% Requirement Including Energy Efficiency Carve-Out
2012-2013	6.0%	4.5%
2014-2015	9.5%	7.1%
2016-2017	13.0%	9.8%
2018-2019	16.5%	12.4%
2020-2039	20.0%	15.0%

- Energy efficiency allowance of 25% is assumed fully subscribed (relying on the large efficiency improvements implicit in the load growth projections)
- Alternative compliance payment = $25/MWh
- Requirement based upon total sales *minus* sales from qualified hydro and municipal solid waste (MSW)
- New nuclear and CCS capacity subtracted from basis