

Impacts of a 15 Percent RPS: Regional Assessment

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EESI Briefing

Background

- EIA is an independent statistical and analysis agency within the U.S. Department of Energy
- EIA analyzes policy proposals for policy makers
 - EIA does not develop, design, or advocate policy
 - This presentation should not be construed as an endorsement for or against any policy

The Proposal

- 15 Percent Renewable Generation by 2020
 - Utilities with fewer than 4,000,000 MWh of sales are exempt
 - Existing hydro and MSW generation is excluded from sales base
- Triple credits for customer-sited renewables
- Requirement expires in 2030
- Compliance with renewable energy credits
 - Utilities may purchase credits from other generators in lieu of generating with renewable resources
 - Utilities may purchase credits from the government at 1.9 cents per kilowatthour, adjusted for inflation

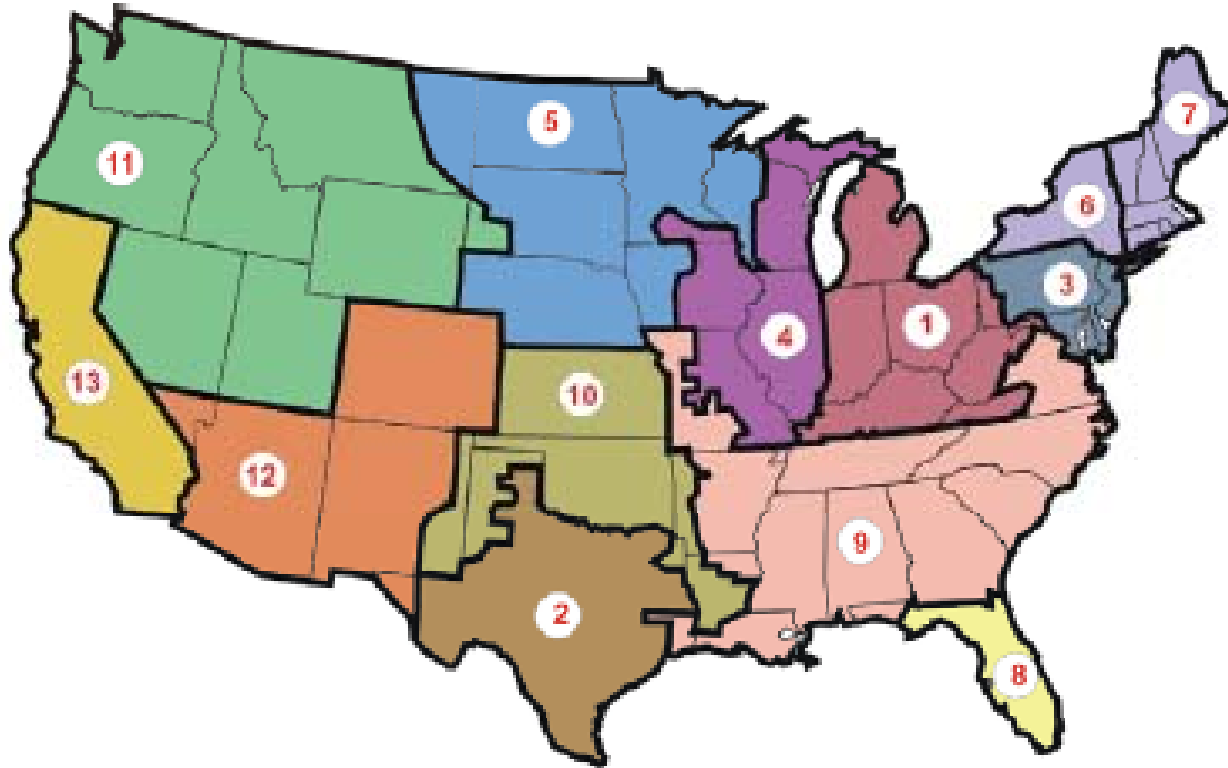
EIA's Analysis

- NEMS - National Energy Modeling System
- A comprehensive model of the U.S. energy economy through 2030
- Represents supply, demand, and conversion sectors
 - Energy price feedback to macroeconomic parameters
 - Endogenously determined energy prices and quantities
 - World oil price is exogenous
- Models most energy policies, including RPS programs
- Not able to model double credits for Indian Lands
- State RPS programs not included in reference case

Renewable Resource Overview

- Renewable resource quality, quantity, and price varies by resource type and by region
 - Low-cost geothermal is available on the West Coast
 - Exploitable wind resources are more widespread, but distribution is still uneven
 - Biomass and solar are available in all regions, but the best resources are concentrated in a few regions

Electricity Regions in NEMS



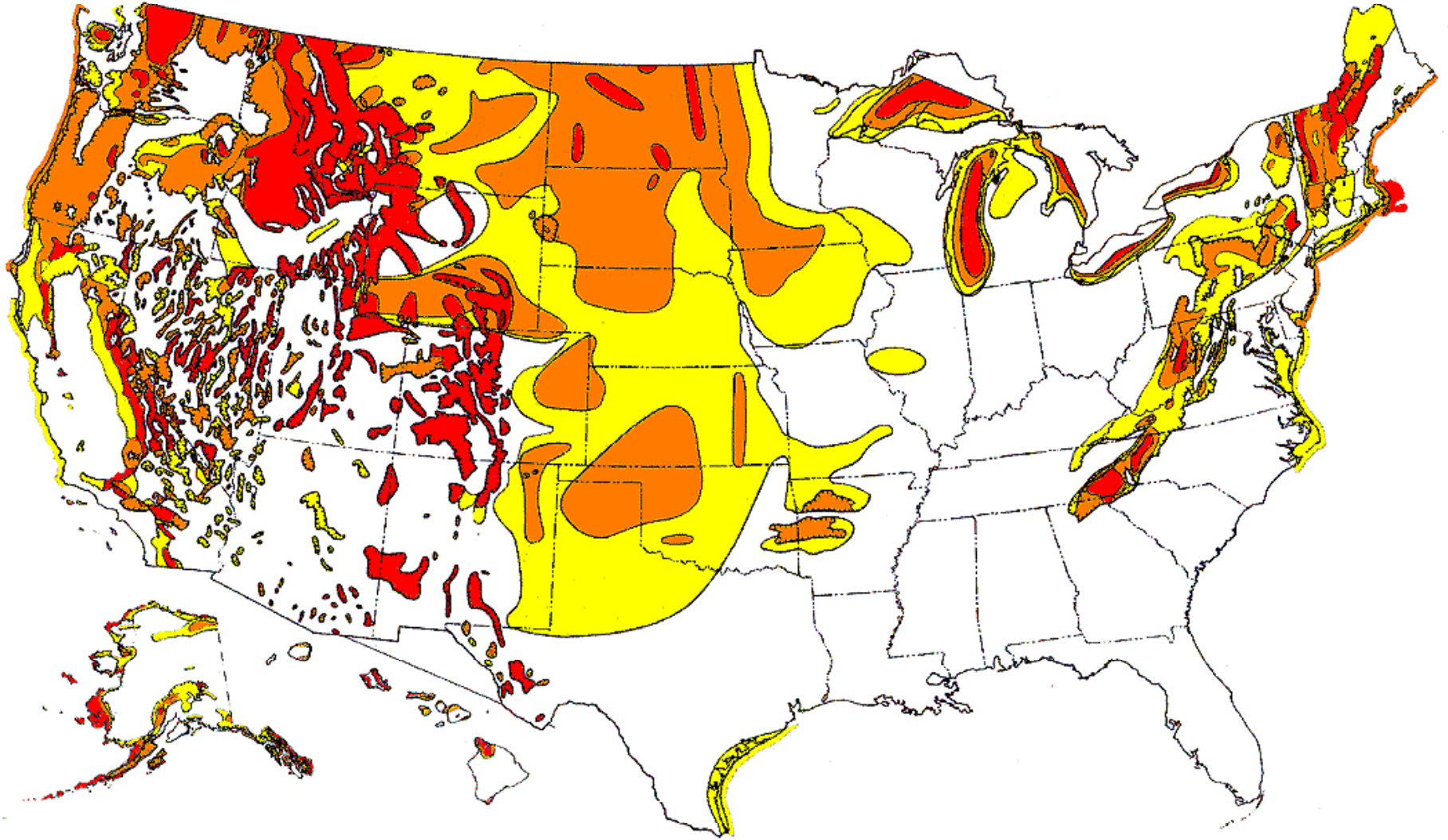
1. East Central Area Reliability Coordination Agreement (ECAR)
2. Electric Reliability Council of Texas (ERCOT)
3. Mid-Atlantic Area Council (MAAC)
4. Mid-America Interconnected Network (MAIN)
5. Mid-Continent Area Power Pool (MAPP)
6. New York (NY)
7. New England (NE)

8. Florida Reliability Coordination Council (FL)
9. Southeastern Electric Reliability Council (SERC)
10. Southwest Power Pool (NWP)
11. Northwest Power Pool (NWP)
12. Rocky Mountain Power Area, AZ, NM, and Southern NV (RA)
13. California (CA)

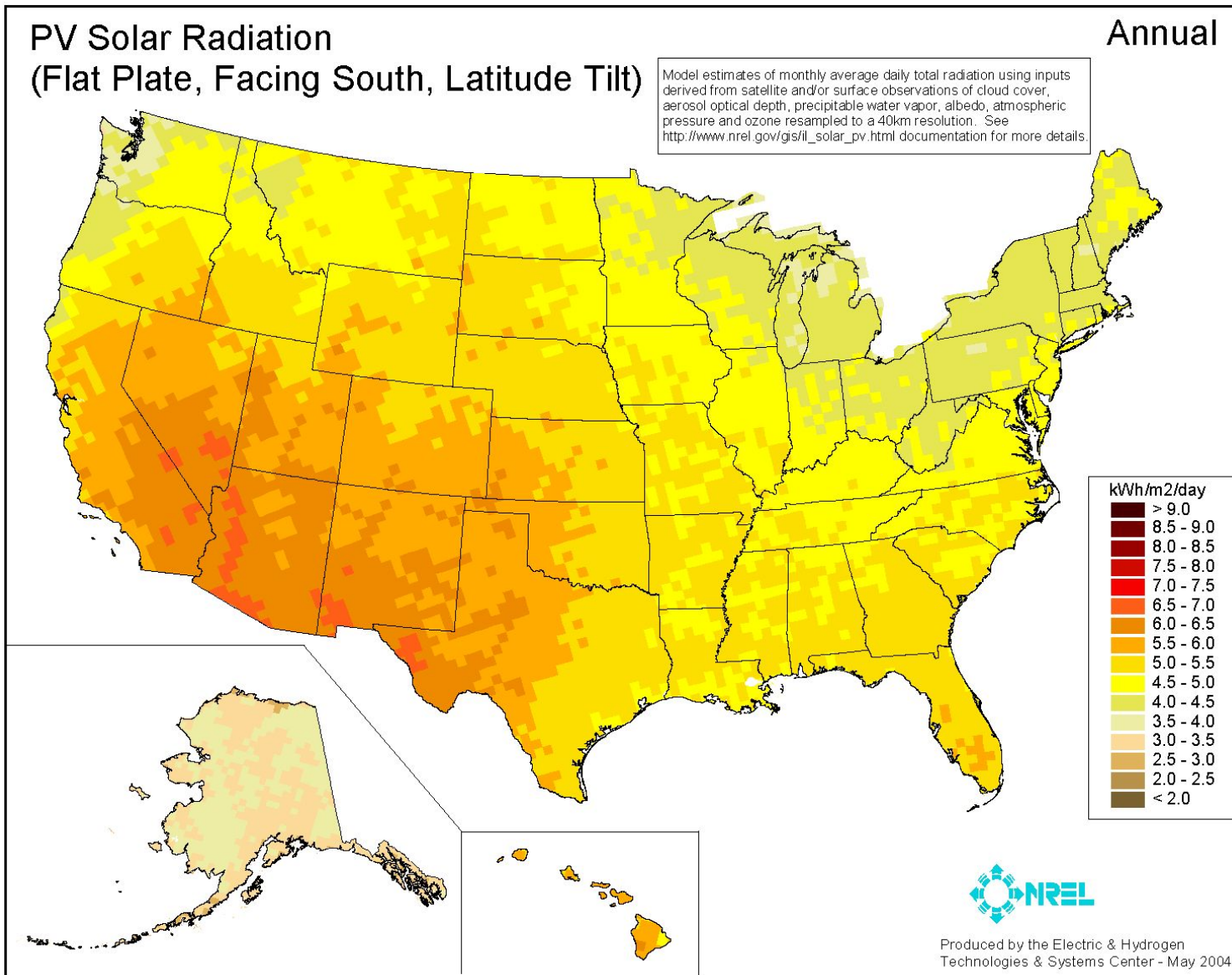
Geothermal Resources

- 88 Specific, assessed hydrothermal sites
 - About 10 GW of capacity with confirmed resource cost
- All in Western U.S.
- Other hydrothermal sites may be available, but costs not currently known
 - Still likely to be found out West
- Non-hydrothermal technologies (“enhanced geothermal systems”) could enable much broader coverage, but the technology is not expected to achieve widespread commercial applicability over our forecast horizon.
 - Uncertain costs
 - Co-production of geothermal heat with oil and gas extraction is not currently modeled

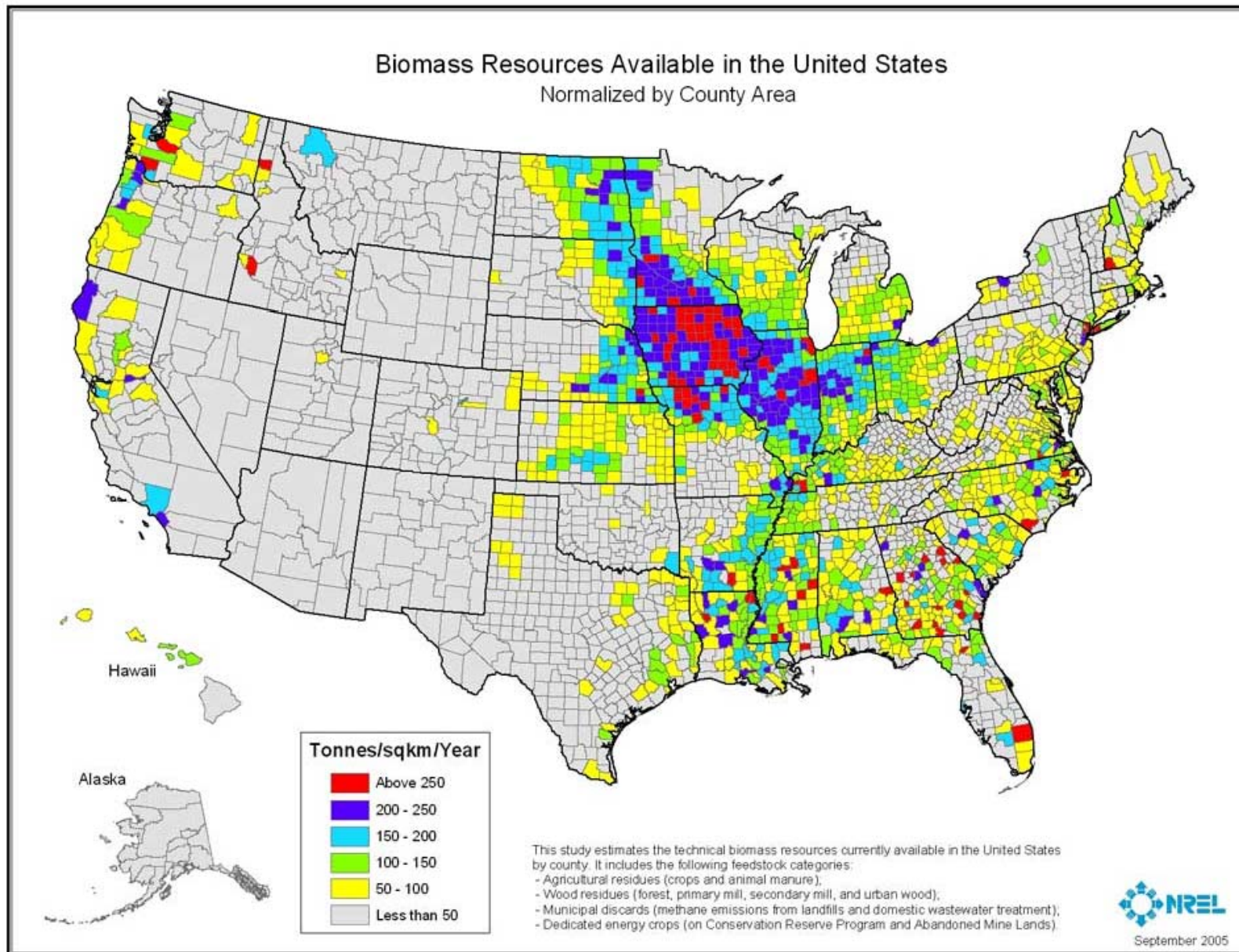
U.S. Wind Resources



Total resource is well in excess of projected U.S. demand
However, much of the resource is in remote and generally inaccessible areas



At 5 kWh/sq.m/day, a 1 kW solar panel would produce 1,825 kWh/yr, about 20 percent of average household consumption for the U.S.



100 metric tons/sq.km/yr could support 25 kW of generation/sq.km or a 500 MW plant on a single 50 mile radius collection zone

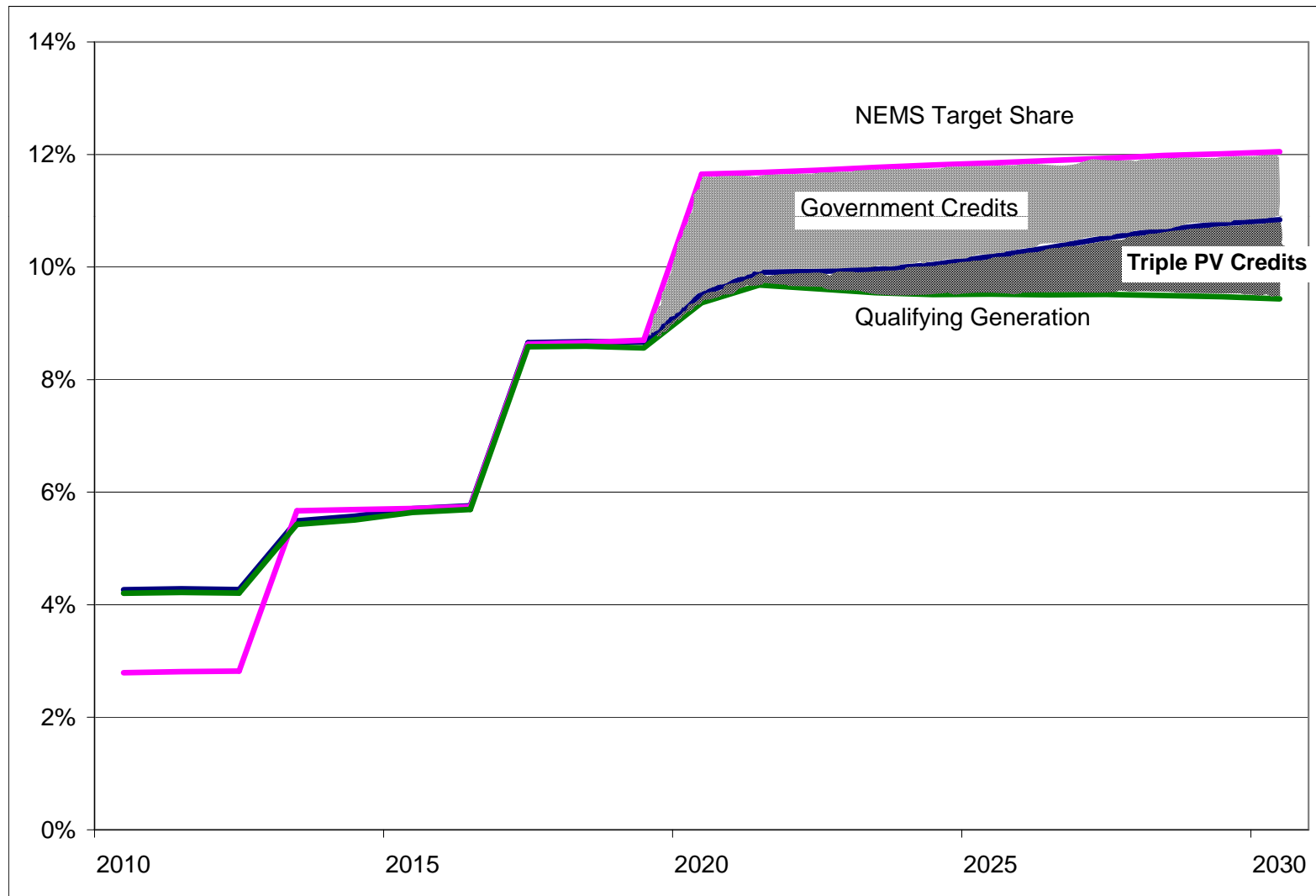
Biomass Cost and Availability

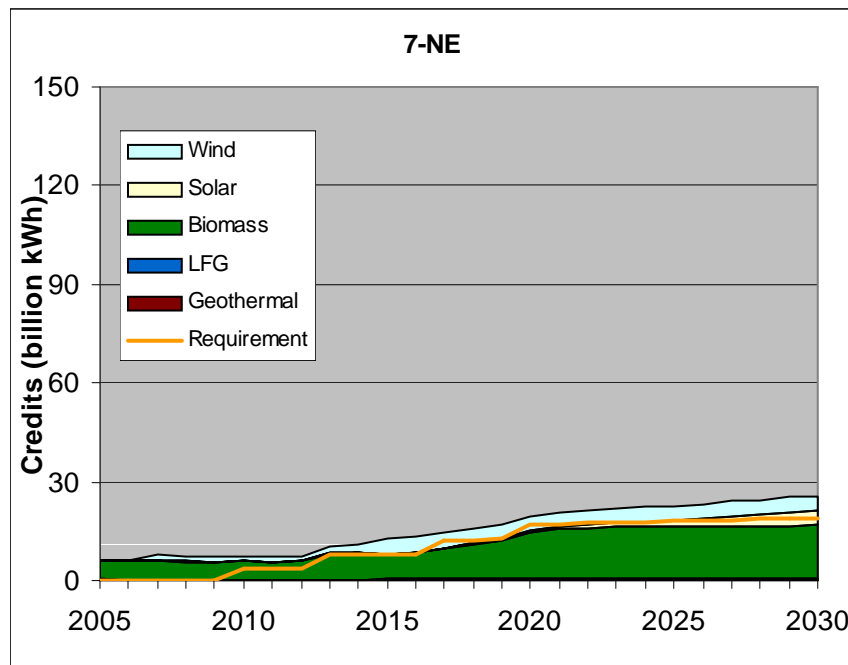
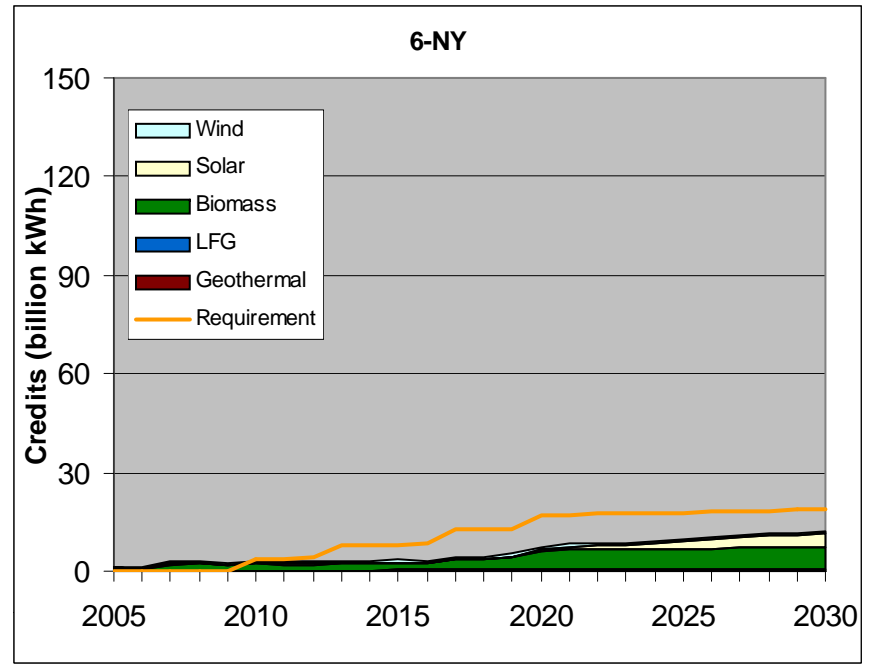
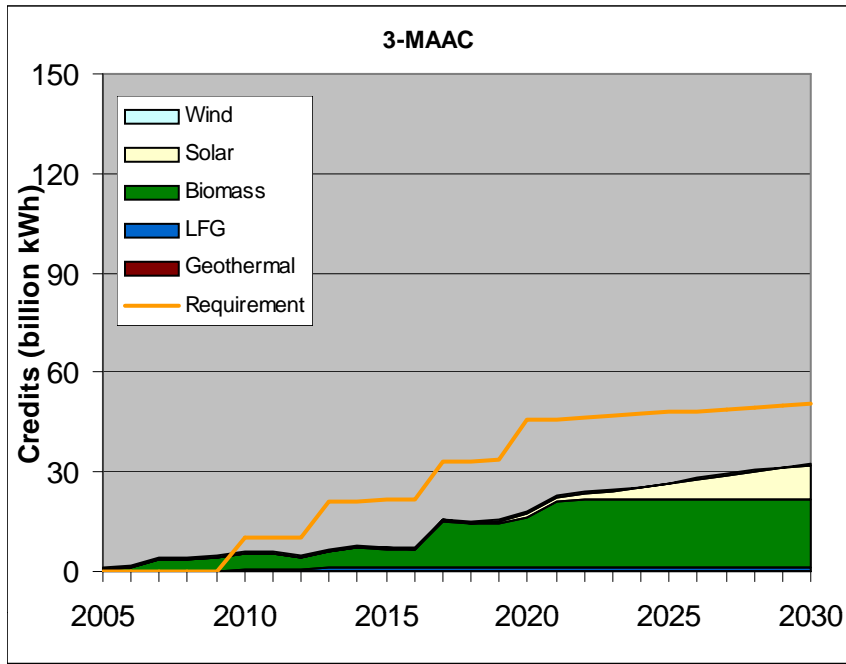
- Electricity region 5 (Upper Great Plains) and 9 (Southeast) have the largest biomass resource concentration
- The Southeast currently has an untapped resource potential of approximately 80 bkWh at or below the 2 cent/kWh credit price cap
 - Paper and forestry industries in the Southeast already generate over 15 bkWh, for a total resource of 95 bkWh, or 11 percent of current electricity sales
- The Upper Great Plains has about 17 bkWh at or below 2 cents/kWh, also about 11 percent of current sales
- While ultimate resource levels in the two regions are comparable, the Southeast has more forestry and urban wood wastes, which are less costly than the agricultural wastes that dominate the Great Plains

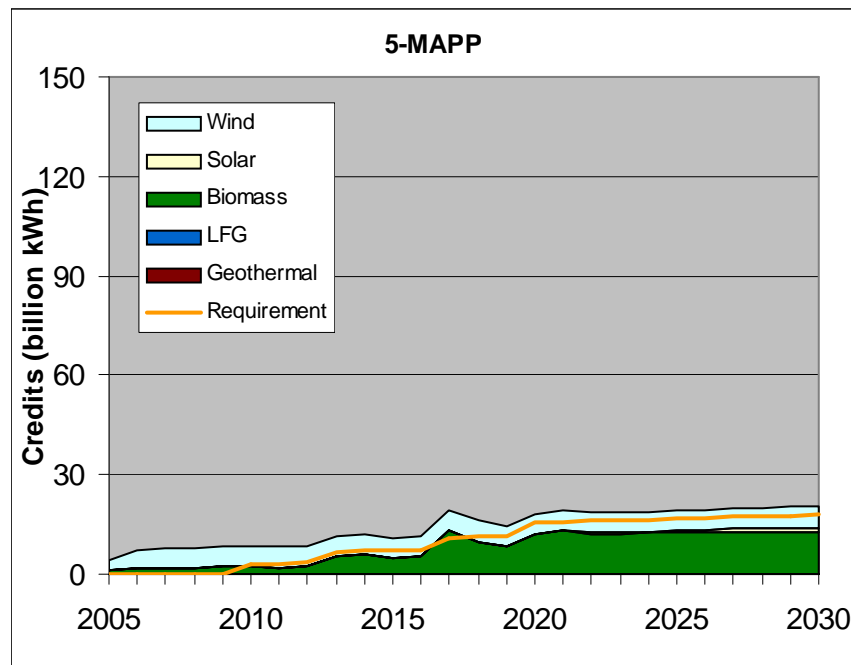
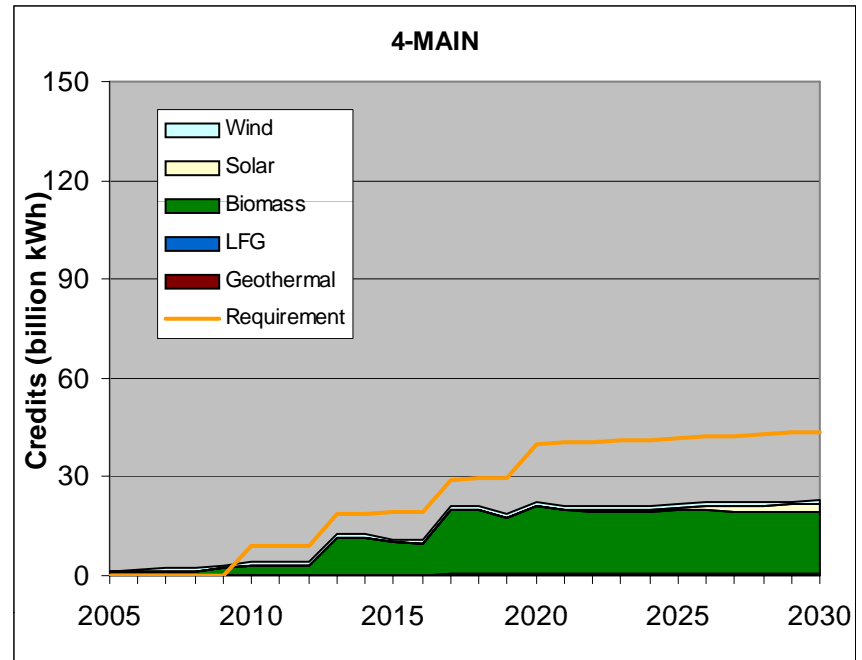
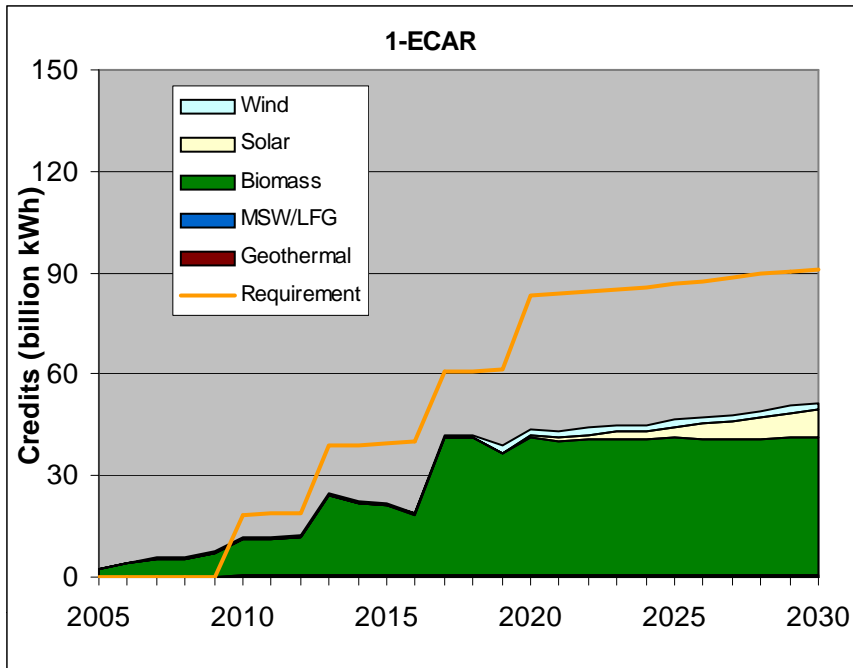
Biomass (continued)

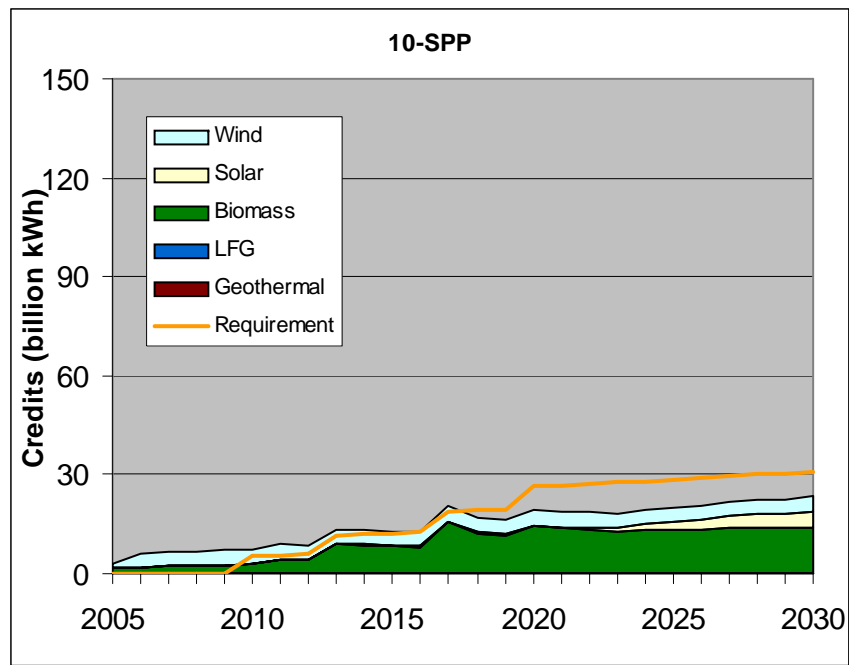
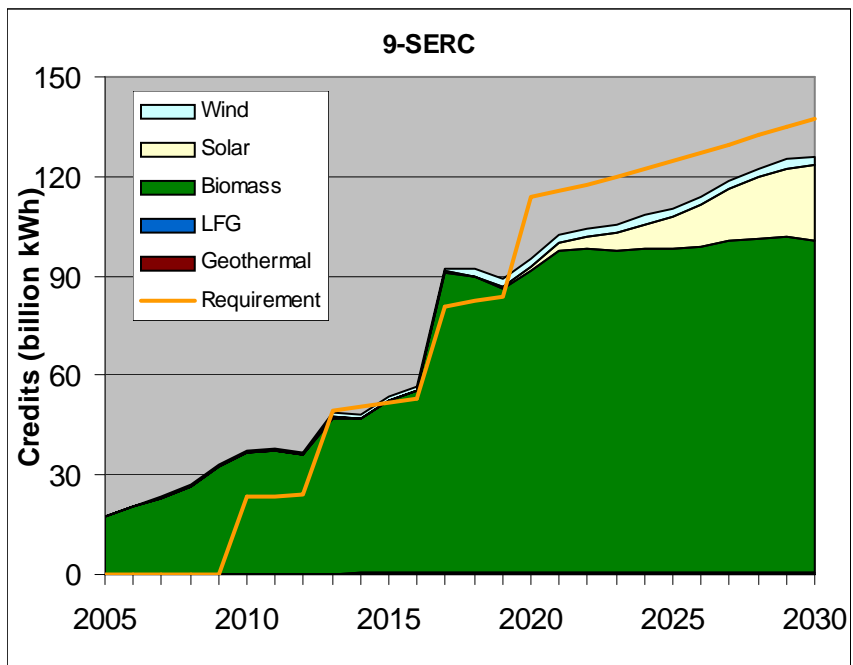
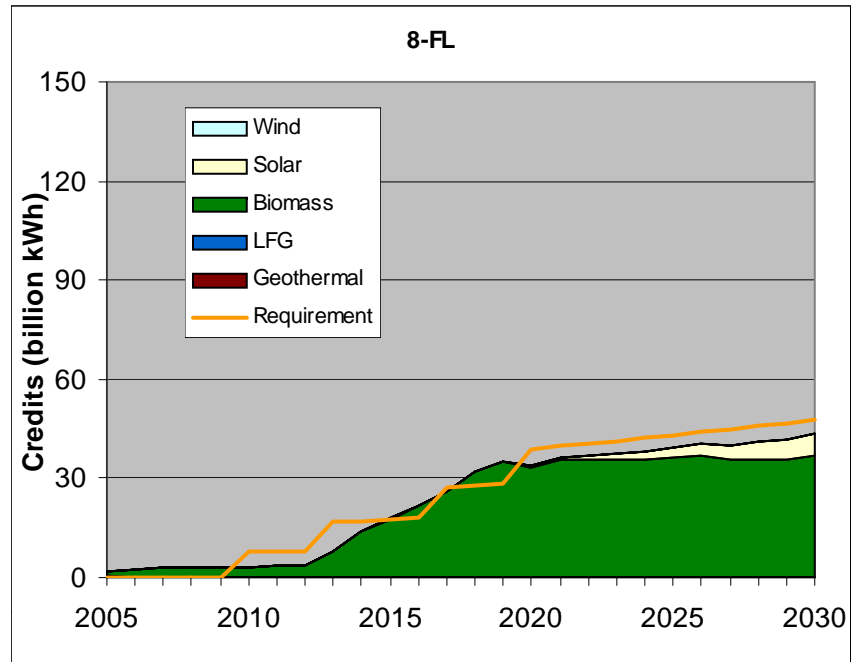
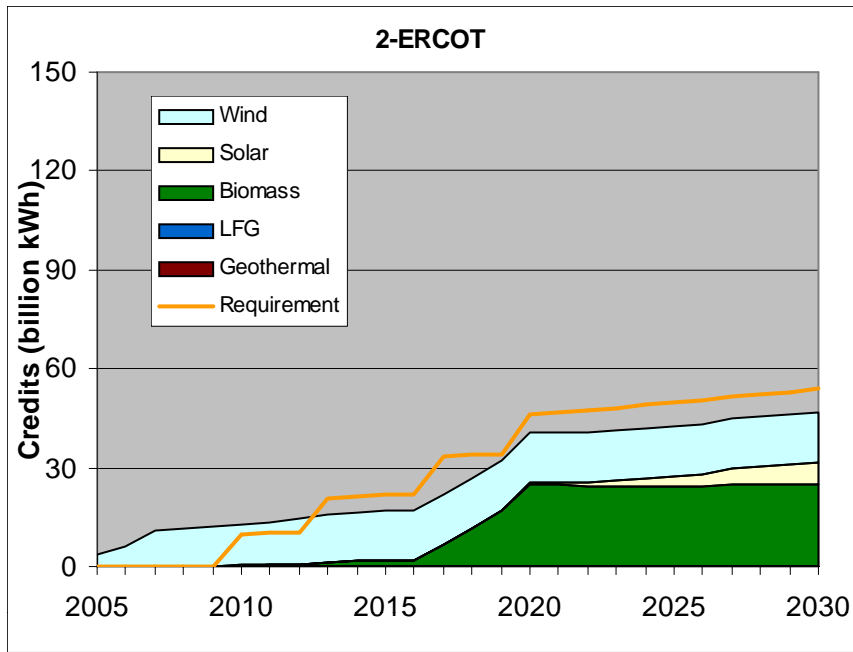
- Biomass can have several uses
 - Co-firing in existing coal plants has low capital costs and is a very flexible short-term compliance option
 - Dedicated, high efficiency biomass facilities meet longer-term needs
 - Ethanol production from cellulosic feedstocks is not assumed to have significant markets
 - Proposed revisions to ethanol production mandates were not part of the requested analysis

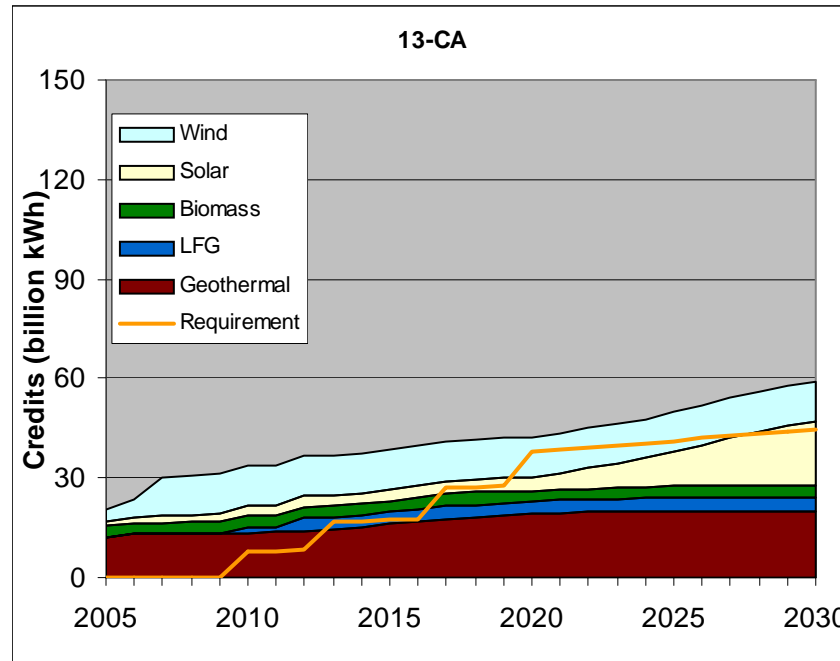
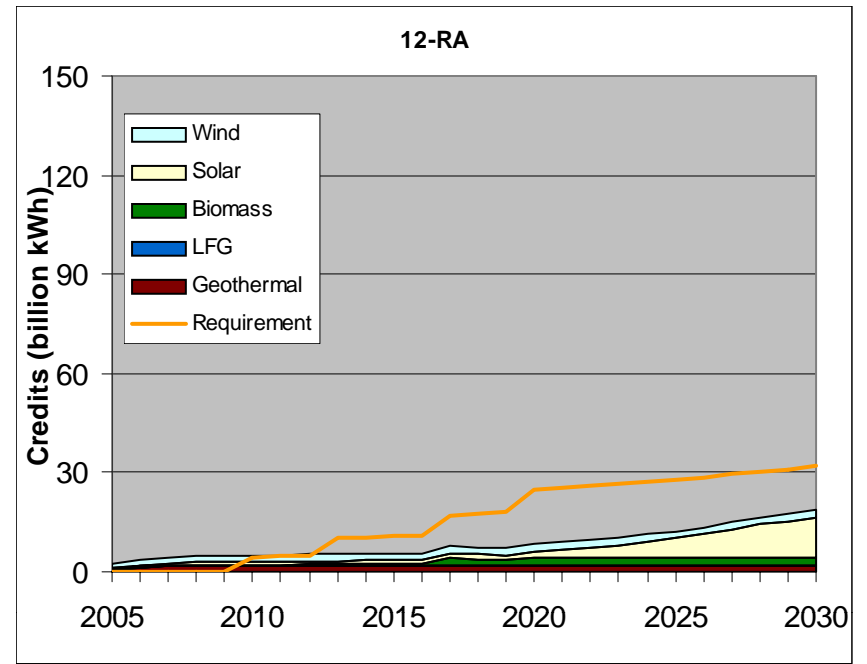
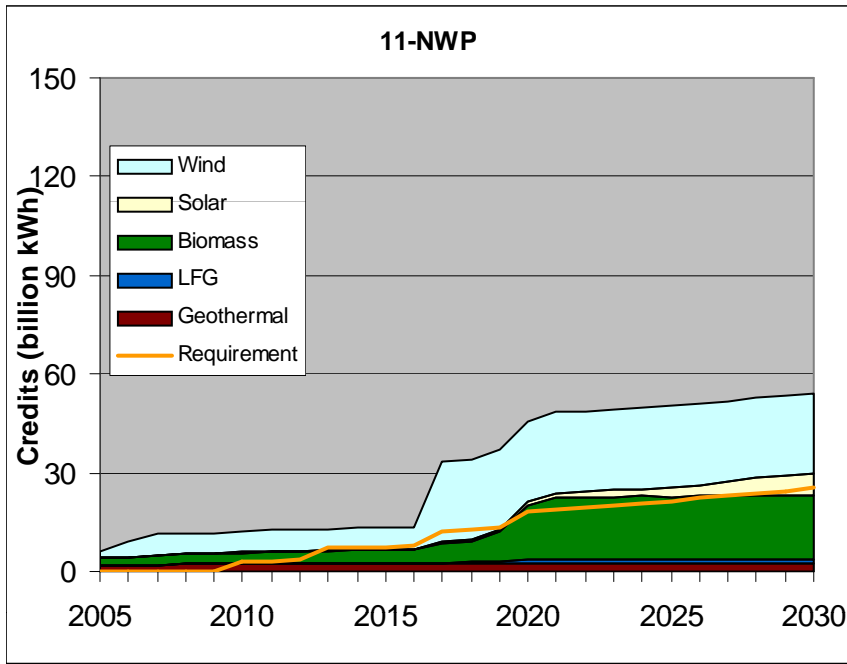
The target is achieved through a combination of renewable generation, bonus credits, and government issued credits



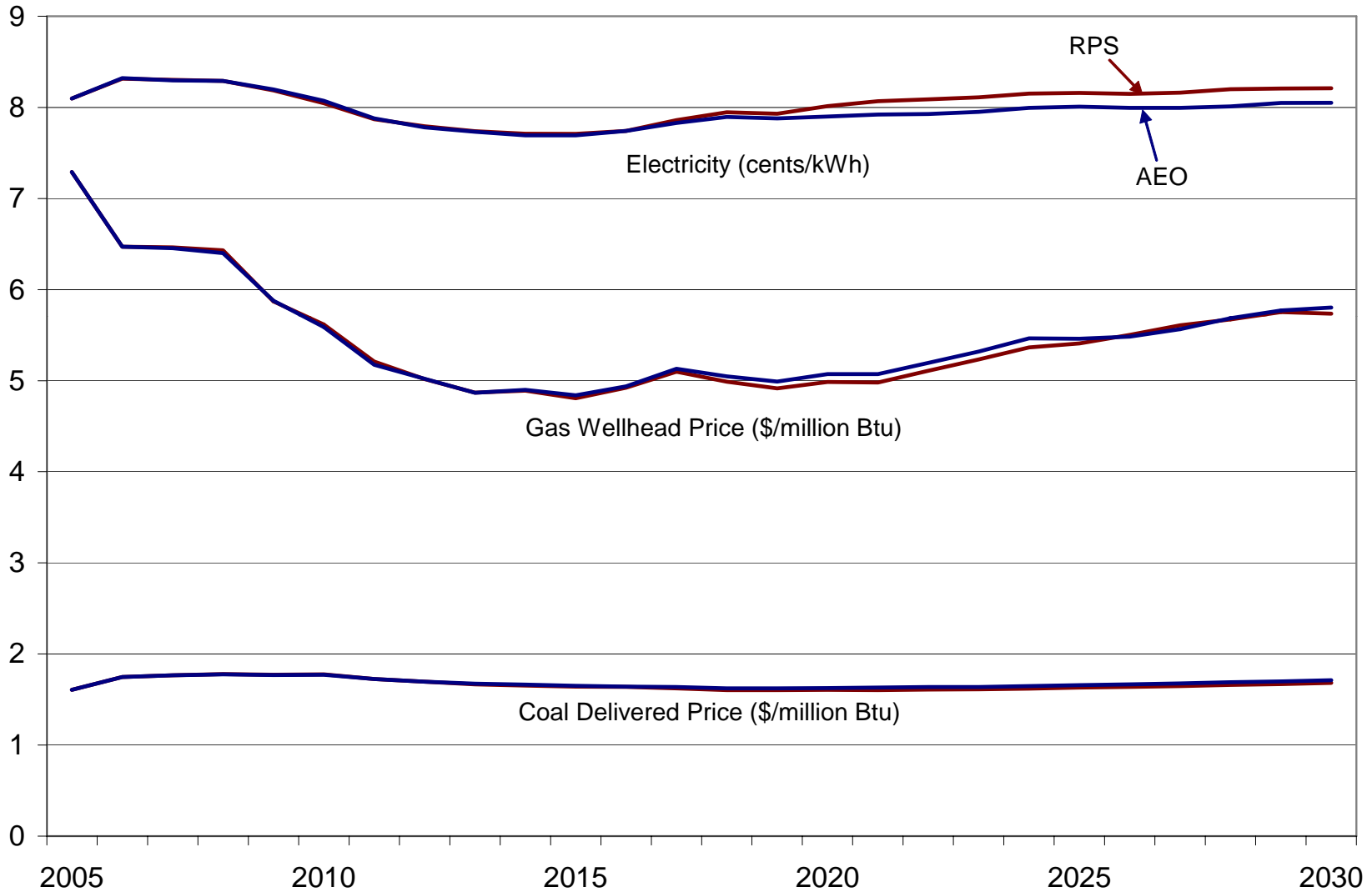






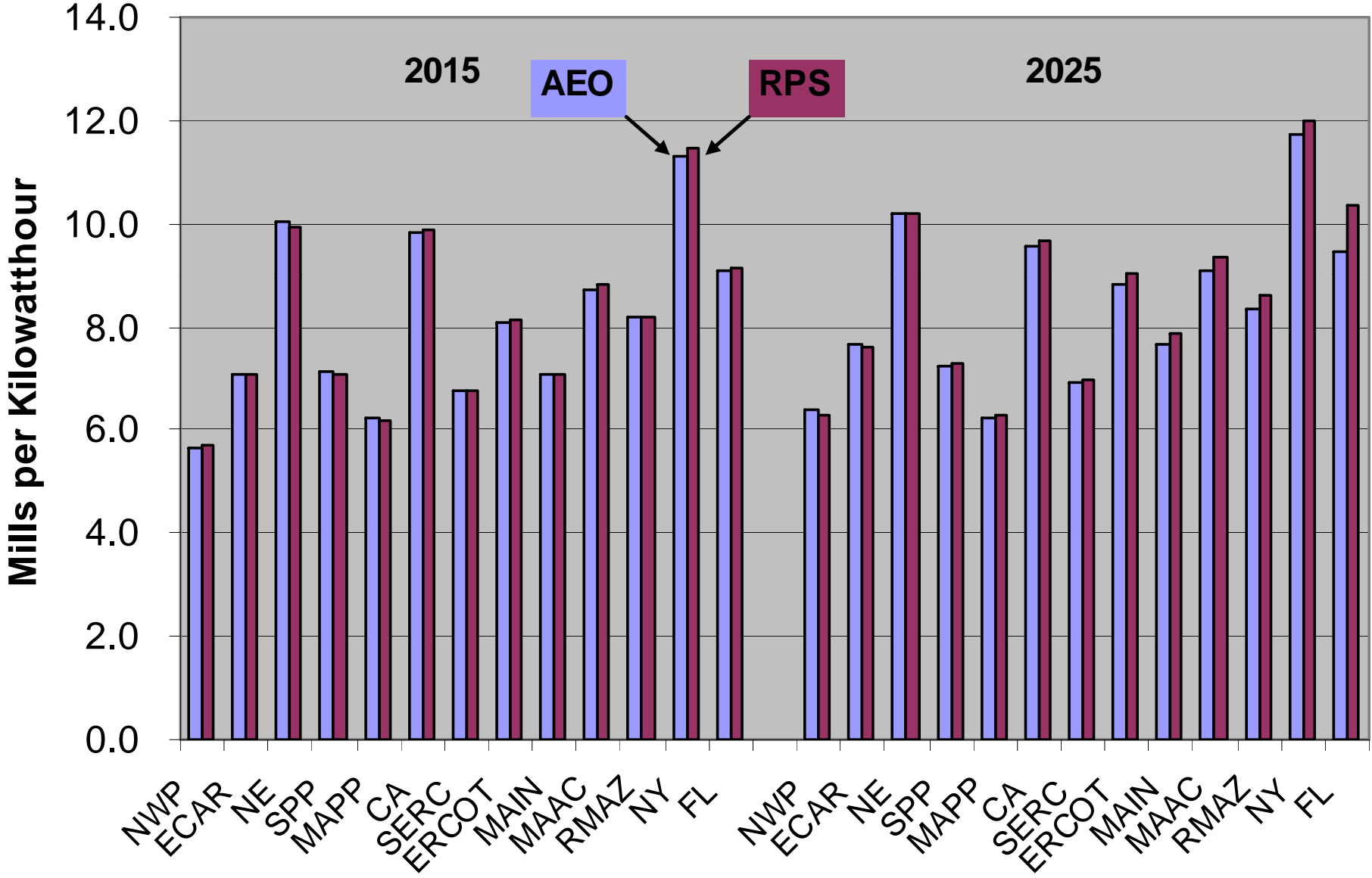


Minor impact on electricity and natural gas prices



Cumulative electricity and natural gas expenditures increase by 0.3% (\$18 billion)

Retail Electricity Price Impacts



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