

La Capra Associates

Renewable Portfolio Standard

Analysis for the State of North Carolina

Presented by: Jonathan Winer
Mon-Fen Hong
Dick Spellman

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Outline of Discussion

- **Our Goal**
- **Key Findings**
- **Renewable and Energy Efficiency Potential**
- **Electric Rate Impact**
- **Other Potential Costs and Benefits**

Our Goal

Provide an objective view of the issues related to a possible Renewable Portfolio Standard for North Carolina.

Three Key Findings

North Carolina has sufficient renewable resources to meet a 5% RPS requirement for new renewable generation

- Less than 1% increase in retail electricity rates
- Doubles current level of renewables
- Potential job creation and property tax benefits

Three Key Findings

It would be difficult to meet a 10% RPS with only new North Carolina renewable supply resources

- Must include wind in both the west and off-shore locations and larger hydroelectric generation
- If these additional resources can be developed, a 3.6% estimated rate increase, at most, by the 10th year

Three Key Findings

Inclusion of energy efficiency would enable the State to achieve a 10% RPS and would reduce consumers' overall electricity bill

- Energy efficiency could easily meet one-quarter of RPS
- Both a 5% RPS and a 10% RPS with energy efficiency could produce net savings of about half a billion dollars over 20 years
- Less than 1% increase in rates, but average bill decreases due to less usage overall

Renewable Resource Overview

North Carolina has over 2,000 MW of renewable generation already

- Equal to 4% to 5% of the State's current energy needs

New Renewable Resource Potential in North Carolina

- **Technical potential for over 12,000 MW of new in-state renewable supply resources**
 - Strong logging and farming sectors – fuel for additional renewable generation
 - Good wind resources, but development may be more challenging

- **Practical potential is as much as **3,400 MW****
 - Maximum amount that could reasonably be expected to be implemented

New Renewable Resource Potential in North Carolina

Resources	Technical Potential (MW)	Practical Potential (MW)	Practical Energy Potential (GWh) *
Landfill Gas	240	150	1,000
Biomass (Wood and Ag. Crops Waste)	2,270	1,100	8,700
<i>Co-Firing**</i>	1,875	384	2,500
Poultry Litter	175	105	800
Hog Waste	116	93	600
Wind (on-shore)***	9,600	1,500	3,900
Wind (off-shore)	N/A	N/A	N/A
Hydro****	508	425	1,700
Solar PV	N/A	N/A	N/A
Total In-State Potential	12,909	3,373	16,700

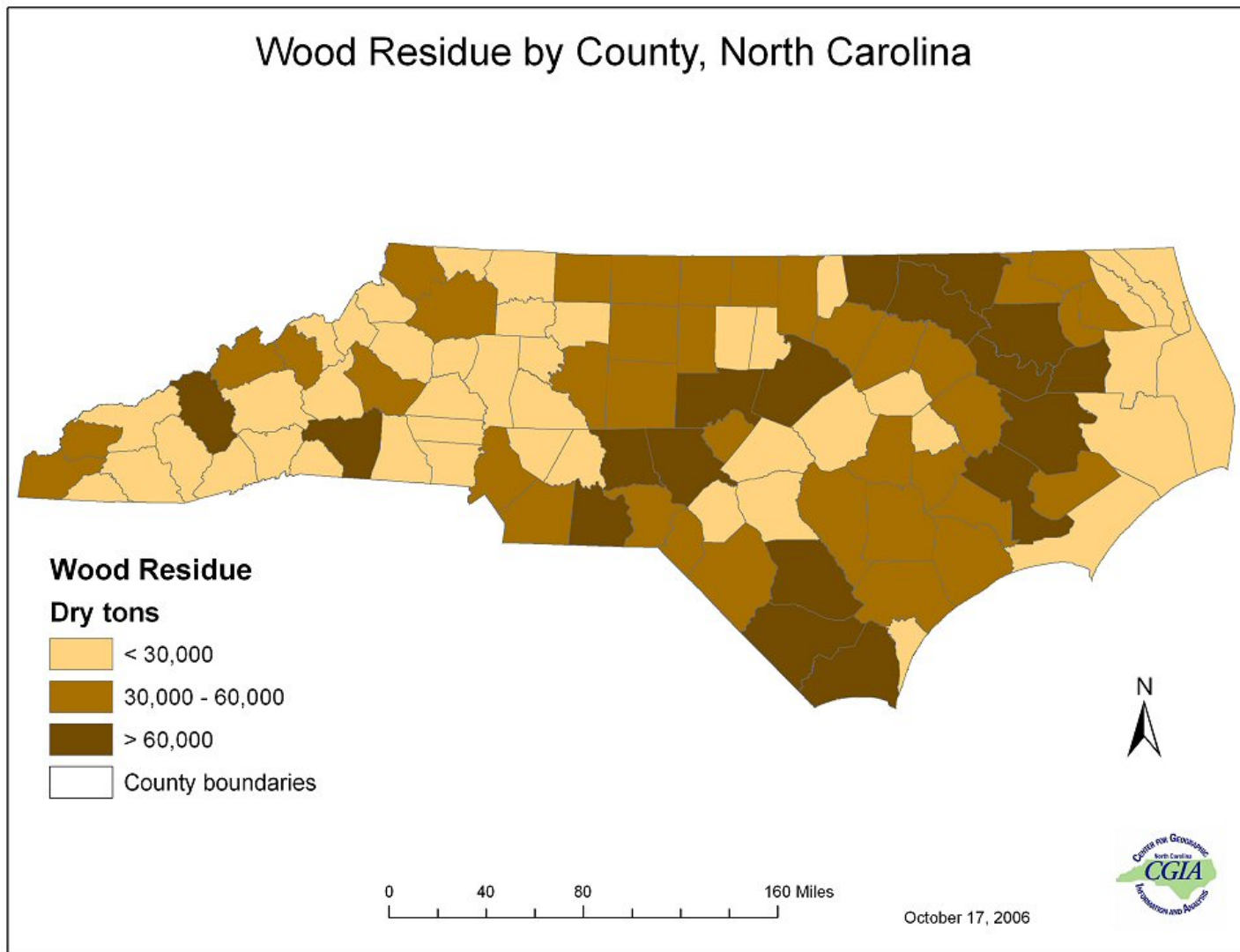
*Energy estimate rounded to nearest hundred GWh.

***Includes wind development in the western mountains.

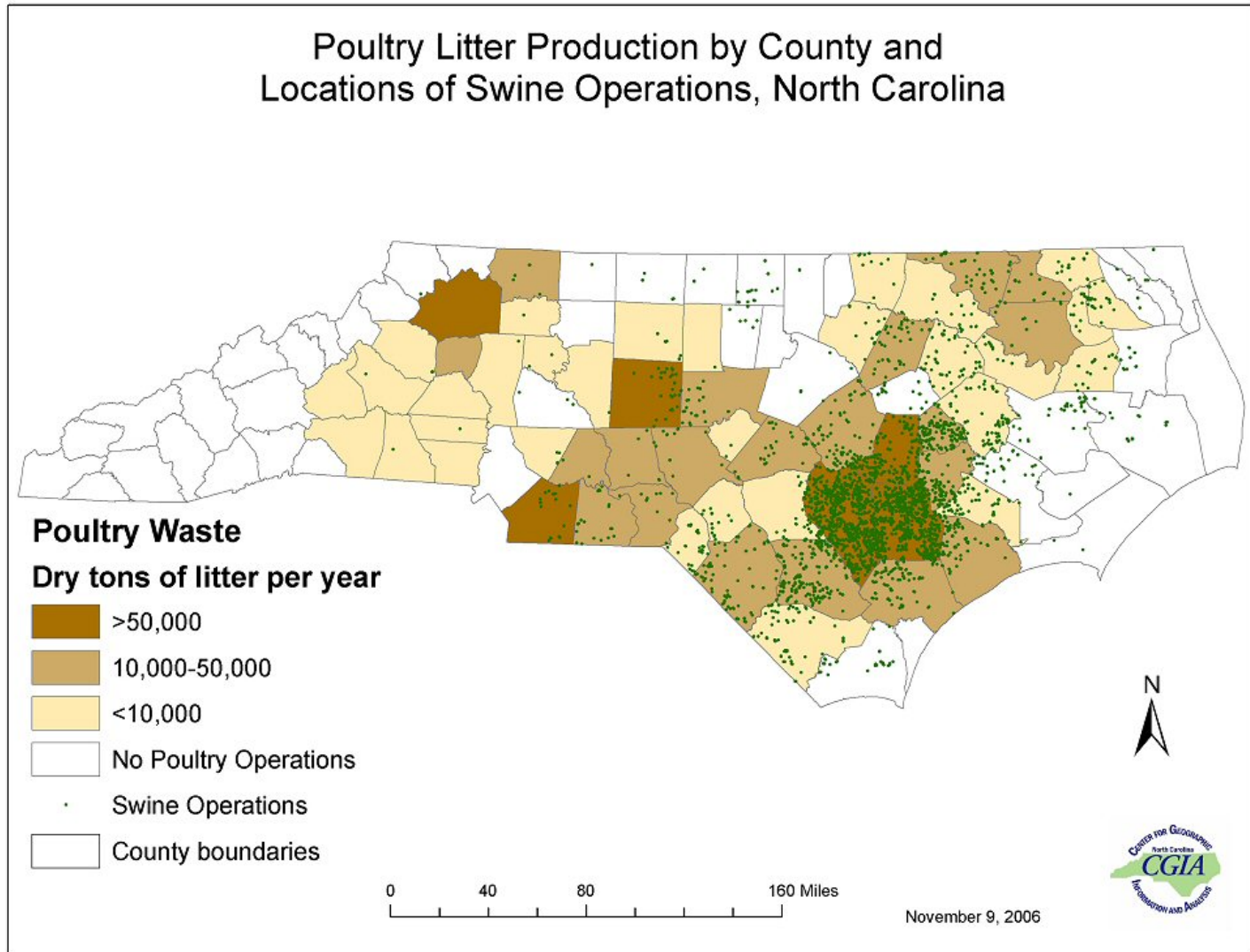
**Co-firing is a subset of the Biomass assessment.

**** Includes hydroelectric generation larger than 10 MW.

Biomass (Wood) Across the State

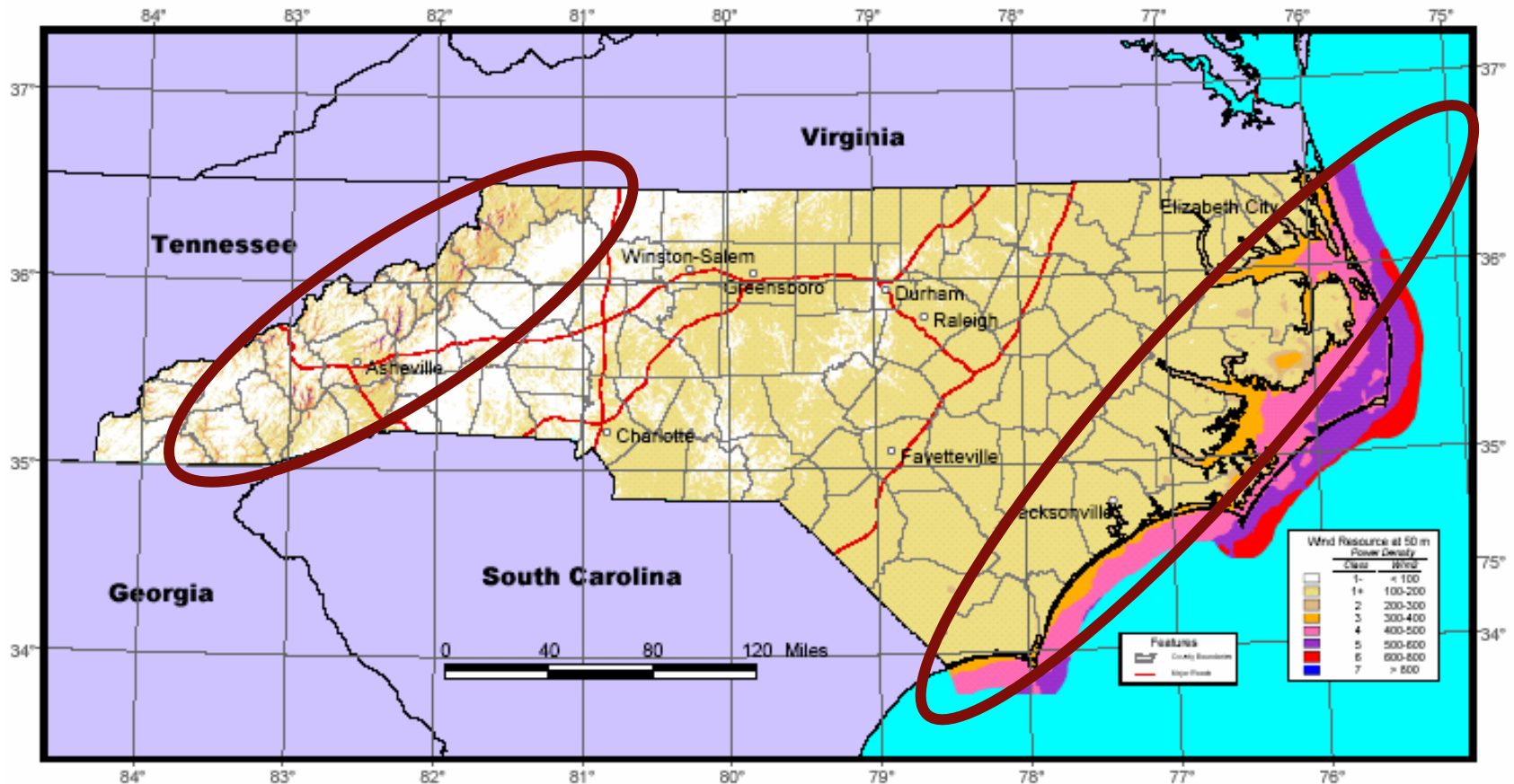


Poultry Litter and Hog Waste More Concentrated

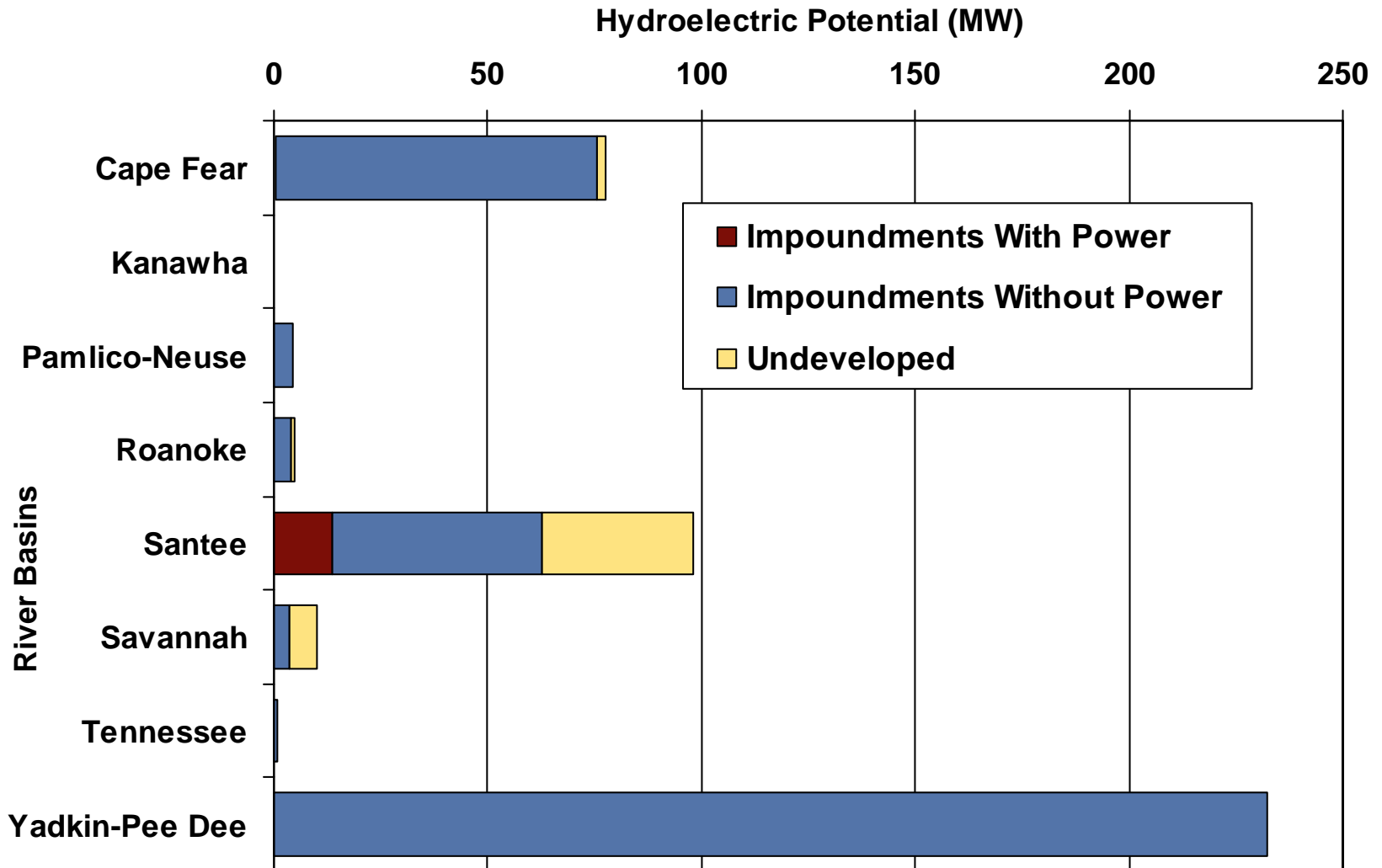


Wind in the West and Eastern Coastline

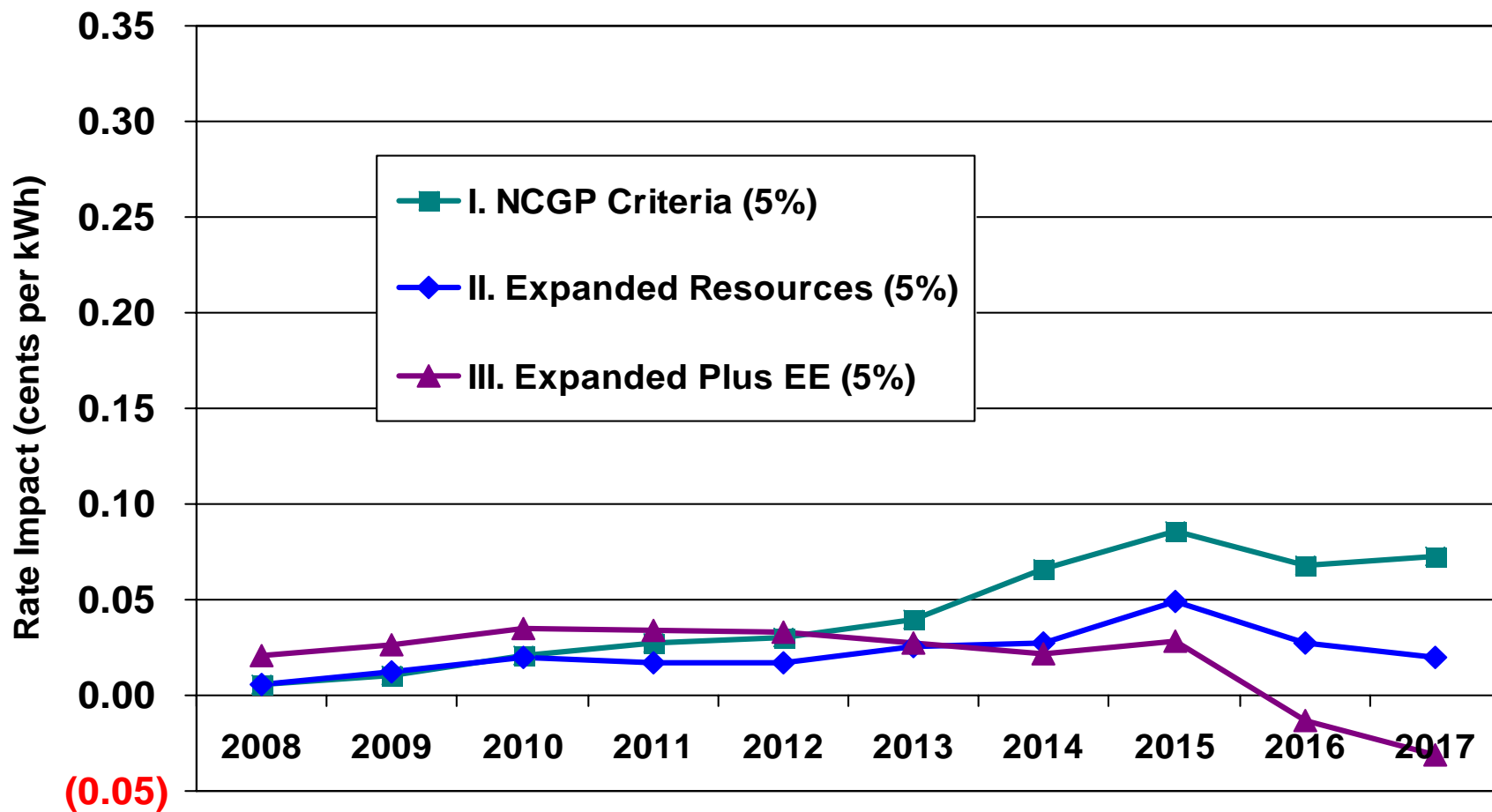
Wind Power at 50 m



Hydroelectric Potential by River Basins

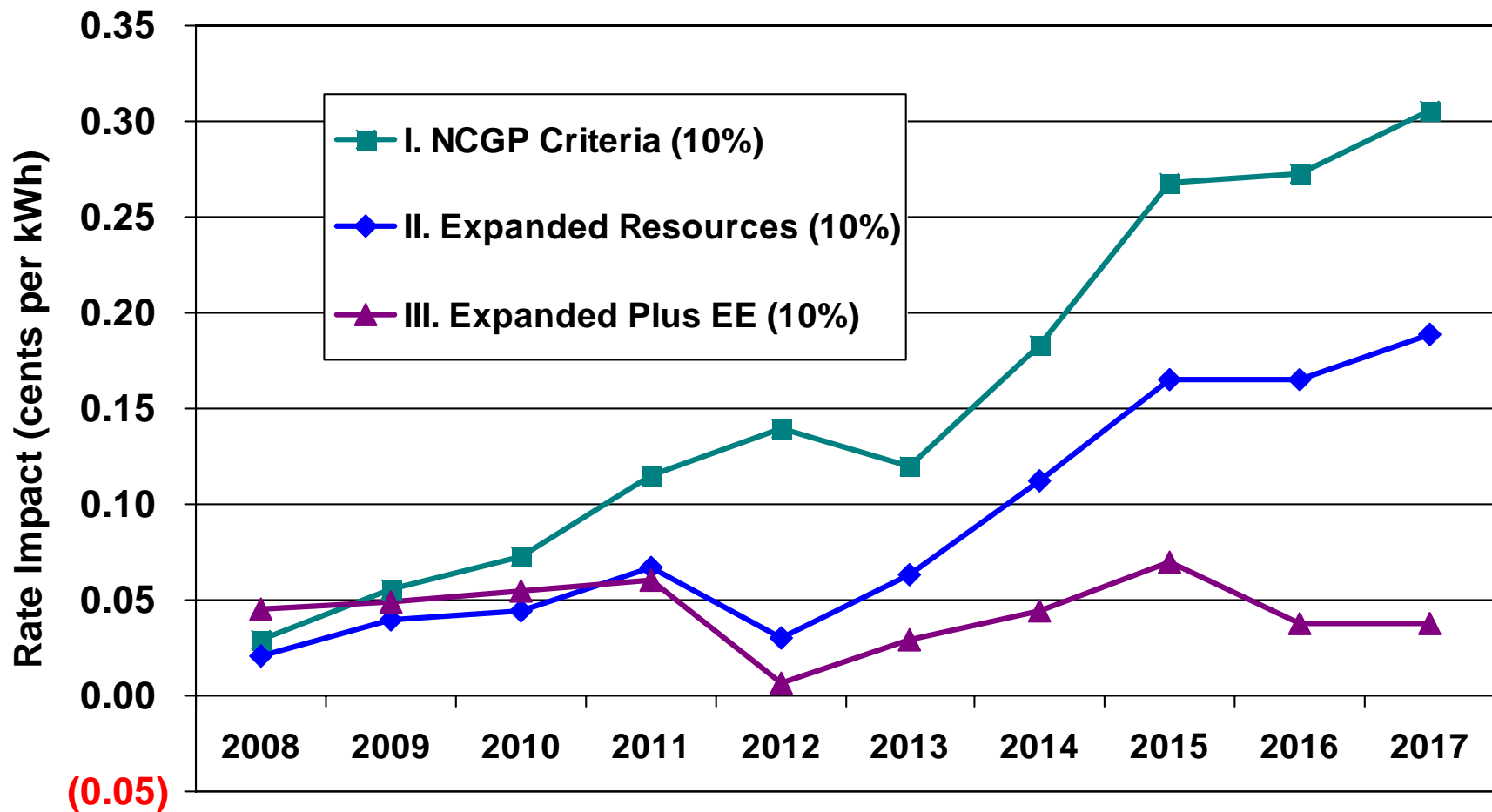


Range of Rate Impacts for 5% RPS is -0.3% to 0.9% by 2017*



*Assumes average electricity rates of 8.5 cents per kWh by 2017

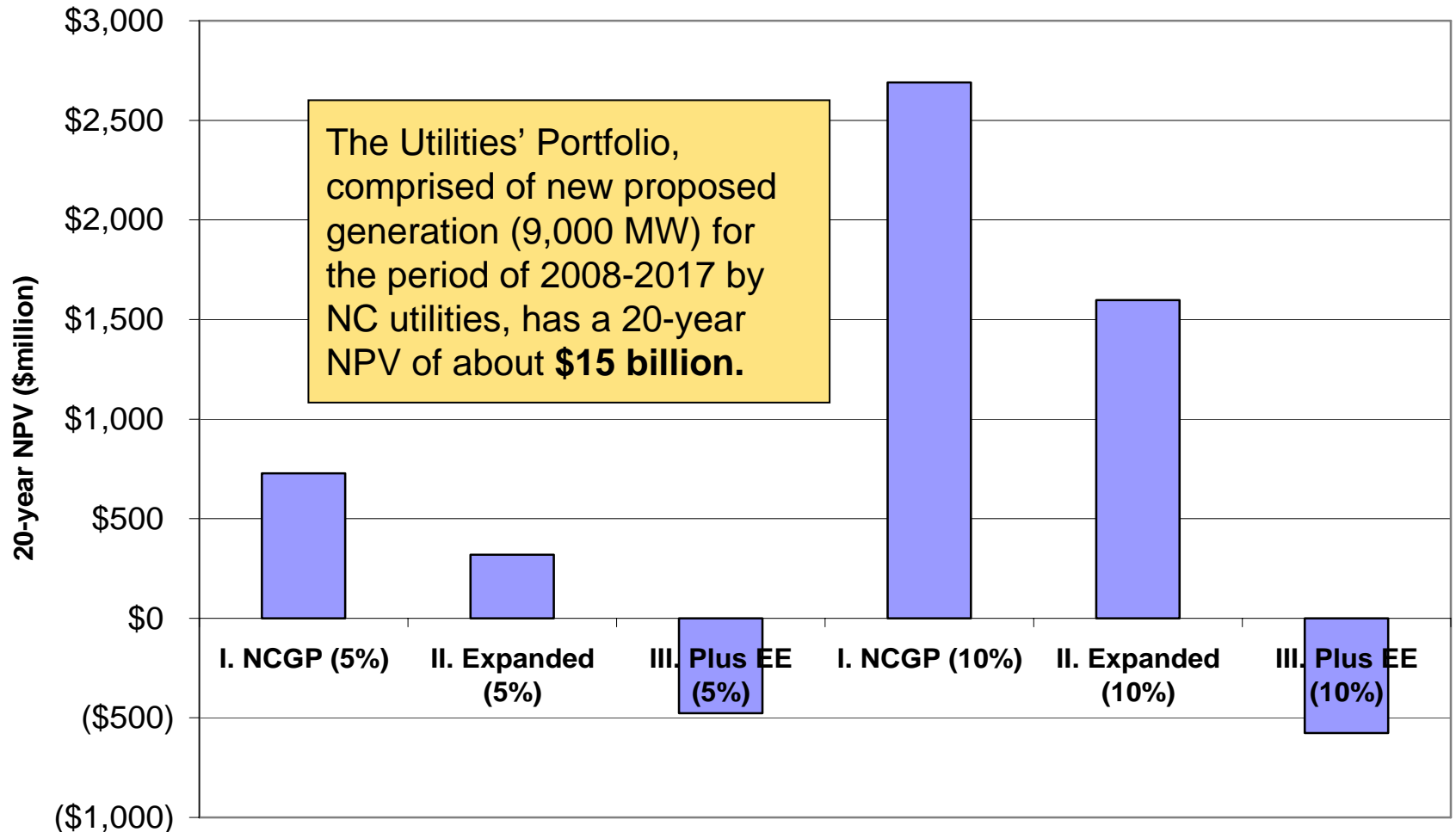
Range of Rate Impacts for 10% RPS is 0.4% to 3.6% by 2017*



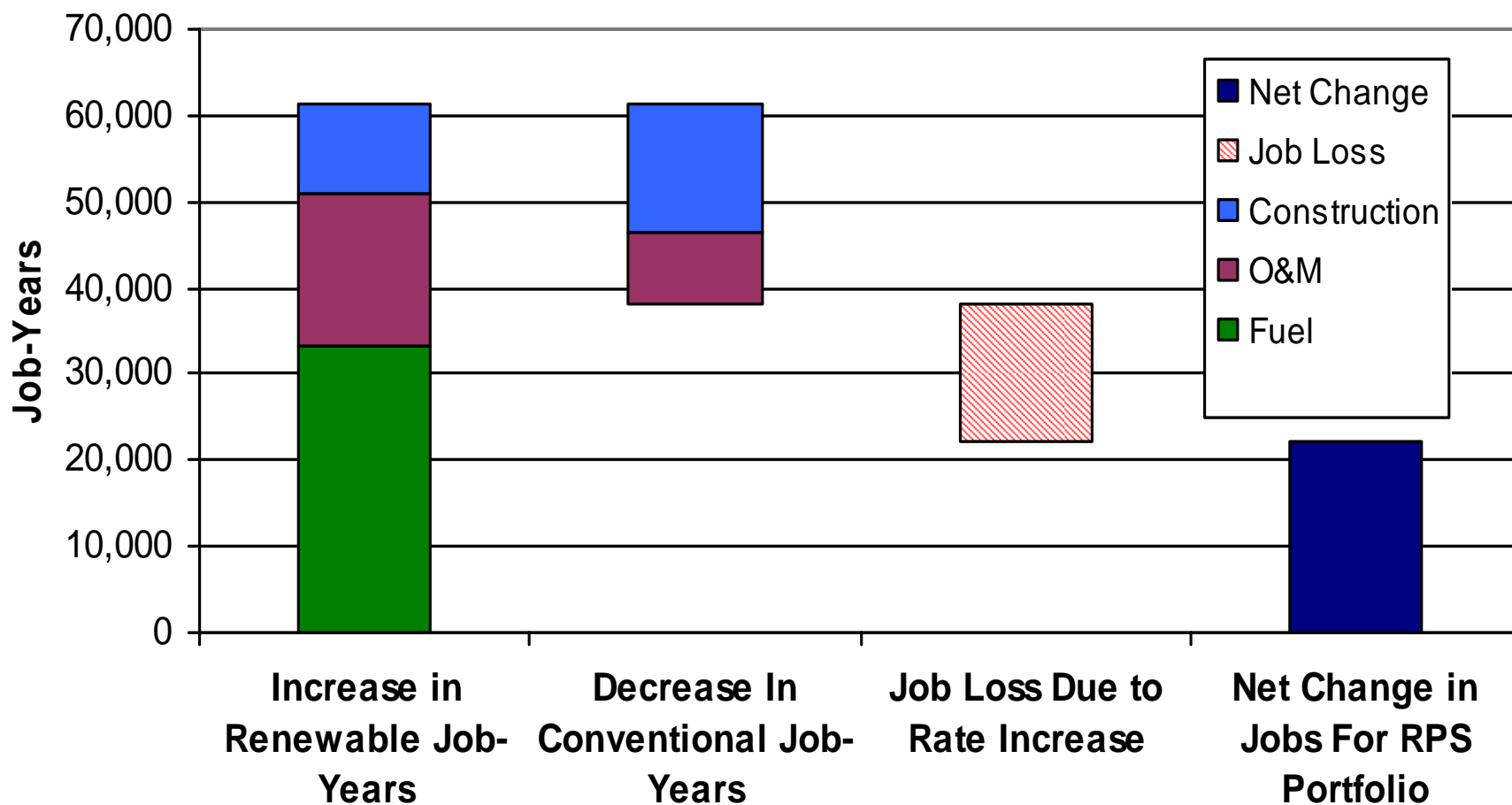
*Assumes average electricity rates of 8.5 cents per kWh by 2017

Total Incremental Cost/Savings (NPV) Over 20 Years

Total Cost for RPS Scenarios

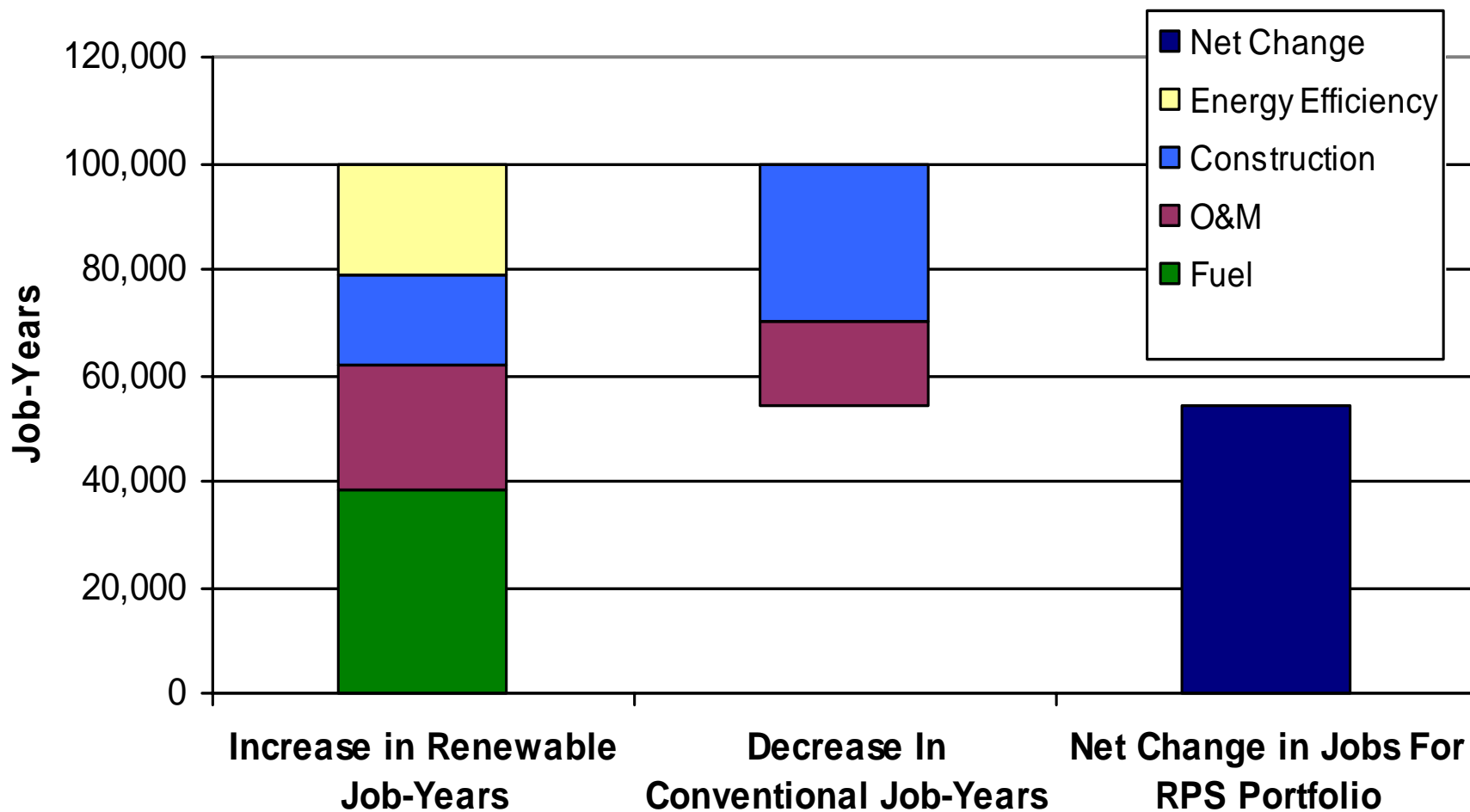


Jobs: 5% RPS **Without** Energy Efficiency*



*Job-years for O&M and Fuel assume 20 years of operation. Electricity rate impact assumed over 20 years.

Jobs: 10% RPS **With** Energy Efficiency*



*Job-years for O&M and Fuel assume 20 years of operation. No electricity rate impact or job losses because overall electricity bill decreases.

Key Environmental Benefits

- **Energy efficiency would have the greatest positive impact.**
- The annual **displacement of Carbon Dioxide**, once a 5% or 10% RPS is achieved, could total at least 7.3 to 13.6 million tons per year, respectively.
- **Potential displacement of emissions related to air quality and health**, such as Nitrogen Oxides, Sulfur Dioxide, particulate matter, and mercury.
- Renewable generation facilities either **do not produce waste or the waste products are more benign** than from coal and nuclear fuels.
- Renewable energy resources **do not have significant environmental impact from fuel extraction** in contrast to the extraction impacts of coal, oil, natural gas, and nuclear fuel.

Conclusions

- There should be sufficient renewable resources within the State to meet a 5% RPS requirement for new renewable generation.
- The State would have difficulty meeting a more aggressive 10% RPS with only new renewable resources located within North Carolina.
- Inclusion of energy efficiency would enable the State to achieve a 10% RPS and reduce average electricity bill.
- An RPS would produce direct economic and environmental benefits to the State.
- An RPS may enable the State to avoid the development of 1,000 MW or more of baseload conventional generation.

The full RPS Report will be posted on the
North Carolina Utilities Commission website today:
www.ncuc.net

Contact Information:

jwiner@lacapra.com

mhong@lacapra.com

dick.spellman@gdsassociates.com