A Study of Increased Use of Renewable Energy Resources in Virginia

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The Virginia Center for Coal and Energy Research

Virginia Polytechnic Institute and State University

Michael Karmis, Director

Margaret Radcliffe
VCCER

Ryan Pletka
Black & Veatch

Contributors

- **Executive Summary**
  Black & Veatch – R. Pletka and J. Abiecunas
- **App A: Existing and Future Renewable Resources in Virginia**
  National Renewable Energy Laboratory (NREL) – L. Bird, D. Heimiller, G. Porro, P. Denholm and A. Milbrandt
- **App B: Electricity Generation Costs and Measures**
  NREL – L. Bird and G. Porro
  Black & Veatch – R. Pletka and J. Abiecunas
- **App C: The Incentives and Impediments to Renewable Energy Systems in Virginia**
  B. Sovacool and R. Hirsh, Consortium for Energy Restructuring, Virginia Polytechnic Institute and State University
- **App D: Economic Development Considerations**
  S. Aultman and J. Alwang, Department of Agricultural and Applied Economics, Virginia Polytechnic Institute and State University

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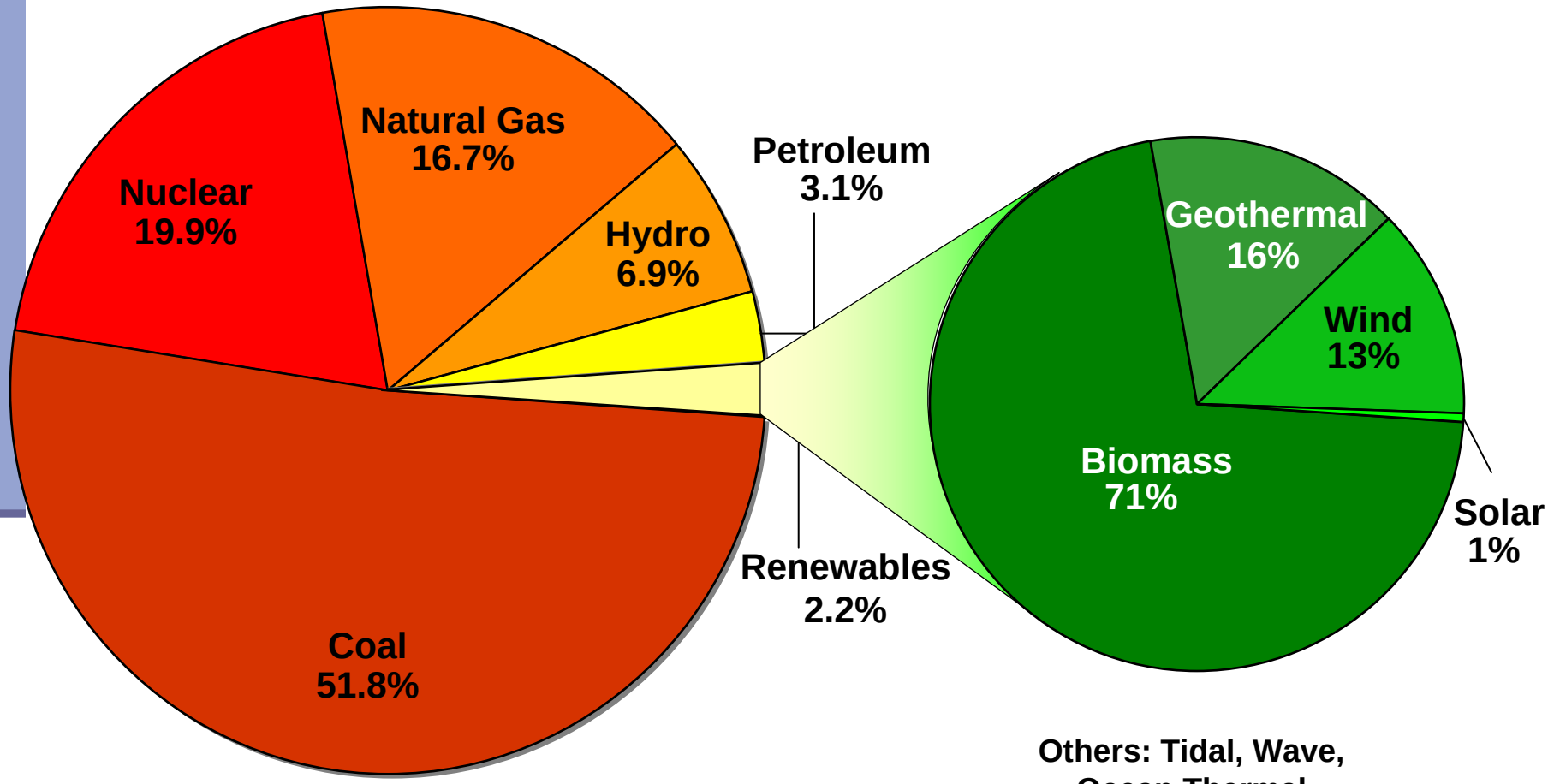
Objectives

- Review current renewable generation
- Look at prospects for future renewable development
- Compare costs for renewable with fossil fuels
- Review incentives and impediments to renewables
- Assess economic impacts of renewables in Virginia
- Discuss environmental compliance cost issues
- Provide recommendations and suggestions for future work

US Electrical Energy Breakdown

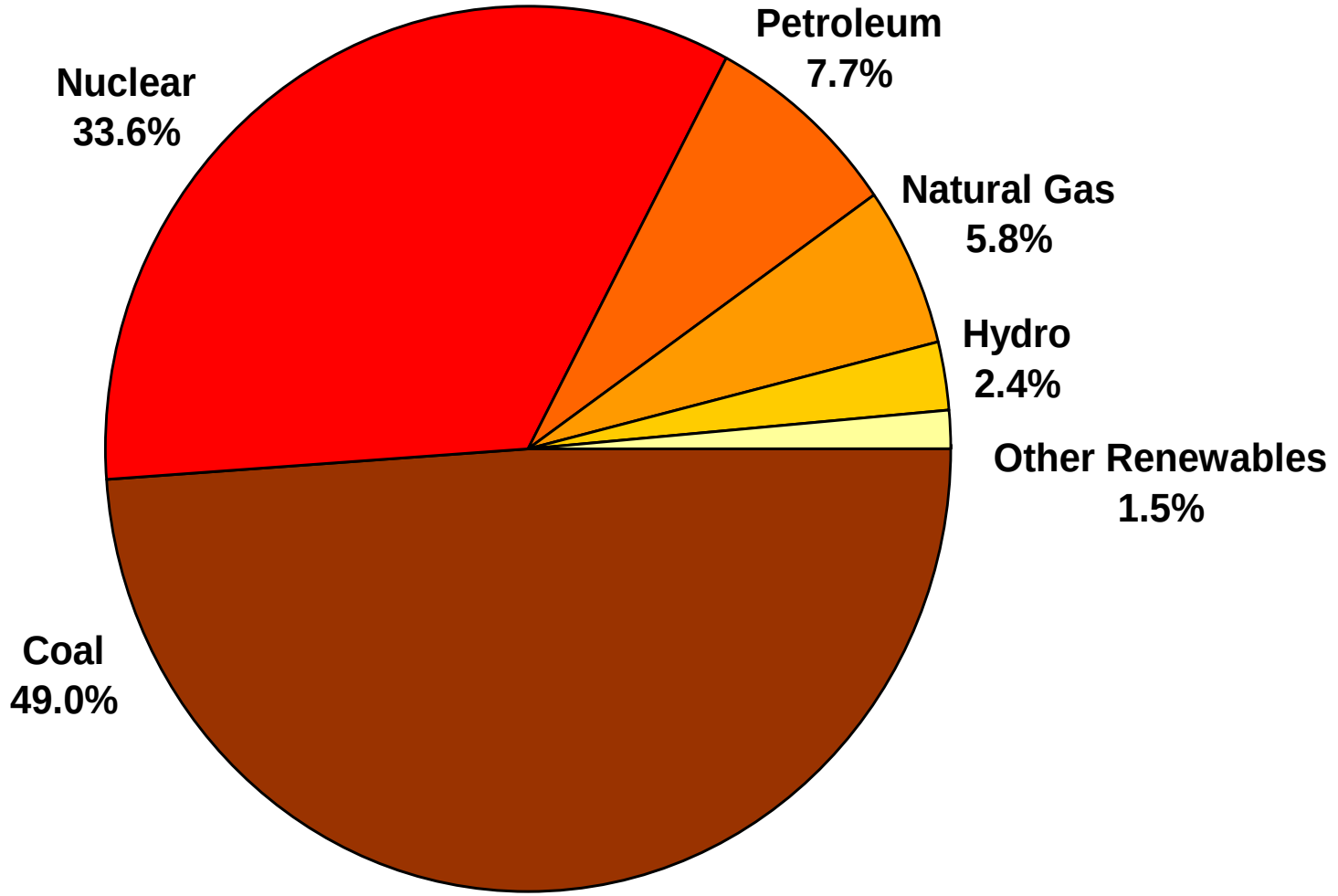
2003 US Electricity Generation



Others: Tidal, Wave, Ocean Thermal

Source: EIA 2004

Virginia Electrical Energy Breakdown

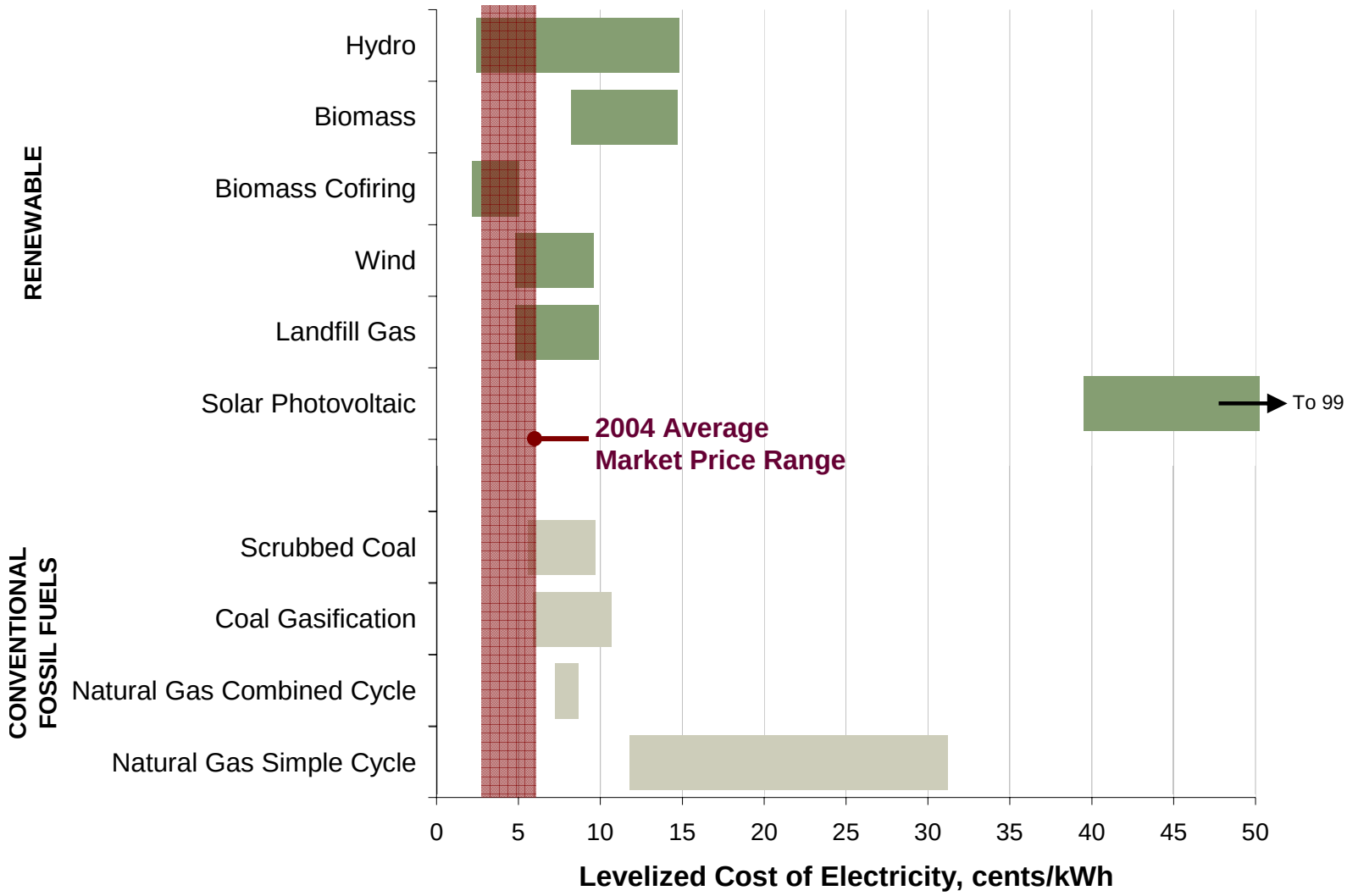


Source: EIA

Technical and Near-Term Development Potential

Source	Technical Potential (MW)	Near-Term Potential (MW)
Onshore wind	910 – 1,960	400
Offshore wind	1,300 – 32,000	0
Landfill gas	30	30
Biomass	760	300
Solar photovoltaic	11,700 – 13,000	<1-2
Hydroelectric	N/A	200
Totals	14,700 – 47,750	930
	Source: NREL	Source: Black & Veatch

Levelized Cost of Energy Comparison for New Power Plants

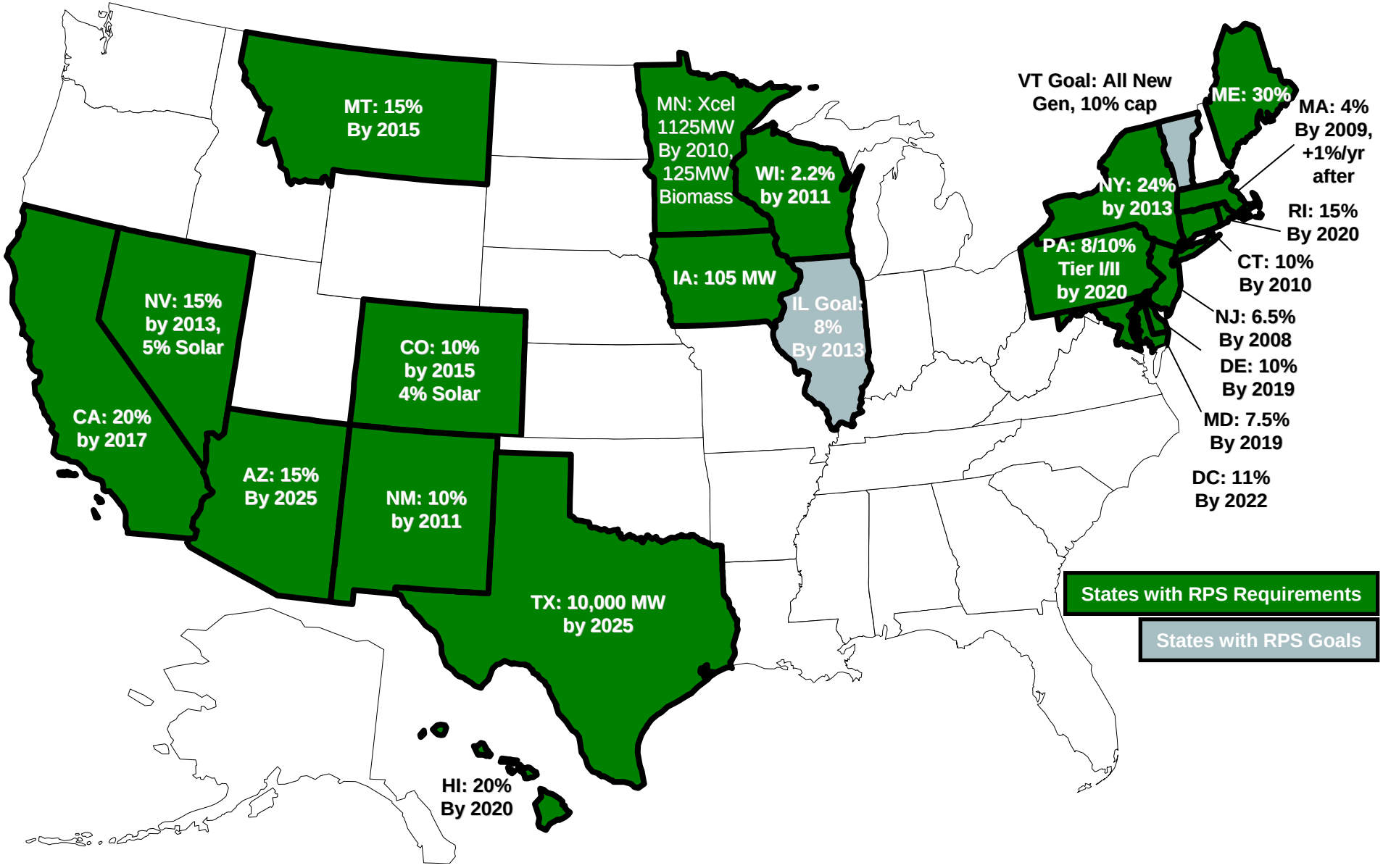


Source: Black & Veatch Estimate

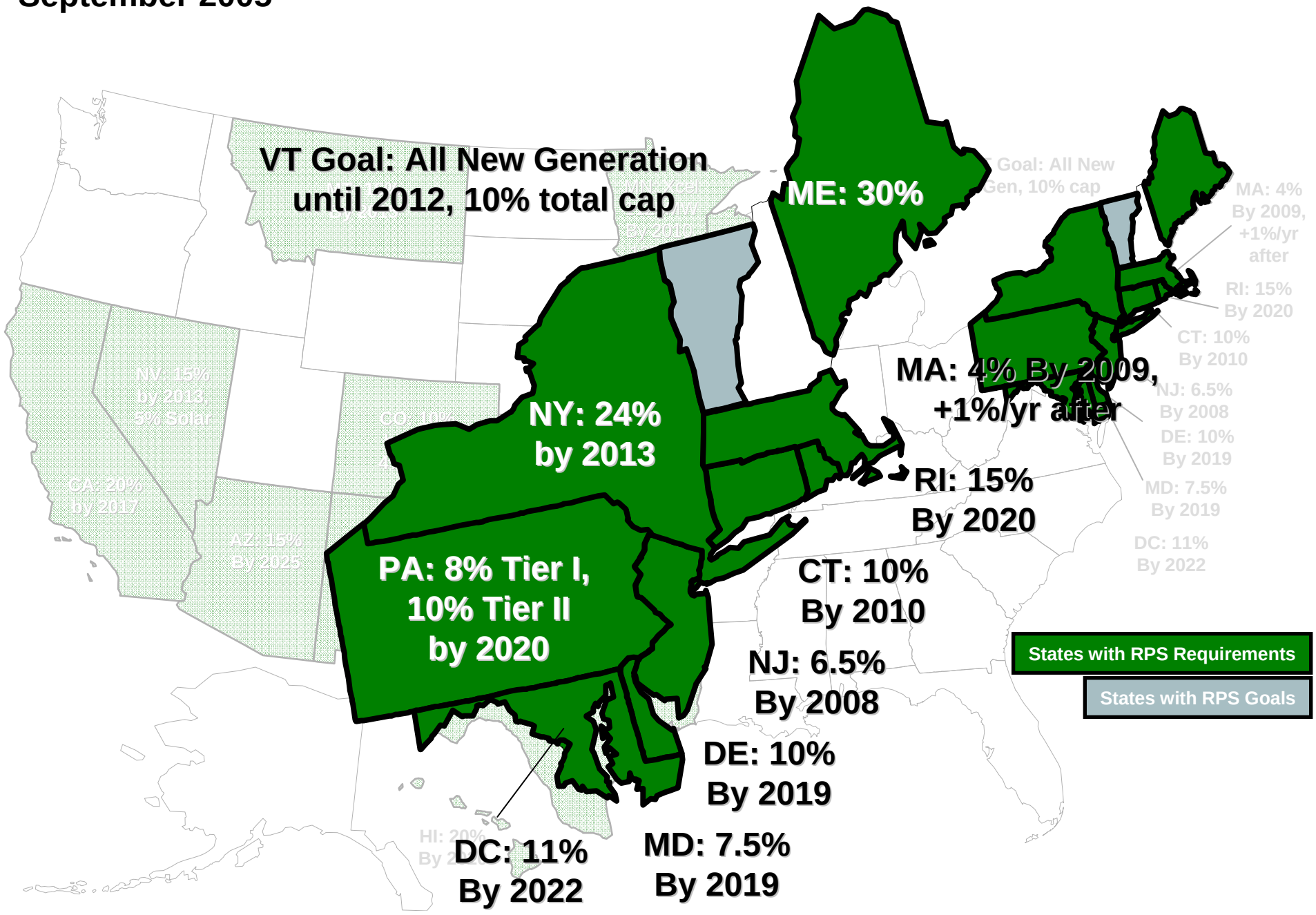
Government Incentives For Renewable Development in Virginia

- Federal
  - Production tax credits (1-2 cents/kWh)
  - Investment tax credits
  - Tax credits for alcohol fuels
  - Accelerated depreciation schedules
- State
  - Local option property tax exemption for solar
  - Small wind incentives
  - Solar manufacturing grants
  - Net metering
  - Streamlined certification of small projects

State Renewable Portfolio Standards
December 2005



State Renewable Portfolio Standards
September 2005



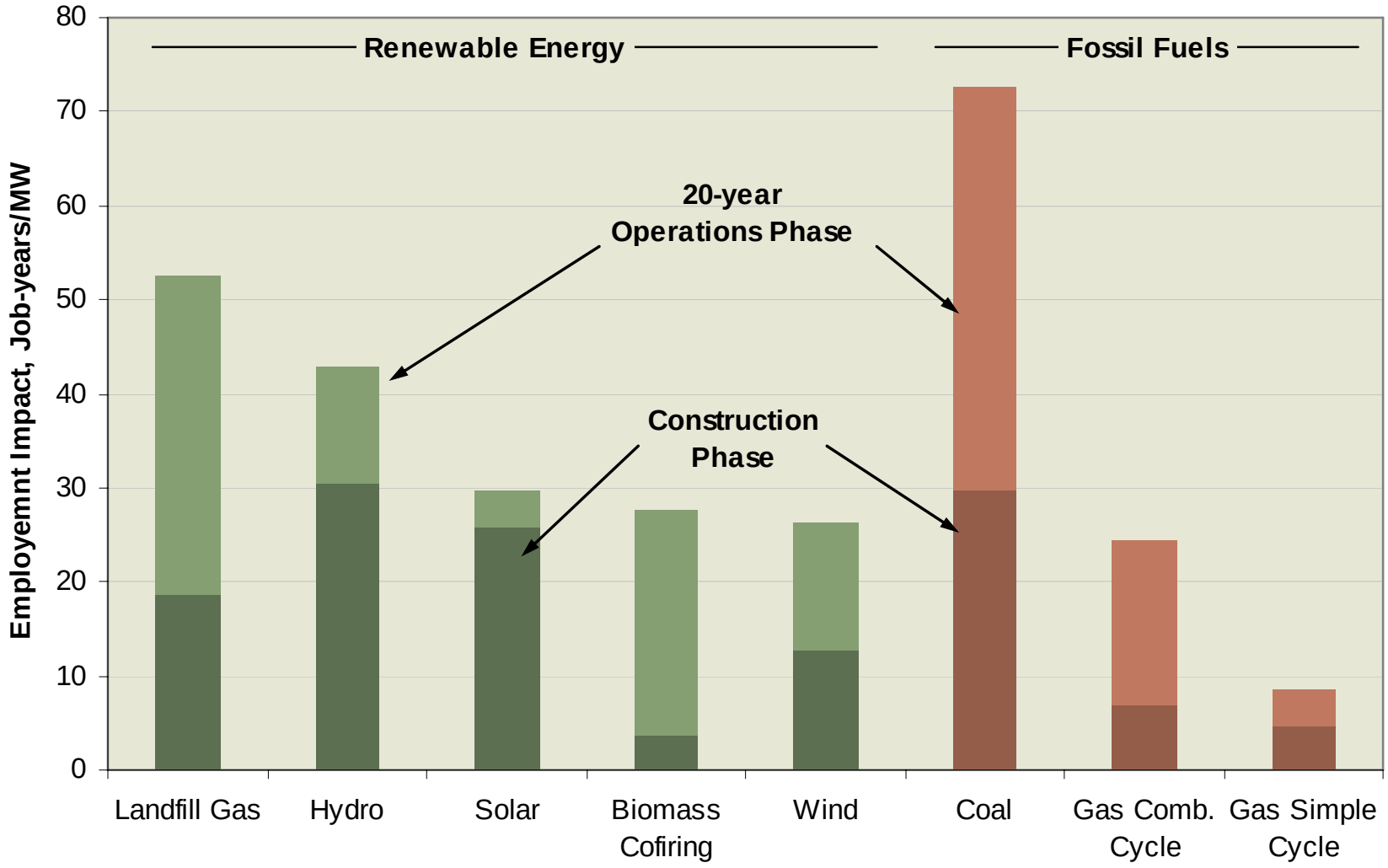
The PJM GATS Program

- PJM Generation Attributes Tracking System (GATS) allows tracking of electricity characteristics
- Like a “nutrition label” for electricity
- GATS enables states to:
  - Track environmental and emissions attributes
  - Monitor compliance with green power requirements
  - Help renewable generators obtain additional value for their renewable resources
- GATS certificates can be sold to those who must comply with state renewable standards, thus adding value to renewable generation

Economic Impacts

- In addition to the environment, renewables impact electricity rates, fuel prices, and jobs
- Direct and indirect impacts:
  - **Direct impacts** - money directly spent on materials, equipment, and labor
  - **Indirect impacts** – “spillover” effects from spending in the affected region
- Fair evaluation should include comparison to equivalent fossil fuel development
- Similar study for Pennsylvania showed potential significant net economic advantages for renewables

Employment Impacts from Renewable Technologies (PA)



Environmental Compliance Costs

- Virginia participates in the EPA NO_X SIP Call and Acid Rain Programs to control NO_X and SO_2
- Clean Air Interstate Rule – Establishes permanent reduction caps on precursor emissions
- Renewable energy *might* reduce the cost of complying with CAIR, if coal-fired generation is retired and replaced by cheaper renewable energy

Conclusions

- **Objective**: initial assessment of renewables including current status, potential, costs, and incentives and impediments
- **Potential:**
  - NREL: over 15,000 MW based on resources available in Virginia, ignoring economic viability of developing these resources
  - Black & Veatch: 930 MW economically viable in the near-term (5-15 years)
- **Costs:** Hydro, biomass co-firing, wind and landfill gas cost competitive with fossil-fueled alternatives
- **PJM GATS**: Virginia utilities' participation in PJM opens renewables energy markets. GATS certificates enable tracking of generation and compliance with state RPS programs
- **Most significant incentives:** federal production tax credit and state RPS programs
- **Most significant impediments**: intermittent nature of some renewables and uncertainty due to variability of federal policies

Recommendations

- Significant work is still needed to characterize renewables development potential in the state
- Areas warranting further study include:
  - Resource assessment
  - Development costs estimates
  - Economic impacts analysis
  - Compliance costs and impacts
  - Best Public Policy alternatives
- Such in-depth analysis will provide valuable and accurate information to lawmakers, utilities and community stakeholders