



Renewable Energy Outlook: International Trends and Perspectives

Presented to:

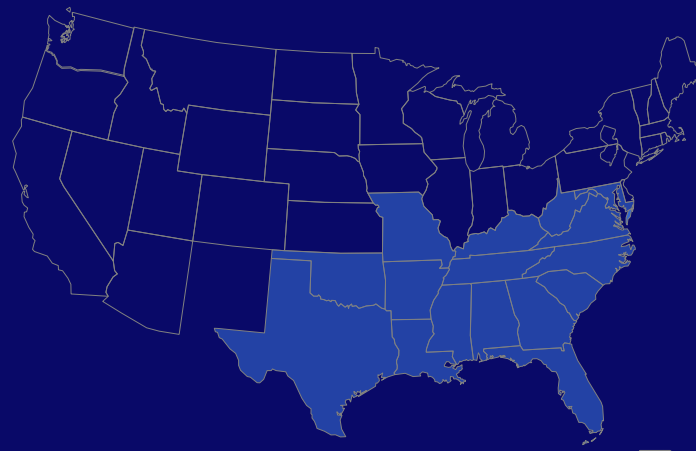
Puerto Rico Renewable Energy Panel
February 24, 2010

Presented by:

Kenneth Nemeth
Secretary & Executive Director



Background

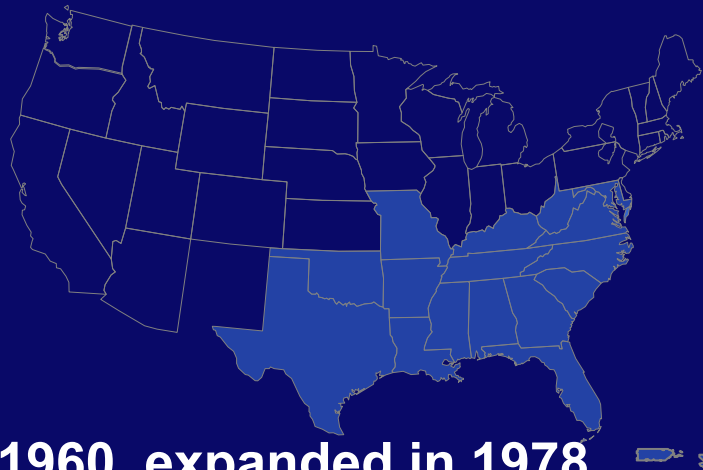


Through innovations in energy and environmental policies, programs and technologies, the Southern States Energy Board enhances economic development and the quality of life in the South.

- SSEB Mission Statement



Background



- Established 1960, expanded in 1978
- 16 U.S. States and Two Territories
- Each jurisdiction represented by the governor, a legislator from the House and Senate and a governor's alternate
- Federal Representative Appointed by U.S. President

Puerto Rico and its Need for Renewable Energy

- Current electricity 70% dependent on foreign oil imports
- Energy Security is nation-wide issue
- Importance of diversification
- 2009 Report *'Achievable Renewable Energy Targets for Puerto Rico's Renewable Energy Portfolio Standard'*



Trends ...in World Energy Consumption & Production



- Consumption growth projected at 44% (2006-2030)
 - Current economic downturn rebounds in 12-24 months
- Non-Developed countries increase from 49 to 59% of world energy consumption by 2030
 - China & India fastest growing non-OECD Countries
 - (1990 = 10% → 2006 = 19% → 2030 = 28%)
- Renewables are fastest growing supply --- 3%/year
 - Highest growth: Hydroelectric (China, India, Brazil) and Wind

Current Status of Renewable Energy Worldwide

- Fundamental transition of world's energy markets continues, while slower than previous years
- Renewable energy expansion is policy driven
- Stable, predictable strategies will be key to renewable development



Barriers to Development of Renewable Energy Worldwide

- Impacts of worldwide financial crisis
- How financial constraints will affect renewable power
- Unclear direction from Copenhagen
- Will environmental and energy security goals become less important relative to short term economic concerns?
- Will clean energy be regarded as luxury option only when economies thrive?



International Policies and Renewable Energy

- Germany
 - Renewable Energy Sources Act (2000)
- Spain
 - Spanish Technical Buildings Code(2006)
 - Barcelona Solar Thermal Action Plan
- Solar Industry- Policy Matters*
 - Greece: Financial incentives, awareness
 - Austria: Financial incentives, awareness, training, R&D
 - Germany: Financial incentives, awareness
 - Spain- Building codes
 - ***Solar Thermal Action Plan for Europe**



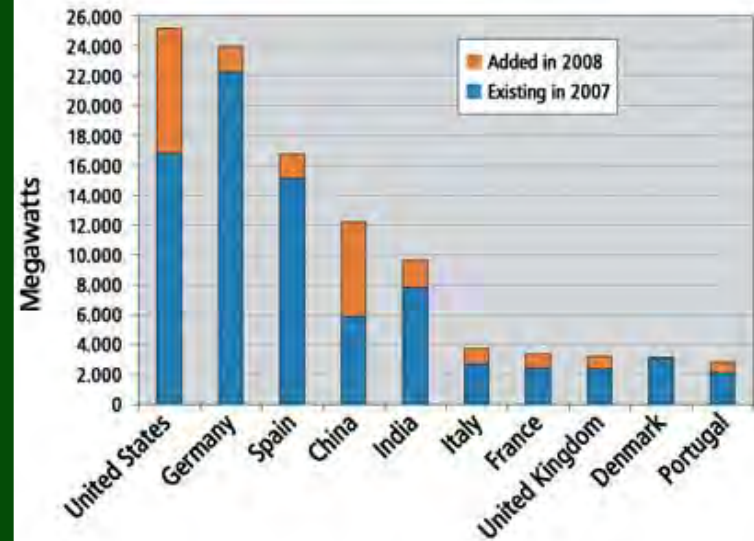
Recent Renewable Power Development Worldwide

- Trends from 2004 to 2008:
 - Annual Renewable investments 4-fold to \$120 billion
 - Solar PV capacity up 6-fold to 16 GW
 - Wind power capacity up 250% to 121 GW
 - Total renewable power up 75% to 280 GW (includes small hydro, geothermal, and biomass)
 - Solar heating capacity doubled to 145 GW
 - Biodiesel production up 6-fold to 12 Billion liters/year
 - Ethanol production doubled to 67 Billion liters/year

Recent Renewable Power Development Worldwide

- In 2008:
 - Wind capacity up 29%
 - Grid solar up 70%
- US led capacity investment \$24 billion (20% of global)
- US led in added and total wind power
- Spain added 2.6 GW of PV (half global installation)
- China doubled wind capacity 5th year running

Figure 2.
Wind Power Capacity, Top Ten Countries, 2008



Wind Energy - Germany

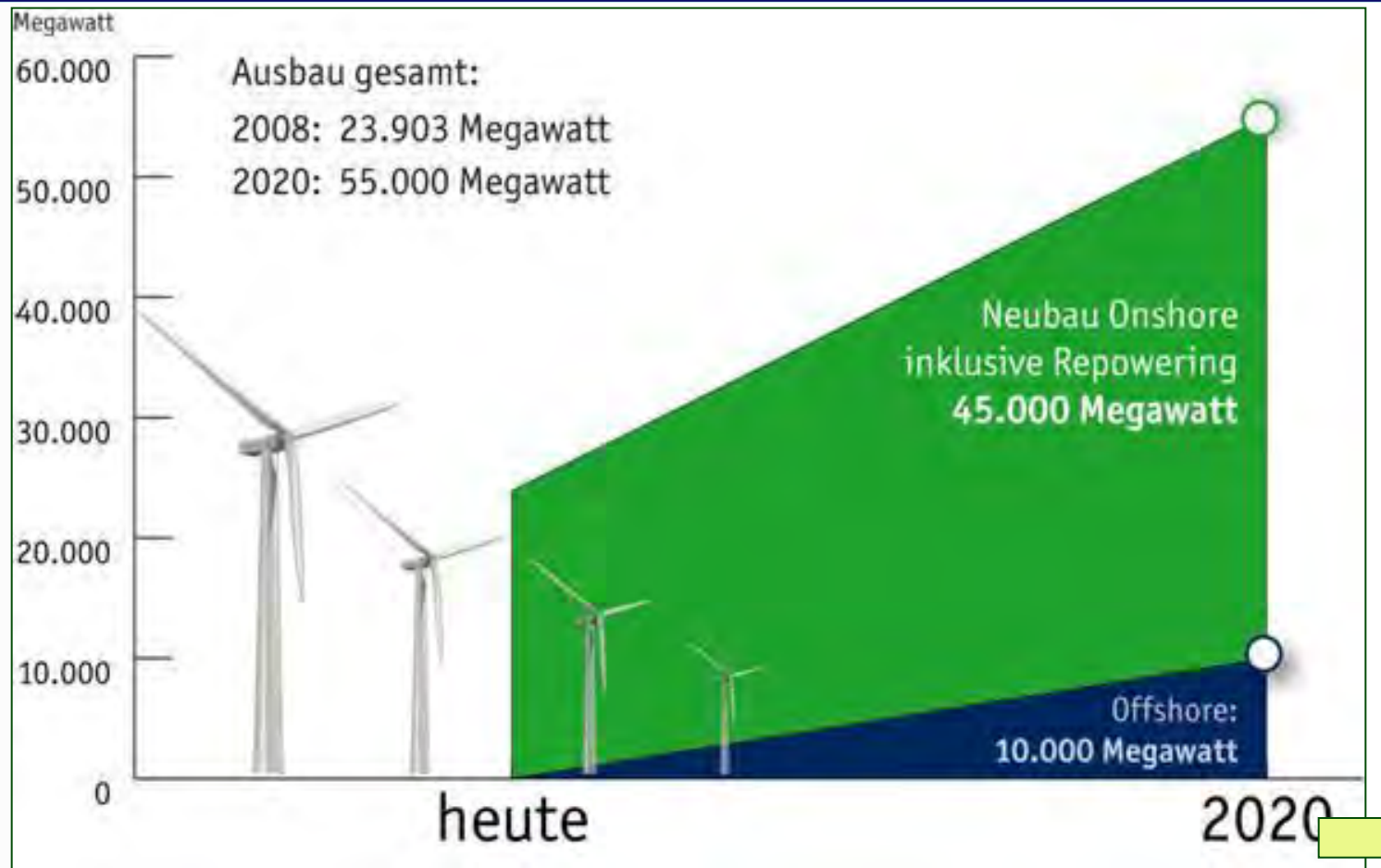




Figure 3.
Solar PV, Existing World Capacity, 1995–2008

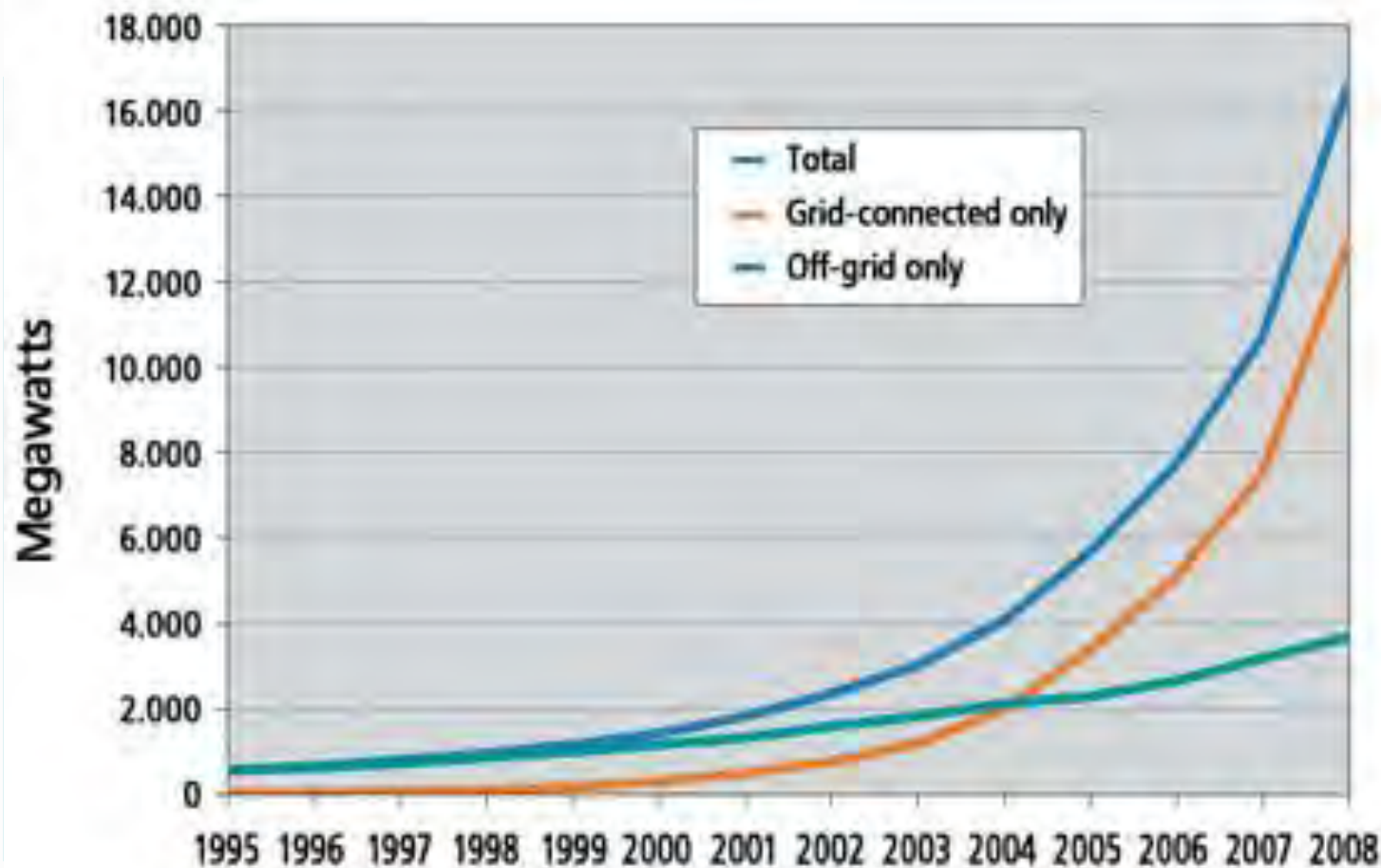
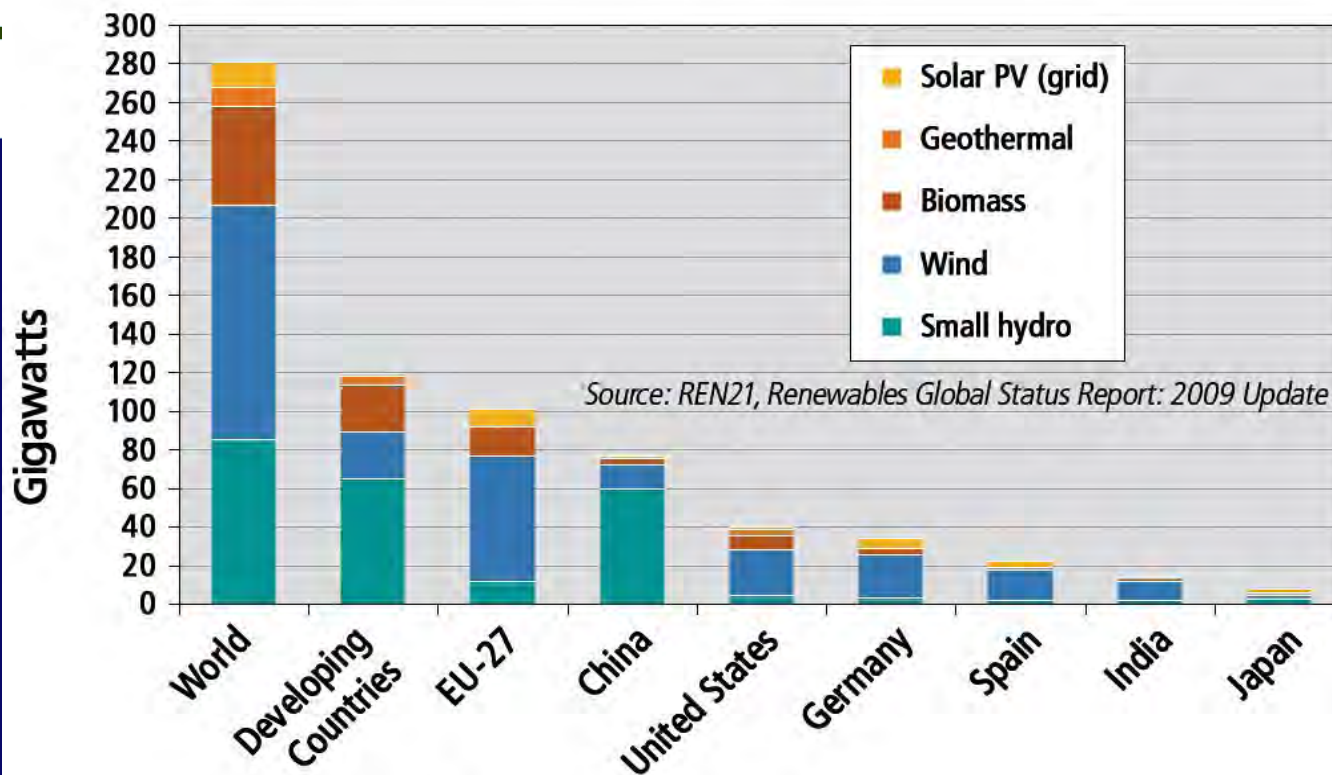




Figure 4.
**Renewable Power Capacities, Developing World,
EU and Top Six Countries, 2008**

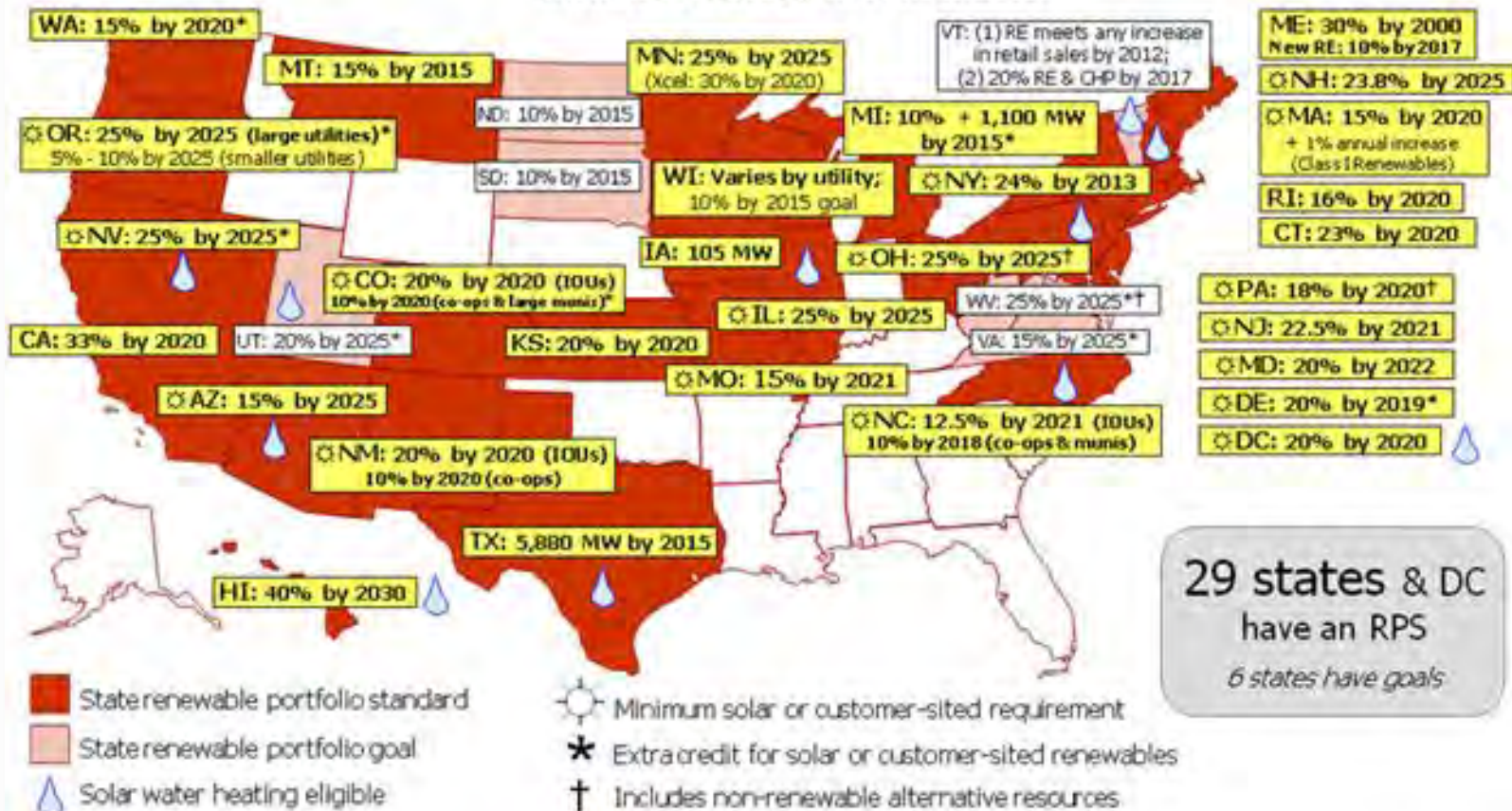


Note: Excludes large hydropower

Renewable Portfolio Standards

Renewable Portfolio Standards

www.dsireusa.org / November 2009



West Virginia Alternative & Renewable Energy Portfolio Act

- **Principles**

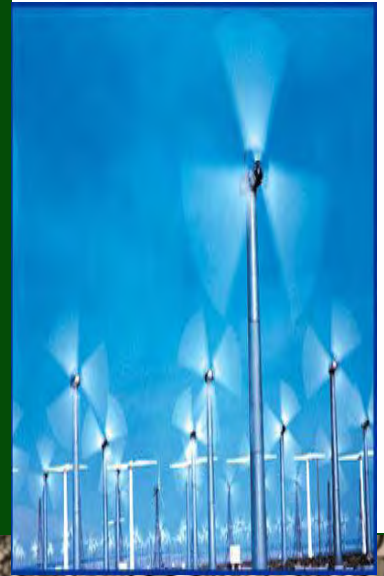
- Tradeable Alternative Energy Resource credits
- Rate Incentives for alternative energy resources
- Alternative Energy Resources Research Fund
- Net metering for self-generation
- Creating jobs through alternative resources

- **Alternative & Renewable Energy Standards**

- Minimum of 10% by 2015 and 25% by 2025

- **Resources**

- Advanced Coal Technology, including CCS
- Coal Bed Methane and Coal Gas
- Renewable Energy Resources (solar, wind, hydro, biomass, fuel cells, other)
- IGCC
- Waste Coal, Tire Derived Fuel
- Pumped Storage Hydro





Puerto Rico & Renewables!



- *“...In Puerto Rico, with our abundant renewable energy resources, the question should be not how to best integrate renewable resources into the existing electric energy grid or other energy infrastructures, but how our existing infrastructures and practices should change in order to allow maximum use of solar, wind, ocean and other renewable energy sources....”*



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