



RENEWABLE ENERGY USA 2009

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Market Overview

- Renewables could provide up to 635 GW of new US electricity-generating capacity by 2025
- Wind, solar, biomass and geothermal energy are all on the rise. At least 17,000 MW of these three energy sources are now under construction
- Renewable energy will account for about one-third of new electricity generation added to the U.S. grid over the next three years
- US invested more than \$10 billion in new renewable capacity in 2007

Market Overview: Policy

- Policy
 - The new administration will invest over \$150 billion in clean technology and renewables over the next ten years
 - Establish a National Energy Council with an Energy and Climate Czar
 - Implement an economy-wide cap-and-trade program to reduce greenhouse gas emissions 80 % by 2050.
 - By 2015 put 1 million plug in hybrids on the road
 - Need to establish a federal RPS that would require 10% of electricity to come from renewables by 2012 and 25% by 2025

Market Overview

- **Affects of the Financial Crisis**

- Lack of Tax Equity due to the fall of Lehman Brothers, Wachovia, and AIG
- The way many current investment tax credits are structured, some projects are not developing as they should

- **Transmission Challenges**

- Need for new transmission, smart grid and energy storage technologies
- Need investment in smart grid infrastructure and energy storage technologies

Wind

- The wind industry is one of the fastest growing industries in the US
- Wind projects accounted for about 30% of all new power generating capacity added in the US in 2007.
- Wind capacity will supply 20% of America's electricity by 2030 (340 GW)
- The U.S. installed 1,400 MW of new wind capacity in the third quarter of this year, bringing the total to over 4,200 MW in the year and over 21,000 MW overall. Over 7,500 MW is likely to be installed in 2008.
- Texas installed wind capacity with 6,297 MW
- The DOE's report on a 20% wind energy scenario found offshore wind capacity could be 54 GW of the 300 GW envisioned.

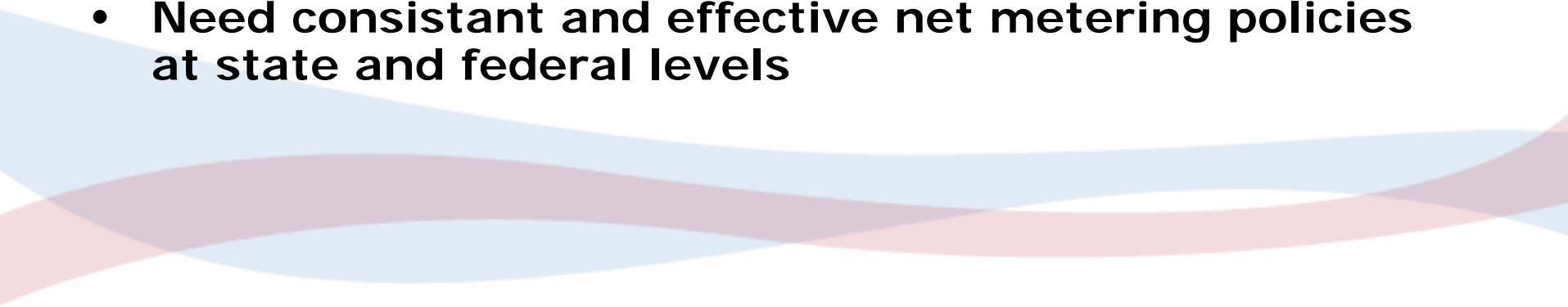
Wind: Challenges

- **Lack of Tax Equity**
- **PTC Extension**
 - The PTC for wind needs to be extended for 5 years
- **Transmission Capability**
- **Manufacturing**
- **Research & Development**
- **Supply Chain challenges**

Solar

- By the end of 2007, the U.S. had over 3,400 MW of installed solar power.
 - 750 MW of PV, 418 MW of utility-scale concentrating solar power, and 2,250 MW (thermal equivalent) of solar hot water systems.
- Represents less than 1% of the US energy mix
- Solar industry is expected to grow in 2009 due to the 8 PTC
- Witnessing consolidation in the industry due to competition
- CSP: Second fastest growing sector after wind
 - 40,000 MW are planned or proposed
 - CSP has no fuel cost, and low operations and maintenance costs, but it has high upfront capital costs

Solar: Challenges

- **Lack of Tax Equity**
 - **Cost**
 - **Transmission**
 - **Raw Material Supply**
 - **Speed of Deployment and Scalability**
 - **Need consistent and effective net metering policies at state and federal levels**
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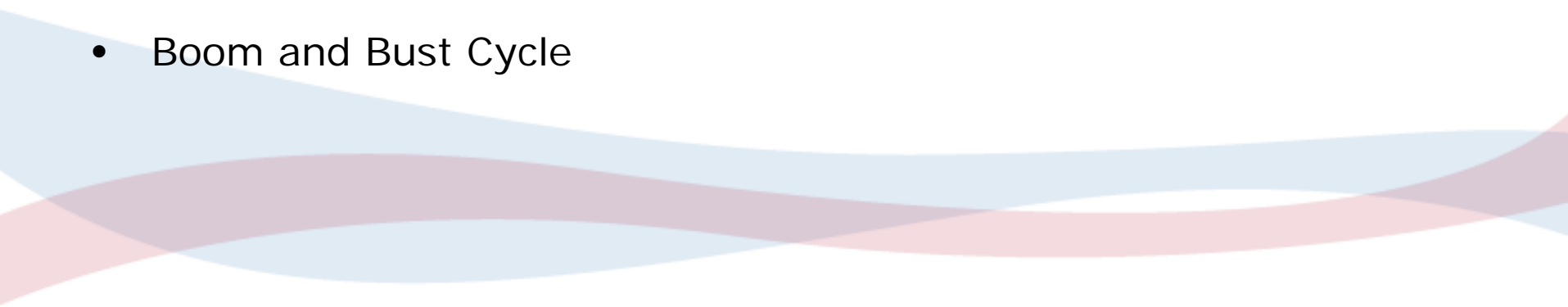
Biomass

- Biomass makes up nearly 50 percent of the renewable electricity in the US.
 - 8.6% annual growth rate in consumption of biomass from 1997 to 2030 at a cost between \$.07 and \$.09 per kWh (almost equivalent to coal)
- Represents approximately 3% of the US electricity mix
- Biomass fell out of favor in the early part of the decade but its use is growing again.
- Biomass is popular in Southeast and Pacific Northwest because of lumber industry.
- Waste-to-energy is helping municipalities to manage waste generated by expanding population.

Biomass: Challenges

- Lack of Tax Equity
- Competing with food sources and overuse of farmland; need to convince a dubious public
- Cost still considered high but declining, depending on type of feedstock and technology used
- Waste-to-energy plants need to meet strict air quality emissions requirements
- Harvesting and transporting biomass remains relatively costly; need to rely on local feedstocks
- Need to create economic development opportunities at the community level.

Biofuels

- The DOE has set a goal of '30% by 2030' which will require for the US biofuels market to replace 30% of current levels of gasoline consumption by the year 2030.
 - Biofuels tax credits were extended for producing electricity from closed-loop or open-loop biomass facilities through 2010
 - Next Generation Biofuels are seen as an important technology to the new administration and Obama will require at least 60 bn gallons of advanced biofuels by 2030
 - Boom and Bust Cycle
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Biofuels: Challenges

- **Fuel vs Food Debate**
 - **Technological Uncertainty**
 - **Research & Development**
 - **Infrastructure Issues**
 - **Tax Incentives and Regulatory Support**
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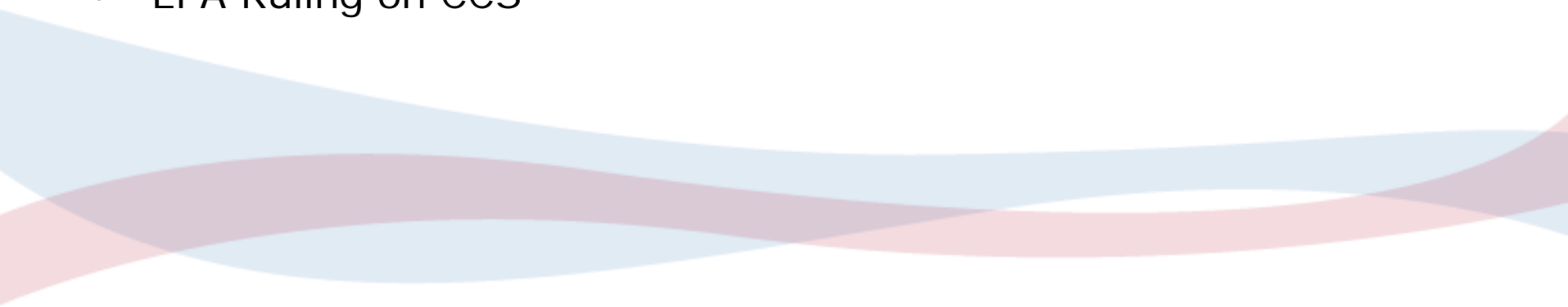
Marine Energy

- Marine energy is currently capable of supplying electricity equivalent to 10-25% of today's world-wide production.
- In the US, wave energy conversion alone could supply the equivalent of 6.5% of electricity at current consumption rates.
- In 2007 EPRI released a report identifying some 95,000 mw of potential hydropower capacity in the US. The industry could grow by almost 120 %, more than doubling its existing 80,000 MW capacity.
- The PTC has been expanded to include certain marine and hydrokinetic renewable energy facilities placed in service on or before December 31, 2011

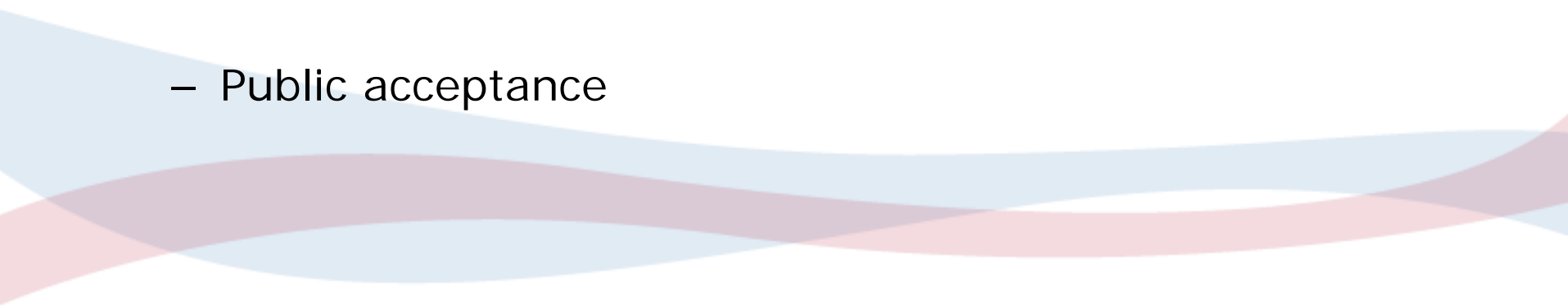
Marine Energy: Challenges

- **Regulatory streamlining and resolving of licensing issues for the new technologies**
- **R&D support next generation conventional hydropower equipment and new technologies**
- **Equitable treatment in the state RPS efforts- inclusion and support**
- **Transmission support**
- **Lack of Venture Capital**
- **Cost**

Carbon Capture & Storage

- Commercial projects in the US are going ahead despite FutureGen
 - CCS is emerging as one of several advanced technologies to limit emissions. A power plant equipped with CCS technology could reduce CO₂ emissions to the atmosphere by approximately 80-90 percent compared to a plant without CCS.
 - CCS can make a significant difference in lowering CO₂ emissions—however the technology needs to be proven.
 - EPA Ruling on CCS
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Carbon Capture & Storage: Challenges

- Permitting
 - Transport
 - Storage
 - Cost - Carbon capture can increase the initial capital cost of a coal-fired power plant by 30 to 60 percent
 - Potential liabilities
 - Public acceptance
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USA Renewable Energy Sector Activities

- June 2009 Clean Tech/Green Building Mission to Miami and Atlanta – Miami Post
- July 2009 UK Inward Mission Clean Tech Roadshow – Boston Post
- October 2009 UK Inward Mission Wind Energy Supply Chain – Houston/Chicago Posts
- October 2009 Green Building mission to San Francisco and GreenBuild 2009, Phoenix – San Francisco/Los Angeles Post
- December 2009 Carbon Capture & Storage/Enhanced Oil Recovery Mission to the USA – Houston/Chicago Posts
- February 2010 EUEC (Energy & Environment) Mission to the USA – Los Angeles Post
- February 2010 - Renewable Energy World, Austin, Texas – Houston Post

Thank You!

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