Renewable Energy Integration Research

PIER Staff Workshop
Research Breakthroughs: What's needed to Accelerate Path to Market and Achieve California's 2020 Renewable Energy Goals

Hearing Room A

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Michael Sokol
Energy Generation Research Office
Energy Research and Development Division
msokol@energy.state.ca.us / 916-327-1416

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Barriers to Renewable Energy Deployment

- High System Cost
- Variability of Resources
  - System Reliability
- Interconnection
- Siting and Permitting
  - Environmental Impacts – land/water use
- Access to Resource

Barriers and Research Solutions

- High System Costs
- Lack of industry understanding

Advanced Technology Development

- Intermittency
- Variability

Forecasting, Energy Storage & Microgrids

Innovative Business Models

- Resource Availability
- Split-incentives
- Limited Funding
- Sizing limitations

Integrated Planning Tools

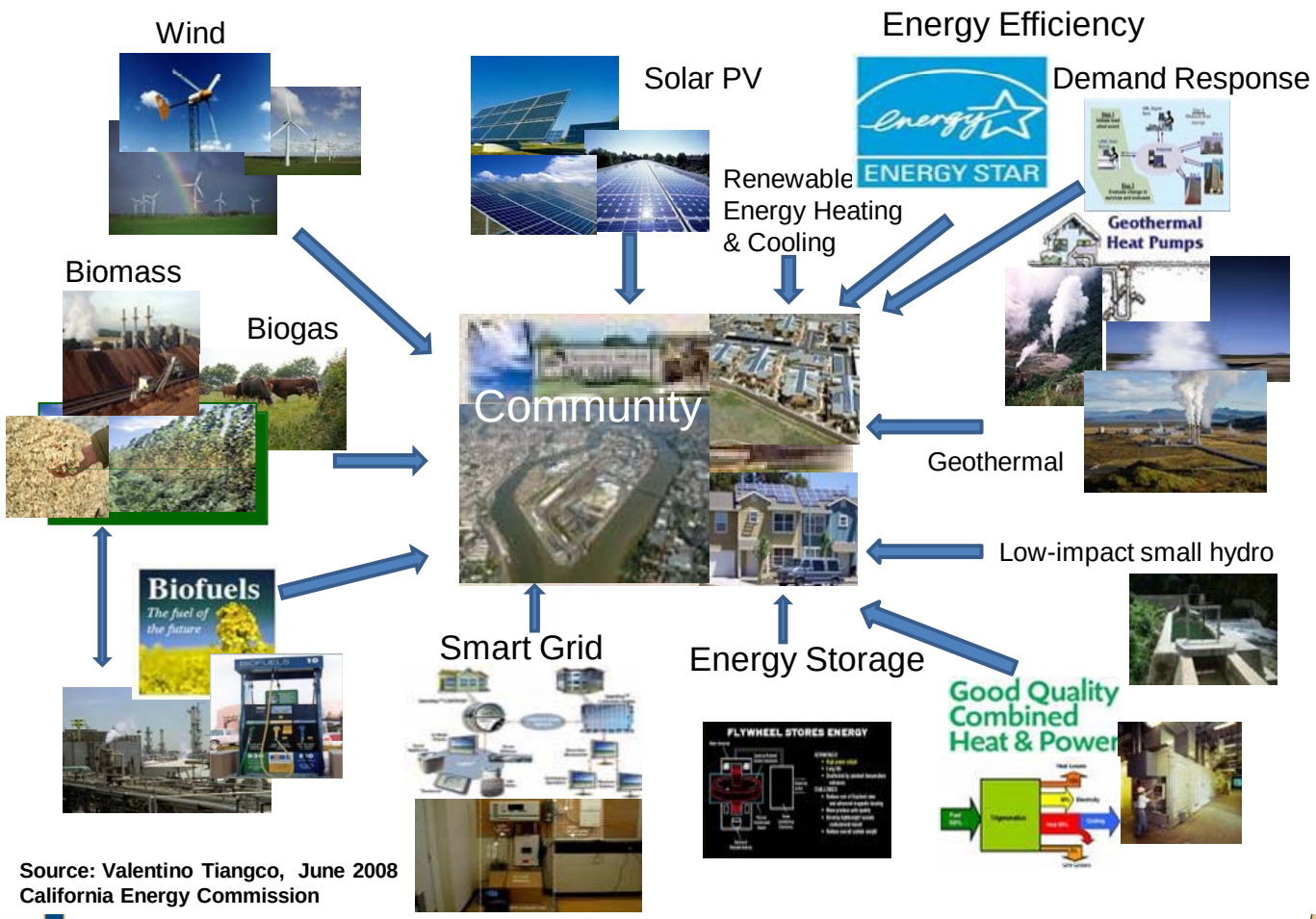
- Environmental Permitting
- Siting
- Interconnection

Recent Research Initiatives

- Community Scale Renewable Energy
  - Renewable Energy Secure Communities (RESCO)
    - Community secure energy supply through local renewables
    - Exploratory and Demonstration Projects
  - Community Scale Renewable Energy Development, Demonstration and Integration
    - Expands on the RESCO approach:
      - Increases Applicant Base (Hospitals, Military Bases, etc.)
      - Fewer restrictions on resource utilization
      - Increases utility involvement for interconnection, T&D issues

Community Scale Renewable Energy

Building Blocks of Renewable-based Energy Secure Communities (RESCO)



Source: Valentino Tiangco, June 2008
California Energy Commission

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Diversity of Community Scale Projects

- 2008 RESCO Included:
  - Jail complexes
  - Rural counties
  - College campuses
- Upcoming solicitation expands:
  - Military complexes
  - School Districts
  - Commercial complexes

Utility Scale Renewable Energy (USRE) Research

- Research Needs for USRE
  - *Wind/Solar/Storage Integration*
  - *Thermal Energy Storage for Solar Thermal Plants*
  - *Improved Solar Energy Forecasting and Monitoring*

- Environmental Research
  - *Mitigation of Utility Scale Solar Installations*
  - *Both applied science and technology solutions to reduce consumption of finite resources (land and water)*
  - *Advising the Desert Renewable Energy Conservation Plan (DRECP)*

Discussion Questions

- What is the most valuable role for public interest funding in renewables integration research?
- What are the significant public interest R&D needs for integrating energy storage with renewables?
- What are R&D efforts that can help simplify interconnection for integrated renewable energy projects?
- What is the most practical venue for zero-net energy demonstrations (neighborhoods, cities, or counties)?