National Renewable Energy Laboratory

Innovation for Our Energy Future

Modeling Renewable Energy Technologies in IAMs for Mitigating Future Climate Change

CCI/IA

Snowmass

August 2010

Draft Multiyear Concept

- 2009:
- Present state of art for RE and EE modeling and impact of capturing the techno-economic characteristics in IAMs via a case study. Case study will be of the U.S..
- Discuss improvements to approach and layout plan for global effort (regionally based?) to apply best in class approach.
- Identify research teams for each region and coordination plan

- 2010
- Review case study results from other regions for enhanced energy economic modeling . Complete 25% of regions.
  - Publish Initial case study results
- Review IAM results with improved RE/EE results

- 2011
- Complete 50% of regions for enhanced RE/EE modeling
  - Publish Special Journal of results
- Complete integration of techno-econ characteristics in IAMs
- Review initial comparative IAM results

- 2012-2013
- Complete 100% of regions and comparative assessments of IAM scenarios with updated RE tech-economic characterization.
  - Publish comparative results from multiple IAMs with updated RE characterizations.
- Recommend path forward for next phase of work.

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A few takeaways from This Year...

- Data quality and robustness matter
- Consistency vs "best in class"
- Generally applicable methodologies are highly valuable given breadth of IAMs
- IAMs show some sensitivity to improved resource data
- Flexible resources/loads remain challenging
- Teaming working; working meetings/calls important to efficiency.

Possible Pathways Forward

- Target: Publication(s) on
  - Methods
  - New resource estimates
    - Wind
      - Onshore
      - Offshore
    - CSP with Transmission?
    - Other?
  - Methods for assessing Flexible loads/supply in IAMs
  - Scenario Comparisons and insights:
    - Global
    - Regional Insights:
      - EU

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Working Approach

- Working teams on:
  - Wind Resource
    - Microscale terrain : priorities:
      - Risoe, NREL
  - Wind Economics; updating the IMAGE data and approach.
    - Comparative satellite data sets
    - Algorithms and data updates
      - PBA, NREL, Others?
  - GIS and Transmission Algorithms
    - How to modify supply or costs for distance from resource to load:
      - NREL, PBA, EPRI, PNNL, DLR,
  - CSP characterization
    - With and without storage

Schedule

- Status Briefings @ EMF24, Oct 25-27, DC
  - Comparison of Satellite Data sets?

- Jan 2011: Status call;
  - Updated Economics method completed
  - Updated Transmission completed
    - CSP data and tech char availalble to teams

- March 2011:
  - Updated Microscale modifications to 0.1/0.5 deg satellite data: priorities: India, China, Others?

- Spring 2011: new scenario runs

- Summer 2011: comparative analysis

- Dec 2011: Submit draft papers