Modeling Renewable Energy Technologies in IAMs for Mitigating Future Climate Change

CCI/IA
Snowmass

August 2012

Draft Multiyear Concept, 2012 version

- 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
- 0th order wind resource comparison
- Some initial IAM results with improved RE/EE results
- Some initial IAM methodology results: IIASA/Message

- 2011
- New offshore wind resource supply curves (Reanalysis data)
- Additional initial IAM results with offshore:
- Add'l IAM Method results: PIK/Remind

- 2012
- Upated CFDDA (40km) wind data for offshore and onshore
- Updated solar resource/supply
- Initial results w/Reanalysis offshore: PIK, IIASA, PNNL
- Update on model methodlgies and High RE Scenario modeling
- Plan for 2013…

Session Outline

- 1:00pm
  - Updated Resource Supply Curves and Initial IAM results: ; Leon Clarke, PNNL; Patrick Sullivan, NREL
  - Solar & Wind Improvements; IRENA/Clean Energy Ministerial Solar and Wind Atlas: Carsten Hoyer Click (on behalf of IRENA), DLR & Dave Renne;
- 2:00pm-: New Approaches to Modeling methodologies for modeling renewables: Niven Winchester, MIT; Patrick Sullivan; NREL ; Chip Friley, BNL

- 3:00 break

- 3.15-4:15 High RE Scenarios: Global Energy Assessment; Nebojsa Nakicenovic, IIASA; RE Futures; Nate Blair, NREL
- 4:15-4:30 pm Discussion of potential session for next year
- 4:30 John's Summary of the 2 weeks…

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Pathway Forward: Model Comparison Study: Role of Renewables in Climate Stabilization: Exploration of Supply, Integration and Model Comparison

- – Investigate if RE resources for wind and solar constrain contributions in climate stabilization scenarios
- – Understand treatment of Variable RETs within global IAMs

- Approach:
- NREL, DLR, & Risoe to provide low, medium and high resource supply curves by country (for aggregation into regions by modeling teams) for on and off shore wind, and solar.
- Set of policy /stabilization scenarios to be defined. Tech options w & w/out CCS, Nuclear also to be considered.
- Study Protocol to be settled Oct/Nov: Data and runs Feb-May 2013
- Snowmass Session 2013 & papers/special issue

2013 Conceptual Agenda

- Day 1:
- Resources/supply updates
  - Wind & Solar, Geo?
- Model Representation and Integration of Variable Renewables
  - Modeling Approaches
    - PIK, IIASA, PBL, PNNL, FEEM, EPRI, EIA, BNL, MIT, TIAM?, IEA/WEO, IEA/ETP, NREL, ADAGE, ICF, others??
      - Short overviews of supply curves/resources
      - Integration & Transmission representation
    - Other teams or topics—please suggest

2013 Conceptual Agenda

- Day 2:

- Expert Studies & State of the Art Approaches
  - Valuation: Wiser, Parsons
  - Transmission Planning/Costing: NREL, LIMES, others?
  - Reliability/Adequacy/Reserve requirements
  - Smart Grid, Demand Response & Storage
    - Potential Speakers: Denholm, Connors,

- Scenario & Model Comparison
  - IAM Scenarios and Model Comparisons
  - Other High Renewable Scenarios
    - US RE Futures
    - EU 2050 Roadmap?
    - Others?

- Next Steps