



**Advanced Model Development and Validation for the
Improved Analysis of Costs and Impacts of Mitigation Policies**

Renewables in Integrated Assessment Scenarios: Lessons Learned and Plans for ADVANCE

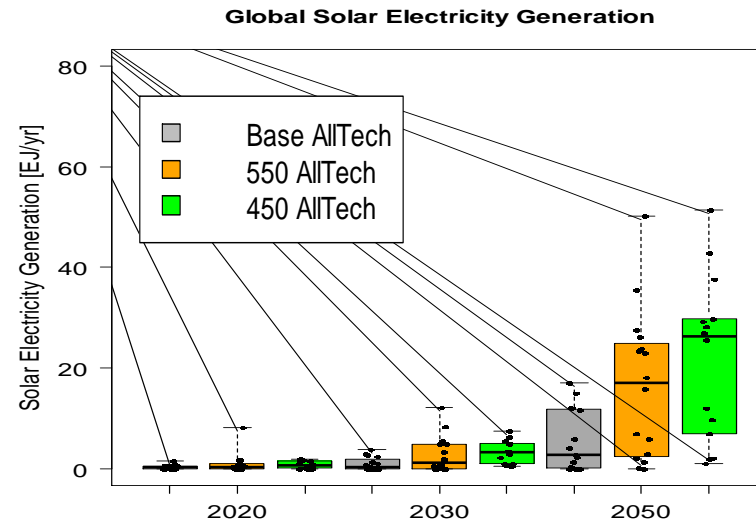
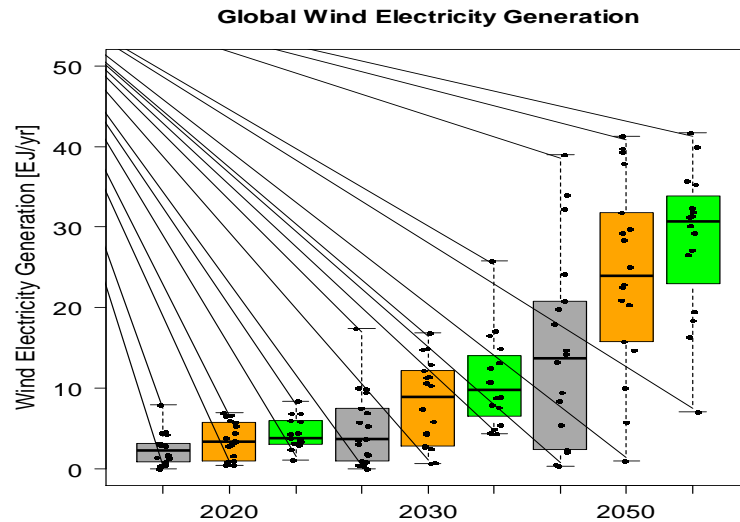
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Potsdam, 20 February 2013



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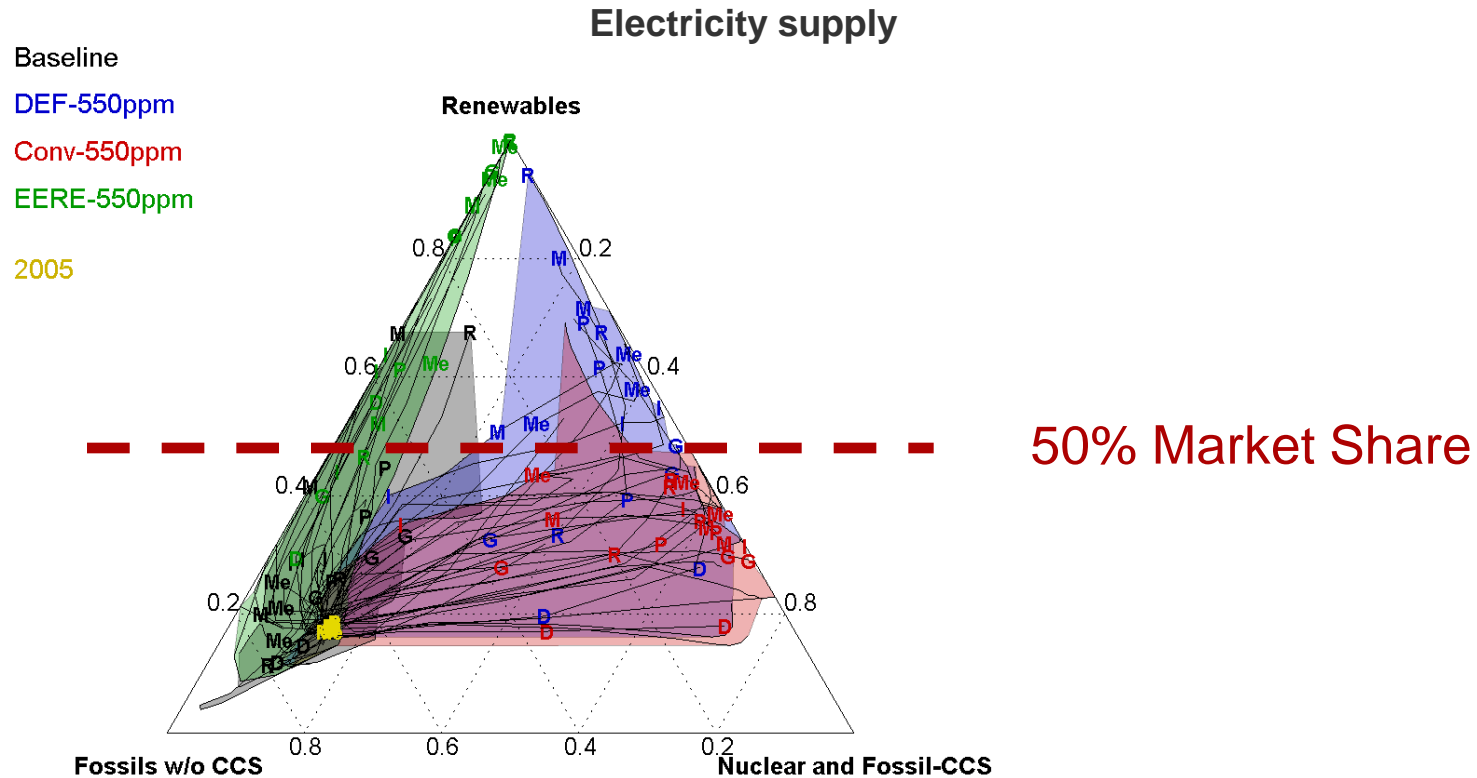
Results from EMF27



EMF27, Luderer et al. (subm.)
IPCC SRREN
Krey and Clarke (2011)

- Substantial increase of wind and solar deployment levels in (almost) all models, even in absence of climate policies
- Large spread in model results

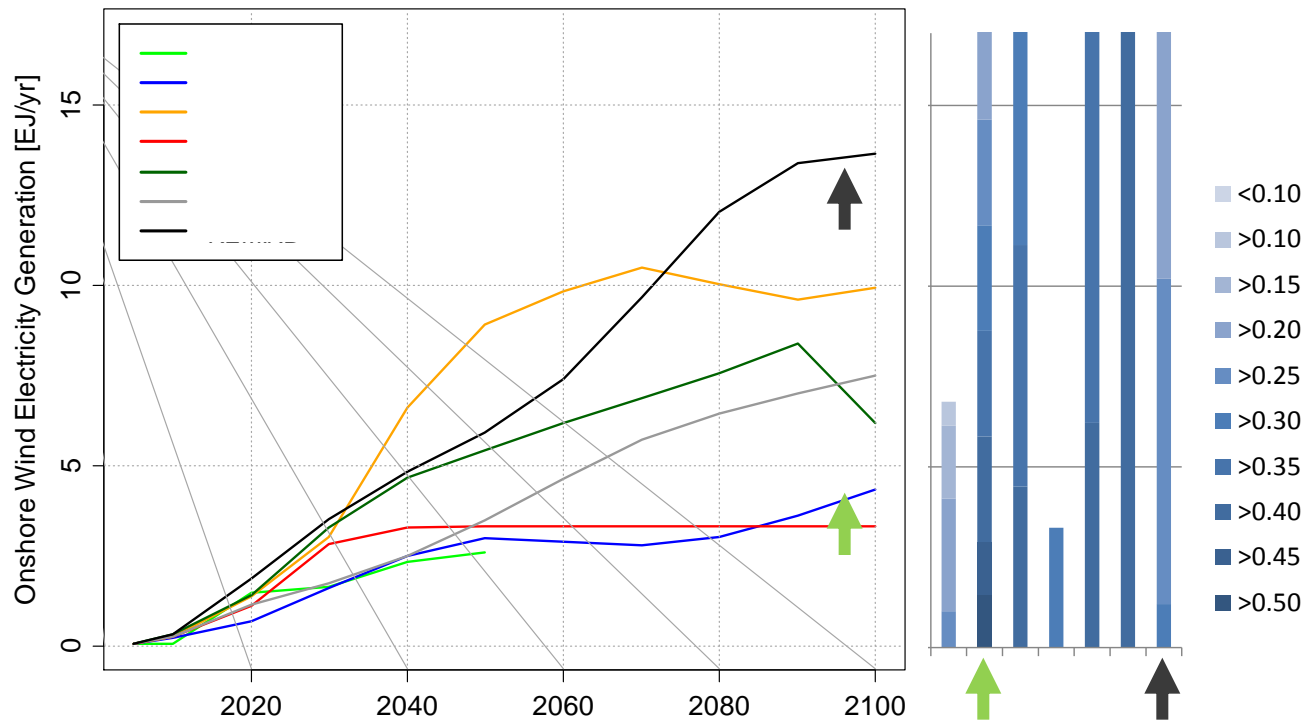
Results from EMF27: Importance of RE for power sector



- Renewables assume a dominant share of power supply in many mitigation scenarios
- Large spread in model results

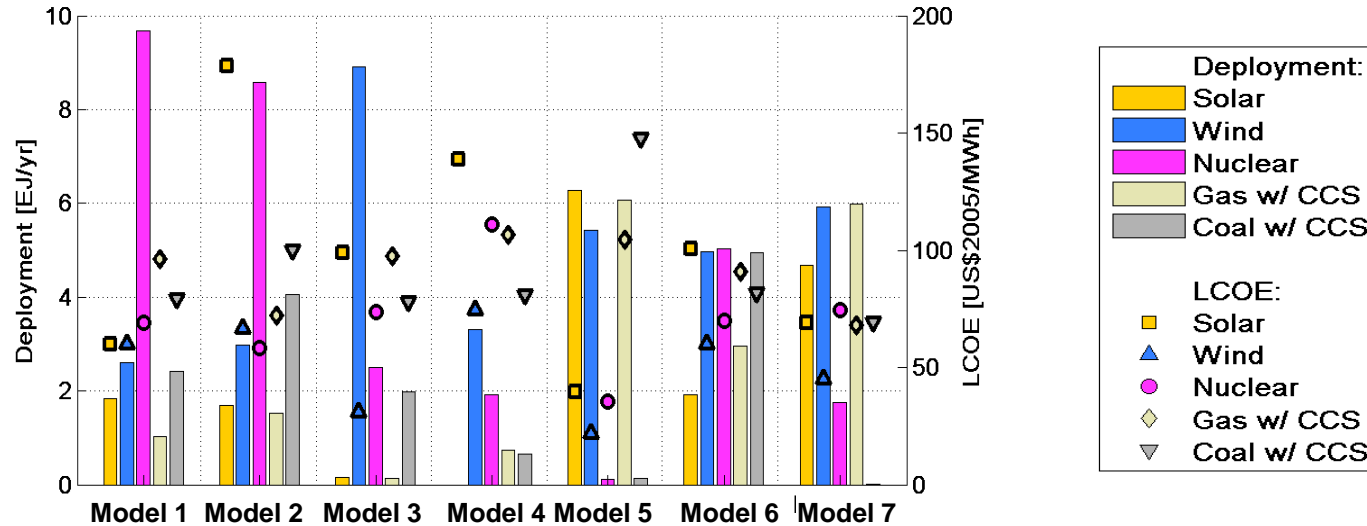
Results from EMF27: Determinants of RE deployment in IAMs

1. Resources



Results from EMF27: Determinants of RE deployment in IAMs

2. Electricity generation costs



Results from EMF27: Determinants of RE deployment in IAMs

3. Representation of VRE integration

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15	Model 16	Model 17
Cost Penalty											Y	Y			Y		Y
Storage	Y		Y				Y*					Y			Y		
Backup Capacity		Y	Y				Y			Y		Y		Y			
Load Duration Curve		Y	Y				Y		Y	Y						Y	
Maximum share	50%	30%	15%	Y		Y		Y	Y								
No Mechanism					Y								Y				

What is ADVANCE about?

Overarching objective of ADVANCE: Promote innovation of IAMs to further enhance robustness of mitigation scenarios



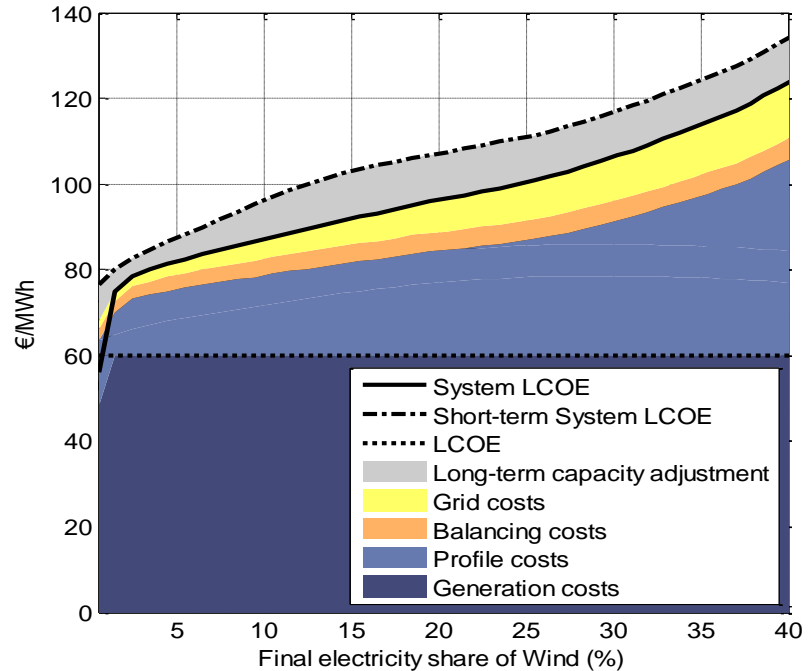
Can be applied to

- (a) Development of RE resource data sets for IAMs
- (b) Methodologies and data sets for treating integration of VRE

The challenge of integrating VRE

Increasing amount of detailed studies on the integration challenge.

How can we make use of these insights for improving IAMs?



Ueckerdt et al., submitted

Expectations for this workshop

- Establish a common vision for the joint work under ADVANCE and the Renewable Initiative
- Define and implement concrete time steps for the further work
- Identify data requirements
- [Think about final products]

Thanks!

References:

- Krey V, Clarke L (2011) Role of renewable energy in climate mitigation: a synthesis of recent scenarios. *Climate Policy*.
- IPCC (2011) Special Report Renewable Energy Sources and Climate Change Mitigation [O. Edenhofer et al. (eds)]. Intergovernmental Panel on Climate Change.
- Luderer G, Krey V, Calvin K, Merrick J, Pietzcker R, Vliet JV, Wada K, Mima S (2013) The role of renewable energy in climate stabilization: results from the EMF27 scenarios. *Climatic Change*, submitted.
- Ueckerdt F, L. Hirth, G Luderer, O Edenhofer (2013) System LCOE: What are the Costs of Variable Renewables? submitted