



Exchanging Best Practices to Incorporate Variable Renewable Energy into Long-term planning in Arab countries

Agenda

Day 1 (April 21, 2019)

Time	Session title	Speaker/ facilitator
9:00 – 9:30	Registration	
Session 1	Opening session	
9:30 – 10:15	Opening and welcome remarks <ul style="list-style-type: none"> • H.E Hala Zawati, Minister of Energy and Mineral Resources, Jordan • Ms. Jamila Matar, Head of Energy Department, LAS General Secretariat, Energy Department • Dr. Ahmed Badr, Executive Director, Regional Center for Renewable Energy and Energy Efficiency (RCREEE) • Dr. Zoheir Hamedi, Regional Programme Officer, IRENA 	
10:15 – 10:45	Self-introduction and expectations of participants	
10:45– 11:30	“Long-term energy planning under high RE scenarios – introduction and workshop overview” <ul style="list-style-type: none"> • Define the focus of the workshop: long-term generation expansion planning • Based on IRENA's "Planning for the Renewable Future Report", discuss role of long-term energy planning; tools used in energy planning; features of VRE; and how VRE features have been incorporated in long-term energy planning • Introduce the objective and structure of the workshop in relation to the planning concepts 	Asami Miketa (IRENA)
11:30 – 12:00	<i>Group photo and coffee break</i>	
12:00 – 13:00	Presentation: RCREEE Engagement in the Arab region	Dr. Ahmed Badr
13:00 – 14:00	<i>Lunch</i>	
Session 2	Country experience	Chaired by LAS
14:00 – 15:10	Introduction of the format <ul style="list-style-type: none"> • Discuss each country's long-term planning process for generation capacity expansion, including how utility and government work together • Describe energy or power system models used for generation capacity expansion planning • Describe how solar and wind are currently modelled in these modelling tools • Discuss challenges in developing scenarios with high shares of solar and wind using these tools 	Daniel Russo (IRENA)



	Country presentations – Group 1 [15 minutes presentation plus 5 minutes discussion]	Participating Country representative (s)
15:10 – 15:40	<i>Coffee break</i>	
15:40 – 16:40	Country presentations – Group 2	Participating Country representative (s)
16:40 – 19:00	<i>Intermission/ Break</i>	
19:00 – 21:00	Round table Discussion: Establishing the Monitoring mechanism for the implementation of the Arab Strategy for Sustainable Energy	
21:00 – 22:00	<i>Dinner</i>	

Day 2 (April 22, 2019)

Time	Session title	Speaker/ facilitator
9:00– 9:30	Recap from Day 1 Plan for Day 2 / Q&A	Reem Korban (IRENA)
Session 2	Country experience (cont'd)	Chaired by Dr. Maged Mahmoud, Technical Director (RCREEE)
9:30 – 10:30	Country presentations – Group 3	Participating Country representative (s)
10:30 – 11:30	Country presentations – Group 4	Participating Country representative (s)
11:30 – 12:00	<i>Coffee break</i>	
12:00 – 13:00	Key planning considerations with a higher share of VRE <ul style="list-style-type: none"> Briefly introduce four planning concepts – capacity credit, flexibility, transmission investment needs, and stability constraints, in relation to long-term energy planning Discuss the need for high-quality, location- and time-specific RE resource data, and the value of iteration between capacity, dispatch, and power flow models 	Asami Miketa (IRENA)
13:00 – 14:00	<i>Lunch</i>	
Session 3	Planning with accurate VRE cost data	Chaired by LAS
14:00 – 15:00	Input presentation 1: cost reduction of VRE and its relevance to long-term energy planning <ul style="list-style-type: none"> Discuss how cost influences the future mix of technologies Discuss the cost reduction trends of VRE in the past and projected future trends – global perspective and 	Daniel Russo (IRENA)



	regional perspective	
15:00 – 15:30	<i>Coffee Break</i>	
15:30 – 16:45	Exchange of country experiences and discussions <ul style="list-style-type: none"> • Questions and clarifications to the input presentations • Discuss the best sources for VRE costs and how to integrate them regularly into models and forecasts Discuss the gaps in the planning process	Moderated by Zoheir Hamed (IRENA)

Day 3 (April 23, 2019)

Time	Session title	Speaker/ facilitator
9:00 – 9:30	Recap from Day 2 Plan for Day 3 / Q&A	Reem Korban (IRENA)
Session 4	Planning for generation adequacy	Chaired by LAS
9:30 – 10:25	Input presentation 1: generation adequacy and capacity credit concept and its relevance to long-term energy planning under high share of VRE. <ul style="list-style-type: none"> • How generation adequacy is impacted by a high share of VRE in a system? • What is capacity credit? • What would happen when the capacity credit is not reflected in the capacity expansion planning Examples of how the capacity credit concept is used in the capacity expansion planning	Benoit Janssens (IRENA/Tractebel)
10:25 – 11:15	Input presentation 2: how generation adequacy and capacity credit concept may be reflected in energy planning models <ul style="list-style-type: none"> • Discuss ways to mimic the capacity credit concept and its implications in capacity expansion models, including, defining time slices better, using capacity margin constraints. 	Asami Miketa (IRENA)
11:15 – 11:45	<i>Coffee break</i>	
11:45 – 13:00	Exchange of country experiences and discussions <ul style="list-style-type: none"> • Questions and clarifications to the input presentations • Discuss the relevance of the capacity credit concept in each country's planning process • Discuss how the capacity credit concept is implemented in each country's model Discuss the gaps in planning process	Moderated by Zoheir Hamed (IRENA)
13:00 – 14:00	<i>Lunch</i>	
Session 5	Planning for a flexible power system	Chaired by Dr. Maged Mahmoud, Technical Director (RCREEE)
14:00– 15:00	Input presentation 1: the flexibility concept and its relevance	Benoit Janssens



	<p>to long-term energy planning under high share of VRE</p> <ul style="list-style-type: none"> • What is flexibility? • What are the measures to improve flexibility and which of these are particularly relevant to capacity expansion planning? • Discuss what would happen when the flexibility is not reflected in the capacity expansion planning • Discuss the flexibility of power plants (fossil, hydro, and renewable plants) • Discuss roles of inter-connectors, storage (including pumped hydro), demand side management, self-consumption <p>Examples of how the flexibility concept is used in the capacity expansion planning</p>	(IRENA/Tractebel)
15:00 – 15:30	<i>Coffee Break</i>	
15:30 – 16:15	<p>Input presentation 2: how the flexibility concept may be reflected in energy planning models</p> <p>Discuss ways to mimic the flexibility concept and its implications in capacity expansion models, including, defining time slices better, using flexibility balances, linking with dispatch models</p>	Asami Miketa (IRENA)
16:15 – 17:30	<p>Exchange of country experiences and discussions</p> <ul style="list-style-type: none"> • Questions and clarifications to the input presentations • Discuss the relevance of the flexibility concept in each country's planning process • Discuss how the flexibility concept is implemented in each country's model <p>Discuss the gaps in planning process</p>	Moderated by Zoheir Hamedi (IRENA)

Day 4 (April 24, 2019)

Time	Session title	Speaker/facilitator
9:00 - 9:30	Recap from Day 3 Plan for Day 4 / Q&A	Reem Korban (IRENA)
Session 6	Planning for adequate transmission	Chaired by IRENA
9:30– 10:15	<p>Input presentation 1: VRE resource and zoning evaluations, the tradeoff between transmission investment and RE resource quality, and its relevance to long-term energy planning under high share of VRE</p> <ul style="list-style-type: none"> • Discuss the importance of geo-spatial information for planning with VRE • Discuss the methodologies to assess transmission investment needs <ul style="list-style-type: none"> ○ Zone planning: renewable energy zones 	Benoit Janssens (IRENA/Tractebel)



	<ul style="list-style-type: none"> • Discuss how to feature transmission constraints in planning process • Discuss the ways to represent the transmission investment, including detailed geo-spatial representation of a model, and cost markup methodology 	
10:15– 11:15	<p>Exchange of country experiences and discussions</p> <ul style="list-style-type: none"> • Questions and clarifications to the input presentations • Discuss the best sources for VRE geospatial data and how to integrate it into models • Discuss the relevance of the VRE's transmission investment needs in country's planning process • Discuss how the VRE linked transmission investment needs is implemented in each country's model <p>Discuss the gaps in the planning process</p>	Moderated by Zoheir Hamedi(IRENA)
11:15 – 11:45	<i>Coffee break</i>	
Session 7	Planning for stability related operational constraints	Chaired by Dr. Maged Mahmoud, Technical Director (RCREEE)
11:45 – 12:45	<p>Input presentation 1: stability-related operational constraints and their relevance/irrelevance to long-term energy planning</p> <ul style="list-style-type: none"> • Discuss the sources of limits to instantaneous penetration of VRE • Discuss the relevance of power system operation with limited synchronous generators in long-term energy planning • Discuss the importance of reflecting VRE adequately in grid codes • Establish different types of stability problems and discuss their relevance/irrelevance to long-term energy planning 	Benoit Janssens (IRENA/Tractebel)
12:45 – 13:30	<p>Exchange of country experiences and discussions</p> <ul style="list-style-type: none"> • Questions and clarifications to the input presentations • Discuss the relevance of the stability concerns in country's planning process • Discuss available VRE grid integration studies and how they relate to long-term capacity expansion planning <p>Discuss the gaps in planning process</p>	Moderated by Zoheir Hamedi (IRENA)
13:30 – 14:30	<i>Lunch</i>	
Session 8	Planning gaps	Chaired by IRENA
14:30 – 16:30	<p>Identification of planning gaps</p> <p>Identify the gaps in each country's planning process with aiming at a higher share of VRE, including planning concepts, data, methodologies, human resources</p>	Dr. Maged Mahmoud, Technical Director (RCREEE)



16:30 – 17:00	<i>Coffee Break</i>	
17:00 – 17:45	Identification of areas for follow up action <ul style="list-style-type: none">Identify the areas of follow up actions that can be supposed by IRENA and partners	
17:45 – 18:15	Closing of the workshop <ul style="list-style-type: none">Jordan's Ministry of Energy and Mineral ResourcesRegional Center for Renewable Energy and Energy Efficiency (RCREEE)Dr. Zoheir Hamedi, Regional Programme Officer, IRENA	