

#IRENAinnovation

IRENA INNOVATION WEEK

The Age of Renewable Power

DEEPDIVE SESSIONS:

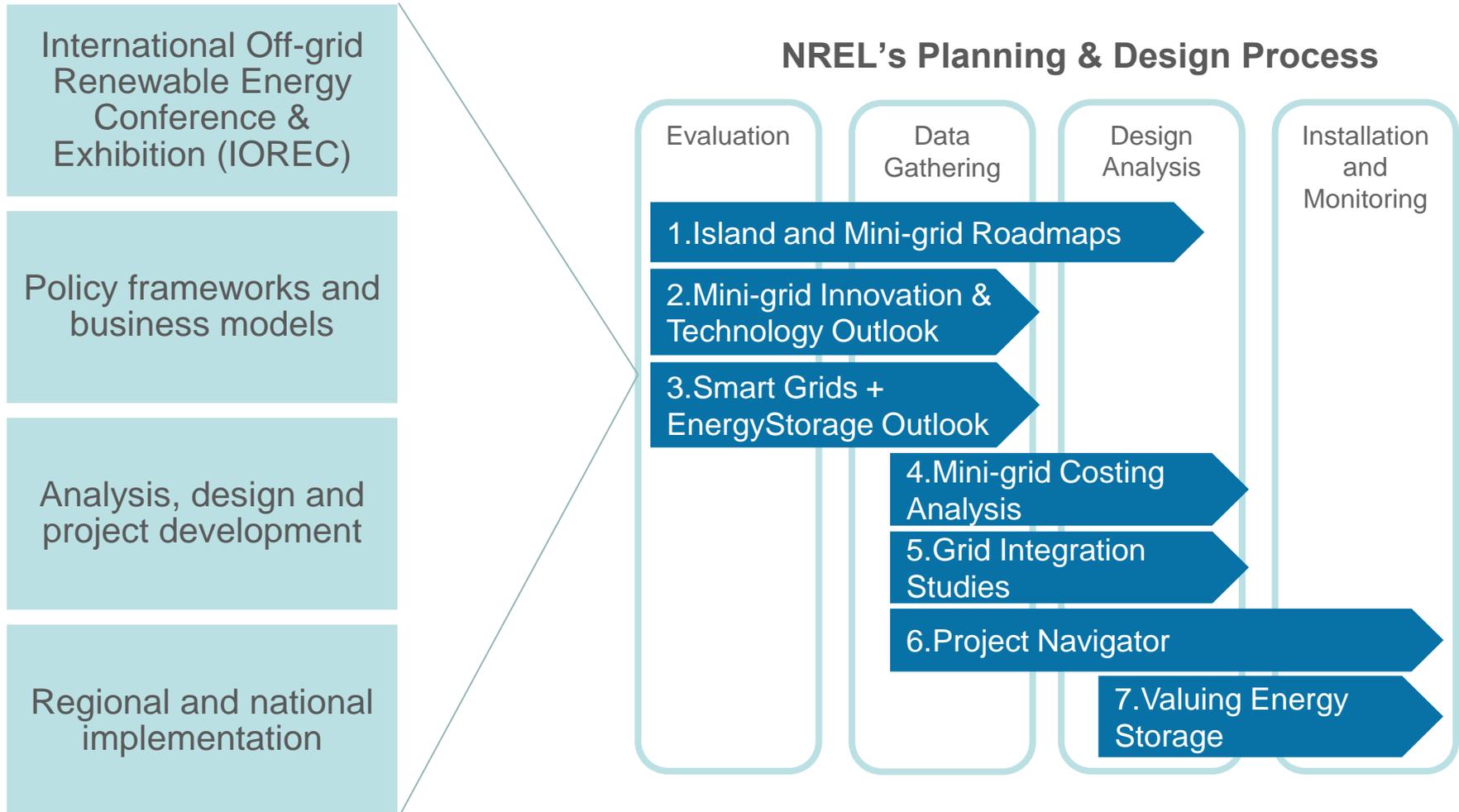
The Future Grid: Smart Mini and Microgrids

11:00-13:00, Thursday 12 May

Roland Roesch; IRENA IITC

11 – 13 MAY 2016 • BONN, GERMANY

IRENA's Mini and Microgrid activities



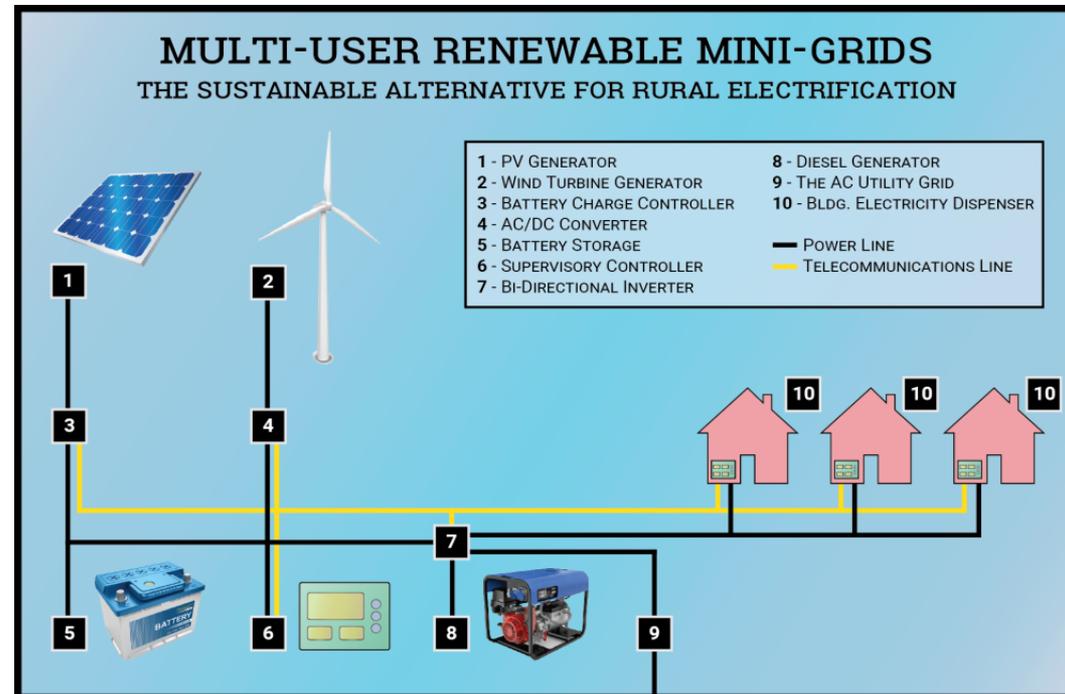
A look in IRENA's relevant initiatives in Mini and Microgrid

1. Island and Mini-grid Roadmaps

- Road mapping for Pacific SIDS
- Three Renewable Energy Road Maps completed, one ongoing

2. Mini-grid Innovation & Technology Outlook

- Types: Autonomous basic, full service, Interconnected for community and industrial applications
- State of the Art Technologies
- Opportunities for Innovation



A look in IRENA's relevant initiatives in Mini and Microgrid

2. Mini-grid Innovation & Technology Outlook: Innovation Prospects

The Renewable Energy Based Mini-grid of the Future

2015

2025

2035

| | | | |
|---------------------------|--|--|--|
| Ease of deployment | Custom engineering based on local needs and resources | Planning tools with increasingly modular and scalable technologies | There are standard off-the-shelf products available and low-cost robust planning tools for easy deployment of REBMGs |
| RETs penetration | Low-penetration RETs considered in autonomous mini-grids | Autonomous and more economical mini-grids with low cost storage, generation and intelligent controls | Interconnected mini-grids considering higher penetrations of RET for cost-effective resilience |
| Commercialisation | Mostly pilots, some commercial autonomous REBMGs for basic service | Commercial autonomous REBMGs for basic service. Some commercial autonomous REBMGs for full service | Commercial autonomous REBMGs for basic and full service. Some commercial interconnected REBMGs for community and industrial applications |

A look in IRENA's relevant initiatives in Mini and Microgrid

3. Smart Grids + Energy Storage Outlook

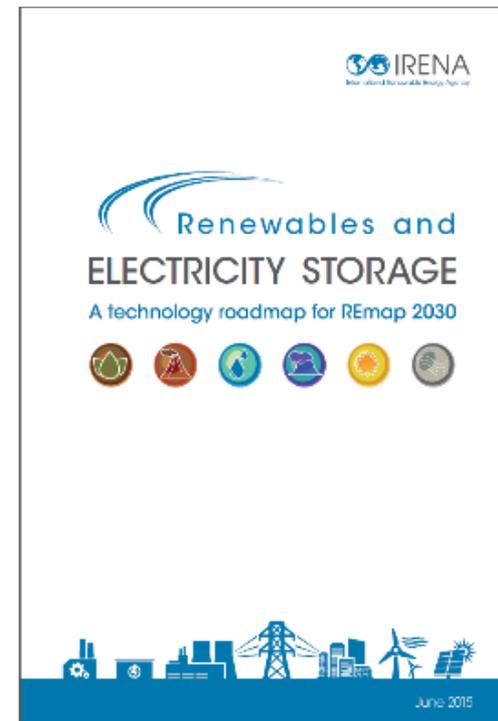
- Storage in islands and remote areas
- Grid-located storage (transm. & distr.)

4. Mini-grid Costing Analysis

- PV Mini-grid systems in Africa, cost breakdown by cost components 2011-2015

5. Grid Integration Studies

- Detailed electrical grid modelling
- Reliability and security assessment with planned penetration levels of RE
- Technical assistance and simulation software for grid studies



A look in IRENA's relevant initiatives in Mini and Microgrid

6. IRENA Project Navigator

- Mini and Micro Grid technical concept and Financial Evaluation Tool



The screenshot shows the IRENA Project Navigator website. At the top left is the IRENA logo (International Renewable Energy Agency). At the top right is the 'IRENA PROJECT NAVIGATOR' logo. Below the logos is a navigation bar with the following links: Home, Learning section, Start a project, Financial Navigator, My account, and Sign out.

The main content area is divided into several sections:

- Welcome to the IRENA Project Navigator!**: A blue banner with a photo of a microgrid installation. To the right of the photo is a list of bullet points:
 - To learn more about the renewable energy project development process and to develop bankable project proposals, please enter the Project Navigator
 - When looking for funding opportunities, browse the IRENA Financial Database using the Financial Navigator
 - If you are a project developer, you can create a workspace online and track your project development progress.
 Below the list is the text: "Choose from the Quick Access tiles below!"
- News**: An orange sidebar containing three news items:
 - 9 November, 2015**: 3rd Project Navigator Workshop, Dubai, U.A.E.
 - 13 May, 2015**: "Introduction to the IRENA Project Navigator" Webinar. [Watch it here!](#)
 - 5-6 May, 2015**: 2nd Project Navigator Workshop, Ulaanbaatar, Mongolia
- Learning section**: A purple tile with the text "Learn about project development".
- Start a project**: A brown tile with the text "Create a project workspace".
- Financial Navigator**: A green tile with the text "Find funding opportunities".

At the bottom of the page, there is a copyright notice: "Copyright © 2014-2014 IRENA - International Renewable Energy Agency. All rights reserved. Terms and Conditions". To the right of the notice are social media icons for Facebook and YouTube.

A look in IRENA's relevant initiatives in Mini and Microgrid

7. Valuing energy storage

- Integrate variable renewables
- Reduce fuel consumption
- **Price at which the power generated is sold**
- **Reduction of generation operating costs**
- Lower need for flexibility due to lower variability
- **Reduction of grid operating costs**
- Increase distributed generation self-consumption
- Reduce demand charge and/or time shift energy consumption
- **Reduction of energy bills**
- Control the frequency of the grid
- Alleviate congestions
- **Reduction of grid operating costs**
- **Reduction of energy losses**



Get in touch!

Emanuele Taibi (etaibi@irena.org)

Maria Ayuso (mayuso@irena.org)

Ruud Kempener (rkempener@irena.org)

Eun Young So (eso@irena.org)

Francisco Gafaro (fgafaro@irena.org)

Roland Roesch (rroesch@irena.org)

Salvatore Vinci (svinci@irena.org)

Chitra Narayanswamy (cnarayanswamy@irena.org)

Islands & mini-grids roadmaps

Mini-grid technology outlook

Electricity storage & smart grids

Mini-grid cost analysis

Grid studies

Project navigator

Policy, business models & IOREC

National implementation

#IRENAinnovation



Thank you