#IRENAinnovation

IRENA
International Renewable Energy Agency

IRENA INNOVATION WEEK

The Age of Renewable Power

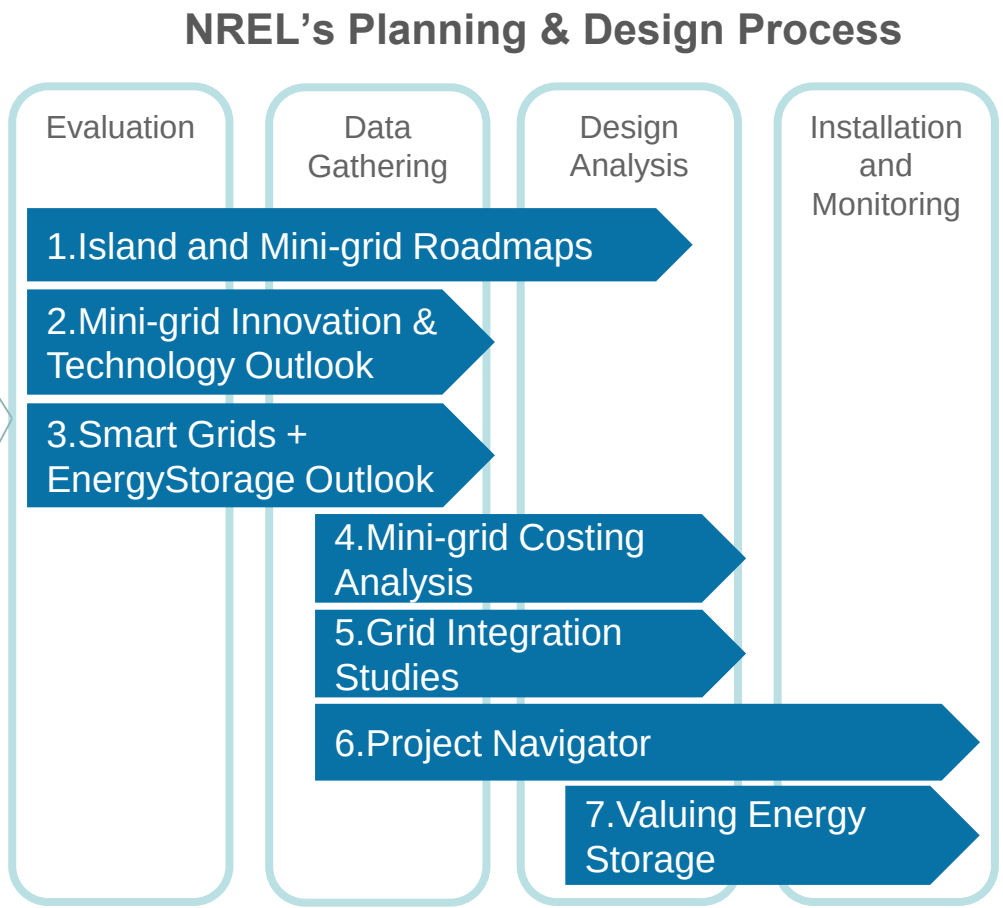
DEEPDIVE SEESIONS:
The Future Grid: Smart Mini and Microgrids
11:00-13:00, Thursday 12 May

Roland Roesch; IRENA IITC

11 – 13 MAY 2016 • BONN, GERMANY

IRENA's Mini and Microgrid activities

- International Off-grid Renewable Energy Conference & Exhibition (IOREC)
- Policy frameworks and business models
- Analysis, design and project development
- Regional and national implementation



Source: www.iorec.org & http://www.nrel.gov/docs/fy13osti/57744.pdf

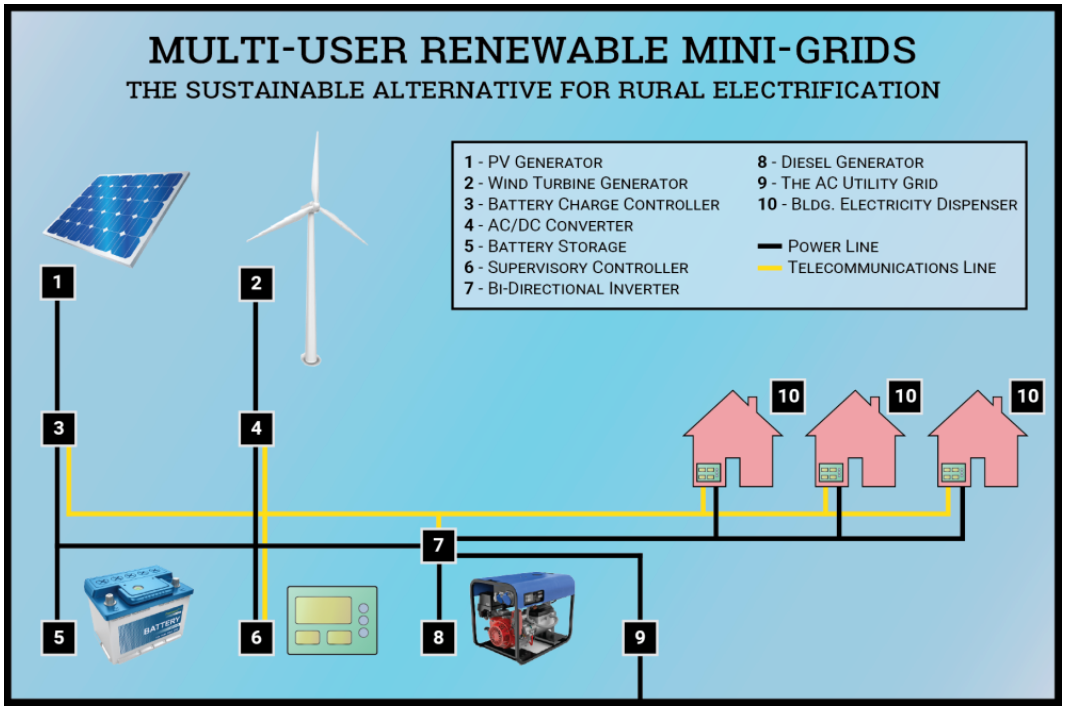
A look in IRENA's relevant initiatives in Mini and Microgrid

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



Source: IRENA (Forthcoming) Mini-grid Innovation & Technology Outlook

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

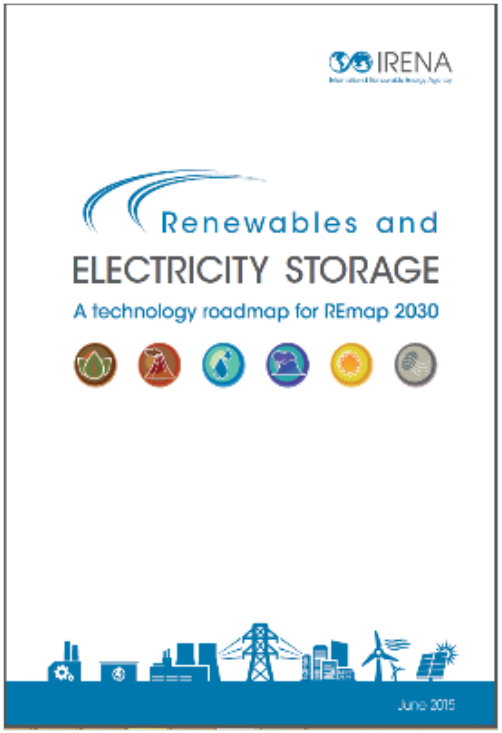
	2015	2025	2035
Ease of deployment	Custom engineering based on local needs and resources	Planning tools with increasingly modular and scalable technologies	There are standard off-the-shelf products available and low-cost robust planning tools for easy deployment of REBMGs
RETs penetration	Low-penetration 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

Source: IRENA (Forthcoming) Mini-grid Innovation & Technology Outlook

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

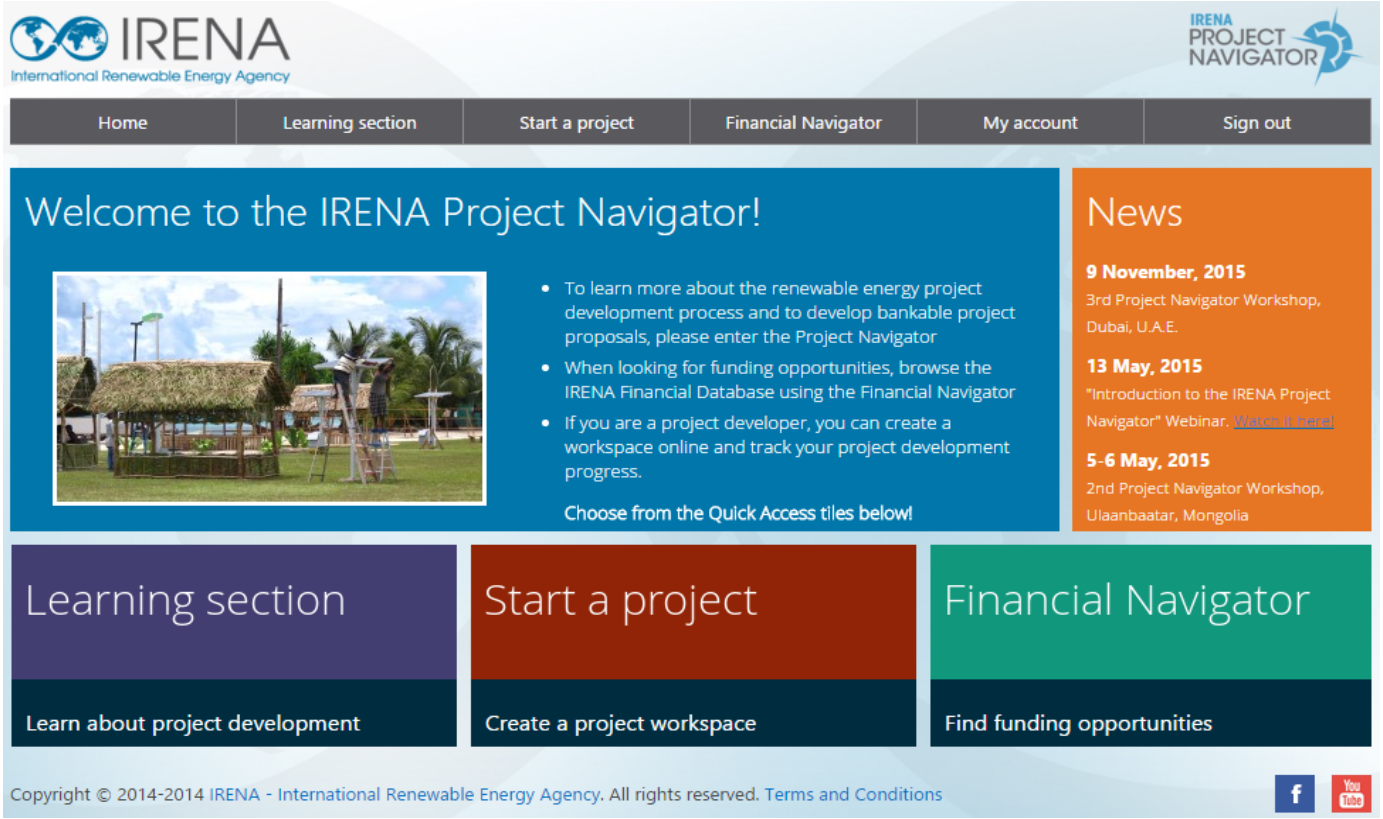
5.Grid Integration Studies

- 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



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!

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Thank you