Remote Prosumers – Preparing for deployment

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Background IEA-RETD

IEA-RETD is part of the IEA’s Energy Technology Network

RETD stands for “Renewable Energy Technology Deployment”.

IEA-RETD is a policy-focused, technology cross-cutting platform (“Implementing Agreement”) under the legal framework of the International Energy Agency.

www.iea-retd.org
The mission of IEA-RETD is to accelerate the large-scale deployment of renewable energies

- Created in 2005, currently 8 member countries: Canada, Denmark, France, Germany, Ireland, Japan, Norway, UK. European Commission to join in 2015.

- IEA-RETD commissions annually 5-7 studies bringing together the experience of some of the world’s leading countries in RE with the expertise of renowned consulting firms and academia.

- Reports and handbooks are freely available at www.iea-retd.org.

- IEA-RETD organizes workshops and presents at international events.
Remote Prosumers: Preparing the grounds for deployment

<table>
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<tr>
<th><strong>Objective</strong></th>
<th>Providing guidance to policy makers on the drivers, opportunities, challenges and implementation strategies of prosumer policies</th>
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<td><strong>Approach</strong></td>
<td>Framework and methodology of the IEA-RETD studies RE-PROSUMERS (2014) and REMOTE (2012) to the special unique situation of prosumers in remote areas and islands</td>
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<td><strong>PSG</strong></td>
<td>Georgina Grenon (FR, chair), Sarah Evangelista (CA), Michael Paunescu (CA), Rune Holmen (Norway)</td>
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<td><strong>IB</strong></td>
<td>Kristian Petrick (IEA-RETD Operating Agent), Wilson Rickerson (MCG), Toby Couture (3EAnalytics)</td>
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<td><strong>Timeframe</strong></td>
<td>May to June 2015</td>
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Agenda

• Three major opportunities for prosumers in islands

• Key drivers suggest quick prosumer uptake

• Main challenges are upon utilities

• Strategic framework for prosumers help islands in the transition
Prosumers = Producers + Consumers of electricity

Introduction

Prosumers with roof-top PV

Produce

Grid

Consume

Self-consume with / without storage

Why are prosumers relevant for islands?
Reducing generation Costs: PV can be cheaper than diesel

Mainland countries

PV below retail rate **but above** generation costs of power mix

Remote Areas / Islands (RAI)

PV below retail rate **and below** diesel generation costs

Integration Cost: Upgrades for grids and motors, automation, storage, etc.
Exploiting available space to tap full RE potential: Roof-top PV can supply substantial share of islands’ electricity demand

Mainland countries: Based on data from RE-COM-PROSUMERS, Denholm & Margolis, BMWi, ADEME
Islands: Calculation assuming average 1kW/inhabitant
On many islands, roof-top PV may be the best (or only) viable RE alternative

Saba, Caribbean
Supporting the energy system: Prosumers are best positioned to absorb the midday PV peak through load shifting

- Peak shaving through storage
- Demand response / change of behaviour

Over-supply
Encouraging roof-top PV generation and self-consumption to reach RE targets and capture the opportunities

- If roof-top PV is necessary to reach RE targets
- Make best use of m² available and kWh produced
- Avoid grid defections
- Avoid curtailment
- Provide fair compensation for injected kWh or system services
- Encourage self-consumption and storage (on-site and central)
Drivers in islands are rather in favour of prosumer, so uptake may be quicker than in mainland countries.
Stakeholders in prosumer uptake

Stakeholders’ position in RAI to prosumers is in general similar to mainland countries

Constrain prosumers

Enable prosumers

Governments

Utilities

Non-prosumers

Technology providers

Line of normalised value of mainland countries
Island utilities may lose business to prosumers but may be able to increase margins by buying cheaper energy from prosumers

**Lost business (like EE measures)**
- but also reduced fuel costs

**New business**
- investment required

**Similar business**
- trading power

**Traditional business**

**Schematic illustration of RAI power market**
from utility view point; assumed full roof-top PV potential utilised (~40%)
To define a prosumer policy strategy, governments need to assess all drivers and balance opportunities and risks

1. Evaluate drivers and conditions
   Are the conditions in place to support non-incentivised consumer scale-up?

2. Balance opportunities and risks
   Given the trade-offs, is support for prosumers a national policy objective?

3. Define policy strategy
Like mainland countries, policy makers in islands have three strategy choices:

1. Constrain prosumers
   - Restrictive policies to avoid structural changes to utility business and regulatory paradigms

2. Enable prosumers
   - Enabling policies like compensation for surplus production and transparent interconnection rules

3. Transition to prosumers
   - New regulatory and policy approaches / paradigms for utility regulation and grid management
Transitioning to prosumers entails structural changes especially in two areas

• **Supporting utilities in redefining their business model:**
  • Investing in roof-top PV or providing financing
  • Trading power: Buying from prosumers and selling to consumers
  • Coordinating between the increasing number of players.
  • Regulators to explore approaches like decoupling of energy sales from revenues

• **Reconceptualising how energy infrastructure is financed and shared.**
  • Lenders may need to modify lending protocols to support distributed RE
  • Allow re-financing through future fuel cost savings / reduced subsidies.
  • Develop micro-finance schemes, on-bill financing, etc.
  • Prosumers can contribute to finance RE systems
  • Leverage their position as a “test beds” for attracting capital
  • Consider (partially) tax-financed energy infrastructure
### Policies for Transitioning to Prosumers

#### 3. A Incremental Transition to prosumers

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<th>Incremental approach</th>
<th>Examples</th>
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| **Prosumer compensation mechanisms** | • Buy-all/sell-all arrangements or hybrids with net metering  
• Net excess generation purchased at full retail rate, or (in islands) at, or near, the avoided cost rate |
| **Rate Design** | • Time-varying prices (this could be positive or negative, depending on the jurisdiction and level of PV penetration)  
• Low fixed charges  
• No special tariff |
| **Ratemaking** | • Decoupling utility revenues from power sales  
• Lost revenue adjustment mechanisms or performance-based incentives |
| **Market Reforms** | • Encouraging new, prosumer-friendly business models  
• Allowing peer-to-peer power sharing |
| **Tax Reforms** | • Shift electricity sales tax to other income sources  
• Tax incentives or credits for solar system components, or investments |
### 3.B Structural Transition to prosumers

#### Main challenges are upon utilities – but new approaches are being developed

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<th>Structural approach</th>
<th>Examples</th>
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<td>Innovative business models</td>
<td>• Utilities become brokers of new customer relationships, partners with prosumer service providers, or even financiers of prosumer infrastructure</td>
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| New product and service offerings              | • Selling specific “services” such as light, heat, or load management  
• Instead of selling electricity as a universal bulk commodity, utilities could make differentiated offerings based on individual requirements. |
| New operational models                         | • Strengthened and more sophisticated grid operations  
• Distribution grids to adapt management mechanisms of transmission grids, e.g. locational pricing, forecasting, and real time visibility |
| Emerging technologies                          | • Smart grid infrastructure to be more integrated, interactive, and price responsive.  
• More visibility and control at the distribution level, customers more opportunities to react to electricity market |
Conclusions

Prosumers have the potential to be an integral part of islands’ energy systems

- Roof-top PV prosumers can
  - help reduce generation costs
  - tap the full RE potential
  - support the energy system
- Key drivers suggest faster prosumer uptake in islands than in mainland countries
- Strategic prosumers framework can support policy makers and utilities to structure the debate and manage the transition

Islands will likely be at the forefront of the transition towards prosumers.
IEA-Reports on prosumers and remote areas and islands are freely available at www.iea-retd.org
THANK YOU!

For additional information on RETD

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