Eleventh meeting of the Technology Executive Committee

United Nations Campus (AHH building), Bonn, Germany
7-11 September 2015

Background note

Technical paper on distributed renewable electricity generation and provision

Effective business models in various markets, including related capacity-building needs

I. Introduction

A. Background

1. The Technology Executive Committee (TEC) held at its 10th meeting (TEC 10) a thematic dialogue on the development and transfer of technology for distributed renewable energy generation and integration.[1] The thematic dialogue aimed at supporting the TEC in identifying and generating policy options, mechanisms and measures to enhance the development and transfer of technology for distributed renewable generation, highlighting its mitigation potential and other co-benefits.

2. Based on the outcomes of the dialogue, the TEC agreed to prepare a TEC Brief on distributed renewable generation, which will be published in 2015, as well as to initiate the preparation of a paper, in collaboration with relevant organizations, to deepen the consideration of some aspects related to distributed renewable generation.

3. The preparation of the paper has been included in the Updated rolling workplan of the TEC for 2014–2015 – Implementation for 2015, as activity 5.2.

B. Objectives of the note

4. In line with the decision at TEC 10, and based on a literature review (as listed in section IV) the technical paper would take a closer look at specific aspects of distributed renewable electricity generation and provision, that is on effective business models in various markets, including related capacity-building needs. This will enable putting forward recommended measures and actions to attract private sector and further deploy technology in distributed renewable electricity generation.

5. This background note provides an overview of the proposed scope of the paper and the process and timeline for its preparation. Being an outline for a technical paper (as opposed to a background paper that provides more of an overview of an issue), the main purpose of this background note is to set the stage and give appropriate direction for the preparation of the technical paper.

C. Possible action by the Technology Executive Committee

6. The TEC will be invited to consider the background note and agree on the general scope of the technical paper and the process and timeline for its preparation.

[1] http://unfccc.int/ttclear/templates/render_cms_page?s=TEC_TD5

II. Overview of the proposed scope of the technical paper

7. Within the last years, renewable energy generation has experienced faster growth rates than most other options in the electricity sector. ***Continued growth of renewable energy has the potential to meet environmental, economic and social goals, both on a national and global scale*** (EUEI, 2014). In order to support this development and to contribute and ensure the sustainable path of energy production worldwide, policy makers, international financing institutions and the private sector have to work together in order to facilitate a reliable and strong environment for renewable energy business models.

8. Against this background, particular attention should be paid to ***distributed renewable electricity generation technologies and systems***,[2] which ***are emerging as a cost-effective alternative to centralised solutions, especially in developing regions***, where access to electricity is still non-existent or unreliable (EUEI, 2014). Their distributed nature allows them to be tailored specifically to local conditions and deployed closer to the demand side. Falling costs and increasing technical maturity can make renewable energy a very suitable option for distributed energy systems.

➔ The paper could present recent numbers and growth estimation for distributed renewable electricity generation markets.

➔ The paper could further analyse market conditions for distributed renewable electricity generation in various regions, including case studies highlighting solutions on the ground which have proven their effectiveness and market-readiness.

➔ This section could also include an introduction on technologies and systems that are being used today in distributed renewable electricity generation and, if possible, identify existing technology gaps.

9. Reduced costs increase the scope, scale and **competiveness of renewables**, driving more projects, leading to more technology improvements and even lower costs. For some technologies and areas **grid parity** with electricity generation from fossil sources has already been reached (IRENA, 2015a, IRENA 2014). This does not imply that markets will deliver a sustainable, cost-effective energy mix by themselves.

➔ The paper could highlight benefits of distributed renewables, including mitigation potential and co-benefits, compared to recent systems based on fossil fuels, and could emphasize on enhanced ways to reach grid parity.

10. In many countries, electricity supply is historically a public function. However, the continued development of distributed renewables means that opportunities for ***direct private-sector investment*** in electricity supply will expand (Komor, 2015). There exist ***different business models*** for distributed renewables; ranging from *build-only* to *build-own-operate-maintain* options. Business models may also vary in the degree of financing: from small-scale customer projects for rooftop PV to larger utility sites or purely private investments projects.

➔ The paper could categorize existing business models of various sizes among different criteria, like the ownership structure or financing model. It could provide case studies[3] for each generic model showcasing tailored solutions for different markets and, if possible, highlight innovative solutions beyond these categories.

Table: Possible breakdown of existing business models for distributed renewable energy:

	Public model	Public-private model	Private model	Community model
Ownership structure				
Scope & output				
Financing				
Case study				

[2] Definitions of main terms will be introduced in the paper
[3] Potential case studies could be presented more detailed in an annex to the technical paper

11. Due to the recent developments, the cost of capital for renewable energy projects is decreasing since perceived risks are already being more accurately quantified. It is likely to fall further as the **investment community learns more about renewable technologies and their opportunities**. Depending on the scale of the project and the project-specific risks, an **average return of about 6%-10%** can currently be obtained for most renewable energy projects in developed markets, with higher returns expected in developing countries (IRENA 2014).

➔ The paper could analyse the business models from a more economic perspective, highlight opportunities as well as concrete risks, based on lessons learned from previous engagements (loan accessibility, corruption, market distortion, etc.).

12. Recent studies found that distributed renewable electricity businesses have adopted a wide range of technologies and business models, but obstacles and barriers still remaining. This includes uncertainty in political will and commitment by local authorities, as well as ***regulatory uncertainty and lack of initial start-up financing and investments*** (IRENA, 2015b).

13. Energy policies need to adapt to changing market dynamics since the renewable energy sector is developing quickly. ***Governments need to consider new types and levels of support as it evolves; as well as streamlining the permitting process.*** Private sector participation is therefore in particular encouraged ***by reducing barriers to market entry through appropriate regulatory frameworks*** (IRENA 2015b). Altogether, the participation of the private sector remains crucial for markets to achieve scale, improve competition and further drive down costs.

➔ The paper could showcase types and levels of existing financial support and policy and regulatory framework supporting distributed renewables business models today.

➔ The paper could provide policy recommendations on success factors for effective business models in distributed renewables, including the financing and policy/regulatory environments.

14. An important recommendation in the literature on distributed renewables is the ***enhancement of capacity among all relevant stakeholders***. National and local governments, the private sector, local communities as well as electric utilities can certainly benefit from an exchange of information on state-of-the-art technologies as well as communicating best-practices. Sustainable and well-designed projects should always incorporate a strong capacity-building component. In addition, the kind of capacity-building should always reflect the specific circumstances and in-country and even local situations; there exists no one-size-fits-all approach.

➔ The paper could identify capacity-building needs and challenges for effective business models, and provide capacity-building options and measures to address those needs, based on shortcomings identified in the past

15. Finally, the following stakeholders would be the audience for this technical paper: business community, policy-makers, financial institutions and local communities.

III. Process and timeline

A. Process

16. Once the general scope of the technical paper is agreed on, a consultant who is proficient with the matter will be hired for the preparation of the paper. In accordance with the agreed scope, the Terms of Reference for the consultant's mandate will be drafted and used for the procurement process.

17. Given the nature of the paper, a draft paper will be submitted at a TEC meeting for consideration, very likely at the first meeting in 2016.

18. Throughout the process, the task force on mitigation, with the support of the secretariat, will oversee the work and provide guidance and comments.

B. Timeline

19. Several milestones for the preparation of the paper have to be set. This includes the agreement on the general scope during TEC 11, the final ToR for the consultant, the final draft ready for further guidance of the TEC, and various rounds of comments by the task force.

2015				2016		
Pre -TEC 11	**TEC 11**	Post-TEC 11	Pre-TEC 12	**TEC 12**	Post-TEC 12	
	Task force on mitigation constantly provides input and guidance					
TF prepares background note outlining scope	**TEC, provides inputs and agrees on scope**	TF prepares ToR for consultant	A consultant prepares a draft paper	TEC provides inputs to final draft	**TEC agrees on draft final paper**	The consultant finalises the paper	Paper is published

IV. References

20. In order to have a good picture of what has been done on business models related to distributed renewable electricity generation, and help define a relevant scope for the paper, a literature review was conducted. The documents below were consulted in various extent:

(a) Case study for Tokelau, Renewable Energy Project, 2013;

(b) Edison Electric Institute (EEI), Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business, 2013;

(c) European Photovoltaic Industry Association (EPIA), Global market outlook 2014 – 2018, 2014;

(d) European Union Energy Initiative Partnership Dialogue Facility (EUEI), Mini-grid policy toolkit, 2014;

(e) International Economic Development Council (IEDC), Understanding Renewable Energy Businesses, 2013;

(f) International Renewable Energy Agency (IRENA), IOREC 2014: Accelerating Off-Grid Renewable Energy, Key Findings and Recommendations, January 2015b;

(g) International Renewable Energy Agency (IRENA), Renewable Power Generation Costs for 2014, January 2015a;

(h) International Renewable Energy Agency (IRENA), REthinking Energy: Towards a new power system, 2014a;

(i) International Renewable Energy Agency (IRENA), REmap 2030 - A Renewable Energy Roadmap, 2014b;

(j) Komor, P. and T. Molnar, Background Paper on Distributed Renewable Energy Generation and Integration, prepared for the Technology Executive Committee, United Nations Framework Convention on Climate Change, 20 February 2015;

(k) The Climate Group, Goldman-Sachs, The business case for off grid energy in India, 2015;

(l) Various presentations from an IRENA side-event during the World Future Energy Summit, 2014.