

EXECUTIVE SUMMARY

Perspectives for Distributed Generation with Renewable Energy in Latin America and the Caribbean

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This paper deals with how to promote **distributed generation (DG)** done with **renewable energy (RE)** in emerging markets of **Latin America and the Caribbean (LAC)**, with the purpose of increasing competitiveness and achieving sustainable economic growth. The paper defines DG as 'electricity generation that is connected to the distribution network.' This definition implies that DG is: (i) grid-connected, and not off-grid generation; (ii) located at customer premises, or close to the load being served; (iii) implemented at a smaller scale than that of utility scale plants connected to a transmission grid.

The paper argues that the key **rationale** for promoting renewable DG in LAC is to reduce the cost of electricity to a country as a whole, because by doing so renewable DG directly contributes to competitiveness and economic growth. However, renewable DG also provides many other benefits that may represent viable rationales for countries to promote it: reducing global environmental externalities (greenhouse gas (GHG) emissions); reducing local environmental and social externalities; helping an 'infant industry' develop; increasing energy security; reducing system losses and building unnecessary capacity; and developing a 'green' branding. In certain circumstances, these other rationales may create net economic benefits for a country, and may justify paying some premium on electricity costs.

The paper examines **four case studies in the Caribbean (Jamaica, and Barbados) and Latin America (Mexico, and Chile)**, to assess what these countries are or are not doing, and why, for promoting renewable DG.

The paper finds that all countries considered have some viable options for renewable DG plants at commercial scale (plants with the main purpose of selling a continuous flow of electricity: particularly small hydro, biomass cogeneration, wind, and biogas). Renewable DG at the small scale (plants with the main purpose of generating for self-consumption and selling excess electricity: particularly solar PV) is viable in countries with very high costs of electricity generation, and where concessional financing is available (such as Barbados); in other countries, however, small scale renewable DG is currently not viable.

Generally, the four countries considered have already developed (or are on the way of doing so) their viable renewable DG potential at commercial scale, in different ways depending on market structure: utility regulation for least cost planning, and creation of a regime for third party generation (such as in Jamaica; or in Barbados under a recently approved RE Policy for a 'Sustainable Energy Framework'); auctions for new generation (Mexico); limited and technology-neutral targets that can be met with the most cost-effective technologies (Chile).

The four countries considered are also showing caution in how they allow non-viable

renewable DG at small scale to contribute to their energy mix. Barbados offers a pilot 'Renewable Energy Rider' (RER) that pays avoided cost. Jamaica provides a 'Standard Offer Contract' that pays avoided cost plus a limited premium for RE's economic benefits. Mexico is implementing its first grid-connected small RE systems with net metering based on new model contracts; meanwhile, it is developing a methodology to estimate 'net economic benefits' for deciding how much RE should be developed in the future, and what prices should be paid for it. Chile is considering net metering programs, but still has not decided the exact terms for them. No country, in any case, has set rates for small scale distributed RE at levels that will ensure the financial viability of systems that are economically unviable. In this, emerging markets of Latin America and the Caribbean have shown wisdom, thoughtfulness, and restraint, especially when compared to more aggressive approaches adopted in Europe or North America.

Based on the encouraging experience of the countries examined, the paper makes five recommendations on how to promote cost-effective distributed RE that can contribute to emerging markets' competitiveness and growth.

1. Define DG clearly and appropriately in each country, based on system size.

The first step in effective policymaking must set country-specific boundaries to what is the object of the policy itself. For clarity, DG should be defined based on its interconnection with the distribution network. Additional definitions of capacity, or technology type, are welcome for providing further clarification if desired; but would not, on their own, be able to clearly define what DG is.

2. Ensure that power systems are developed based on least cost generation.

Least cost planning should be the cornerstone provision before anything else is even considered, because all countries have some options for distributed RE that are least cost but that are not being implemented. Ensuring that everything that makes sense in each country is actually identified, assessed, and developed will set priorities right, starting from the win-win options. This can be done:

- ❑ **For commercial scale renewable DG, through effective regulation and market design.** In vertically integrated markets (such as Jamaica or Barbados), effective regulation means: (i) an obligation on utilities to demonstrate that its generation expansion plans are least cost; and a duty on regulators to check and enforce that obligation; and (ii) an obligation on the utility to purchase from third parties when this is lower cost. In liberalized markets (such as Mexico or Chile), effective market design means: (i) non-discriminatory treatment of RE in selling energy and capacity; and (ii) auctions for awarding additional capacity and/or energy at least cost.
- ❑ **For small-scale renewable DG, through well-designed feed-in tariffs.** This paper defines feed-in tariffs not as subsidies, but simply as standing offers to purchase power at some predetermined price, for a predetermined period of time, and subject to certain technical requirements. Well-designed feed-in tariffs set price at no more than actual avoided cost; set term at least equal to the useful

lifetime of systems; prefer net billing to net metering (to measure and bill separately the electricity bought by a customer; and excess electricity sold by a customer); and cap individual and total eligibility.

3. Neutralize threats to efficient DG

Just because least cost generation makes sense, it is no guarantee it may actually happen. In practice, even excellent projects may be threatened by inertia, inadequate grid rules, and cumbersome permitting and planning processes that increase transaction costs.

Effective policy will expect these threats, and preempt them:

- ❑ A mix of **obligations and incentives can help combat inertia**: explicit obligations to consider reasonable RE options in least cost planning; obligations on utilities to purchase power from third parties (independent power producers, IPPs) when this is at some margin below their avoided cost; limited RE portfolio standards that are technology-neutral and gradual in implementation; and cost recovery tariff mechanisms that ensure suppliers can recover the efficiently incurred capital costs of developing RE;
- ❑ Grid codes can be updated to **make it easy and safe to connect to the grid** with renewable DG; they should include technical and operating standards, reasonable restrictions, and fair prices to charge for Grid use;
- ❑ **Streamlined, standardized permitting and planning approaches** can reduce transaction costs and ensure that viable projects are actually developed in reasonable time; these approaches would include one-stop-shops for obtaining all required permits, technology-specific processes for environmental and construction permits, pre-established contents of Environmental Impact Assessments, technology-specific standards for allowed impacts, and cut-off sizes for renewable DG that can be installed without permits.

4. Consider if paying more for power may increase competitiveness and growth

At this point, after having ensured in every way that win-win options may actually take place, countries should examine if there are any circumstances where paying a premium is cost-benefit justified. Economic considerations are important: does paying a premium actually create *net* economic benefits to the country? That is, are economic benefits greater than economic costs? Political considerations are just as important: will voters accept paying more, and will they reelect politicians who make them do so?

Paying a premium for electricity may be justified, for example, in the following cases:

- ❑ **To increase system resilience and energy security**: there should be a prudent diversification of (i) which primary sources of energy are used, and (ii) which locations these sources are obtained from. Alternative tools for energy security (forward contracts) should also be considered;
- ❑ **To develop a 'green economy' and create 'green jobs'**: the 'infant industry' argument is often used to subsidize manufacturing or services, but is subject to

risks. To mitigate those risks, countries should consider the ‘infant industry’ argument only if (i) there is a strong *potential* domestic market for that technology; and (ii) the country has (or could develop in the future) the industrial capabilities required to manufacture or service certain technologies;

- ☐ **To reduce local and global environmental externalities:** if a Government decides that it is worthwhile paying more for making the environment more sustainable, it should at the very least treat local and global environmental externalities differently:
 - Domestic consumers would capture the full benefits from reducing **local environmental and health externalities**; therefore, it may be argued that they should pay the entire cost of doing so;
 - However, domestic consumers would only obtain a fraction of the benefits from reducing **global environmental externalities** (GHGs); therefore, governments of emerging markets should be careful before deciding that their citizens pay the entire cost of reducing GHGs. Win-win options that reduce GHGs while also saving money to the country should be promoted first. Other options have an additional cost that from a global perspective may be justified, and may represent an efficient solution. Emerging markets should seek concessional financing and grants from international organizations, or industrialized countries, to develop those projects. While the Clean Development Mechanism is struggling, National Appropriate Mitigation Measures (NAMAs) are emerging as a new framework for doing so;
- ☐ **To promote a country’s branding:** ‘sustainable products’ may be sold at a premium; ‘sustainable tourism destinations’ may likewise be marketed at a premium. However, that premium should not be borne by the population of an emerging market.

The actual determination of what premium is justified is likely to prove difficult and controversial. Governments should tackle this on a step-by-step process that:

1. First, involves key public and private stakeholders, and that determines which items deserve or not a premium;
2. Second, develops a methodology for determining the premium to be paid;
3. Third, assesses actual economic costs and benefits to the country.

5. Avoid the trap of paying too much

Even when countries decide that paying a premium is worthwhile, this does not mean that the premium should be loosely set, and that customers end up paying too much. Three key ways of avoiding this trap are:

- ☐ **To create disaggregated, cost-reflective tariff structures.** The premium should be added to the tariff component that is actually affected by the benefit

created by distributed RE. For this to happen, there must be different components for different services: provision of energy, connection to the distribution grid, provision of backup and stand-by capacity. For example, a solar PV system (without battery) may save on energy (fuel costs), but will not save on those other services;

- ❑ **To always set total caps on feed-in tariff programs.** That some premium may be justified should not mean unlimited eligibility for feed-in tariffs. Otherwise, it may affect quality of service, and create unpredictable and unsustainable costs that ultimately are borne by customers. A country should decide what total quantity is justified to provide the desired level of a certain benefit;
- ❑ **To always prefer net billing to net metering.** Net metering is equivalent to setting feed-in tariffs at the retail rate (that is, the commercial tariff). That is the same rate that should decrease in order to increase competitiveness and create sustainable economic growth. By implementing net billing, a country would use bidirectional meters to apply a cost-benefit justified premium to electricity sold by generators, but no more than that.