Konrad Adenauer Stiftung

HOW TO ACCELERATE THE DEVELOPMENT OF RENEWABLE ENERGY IN THE CARIBBEAN ISLAND STATES

AN ANALYSIS OF THE MAJOR OBSTACLES AND HOW TO DERIVE PRACTICAL RECOMMENDATIONS

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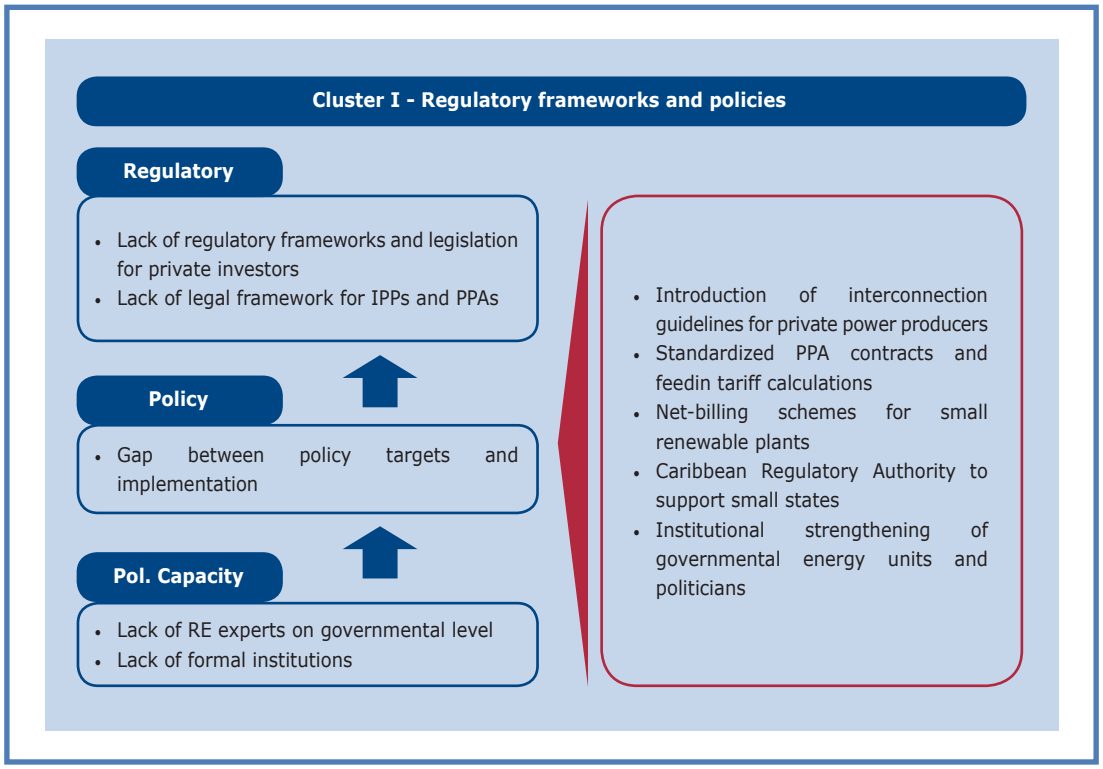
Abstract

Caribbean islands are known for their abundance of natural resources that can be used for sustainable energy. This includes both high solar irradiation levels for photovoltaic (PV) power generation, as well as high and constant wind speeds for the operation of wind turbines. In addition, many mountainous and volcanic islands allow the operation of water and geothermal power plants [IRENA, 2012]. However, despite this resource wealth, the development of renewable energy power plants takes place relatively slow. Therefore, nowadays about 97% of electricity production in the Caribbean island States is based on the incineration of imported fossil fuels, which not only causes high electricity costs of around 30 US cents/kWh, but also massive climate-damaging emissions [MacIntyre et al, 2016]. The paradox is that studies show that the implementation of renewable energy sources would clearly reduce both fossil fuel consumption and electricity generation costs on Caribbean islands [Blechinger et al, 2016; Shirley & Kammen, 2013; Wright, 2011]. What is in the way of developping a sustainable energy supply? In this policy paper we will highlight the main barriers against renewable energy expansion and identify possible solutions to overcome them. The main obstacles are: The regulatory and political framework, the cost and funding opportunities and the market power of conventional energy suppliers [Blechinger, 2015; Ince, 2013].

Regulatory and policy framework

The most important reason behind the slow implementation of renewable energy projects in the Caribbean islands is the lack of a regulatory framework for private investors and independent power producers, so as the lack of adequate electricity supply. This deficiency is worsened by the insurmountable gap between over-ambitious political goals for expansion and the actual transfer into real legal and regulatory frameworks. A variety of small island states in the Caribbean set in the past high goals for renewable energies and CO2 reduction (e.g. St. Vincent & the Grenadines with 60% RES share by 2020 - currently <15%; Barbados with 65% to 2030 - currently <5% [REN21, 2016]), but these often lack the specific target monitoring. This means they have not been adapted into quotas nor binding regulations and transformations in the 30 autonomous or semi-autonomous states with a total population of 40 million, mainly due to the low level of energy expertise in the governments of small island states. In addition, there is often an absence formal institutions such as a specialized Department of Energy to develop and implement energy policy regulations.



To eliminate the regulatory and political hurdles it is important to strengthen the political institutions. This must be done from the bottom up, so that they can take over the tasks necessary for a local energy turnaround as independently as possible. Here we can distinguish the larger and the smaller Caribbean island states: For the larger Caribbean island states (such as Dominican Republic, Jamaica, Cuba, Puerto Rico) this represents an institutional strengthening of their respective (renewable) Energy Ministry and Regulators, the latter comparable to the German Federal Network Agency, whose main task is to monitor the network usage charges and approve. Along with this, it is necessary to reinforce the knowledge and capacities of individual

employees in these institutions. For the smaller island states -particularly in the eastern Caribbean- it is necessary to develop a transnational regulatory authority that can bundle the knowledge and skills. So an "Eastern Caribbean Regulation Authority - ECERA" is under construction since 2011 and it is mandatory that it is further strengthened [World Bank, 2011]. Thus, the lack of regulatory framework could be eliminated by using the improved national or transnational institutions.

In addition to the institutional system challenges, the Caribbean island states have many concrete regulatory sites. For the development of renewable energy is essential to create a port policy for decentralized systems, so that individuals and small businesses are able generate their own electricity and feed it to a specific tariff to the central network. This Directive has now been introduced in some countries (e.g. Barbados, Grenada, Jamaica [REN21, 2016]), but it is often thwarted by energy operators through very low expansion limits. An optimal policy would define both the technical conditions so that the local power their network can still be operated safely, as well as the amount and duration of compensation for electricity fed. Due to the high retail prices and the very favorable electricity production costs for decentralized photovoltaic systems, a so-called net-metering system in which the compensation rate is equal to the end-user tariff will often already lead to over-production. Therefore, it would be better to set a net billing system, in which the compensation rate is lower than the final consumer tariff. This gives the local energy suppliers and network operators the price difference opportunity to fund network infrastructure so as balancing capacities operation. In addition to this net billing system, the regulator can still provide standardized power purchase agreements and conditions, so as methods to calculate the appropriate tariffs, in order to significantly reduce transaction and administration costs of independent power producers. The proposed measures will increase the legal and investment security for individuals and independent power producers in renewable energy projects, and thus its implementation in Caribbean islands will be more likely.

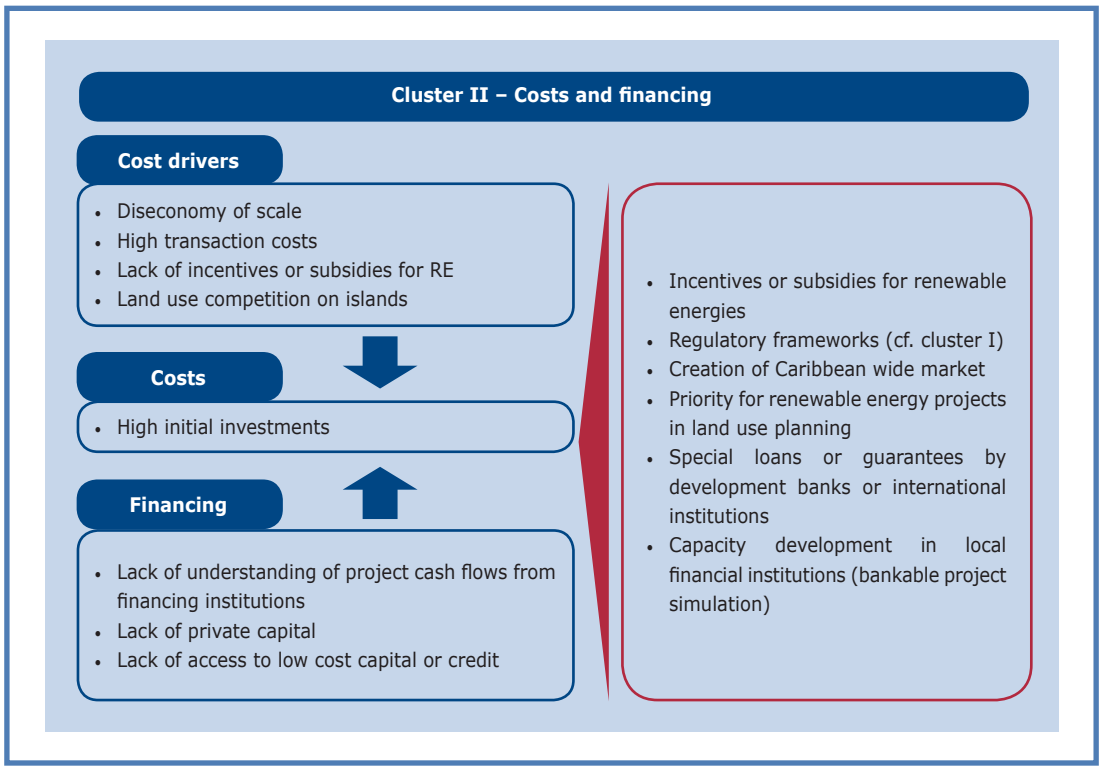
Costs and funding opportunities

Power production costs of renewable energy power plants in the Caribbean are on their lifetime significantly lower than those of power plants primarily driven by diesel or heavy fuel oil. Despite this, the high investment costs of renewable are still seen as a clear implementation obstacle. This means that the high initial costs and the relatively low costs of the further course make the financing of renewable energy projects more difficult than those of conventional projects with low initial costs and high fuel and operating costs. In addition to the cost structure of renewable energy projects in general, there are specific cost drivers, especially in the smaller Caribbean islands. Due to the small market size, this results in negative economies of scale and high transaction costs for the investing companies, as they have to develop the market again in each country. Simultaneously, the competition for lands -especially with the tourism sector- leads to a price increase in lands for potential renewable energy power plants. At the same time, as described in the previous paragraph, there is a lack of comprehensive regulatory framework or subsidy systems to mainly reduce the initial cost of renewable energy projects.

The cost structure slows particularly the development of those projects where there are no matching funding instruments available. This reflects another key obstacle

to the Caribbean islands: the lack of funding infrastructure. This is mainly due to lack of knowledge of the local banks to correctly evaluate and calculate the recovery rate of renewable energy projects. Also, local banks capital is only available at relatively high interest rates, while favorable capital of international (development) banks only flows in large projects and does not support the decentralized expansion of renewable energies. Additionally, there is no free private capital that can extensively invest with the individuals in PV systems or comparable sustainable energy solutions.

There are some possible solutions in order to overcome the mentioned cost and financing hurdles: local governments can directly reduce capital expenditures through subsidies, for example through reduced import costs or through tax concessions. The cost of projects or project development would be greatly reduced by the creation of a Caribbean-wide market and the related suppressions of trade restrictions and tariffs. At the same time, a prioritization of renewable energy projects in the land use planning could lead to more and

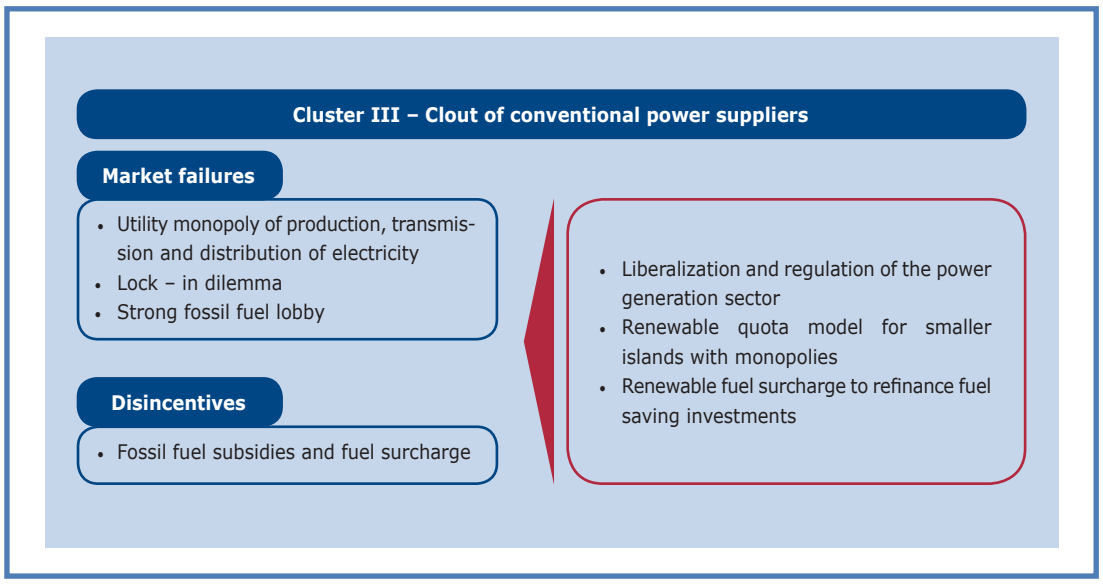


cheaper land for such projects. The financing gaps could be closed firstly by increased investment security. This means that the risk of individual projects can be reduced by introducing the proposed regulatory instruments and thus increase the ability to finance. Favorable loans through local banks should be available for smaller projects and in order to reduce the risk, these banks should be backed by international development banks. In addition, it is necessary to build capacity and local knowledge ("capacity development") for project evaluation, so as the provision of appropriate calculation tools and procedures. This combination of reduced investment costs and better financing options can greatly speed up the implementation of renewable energy projects, since they already generate profits in the medium term and reduce total energy costs on the Caribbean islands.

Market power of conventional energy suppliers

The third major barrier is the market power of incumbent conventional energy providers and the lack of incentives and will to local energy transition. This power is fed by a historically grown monopoly structure which is not to break, especially in small island states. The alternative would be a liberalization of the energy market as it has taken place in Germany since 1998, but on a 100,000-habitants island like Grenada it has economically little sense to introduce a competition in the generation, transmission and distribution or to unbundle vertically integrated utilities with an *unbundling* (separating the network operation and electricity). That is, in these islands prevail monopolies that have little incentive to change their business model. The main disincentive is the compensation structure for the electricity generator and the tariff model for end customers. These tariffs are often divided into two parts and include a fixed share that is regulated and a flexible share, the so-called "fuel surcharge". This regulates the direct transfer of fuel cost by the suppliers to the final customer. Thus, even inefficient diesel power plants can be profitably operated, because the high cost of fuel can always be passed on to the customer. To protect the population from extremely high electricity prices, subsidies are often paid to the composite of the Caribbean oil importers (namely *Petrocaribe*) through middlemen, so that the fuel price for the power plant operator is not too high. These double disincentives are protected on the Caribbean islands by a strong fossil lobby. At the same time there is a lock-in dilemma, that is, the prevailing power structures and behavior are so intertwined with the fossil energy industry embossed on the Caribbean islands that no change can occur. With this combination, most utilities decide to continue to operate conventional power plants because it is the less risky and apparently the more economical way.

To overcome these strong forces it is necessary a functioning market and electricity prices regulation, so as a further liberalization on the larger islands. This regulation goes hand in hand with the previous recommendation to strengthen national and supranational regulators. State-run power utilities, as they still exist in many Caribbean island nations, could get certain specified renewable energy quotas by government mandate. For private suppliers, these rates could be determined



by the regulator, which require government development objectives and thereby accelerate its implementation. However, this kind of provision is expected provoke strong opposition in the powerful fossil lobby. Therefore, it is important to also provide positive incentives. This could be presented in a kind of "renewable fuel surcharge", where the electricity generated by renewable energy power plants would be paid in accordance to the fossil power with a fixed and variable portion. The fixed portion is the same for conventional and renewable power generation, and the variable may also be geared to the fuel prices. Since the costs of renewable energies are below those of fossil power plants, these variable charges may be smaller, for example, 80% of the conventional "fuel surcharge". This would still allow the economic operation of renewable energy power plants and at the same time reduce the retail price. Thus, both the utilities and the local population will be big supporters of renewable energy projects.

Conclusion

Rich in sunlight and wind, the Caribbean islands are best suited for an energy turnaround with renewable energies. They are poor in their own fossil fuel resources and therefore import foreign fuels at high prices that drive up the electricity bills for the end consumer. At the same time, the increased expansion of renewable energies is slowed down -in spite of ambitious expansion plans of the respective governments- because of the deficiencies and shortcomings of the political institutions that should set the regulatory framework for the transformation of the energy system. In addition, the financiers are overwhelmed with the different type of cost structure in renewable energy projects and lack the appropriate incentives to invest in sustainable energy supply. Meanwhile, the monopolistic energy markets of the Caribbean island states cause the releasing fossil fuel energy companies to hold an economic supremacy and no will of forming the energy transition.

To promote the energy turnaround on the Caribbean island states it is necessary to strengthen political institutions and regulatory authorities. The most important steps are the guidelines for the development of renewable energy, as on implementation rates, incentives for settlement procedures, the introduction of economically acceptable price rates and the expansion of financial instruments. The local energy turnaround will succeed if all local players to pull together and lean on international support. These can range from technical advice, research cooperation or project funding. It is not only possible but absolutely necessary now to act together to the Caribbean islands in an environmentally and economically sustainable future cause.

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