



# **ENERGY/RENEWABLE ENERGY**

## **in the Caribbean**

Interview  
with

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Programme  
(GTZ -CREDP)

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## INTRODUCTION

The Caribbean Renewable Energy Development Programme (CREDP) 2004 -2009 is financed by the Global Environmental Facility (GEF) with additional support provided by the Government of Germany through its aid agency the GTZ. The UNDP is the GEF Implementing Agency and the CARICOM Secretariat is the Executing Agency.

Participating countries: The Bahamas; Barbados; Belize; Cuba; Dominica; Grenada; Guyana; Jamaica; St. Kitts and Nevis; St. Lucia; St Vincent and the Grenadines; Suriname; Trinidad and Tobago. Most are Small Island Developing States or low-lying coastal states, and net importers of energy, almost entirely in the form of petroleum. Energy imports are a critical element in the countries of the Region's balance of payments management.

The main objective of this project is to remove the existing barriers to developing renewable energy technologies in the Caribbean through various coordinated interventions at the national and regional level.

As CREDP comes to a close and the CARICOM Secretariat develops an Energy Programme, it was seen as critical to consult with Ministries responsible for Energy within the CREDP countries to capture their commitment to facilitate renewable initiatives in the project network: the region in general.

In an interactive approach, the CARICOM Secretariat embarked on face-to-face consultations with the Energy/Renewable Energy Constituency in Member States; Ministers, Ministries and Departments of Energy, Utilities, and universities in the Region in 2009.

This series of transcripts of interviews conducted by Carlton James, Advocacy and Communications Adviser, CARICOM Secretariat, is an output of those consultations.

## INTERVIEW

CJ: Thomas, given your experience and background in the area of Renewable Energy in the Caribbean, why do you think Renewable Energy is relevant to our existence today?

TS: Well, that is quite a challenge, but one thing is very clear, we have in the entire Caribbean a wealth of Renewable Energy sources which are not even tapped. This becomes particularly relevant to countries that depend on import fossil fuel and when energy is ranking high on the international agenda.



Thomas Scheutzlich

Basically what we try to do is to support the Caribbean region in harnessing the existing Renewable Energy sources and to use those proven technologies today that are used worldwide. These are basically, hydro power, wind power, solar energy, biomass, bio-fuel in all its forms and geothermal energy.

There are more Renewable Energy sources coming up on the horizon but they are not ready off-the-shelf technologies.

CJ: Where would you begin if you had to make a comment on each of the renewable sources in this Region?

TS: Basically hydro power; because hydro power is not an old-fashioned technology, but an old technology, used for hundreds of years in Europe, America; all over the world and also in the Caribbean.

We have in some countries and some islands, hydro power which is used for more than 50 or 60 years. This is particularly so in the Eastern Caribbean, in St. Vincent and Dominica. In both countries we have hydro-power plants which were installed in the 50s. They are now discussing in St. Vincent and in Dominica, the overall rehabilitation and upgrade of these hydro power stations.

There are other countries which have significant potential of hydro-power. In Jamaica we already have hydro power plants in operation since many decades. If I go through the Caribbean, we have Belize with hydro power; Cuba; then if we count the Dominican Republic as the Caribbean.

We have limited hydro power in St. Vincent and Grenada. Maybe some in Trinidad and Tobago not significant. Then of course Guyana. Guyana particularly has a huge potential of hydro power which is largely untapped and the same is true for Suriname. But Suriname already has a large hydro power plant in operation which supplies a major part of energy in Suriname.

CJ: Thomas, take a minute and explain how water is used to provide power?

TS: Basically, it is the energy of the water flowing through a pipeline. That means there are two variables that determine the power we can harness from hydro power sources; the head between the water flows into what we call a penstock and the level where the turbine is installed where we turn the kinetic energy into electricity. Let's put it in this way that means always the amount of water and the height between the upper and the lower levels of hydro power plant determines the capacity of the hydro power plants. That's basically how it works that means if you run a river or a hydro power water source through a pipeline system it creates a pressure which you can turn into electricity by a turbine and the combined generator into electricity at the end of what we call penstock.

CJ: Wind Energy.

TS: While we have hydro power only in certain parts of the Caribbean. Wind energy is almost omnipresent in the entire Caribbean. Basically the Caribbean, particular the Windward Islands, lie exactly in the path of the trade winds that blow through the Atlantic from Europe and we have a rather steady direction of wind from the North East particularly the countries that lie in the forefront. The Leeward Islands, like Antigua, St. Kitts going right down to Saint Lucia, St. Vincent, Dominica all the way particularly on the East Coast have considerable wind energy potential.

We from the CREDP/GTZ project did a couple of years of measurements in St. Vincent and in Saint Lucia. We also assisted with taking some measurements in Dominica. We had a look at wind power measurements which were taken by the Caribbean Development Bank and the Organisation of Eastern Caribbean States back in the 80s. So overall, there is considerable wind power potential in the entire Caribbean which is not harnessed at all.

We already have wind farms that are operational in Guadeloupe, Curacao and in Bonaire. There is a new one in Jamaica; a major one called the Wigton Wind Farm which was commissioned in 2004. It contributes 20 megawatts roughly to the overall energy supply in

Jamaica. That wind farm is particularly interesting because it has already survived two hurricanes. Utilities are always a bit scared about wind and hurricanes in the Caribbean, but the wind farm in Wigton proves that this technology can be applied in the Caribbean.

CJ: Wind farms are invariably in places that have been used by communities. I gather that the two could co-exist; for example, agriculture-type farming alongside a wind farm.

TS: The major barrier for wind farms particularly on smaller islands is the availability of land. Wind farms and wind parks compete for use of land with housing and other types of infrastructure. Basically the problem is that we have a high degree of housing spread all over the islands so most islands have very few spots which are still not occupied by housing developments and schemes. That is the constraint of course. But on the other hand, if an area is used for agriculture or cattle feeding then there is no real conflict of use. Therefore it is shown that wind farms and agriculture can co-exist. For instance in Germany, in Europe you will see there are wind farms in agricultural areas.

CJ: Photovoltaics?

TS: Solar energy is even more present in the Caribbean where the radiation is roughly about a third higher and more intense than in Europe. It is known that in Europe and America, photovoltaics have developed tremendously over the last 20 years; particularly in Europe.

I am German so I tend to always refer to Germany, which is leading in the development and use of PV technology.

Here in the Caribbean we have two basic forms of solar energy that can be used. One, already well known to us is solar water heating. In this case particularly, Barbados has proven over the last decades that solar water heaters can practically be installed in every house. If you think of solar water heating in the tourism sector like for washing, laundries, showering for guests, etc. there is a tremendous demand for hot water and that can be done by solar. There is no need to continue to install electric water heaters in new houses. That is one technology. The other, equally interesting technology is what we call *photovoltaic (PV)*. That is a technology where sunlight is converted directly into electricity by solar cells. We are just at the beginning of seeing that photovoltaics will play a larger role in the future of the Caribbean.

One example which I always quote is Grenada. Over the last 2 to 3 years we have seen a development where in Grenada in the retail houses and also some hotels and supermarkets or larger malls have in the meantime

PV systems on their roofs and that contributes through a system they call Net Metering to the reduction of their operational costs.

Net Metering means simply that the electricity which is produced by this Photovoltaic system is deducted from what the consumer would otherwise have bought from the utility. Net Metering is generally an electricity policy for consumers who own small renewable energy facilities, such as wind, solar power or home fuel cells. Under net metering, a system owner receives retail credit for at least a portion of the electricity he/she generates.



CARICOM Secretariat's Joseph Williams on site with Thomas Scheutzlich

That means all these photovoltaic systems are grid-connected and we will see more to come. We already have in Saint Lucia some projects which are in preparation and this year will be installed. We see in St. Vincent the same. We have in Jamaica, Grenada. So photovoltaic is something which we should have an eye on, particularly since the costs for production of solar cells will drop further. One thing is also clear. That is that present low electricity prices will not sustain. We will go back to higher oil prices and then photovoltaics will play a major role.

CJ: You talk about these private photovoltaic systems feeding into a grid. Does this suggest that electric utilities are ready and willing to accept that kind of arrangement and are now ready to talk "Renewable Energy"?

TS: Utilities in the Caribbean have moved forward tremendously in their approach to renewables during the last 3 to 4 years. While we know that utilities are traditionally a bit conservative and prefer to do what they have always done and what they know; in the Caribbean, that means running diesel plants or fossil fuel-based plants. Many utilities have recognized that this cannot continue particularly based on high oil prices internationally, so they are looking into Renewable Energies.

I think utilities have learned a lot during the last couple of years. Based on pressure; sometimes from the consumers, from government and international discussions about renewable energies, utilities are embarking on Renewable Energy technologies; basically, wind technologies. Those which already have hydro-power are looking into new hydro-power plants. Photovoltaics is also an interesting option for them. Particularly we see that in St. Vincent. St. Vincent is just preparing with our systems, a larger photovoltaic plant on the roof of

the St. Vincent Electricity Company (VINLEC) main building. We have the same interest in Grenada and recent discussions with LUCELEC of Saint Lucia also indicated some interest in applying photovoltaics.

They also accept that in individual houses they will use more individual systems like we see in Grenada. Already utilities are preparing what they call a feed-in policy. That means this will regulate and give guidance to individual users and households on what they can do or what they will be allowed to do; what we call self-generation; and feed this into the grid or the net-metering scheme. That is basically photovoltaic but theoretically it can also apply to small and what we call micro-hydro and also to small windmills.

CJ: Geothermal energy in the Caribbean.

TS: Geothermal, particularly in this part of the Caribbean, that we call the Volcano Islands or the volcano belt, is certainly one of the most important of Renewable Energy resources; one with great potential. We know that for many decades, geothermal prospects were being analysed, but there is quite a difference - a gap, between having an eye on this resource and really quantifying it.

Over many decades everybody talked about geothermal but not much happened. Now, we see real development going on. For instance, in St. Kitts & Nevis, in Dominica and also in other parts like Saint Lucia and St. Vincent there are resources but basically in Dominica and particularly in St. Kitts and Nevis things are happening. That means physical development, drilling and looking into the source.

Geothermal is a Renewable Energy where we have a large resource of either hot water or steam that can be used to produce direct electricity. The investment is considerable and particularly the resource assessment is very costly. To drill a hole to see whether there is a resource and to see the quality and quantity of the resource costs millions.

That makes it different from other sources like wind power which can be measured within one year and installed in relatively short time. Hydro-power is also a medium term to long term investment, but clearly geothermal needs long term planning.

In Saint Lucia, unfortunately we have a situation where there is a resource but it is difficult to move forward for several reasons; one is legal.

Politicians and Investors alike are keen to see geothermal resources in Saint Lucia harnessed one day. The main source as far as is known, lies

in the UNESCO World Heritage area of the Pitons. That may be a constraint to harnessing geothermal energy in Saint Lucia.

CJ: Let's move on to Biomass. Of course there are examples in the Guyana and Belize as well as in Barbados. Tell us something of Biomass as a Renewable Energy source.

TS: The use of biomass for energy production is as old as hydropower. If you look at the sugar industry, traditionally bagasse is burnt as a fuel to satisfy the energy needs of old-fashioned sugar factories. Traditionally and interestingly, the sugar factories that are 100 to 200 years old were deliberately built at low energy efficiency because the bagasse during the harvest season was more of a hindrance than a help, so they had to get rid of the bagasse which would otherwise pile up in the backyard of the sugar factories.

So sugar factories were traditionally made to use bagasse for the energy that they need. Today we are looking at sugar factories with higher thermal energy, the bagasse is still there. Burning the bagasse and producing the electricity base on bagasse means cogeneration. Therefore a sugar factory for instance can produce more electricity than it needs for its own consumption and feed the excess into the national grids. That is a basic form of biomass as a form of renewable energy.

Of course there are others. If you look at Guyana, Suriname; there we have large resources of wood. I am not talking of natural wood but plantation wood; or residuals.

Take the huge sawmills in Guyana; they have sawdust leftover from the wood production. That could be used for electricity production that could either be burnt or through charcoal. So there are still resources which are not fully used.

When it comes to the small islands it is a little more difficult because the feedstock for biomass is simply not so much. There may be something if you look into bananas but banana is being used to maintain the fertility of the ground. So you cannot use banana stalks because they have to stay on the ground. If you take for instance, nutmeg shells of Grenada, this may be a source. I am at the moment not aware if there is any specific information on the quantity of shells from the nutmegs we have in Grenada; a major source.

One thing that may be interesting is import of bio fuel to mix it with gasoline/diesel. That is being practiced largely in Brazil for instance. So there may be a way to go for the ethanol route as well using sugar cane to produce ethanol to be mixed with fuel for transport.

So basically, these are two examples of biomass use in the Caribbean. We will see these technologies coming up more. The higher the electricity prices, the more costly the business of fossil fuel will be. We are likely to see more biomass and other bio-technologies as well.



John Compton Dam

CJ: Is GTZ/CREDP looking at energy from waste?

TS: Energy from wastes is used in industrialised countries on a large scale. In our project we are not so much looking into energy from waste. It may be a source but we have to be careful because here the separation of waste is not very advanced. That means the type of waste we have here has to be looked at carefully. There is a very high content of organic matter. That means high moisture content and lower caloric value of the feedstock. I think if we look into waste from energy here, we would have to introduce first, a certain system of separation of the different fractions of the waste. That is the precondition. I think it would be difficult to harness waste given the way in which it is being largely dumped at the moment. Generally, energy from waste is an option that needs to be further analysed.

CJ: What are your thoughts on energy efficiency and its relevance?

TS: Energy efficiency always comes up when the price of electricity rises. When commercial and industrial consumers suffer from high electricity prices they start thinking what can be done in order to reduce the consumption of energy.

The saving potentials in energy efficiency are tremendous. The most obvious and most known to all of us is the change from incandescent bulbs to compact fluorescent lights (CFLs) or to more efficient fluorescent lights. There are technologies called AT12 which are rather new technologies in fluorescent lighting. But lighting is just one part of it. The major consumption of electricity goes into air conditioning. There are also other areas. If we go to the industrial sector, they are using oversized pumps and motors, which means they use more electricity than they would need. They should be appropriately-sized for their tasks.

In summary, energy efficiency has tremendous saving potential. Best of all, it can be implemented immediately. There is no need to change policies; there is no need to change laws. Actually, this is a technology that can be applied at individual scales, starting in the households, but

also in offices, in public buildings, in hospitals, in government buildings, in schools. That is a major part of our work. We are just beginning to look at different sectors by demonstrating what can be done, what potential we have; what technologies are available, facilitating technology transfer, making access to the latest development in appliances. So there is tremendous potential but one thing must be clear, this would only function if there is a 'working together' between utilities, bureaux of standards, and governments.

For instance, governments have roles in facilitating the use of energy-efficient appliances. If you go into a shop and try to buy a washing machine for instance, nobody can explain to you how much water it uses, how many kilowatt hours it uses; if the machine turns this way or that way; is directly heated or not. The same goes for a fridge or freezer; nobody can tell you how many kilowatt hours it consumes. In some parts of the world, this is standard. When you go into a shop, you can see and compare; this one consumes more than the other one. So there are still lots of things to do and joint efforts are necessary to harness the potential of energy efficient technologies.

CJ: Your work on behalf of GTZ the German Technical Cooperation Agency in this Region has made you interact with a number of other agencies. What has been your experience in Renewable Energy generally in this Region, including working with other agencies?

TS: Let me briefly mention that the GTZ is the German Agency for Technical Cooperation. It is not the donor agency but the executing agency on behalf of the Ministry of Economic Cooperation and Development in Germany. That means GTZ is actually spending tax-payers money in different areas of the world and in different project areas. Now Renewable Energy, Energy Policy, Energy Efficiency are the major areas in which GTZ is offering technical assistance world wide. I think it is correct to say that the German government is one of the main donors to the energy sectors worldwide. In the Caribbean one of the major projects, the Caribbean Renewable Development Programme (CREDP) which is carried out by the CARICOM Secretariat together with the German Government is one of the larger regional projects.

It is very important that we coordinate our activities with our donors. That means basically aiming at avoiding overlapping, avoiding duplication of efforts and spending funds wisely in a complementary way. That means we work together with other organizations like UNDP, World Bank, OAS, EU, and there is a constant exchange on who is doing what and trying to avoid, overlapping and to use in an efficient way all the funds that come into the Region for energy projects.

CJ: You mentioned partners including the CARICOM Secretariat. Now that the Secretariat has an energy programme, what do you see as its role? How can the CARICOM Secretariat best serve Renewable Energy in the areas of the Caribbean?

TS: Well the fact that the CARICOM Secretariat has re-established what many years ago was already there, an Energy Desk; is a major achievement. The Heads of Government recognize that the Energy problems in the Caribbean are really critical for the social and economic development in the Region. So, it is a major step forward to have an Energy Unit that looks into energy issues.

The task of the Energy Unit should be a facilitating role, networking, guiding the development of the sector at the regional level, e.g. facilitating a regional energy policy. There are funds flowing into the region from different donor organizations to assist the development of the energy sector.

There is a role for the Energy Unit as a “one-stop” agency that knows what is going on in the region, including overlapping and avoiding duplication. So if for example, GTZ starts a project in CARICOM with IDB or when World Bank comes in, the Energy Unit of the CARICOM Secretariat has a role to guide and to channel the funding to the right places so it can be wisely spent. So we see CARICOM Secretariat particularly the Energy Unit as an overarching role, facilitator for the energy sector.

CJ: How would you like the Caribbean energy players, managers, and policy-makers to see GTZ in the context of renewable energy in the Caribbean?

TS: Well, GTZ does not do their own projects. We contribute to projects of our partners and we offer assistance in bringing these projects to life. That means we try to suggest projects where we see the need. Basically we react on demand. That means all partners have to bring their own contributions.

We offer to implement the project of our partners by bringing in technical expertise through local or regional or international short term experts. We offer advice in policy development, we advise Governments. We advise Ministries in the Region in order to improve the framework condition for sustainable energy. We offer capacity-building, we offer networking and access to best-practice technology transfer, but all this is related to projects and programmes of the region.

Today, ours is a regional programme covering all CARICOM states offering technical assistance not only to governments but to utilities, to

private sectors. As I mentioned, improving framework conditions legally, politically, regulatory framework, also identifying concrete Renewable Energy projects like wind parks; photovoltaic projects and bring them to a stage where investment decisions can be made.

CJ: Tell us about the proposed wind farm and the involvement of GTZ

TS: The entire East coast of Saint Lucia like the other islands has a very good wind regime throughout the year. This area is particularly interesting to be developed as a wind farm because it is at a certain distance from the sea. That means that corrosion would be less of a problem than if the wind path were closer to the sea. Then there is a hilly area where wind speeds are forced to go up. Fortunately, this is not an area earmarked for housing, as one needs to maintain a certain distance between windmills and housing. Given the density of population in Saint Lucia, there are not too many spots that are suitable for wind farms. This particular one is.

There is another interesting aspect of developing this area as a wind farm or wind park. At this moment the existing electricity grid does not allow unlimited wind power to be fed into it, but this area can be developed over the next 10 to 20 years in stages to meet increasingly, the energy demand of Saint Lucia.

First, the CREDP GTZ together with LUCELEC intends to develop this piece as the first step to roughly 10 to 12 megawatt wind farm. In about 10 or 20 years if the Government takes the decision to reserve the entire area for further development it could be built in the second or third step for a another 10 to 20 megawatts for future times.

Therefore this part of the island is very important to be surveyed and marked and reserved for wind power development. If this chance is given up and not used there are not too many other spots on Saint Lucia that could serve that purpose.

CJ: Adopting Renewable Energy technologies not only as a hedge against high energy costs, but also as a sensible thing to do requires some degree of policy. What are your thoughts on the relevance of Energy Policy at this time?

TS: Most of the Caribbean territories don't have a written energy policy. That was not so critical in times where the energy sector seemed to be settled, energy security was safe, and there was no major discussion about environmental problems. But times



Joseph Williams and  
Carlton James on site

have changed. First of all we talk about climate change and impact. 80% of climate change-related problems stem from energy conversion processes. We see the oil crisis; we have shortage of oil, fossil fuels also are greatly contributing to CO2 emissions.

So all this together calls for energy policies that serve as guidance in formulation of long term strategies of Governments; what the Governments want to achieve in the long term. That means 10, 20 years. What are the major objectives? What should the energy future of a country look like? Should it keep on depending forever for fossil fuel? What sources should be developed? What measurements should be taken? What strategies? So it is very important to have a written Energy Policy as a baseline for any action to be taken to later on, implement this policy.

Once a policy exists in writing, the second step is to come up with an action plan as to how the policy should be implemented. Such an action plan is usually more short term thinking; say 3 to 5 years and can be adopted easily. But as I said before, energy policy is very important.

Many countries have started or have already completed drafts of Energy Policies. For instance, in St. Vincent the cabinet recently approved an Energy Policy. In Saint Lucia presently the Energy Policy is being discussed. In other countries it is under development. Once we have that policy it is easier to take action as a consequence of a written policy and not a patch-work action plan put together that is not underlying of a long term strategy.

CJ: What sorts of considerations, what sorts of elements, go into an Energy Policy at this time? Ideally, what should be considered?

TS: As part of an Energy Policy, of course there are institutional considerations. Who should have what responsibility? Which Ministries should be involved; what institutions should be consulted, advisory panels? Content-wise of course, Energy Policy has to address all areas, not only Renewable Energy, Energy Efficiency, but it also has to address fossil fuels.

One thing is very clear. That is that the region will for the next decade depend to a certain extent on fossil fuel. We have to be realistic. Renewable Energy and Energy Efficiency can greatly contribute to such a future but we still depend on fossil fuel. That means a larger part has to address the import of fossil fuels. Where does it come from? What amount should be imported? It also has to address concerns like the transport sector. That is also part of energy. A larger part of energy goes into transport sector, and of course the entire area. As mentioned

before, indigenous energy sources, Renewable Energy, Energy Efficiency, all these different areas have to be addressed in the Energy Policy.

On the other hand, an Energy Policy should not be too specific when it comes particularly to quantification and tariffs; that in our understanding has nothing to do with the policy. That can be done in the rules and regulations of an Electricity Law. Like it is at the moment tariff structures are fixed in Electricity Laws, it doesn't have anything to do with the policy.

CJ: Based on the GTZ global experience, if you had to recommend a draft of a policy or a template that would suit say the island states of the Caribbean. What part of the world would that come from?

TS: Ideally it should come from a part of the world where energy supplies is diversified and Renewable Energies are greatly used. That is in Europe. We see great potential and advance in the United States. But I think countries in Europe like Germany have quite some progress with feed-in-law. It does not make sense to copy these laws as certain conditions that would work in Europe would not work here. I think it would be wise to visit these laws and to see whether certain elements would be appropriate here, like for instance, creation of incentives, cross subsidy; not government subsidy but consumer subsidies in order to push certain developments like financing or compensation for more expensive technologies. Certain elements can certainly be taken over into law here and that is what we also do. This is part of our advice to governments that we try to carefully analyse elements of other laws and to advise which parts may be adopted here.

JW: Why do you think electric utilities form a significant part of the energy sector?

TS: Utilities are key for the energy sector for several reasons. We have here in the Caribbean a situation where in many territories the utilities have the universal monopoly. That is a fact whether you like it or not. And in certain aspects it should not be changed, or if at all, changed very carefully. We have small markets, small islands, and the competition could also help to bring certain developments forward. That means utilities would have important roles in the territories.

In our project given the fact the utilities have the mandate, they have the licenses, and they know their business, they are our natural partners in developing Renewable Energies. Of course some are hesitant, because they associate Renewable Energies with higher risks that come with a new technology. They are not confident about how it works, and this is part of our work; to help them to understand the technology, to

train them to manage and at the same time gain more confidence in using these technologies like wind. Hydro power is different. That is already established here but wind particularly or solar, there are a lot of uncertainties of how the technology works, how economically it is. Utilities tend to be more traditional and careful if adopting these technologies.

One thing is very clear, without the utilities there would be no major success in using Renewable Energy and Energy Efficiency in the Region.



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