

Chapter 17

Strategies Developed by DIREKT for the Small Island Developing States to Enhance Renewable Energy Utilisation

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Abstract Given the current global situation of scarce energy resources, rapidly rising fossil-fuel prices and drastic climate changes, it is recognised that the promotion and application of Renewable Energy (RE) and Energy Efficient (EE) technologies is of vital importance for sustainable socioeconomic development in the Small Island Developing States (SIDS). The DIREKT network (Small Developing Island Renewable Energy Knowledge and Technology Transfer) is a teamwork scheme that involves the participation and collaboration of various universities from Germany, Fiji, Mauritius, Barbados and Trinidad and Tobago. The aim of the DIREKT project is to reinforce science and technology competency in the domain of renewable energy through technology transfer, information exchange and networking, targeting ACP (Africa, Caribbean, Pacific) SIDS as they are more vulnerable to problems associated with climate change. The overall objectives of the DIREKT project consist, basically, of enhancing sustainable

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collaboration between the participant countries and the EU, and transferring research results on the key topic of renewable energies, by putting into operation “technology transfer centres” in the participant countries. To help in achieving these aims, the partners of the DIREKT project have set up short-term, medium-term and long-term strategies to be applied to SIDS.

Keywords Strategy · Small island developing states

Short Introduction

This paper presents the strategies developed by DIREKT for the Small Island Developing States (SIDS) to enhance renewable energy utilisation. The DIREKT network (Small Developing Island Renewable Energy Knowledge and Technology Transfer) is a teamwork scheme that involves the participation and collaboration of various universities from Germany, Fiji, Mauritius, Barbados and Trinidad and Tobago. The overall objectives of the DIREKT project consist, basically, of enhancing sustainable collaboration between the participant countries and the EU, and transferring research results on the key topic of renewable energies, by putting into operation “technology transfer centres” in the participant countries.

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Introduction

The DIREKT network (Small Developing Island Renewable Energy Knowledge and Technology Transfer) is a teamwork scheme that involves the participation and collaboration of various universities from Germany, Fiji, Mauritius, Barbados and Trinidad and Tobago. It is a three-year project begun in 2010 and expected to end in 2012. During these three years, the aim of the DIREKT project is to reinforce science and technology competency in the domain of renewable energy through technology transfer, information exchange and networking, targeting ACP (Africa, Caribbean, Pacific) Small Island Developing States, as they are more vulnerable to problems associated with climate change. The overall objectives of the DIREKT project consist, basically, of enhancing sustainable collaboration between the participant countries and the EU, and transferring research results on the key topic of renewable energies, by putting into operation “technology transfer centres” in the participant countries. Finally, the specific objective of DIREKT is to establish a long-term EU-ACP Small Island Developing States science and technology network. To help in achieving the set aims and objectives, the ACP Science and Technology Programme, which is an EU programme for cooperation between the European Union and ACP region (Africa, Caribbean, Pacific), is funding the project.

Given the current global situation of scarce energy resources, rapidly rising fossil-fuel prices and the potential exacerbation of these problems by climate change, it is recognised that the promotion and application of Renewable Energy (RE) and Energy Efficient (EE) technologies is of vital importance for sustainable socioeconomic development in the Small Island Developing States that constitute the Caribbean. Taking all these problems into consideration, the DIREKT team has developed a strategic plan for short-term and long-term applications.

Strategy

Strategy refers to a plan of action designed to determine basic objectives and the allocation of resources towards the accomplishment of these objectives. It determines the direction in which a set project needs to move to fulfil its mission. A strategic plan acts as a road map for carrying out the strategy and achieving long-term results, that is, its end vision.

Strategic planning implies short-term to longer-term planning, which is allied to the institution or project’s vision, values and goals. Short-term planning normally looks at projected goals over at least a three to six-month period. Medium-term planning is probably a year to eighteen months. Long-term planning would look at a very long-term goal—say over five or ten years. Thus, to ensure all the goals and objectives set by the DIREKT project are achieved within the three-year time frame, each partner involved in the DIREKT scheme has come up with a

strategic plan consisting of short, medium and long-term strategies to be implemented in their respective countries. This paper provides a summary of the strategic plans of the partner countries.

The general goal of the technology transfer strategy is to stimulate greater awareness of the potential of renewable energy by demonstrating to the public the available RE technologies, and providing training in such technologies. It is anticipated that, with this exposure, knowledge and increased capacity, individuals will be motivated to engage in innovative technologies that have the potential to unfold new economic development opportunities and promote a clean environment and a sustainable future.

Barbados's Strategy

The specific objectives of the Barbadian team consist of setting up a technology transfer centre that will act as a hub for the dissemination of RE material and RE technologies to the wider community. This will be done primarily through a "Renewable Energy Demonstration Facility", which in the first instance will be a pilot project at the University of the West Indies. Further objectives are: to promote the use of RE technology by providing awareness and training in RE technologies through workshops, seminars and networking events; to strengthen the capacity of research staff by providing them with the necessary knowledge and resources; to provide closer links between research institutions and the public sector in order to better cater for the needs of the market; and to enhance the capacity of businesses to use renewable energy and to develop new and innovative RE products.

Main Activities

A principal activity required in order to execute this strategy is training, capacity development and the dissemination of public awareness materials through workshops, short courses, seminars and networking events. Training will be provided to administrative staff, businesses and research staff, with an emphasis on gender balance, in the following technological areas:

- the application of photovoltaic technology
- the maintenance of photovoltaic systems
- geothermal and wind technology
- writing grant and project proposals for RE projects

There will also be networking events to disseminate information about the DIREKT project and available RE technologies. A second principal activity required to execute the strategy is a technology transfer centre, which will be run as a pilot project at the University of the West Indies entitled the "Renewable

Energy Demonstration Facility”. The mission of the Renewable Energy Demonstration Facility will be to transfer innovative knowledge on renewable energy technologies to the University community, schools and wider society, including the business sector and policymakers.

The renewable energy technologies to be displayed, tested and compared will initially be: a fixed solar photovoltaic system, a single-axis tracking photovoltaic system, a vertical axis wind turbine, and simpler renewable energy technologies such as solar cookers and dryers, stills, solar water heaters, and solar mobile generators. A major focus in terms of display will be models to demonstrate the potential of marine power technologies, given the significant role they could play in the future Caribbean energy profile. These would include sea_water air conditioning, wave power (onshore and offshore), and ocean thermal energy conversion (OTEC).

Fiji's Strategy

A strategy that provides solutions to these problems while contributing to the socio-economic development of the region consists of facilitating the training of businesses and decisionmakers through short courses/workshops, and engaging both research institutes and businesses in a project that identifies potential RE resources for remote rural communities; a learning opportunity should also be provided to businesses by demonstrating to them how the appropriate Renewable Energy Technologies (RETs) are designed using readily available software.

Apart from producing the intended outcomes, such an interactive project will have hidden benefits. An important example is the opportunity to demonstrate to businesses and decision makers the resources and the capacity available within the region (and especially within the research institutes) to carry out feasibility studies and to develop RET design models.

Main Activities

The key elements of the overall strategy consist of establishing a research and technology transfer centre, strengthening the link between research institutions and the RE-related market in the Pacific, combining the capacity building of the RE business sector with the socio-economic development of the region, and using a pilot project to demonstrate the efficacy of the chosen strategy.

These projects will require ongoing data collection and analysis, and the installation of RETs. To ensure the sustainability of these projects, there is a need for skilled local expertise (within both the government and private sectors). Businesses need a range of expertise (from how to install masts and equipment to predicting wind-energy regimes in selected regions using appropriate software).

The Fiji partner is already working closely with a number of regional energy agencies in the Pacific. These relations will be further enhanced, in keeping with the “many partners, one team” motto adopted by the framework partners.

An implementation plan that provides for all requirements has been suggested as follows:

(a) *A research and technology transfer centre*

This will be a virtual centre, and will consist of a physical office (with the appropriate communications and data-storage capacity) from where all the research and technology-transfer actions of this project will be coordinated. It will be an information hub which businesses, NGOs, other government and private sector organisations, as well as research institutes, can access for information on all RE activities in the region. It will store information on the plans and activities of the DIREKT project’s Fijian partner in the Pacific region. A website, linked to the parent DIREKT website maintained by the lead partners in Hamburg, will be created to provide an effective communication instrument and to assist in the visibility of the actions of DIREKT’s Pacific network.

(b) *Capacity building for businesses and decisionmakers*

This goal will be best achieved via a two-day workshop which will include regional research institutions as active partners in the organisation and conducting of the activities, provide capacity building through a series of seminars, combined with hands-on learning opportunities and local field trips, and endeavour to involve other regional energy agencies through co-financing.

(c) *Pilot project*

The Pilot Project will act as a “proof of concept” for the R&TT Strategy. It will combine the capacity building of the RE business sector with the socio-economic development of the region, and will also involve regional research institutions in its actual action plan. The elements of this Pilot Project are outlined in a separate document.

Mauritius’s Strategy

The strategy developed by the Department of Chemical and Environmental Engineering at the University of Mauritius is the roadmap for Mauritius to address the energy and environmental challenges lying ahead, which depends on innovation through science-driven development of new technologies. This plan renews and extends the commitment of our island to the environment, both resolving and supporting a future using cleaner energy.

Main Activities

Therefore, the main objectives of the department are:

- to promote more efficient use of energy and increase the use of renewable energy;
- to embark on projects to explore and harness all potential for local sources of renewable energy and to reduce dependency on imported fossil fuels;
- to support programmes to reduce the consumption of fossil fuels, achieve greater efficiency in the use of energy in enterprises, offices, homes, the public sector, the transportation sector and in hotels;
- to support programmes for research and analysis pertaining to the development of renewable sources of energy and consumption trends, and to ensure environmental sustainability;
- to embark on energy-management programmes through networking with local and international partners;
- to create awareness campaigns on energy saving and the use of renewable energy sources.

Moreover, to propagate the notion and implementation of renewable energies throughout the island, the university will target the following:

- the availability, security and diversity of supply, with particular focus on renewable energy;
- affordability, with a view to ensuring socio-economic development of the country, taking into account the financial sustainability of the utility;
- energy efficiency and conservation, given the high volatility of the price of fossil fuels, in particular oil;
- targets for efficiency in the electricity sector;
- the introduction of sustainable energy topics in all programmes at tertiary level;
- the running of programmes as a permanent activity to create awareness of the benefits of energy efficiency, renewable energy and sustainable living, including information on incentives/deterrents and rights/obligations for consumers.

However, the development of a sustainable energy economy affects people's way of life, so it is important to develop not only a broad appreciation of sustainable energy and the resulting environmental benefits, but also to transfer expertise and skills, including practical engineering skills in areas such as energy efficiency and renewable-energy technologies. Thus, relevant educational materials on sustainable energy will be developed by the department, and the transfer of expertise will be achieved through:

- knowledge creation to boost pure and applied research and the development and building of a platform for innovative ideas;

- knowledge diffusion by promoting emerging sectors, inculcating industrial skills, promoting life-long learning and continuous professional development, and promoting innovative e-learning systems;
- investing in resources by recruiting, retaining and rewarding quality people, ensuring sustainable professional development for staff, enhancing provision for modern high technologies, developing and optimising infrastructure and equipment, exploring sources of funding through national, regional and international collaboration, and strengthening its networking role nationally and internationally;
- community outreach by assisting communities in developing, monitoring and enhancing renewable energies and by promoting civic engagement.

Trinidad and Tobago's Strategy

Trinidad and Tobago is the most industrialised of the Caribbean Community (CARICOM) countries and its energy requirements are among the highest in the region. One current challenge is that, due to an increasing population size and industrialisation, Trinidad and Tobago's energy needs are increasing. The government of Trinidad and Tobago has expressed a commitment to the development of an energy policy that includes renewable energy.

National Renewable Energy Strategies will have to be developed to meet the objectives of an Energy Mix Policy, as outlined in the Framework for Development of a Renewable Energy Policy for Trinidad and Tobago. To be effective, these strategies must clearly be developed as a step-wise process, and must also be implemented within the broader framework of carbon reduction strategies, consistent with the draft National Climate Change Policy that is presently being developed in the context of the global objective of reducing emissions of greenhouse gases, as outlined in the Kyoto Protocol, of which Trinidad and Tobago is a signatory.

Main Activities

In its budget of 2010–2011, the government of Trinidad and Tobago introduced tax measures to support opportunities for small-scale, low-cost applications of renewable energy in residential, commercial and other institutional sectors. To maximise the effectiveness of energy use, appropriate measures for energy efficiency and conservation must also be undertaken. It is expected that this knowledge will have a significant impact on capacity building, awareness creation, public outreach, and market growth and expansion in renewable energy in Trinidad and Tobago.

Medium and long-term strategies identified by the government of Trinidad and Tobago are:

- carbon reduction;
- mass transportation;

- green buildings;
- education through capacity building and awareness creation;
- research and development;
- the creation of an enabling environment;
- energy efficiency and conservation;
- appropriate institutional arrangements.

The Trinidad component of the DIREKT project will effectively contribute to the development of the renewable-energy sector in Trinidad and Tobago in a manner that is entirely consistent with the regional and national strategies for renewable energy. The first is the organisation and delivery of seminars designed to increase public awareness of renewable energy technologies, and to provide training and capacity development in RE. The second is the establishment of a technology transfer centre, which will essentially be a database and e-platform, which can bring together information relevant to RE technologies and facilitate the interaction of RE stakeholders, e.g. researchers, businesses, students and the general public. The third is the pilot project proposed for the Trinidad component of the DIREKT project—essentially the establishment, operation and display of a renewable energy powered laboratory at the University of the West Indies.

Germany's Strategy

The long-term goal of the Research and Transfer Centre—“Application of Life Sciences” (RTC-ALS) is to be the leading renewable energy technology transfer centre for developing countries in northern Germany, and to become well-known internationally. The RTC-ALS will make use of its strengths to promote the centre, and will not focus on engineering solutions for energy-related topics. Consequently, the general direction of the RTC-ALS should be to strategically make use of its strengths to take advantage of opportunities. Besides this general approach, weaknesses as regards in-depth knowledge of circumstances within developing countries should be dealt with on an appropriate timescale. The general direction will take advantage of a multidisciplinary approach, by combining inputs from various partners on a national and international level. Furthermore, all results will be specifically published for the various target groups to make sure that the RTC-ALS will become a widely known partner.

Main Activities

To reach this overall goal, various sub-goals were created with different timelines, which involved the following activities:

- as the leading renewable energy technology transfer centre for developing countries in northern Germany, to determine indicators for goal achievement;

- establishing a second pillar, next to the RE research topic, which might be of additional use (e.g. capacity building for energy-related jobs) and establishing contacts/access to networks;
- publishing articles related to RE in developing countries on a national and international level;
- promoting cooperation with partners in developing countries for knowledge-oriented proposal writing;
- support for orientation of local actors;
- application-oriented proposals;
- establishing contact with national and international organisations present in developing countries;
- observing the national development of the RE activities of other organisations (HEIs, NGOs, foundations) to find out who is active in the field of RE transfer/projects in developing countries;
- positioning and marketing of RTC within the HAW (Hamburg University of Applied Sciences) and adjoining events/publications;
- setting up the concept of the technology transfer hub (according to the DIREKT proposal) and its implementation plans.

Conclusion

With the development of a strategic plan by each partner involved in the DIREKT project, it is certain that the specific aims and objectives set up for the promotion of renewable energies in developing countries will be met, and that the same principle can be extended for other developing countries to enjoy a safe and clean future.

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