

Chapter 13

“Sustainable Energy for All” Approach to SIDS: A Case Study from Dominica

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Abstract The Commonwealth of Dominica, amongst the least populated islands in the Caribbean (70,000 pop.), identified the potential to upgrade and expand its hydropower generating capacity from various sites in the country. One site is located in Newtown, outside of Roseau (Dominica’s capital city). It offers the possibility of increasing its share of clean energy in the country’s electricity mix through small-scale hydro developments. Dominica has also considered the development of additional hydropower resources within the Roseau valley, a protected area, though it requires addressing ecosystem-based climate resilience concerns in an integrated manner. This may pose a sustainable energy challenge in the short term; in the long run, Dominica plans to become carbon negative through the addition of geothermal energy to its electricity mix. The Government’s commitment to these plans has been internationally declared, as part of the United Nations Secretary-General “Sustainable Energy for All” (SE4All) initiative. SE4All provides the country with a chance to contribute to its global objectives, by addressing national electricity demand where 70 % of the country’s energy matrix comes from fossil fuels (the remainder coming from hydropower). In response to the request for assistance to reduce its reliance on costly fuel imports, UNDP support to Dominica’s efforts is following an approach targeting the adoption of green, low-emission and climate-resilient development strategies (GLECRDS). Through the GLECRDS approach, UNDP is helping other developing countries – several of them, small island developing states (SIDS)—to combine and sequence different sources of finance to address broader sustainable development concerns.

Keywords Sustainable energy · Development · Climate change · SIDS · EITT · GLECRDS · Mitigation · Adaptation

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Short Introduction

Dominica's sustainable energy agenda is linked to the country's specific vulnerabilities to climate change. As one of the wettest Caribbean islands (2,500–3,800 mm average annual rainfall), Dominica is highly exposed to landslides in its mountainous terrain. Coupled with its exposure to hurricanes (particularly since Hurricane David in 1979) and sea level rise (with estimated increases for the region at an average of 3 mm annually), the country faces the challenge of protecting key economic sectors from long-term climatic impacts, e.g. terrestrial biodiversity subject to increased severity of extreme weather patterns (e.g. drought, storms, floods) affecting the country's hydroelectric potential (MAE 2001).

Dominica's Commitment to SE4All

Dominica is one of the many examples worldwide of direct linkage between sustainable energy and economic development. These linkages inspired the emergence of the Sustainable Energy for All (SE4All) initiative, also drawing from the personal experience of its precursor, UN Secretary-General Ban Ki-moon recalling the importance of energy for development during his youth in post-war Korea (UN 2012a). SE4All responds to the UN General Assembly of December 2010 declaring 2012 as the International Year of Sustainable Energy for All, and the mandate given to him for the coordination of activities to raise awareness on the subject (GA Resolution 65/151). Launched in September 2011, SE4All is not limited to the several awareness-raising events taking place during 2012. Indeed, the initiative's implementation roadmap includes several activities all the way to the achievement of the SE4All goals by 2030. Prior to the 2012 UN Conference on Sustainable Development (Rio+20), countries interested in supporting the initiative were requested to commit to it. Dominica is one of the several signatories of the Barbados Declaration on Achieving SE4All in all SIDS of May 2012 (including 20 SIDS from Africa, the Caribbean and Pacific regions), which along other developing and developed countries worldwide have confirmed actions towards the initiative.

In the aftermath of Rio+20, the SE4All initiative has positioned itself as a global effort heralded by government, civil society and the private sector. Ban Ki-moon has convened broad-based support globally with a simple message: sustainable development is not possible without sustainable energy. It represents a strategic positioning of energy concerns in the global development agenda, as the pursuit of Millennium Development Goals (MDGs) moves towards attaining Sustainable Development Goals (SDGs) in a post-2015 context. The three SE4All main goals, depicted in Fig. 13.1, are also straightforward:

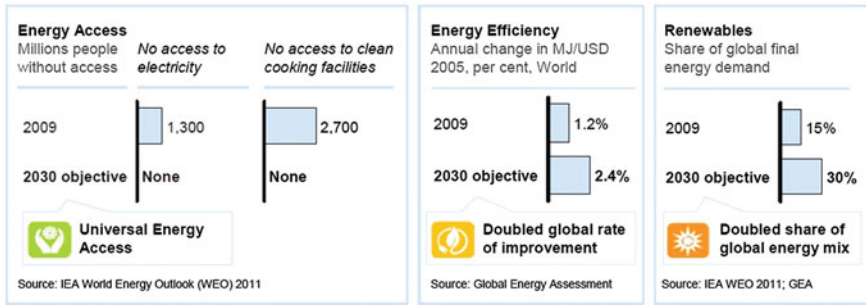


Fig. 13.1 SE4All 3 key objectives (UN 2012a)

The Commonwealth of Dominica lies in almost in the centre of the arc of Caribbean islands known as the Lesser Antilles, between the French overseas departments of Guadeloupe to the north and Martinique to the south—see Fig. 13.2. It covers some 290 square miles (750.6 km².) and has 148 km of coastline.

The country is richly endowed with 365 rivers, warm tropical climate and an average daytime temperatures range from 75 to 80 °F, with cooler temperatures in the mountains. The dry season is from January to April. The rainy season is from July to October. The terrain is rugged and mountainous; the highest point is Morne Diablotin which rises to 4,747 ft. Dominica is heavily forested (60 % of the



Fig. 13.2 Map of the Eastern Caribbean

country is covered by vegetation) and has the second largest thermally active lake in the world, also known as “the Boiling Lake”, as an indication of its geothermal potential.

As a Small Island Developing State (SIDS) in the Caribbean, Dominica is the least populated country in the Organization of Eastern Caribbean States (OECS) sub-region (70,000 inhabitants approx.). Its economy shows a GDP of approximately US\$400 m, GNI per capita of US\$4,770 and a current installed capacity of 21 MW. The country is planning to invest in increasing the capacity beyond 100 MW, through the development of geothermal resources. However, progress in this area is also contingent upon the completion of interconnection investments with their neighbouring French islands, considering that the excess capacity would have to be exported:

At present, 7.6 MW of grid-connected hydroelectricity is generated in Dominica (WB 2011). The introduction of low-volume, continuous-flow systems has made hydropower technologies readily applicable for small streams. However, poor agricultural practices and inadequate forest management have decreased flows in rivers and streams on many islands in the Caribbean (WB 2011). With the reported decreased water flow, only Dominica and to a lesser extent St. Vincent and the Grenadines may be able to economically exploit hydropower—see alternatives suggested by the same study in Table 13.1:

Hydro itself is highly site-specific, and detailed studies must be conducted at potential sites to arrive at more accurate projections of the economic viability of development. Dominica has preliminarily identified the potential to upgrade and expand its hydropower generating capacity from various sites in the country.

One such site is located in Newtown, outside of Roseau, Dominica’s capital city (see Fig. 13.3). The expansion of existing facilities offers the country the possibility of increasing its share of clean energy in its electricity mix through small-scale hydro developments. For instance, Dominica has considered the

Table 13.1 Caribbean viable electricity options (*Source* World Bank)

Country	Distillate	Coal	LNG	Wind	Geothermal	Hydro*	Bioinass*
Antigua and Barbuda	✓	✓		✓			✓
Grenada	✓	✓		✓	✓		✓
St. Vincent and the Grenadines	✓	✓		✓		✓	✓
St. Kitts	✓			✓			✓
St. Lucia	✓	✓		✓			✓
Dominica	✓			✓	✓	✓	✓
Nevis	✓			✓	✓		✓
Barbados	✓	✓	✓	✓		✓	✓
Guadeloupe	✓	✓	✓	✓	✓		✓
Martinique	✓	✓	✓	✓	✓		✓
Haiti	✓	✓	✓	✓		✓	✓
Jamaica	✓	✓	✓	✓		✓	✓
Dominican republic	✓	✓	✓	✓		✓	✓

✓ = Viable option

*The resources are site specific and need to be studied further

Fig. 13.3 Map of Dominica

development of additional hydropower resources within the Roseau valley, a protected area, though it requires addressing ecosystem-based climate resilience concerns in an integrated manner.

Indeed, the country’s ecosystems are among the richest in the Lesser Antilles. The forest systems are extensive, with all forest zones and types represented. These highly valued ecosystems are under threat from impacts of human activities (see Fig. 13.4), e.g. poorly managed mining and quarrying activities, unplanned infrastructural development:

In spite of the country’s rich river endowments, ecosystem considerations need to be considered for small hydropower developments in the short term. In the long run, Dominica plans to become carbon negative through the addition of geothermal energy to its electricity mix. The Government’s commitment to these plans has been internationally declared, as part of the SE4All initiative, as follows (AOSIS 2012):

1. Increase renewable energy generation from the current 30 % from hydro to 100 % by adding geothermal energy to the mix; and
2. Become carbon negative by exporting renewable energy to its neighbours—Guadeloupe and Martinique—by 2020.

The importance of sustainable energy for Dominica and other SIDS seems overlooked in international climate change negotiations. However, the firm position of SIDS on the debate regarding the mitigation responsibilities of industrialized nations is equal to their emphasis on addressing their concerns over domestic energy demand, in as much as it impacts their national budgets and



Fig. 13.4 Extractive industries (*Photo BERNARD engineers*)

development strategies (Alfaro-Pelico 2012a). Yet, the 3 global objectives of the SE4All initiative on energy access, energy efficiency and renewable energy are an ambitious global effort begging the question of its applicability to SIDS.

SE4All Opportunities for Dominica

SE4All proposes a framework of actions for governments, civil society and the private sectors to contribute to meeting the global goals, summarized as follows:

1. *Energy Access*—Ensuring universal access to modern energy services, by bringing the number of people with no access to electricity (estimated at 1.3 billion in 2009) or to clean cooking facilities (2.7 billion in 2009) down to zero by 2030;
2. *Energy Efficiency*—Doubling the rate of improvement in energy efficiency, by increasing the percentage annual change in MJ per dollar from 1.2 % (2009), to 2.4 % by 2030;
3. *Renewable Energy*—Doubling the share of renewable energy in the global energy mix, by increasing the share of global final energy demand from 15 % (2009) to 30 % by 2030.

The Secretary-General’s High-Level Group on SE4All has developed a global action agenda (UN 2012b), which suggests 7 sectors of action, and 4 enabling areas of support across these sectors—see Fig. 13.5, from which areas of high-impact opportunity are identified:

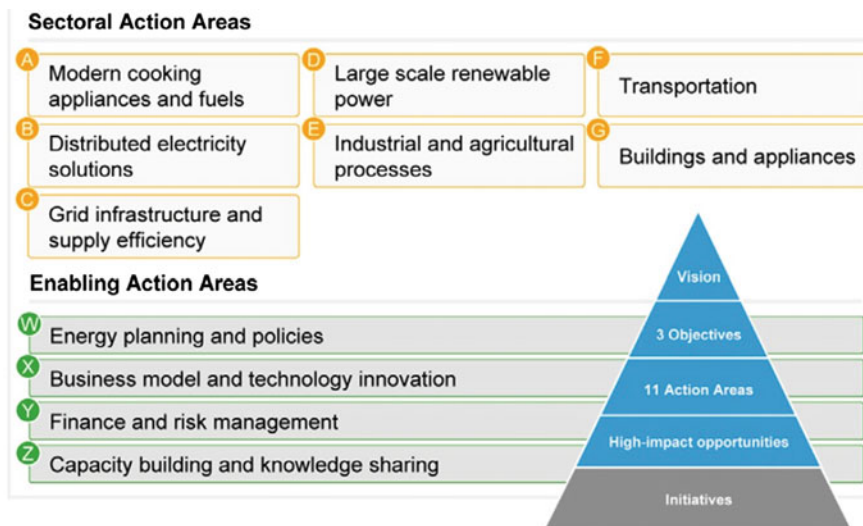


Fig. 13.5 SE4All action areas

The broad and structured SE4All framework can apply to any country, business or organization. Dominica itself can contribute to the 3 global objectives, but may also obtain assistance in the pursuit of its own national sustainable energy goals, through the proposed agenda action. For instance, the SE4All Sectoral Action Area D “Large-scale renewable power” sets forth a number of high-impact opportunities (HIOs), which are relevant to Dominica’s plans (e.g. coordinating grid-connected infrastructure strategies for different renewable energy project developers). Such an action would, for instance, ensure that the country’s hydropower and geothermal investors do not face the same barriers, or constraints limiting successful renewable energy deployment.

Meanwhile, the SE4All Enabling Action Area Y “Finance and risk management”, proposes a number of HIOs critical for the mobilization of appropriate levels of funding for sustainable energy developments (e.g. developing a coordination mechanism for sustainable energy finance that can match funding needs with existing sources of philanthropic, public, and private finance). This HIO area has become increasingly important for Dominica, first, considering the large amounts of investment required for large geothermal development. Secondly, funding to realize its small scale hydropower potential would readily address immediate energy demands, but also requires accessing sources of funds that are catalytic of additional finance. A variety of sources can be tapped into from Dominica’s national and international climate finance landscape.

Domestically, Dominica key sustainable energy investors are their utilities. Dominica Electricity Services Limited (DOMLEC) is the sole electrical utility in the country, which is heavily involved in assessing and realizing the national geothermal potential. Meanwhile, the Dominica Water and Sewage Company

(DOWASCO) is the national water utility. DOWASCO will play a critical role in the success of hydropower developments, jointly with DOMLEC. The SE4All framework also accommodates for the role different stakeholders can play in the process—see Fig. 13.6. For instance, the above investment plans need strong commitment from the Ministry of Environment and Natural Resources, Physical Planning and Fisheries; and that of Public Works, Energy and Ports.

Civil society is represented by a wide array of actors. These range from the communities heavily dependent on the rivers for their livelihoods (including indigenous groups such as the Karibs, after which the entire Caribbean region is named), to schools and training organizations that would need to prepare the local population to fully benefit from sustainable energy developments (e.g. climate change awareness-raising, learning skills for potential employment).

The private sector should also play a major role, as energy developments also create business opportunities for local entrepreneurs (e.g. ESCOs, services, supplies). Internationally, Dominica’s commitment to SE4All also opens the door for different forms of assistance from the same type of stakeholders.

Donor governments such as Denmark are fully committed to supporting sustainable energy developments in small islands, as confirmed by its \$15 million contribution to the SIDS DOCK initiative in the aftermath of the 2009 UNFCCC Conference in Copenhagen (COP-15). Dominica is eligible to funding from this initiative, as are other members of AOSIS.

Other forms of assistance are also available to Dominica, through international climate finance mechanisms such as the Global Environment Facility (GEF), or technical cooperation through other platforms (e.g. Clean Energy Ministerial initiative on the Sustainable Development of Hydropower). International companies and civil society can also play a role (e.g. foreign-based NGOs, academia) in supporting Dominica and other SIDS realize their sustainable energy ambitions.

Fig. 13.6 SE4All stakeholders

Coordination across groups	Public sector	Private sector	Civil society
Policies and institutions	++	+	+
Technological innovation		+	
Finance solutions	++	++	+
Implementation capacity	++	++	++

The challenge for a small island will be harnessing all kinds of financial and technical assistance, in a manner that is conducive to national sustainable development objectives. Indeed, this same challenge is faced by larger countries.


UNDP’s Approach to SE4All Support in Dominica








A key role for UNDP, as part of the UN global development network, is to support country-driven sustainable development efforts in an integrated manner. The convening power of the UN Resident Coordination system, often led by the UNDP Resident Representative in each country, is critical to ensure that energy interventions indeed contribute to development.

The linkages between energy and development has been previously established, and the SE4All initiative has helped highlight its importance towards attaining the Millennium Development Goals (MDGs)—see Table 13.2. This has also underscored the importance of energy in a post-2015 scenario set for the attainment of Sustainable Development Goals (SDGs).

The 2012 UN Conference on Sustainable Development (UNCSD or Rio+20) became a major platform for this thrust. Indeed, more than US\$50 billion have been mobilized toward sustainable energy, based on commitments made by countries, business and other partners. It is, however, not so clear how these commitments will materialize in countries such as Dominica, amongst other developing countries.

Table 13.2 MDGs vis-à-vis sustainable energy [*Source* Alfaro-Pelico (2012b)]



	<i>MDG Goal</i>	<i>SUSTAINABLE ENERGY Linkages</i>
	Goal 1: Eradicate extreme poverty and hunger	• Access to cleaner energy services will help reduce the fuel import bills choking the budgets of developing countries (particularly, SIDS)
	Goal 2: Achieve universal primary education	• Lighticity in schools during the day, and at home in the evenings help children do more homework
	Goal 3: Promote gender equality and empower women	• Availability of modern energy services frees (girls') and young women's time from survival activities (gathering fuel-wood, fetching water, cooking inefficiently, crop processing by hand, manual farm work)
	Goal 4: Reduce child mortality	• Globally indoor air pollution contributes to respiratory infections that account for up to 20 percent of the 11 million child deaths each year
	Goal 5: Improve maternal health	• Energy services are needed to provide access to better medical facilities for maternal care (for example, adequate operating theaters)
	Goal 6: Combat HIV/AIDS, and other major diseases	• Electricity in health centers enables night activities, and allows equipment use (for example, medicine sterilization, medicine refrigeration)
	Goal 7: Ensure environmental sustainability	• Using cleaner, more efficient fuels will reduce greenhouse gas emissions, which are a major contributor to climate change

The situation is similar at the on-going international climate change negotiations, where hundreds of billions of resources are earmarked to address climate change (e.g. US\$30 billion annually of fast-start finance pledged from 2010, US\$100 billion annually expected to be channelled through the Green Climate Fund from 2020).

However, countries face the challenge of accessing these funds. Some of these shortcomings often arise by design, especially if one takes a closer look at the far-from-straightforward global climate finance architecture—see Fig. 13.7 for more details.

The complexity of the financing landscape to address climate change creates an additional burden on developing countries to access “new and additional” predictable sources of funds. Even when funds are accessed (for instance, those channelled through multilateral mechanisms such as the UNFCCC), countries need to integrate them with other sources (e.g. own national budgets, private finance, foreign aid), in order to deliver effectively on the intended development impacts.

This has been one of the entry points for UNDP’s assistance. Dominica is amongst the many SIDS eligible to access funding from the Global Environment Facility (GEF)—several countries have benefited from the GEF after ratifying the

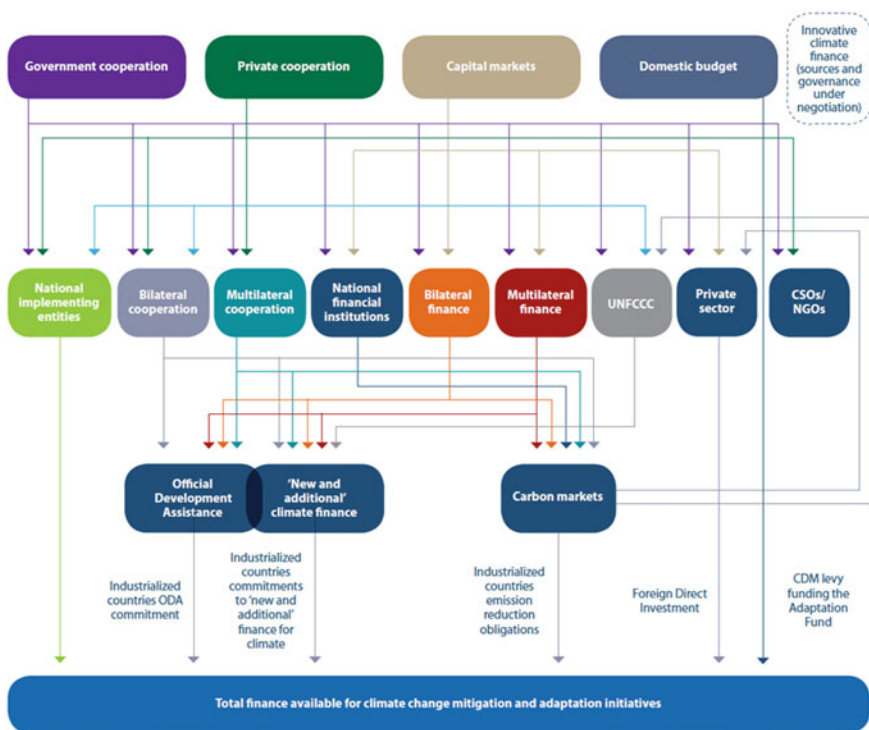


Fig. 13.7 Climate finance landscape [Source Glemarec (2011)]

3 Rio Environmental Conventions (outcomes of the 1992s Earth Summit): climate change (UNFCCC), biodiversity (CBD) and land degradation (UNCCD).

In the current fifth replenishment cycle (GEF-5), Dominica may access up to US4 million for projects addressing climate change mitigation concerns (amongst other), through several implementing agencies (UN agencies and development banks accredited by the GEF). Its request for UNDP assistance is drawing from its green, low emission, climate resilient development strategy (GLECRDS) approach:

As depicted in Fig. 13.8, UNDP’s GLECRDS framework considers the integrated nature of climate change adaptation and mitigation concerns. Although climate funds often come with a tag (e.g. GEF’s Special Climate Change Fund is primarily devoted to adaptation), UNDP’s support towards the deployment of sustainable energy technologies considers also the mitigation side of the same coin.

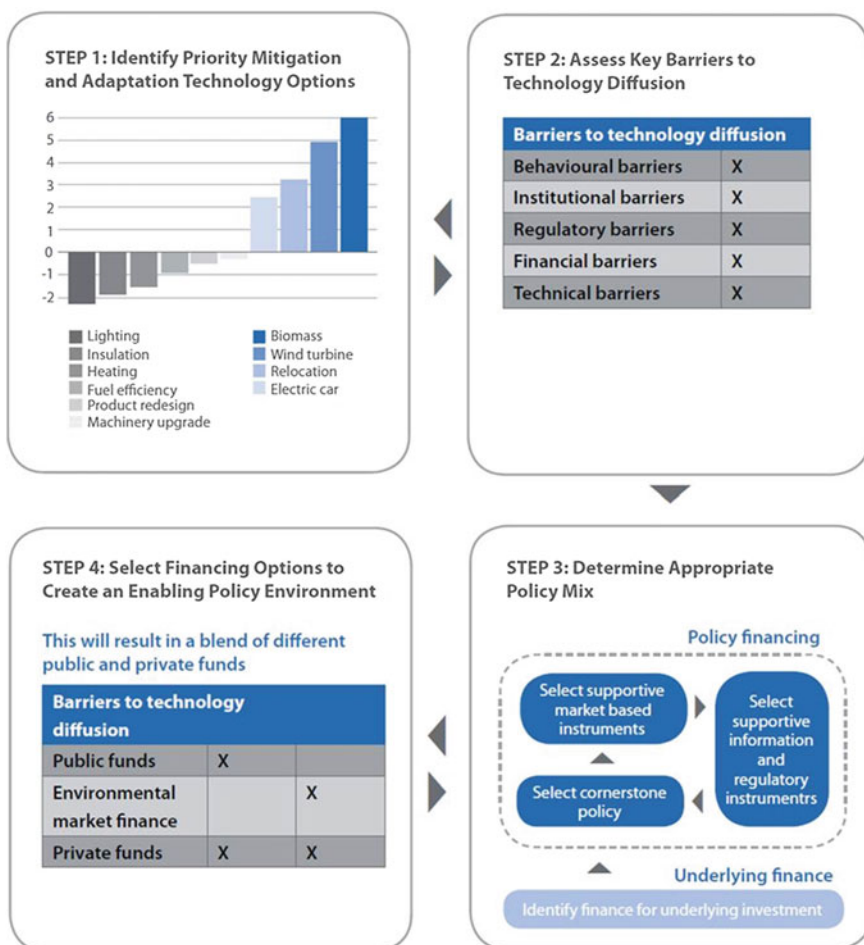


Fig. 13.8 UNDP’s GLECRDS framework [Source Glemarec (2011)]

For instance, Dominica’s hydropower plans need addressing the “green” concerns noted earlier (human-induced contamination), the “low emission” goals intended with GEF funds (cleaner energy matrix) and “climate resilience” risks (water resource challenges, e.g. prolonged dry seasons). Broader climate considerations, alongside sustainable development objectives, i.e. social inclusion (e.g. gender impacts, indigenous community involvement), economic growth (e.g. energy intensity, fiscal balances), informs UNDP’s four-stepped GLECRDS approach. The GLECRDS framework allows for integrated sectoral considerations, which are consistent with Dominica’s SE4All agenda.

As a result, Dominica’s investments in hydropower will require the involvement of a wide range of stakeholders beyond DOMLEC or its energy ministry. Consultations with the environment ministry are providing for a broader understanding of the policy, financing, capacity and technology constraints requiring a more comprehensive analysis, beyond the information provided by standard environmental impact assessments (e.g. integrated resource assessments, water availability maps, river flow analyses).

Therefore, UNDP’s work in the energy, infrastructure, transport or technology (EITT) sectors takes low emission considerations beyond mitigation, within the GLECRDS framework—see Fig. 13.9:

In doing so, UNDP has been promoting sustainable energy interventions at very different scales (see Fig. 13.10) with GEF funding, and in partnership with both public and private sector stakeholders:

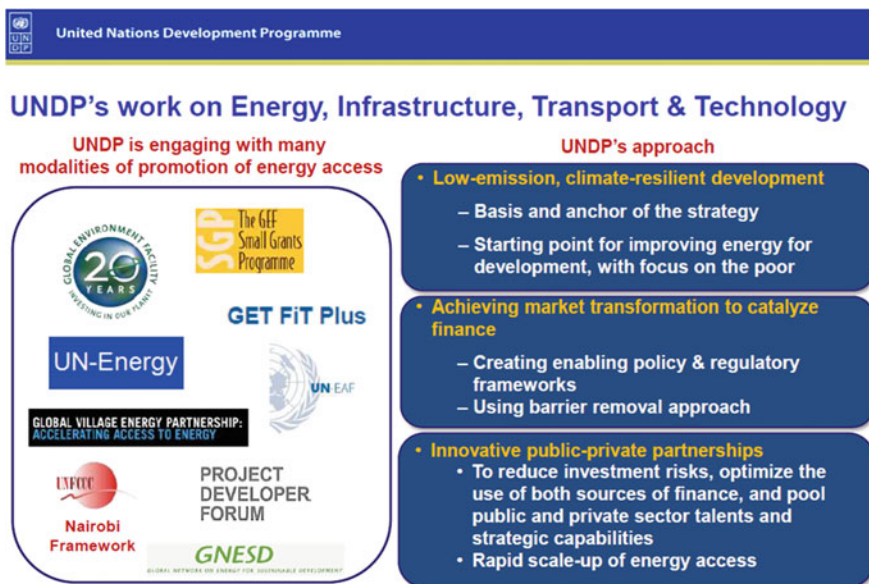


Fig. 13.9 UNDP low-emission EITT approach [Source Alers (2011)]

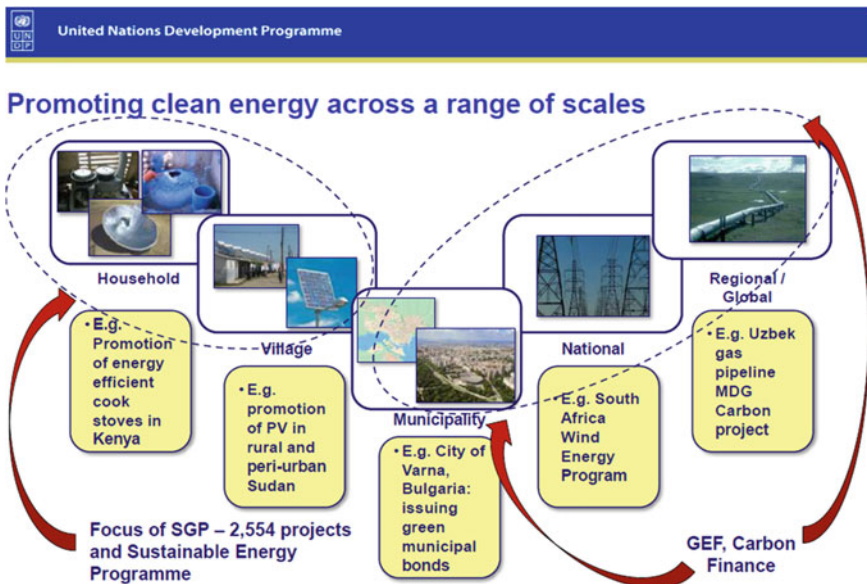


Fig. 13.10 UNDP sustainable energy approach [Source Alers (2011)]

This multi-scale support is successfully achieved by assisting countries combine and sequence their different forms of climate finance [Alers, Glemarec (2011)]—see Fig. 13.11:

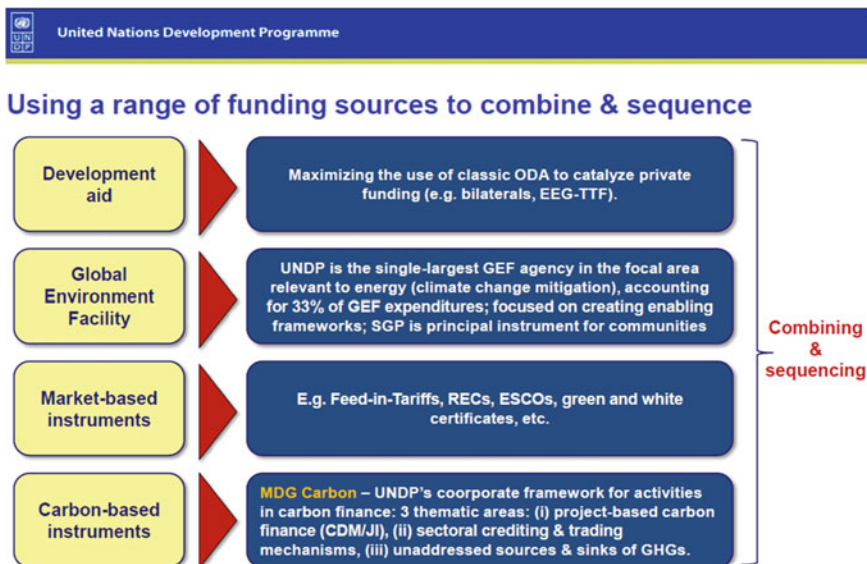


Fig. 13.11 UNDP combining and sequencing approach Source Alers (2011), Glemarec (2011)

For instance, Dominica's low carbon development proposal being submitted for GEF funding may combine US\$2–4 million from GEF's trust fund with direct or indirect contributions (grant or in-kind) from development aid (e.g. \$0.3–1 m Denmark government's donation to SIDS DOCK, \$0.2–0.6 m UNDP grants both from core and non-core sources) and market-based instruments (e.g. \$1.2–6 m from DOWASCO and DOMLEC's capital outlays to be repaid through tariffs or other means).

However, it is the catalytic nature of GEF funds that may unlock the potential to access the alternative sources of finance within the same project (combining), and help restructure the terms of other funds (sequencing, by blending existing grant finance with other non-grant resources, e.g. soft or hard loans from Dominica's Agricultural Industrial and Development Bank, or the Caribbean Development Bank).

Conclusion

Dominica's ambitious sustainable energy objectives match its potential to deliver on its sustainable development goals 100 % through cleaner sources of energy (e.g. hydropower and geothermal). The approach the country takes in responding to the challenge might well determine its chances of success, as it is the case for other SIDS.

Dominica's commitment to the "Sustainable Energy for All" is certainly a step forward in this direction. Not only does it demonstrate the country's firm stance on responding to national sustainable energy objectives, but it also shows how other countries can benefit, starting with the neighbouring islands of Guadeloupe and Martinique.

These values are shared by other SIDS signatories of the Barbados Declaration, proving how serious about climate change mitigation these countries are, even when they agree the main burden of reducing greenhouse gas emissions should be placed on to developed countries. The SE4All framework and the UN Secretary-General action agenda launched ahead of the Rio+20 conference provides guidance on how countries can go about pursuing sustainable energy.

The multi-stakeholder approach is very typical of UN-led processes, but it has also proven critical in many countries worldwide to bring sustainable energy to their homes. It shows that industry alone cannot address the energy challenge, nor can development aid finance such an undertaking, nor can interventions ignore the voice of indigenous communities, or neglect the importance of empowering women in the process. The other challenge is bringing all parties and resources (time, money, and their expectations) to the table in a way that it does not compromise the delivery of the intended sustainable development goals. The international climate negotiation process, and its outcomes (cycles, finances, and their intentions), provide an example of how complex the process can be.

It is down to countries to determine their approach and partners to their causes. Dominica’s long-term partnership with UNDP draws from a track record of integrated development assistance, which ranges from supporting the country’s poverty eradication efforts to providing advice to its energy investment plans in such a way that it helps the country pursue green, low emission, development strategies.

References

- Alers M (2011) UNDP’s work on sustainable energy, presentation to the PSLO energy sector mission: energy sector opportunities at the United Nations. United Nations development programme, New York, 28 Oct 2011
- Alfaro-Pelico RI (2012a) Small island developing states and climate change: effects, responses and positions beyond Durban, working paper 1/2012, Real Instituto Elcano, Madrid, 23 Jan 2012
- Alfaro-Pelico RI (2012b) 2012 international year of sustainable energy for all, presentation to the 5th meeting of UNDP’s environment and energy community of practice latin America and the caribbean. United Nations development programme, Panama, 6–8 Mar 2012
- AOSIS (2012) The barbados declaration on achieving sustainable energy for all in small island developing states, alliance of small island states, Bridgetown, 7–8 May 2012
- Glemarec Y (2011) Catalysing climate finance: a guidebook on policy and financing options to support green, low-emission and climate-resilient development. United Nations development programme, New York (http://www.beta.undp.org/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment/in_focus/catalyzing-climate-finance.html)
- MAE (2001) Commonwealth of Dominica’s initial national communication under the United Nations framework convention on climate change, environmental coordinating unit, ministry of agriculture and the environment, Roseau, Nov 2001
- UN (2012a) Sustainable energy for all: a framework for action. The secretary general’s high-group on sustainable energy for all (Jan 2012). United Nations <http://www.sustainableenergyforall.org>
- UN (2012b) Sustainable energy for all: a global action agenda—pathways for concerted action toward sustainable energy for all. The Secretary general’s high-group on sustainable energy for all (April 2012). United Nations <http://www.sustainableenergyforall.org>
- WB (2011) Caribbean regional electricity supply options: toward greater security, renewables and resilience. World Bank, Washington D.C