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HAITI: ENERGIZING SOCIO-ECONOMIC REFORM

Gwyneth Edwards and René Jean-Jumeau wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.

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Minister René Jean-Jumeau, delegate to the prime minister of Haiti, in charge of the Department of Energy Security, looked out into the Bay of Port-au-Prince from his government office. It was February 2014, and in just two weeks, he was scheduled to present a proposal to the prime minister of Haiti on how to advance the country’s energy infrastructure to spur Haiti’s socio-economic reform. Although the country had suffered from political and economic setbacks, Haiti sought to attract foreign investment and become a gateway to the Americas. The opportunity, however, depended on a solid energy infrastructure, which Haiti lacked: over 70 per cent of Haitians did not have access to the electricity provided by the country’s state-owned enterprise, Électricité d’Haïti (EDH). Although EDH’s installed capacity was almost 300 megawatts (MW), obsolete equipment, poor maintenance, ineffective billing and collection systems, theft, and vandalism reduced capacity by a third. In addition, 70 per cent of Haiti’s energy supply was made up of wood and charcoal, most of which was consumed by residents for their daily needs. Private enterprises depended on self-supplied energy, fuelled by imported oil products.

With a doctoral degree in engineering, Jean-Jumeau understood that the technical options were numerous. He also felt that the solution required public–private partnerships throughout the energy value chain. The minister knew that his presentation to the prime minister would be the beginning of numerous requests for proposal, so the presentation needed to outline a clear strategy for proceeding. “How should I structure my proposal?” thought the minister. “What criteria should my proposal contain to allow us to move this effort to the next phase?”

HAITI: THE PEARL OF THE CARIBBEAN

The Republic of Haiti was located in the central Caribbean on the island of Hispaniola, which Haiti shared with the Dominican Republic. At the end of the twentieth century, Haiti’s economy was affected by shortages of arable land, environmental deterioration, use of traditional technologies, under-capitalization, lack of public investment in human resources, migration of skilled labour, and a weak national savings rate.

In 2011, the country’s estimated gross domestic product was almost US$12.44 billion,[[1]](#footnote-1) mainly in agriculture (24.7 per cent) and services (55.8 per cent) (see Exhibit 1), while 66 per cent of the population was not formally employed. Haiti’s balance of trade in 2012 was over $2.7 billion for imports and $785 million in exports. Exports to the United States were supported by programs such as those under the U.S. *Haitian Hemispheric Opportunity for Partnership Encouragement Act of 2006* (HOPE I and II) and the *Haiti Economic Lift Program Act of 2010* (HELP), which provided special trade rules for export of Haitian-manufactured apparel to the United States.[[2]](#footnote-2) Imports were supported by low trade barriers and 15-year tax holidays, implemented by the government of Haiti. Haiti also received foreign aid from countries such as the United States, Canada, and China, the European Union, and organizations such as the International Monetary Fund and the World Bank, providing about 40 per cent of the country’s $3 billion annual budget. By 2013, Haiti had a population of approximately 9.89 million and the United Nations Human Development Report listed the country as the poorest in the western hemisphere.

Haiti’s geology was mainly rough and mountainous, although the country’s eastern mountain ridge cut off trade winds, making the climate tropical and semiarid, ideal for agriculture. The island was centrally located in the Caribbean Sea; Haiti’s coastline was one of the longest in the region (1,771 kilometres), containing over a dozen ports, the largest being in Port-au-Prince, the nation’s capital. The country operated two international airports and maintained two major highways that ran across the country. In 2013, due to Haiti’s proximity to other markets and growing tourism and trade environment, many airlines offered direct flights from major cities, such as New York City (3 hours), Miami and Fort Lauderdale (1.5 hours), Montreal (4 hours), France, Dominican Republic, Cuba, and Guadalupe. Although Haiti was politically separated into 10 regions, the country was commonly divided into four geographical regions (see Exhibits 2 to 5).

Haiti’s culture was grounded in its African, French, and Spanish roots. The country’s official language was French, while the common language was Haitian Creole. Many of the Haitian business community also spoke English as a result of their extensive dealings with international trade and investment. As part of Haiti’s recovery from the past and the more recent 2010 earthquake that killed over 100,000 people, the nation’s government had aggressively pursued social and economic reform. Because of Haiti’s centrality in the region, rich land and culture, and hardworking people, Haiti is often referred to as the “Pearl of the Caribbean.”

ENERGY AND ELECTRICITY

As Haiti worked toward socio-economic reform, a preoccupation of the government was the country’s infrastructure, with a particular focus on the need for competitively priced and reliable power. Haiti’s energy consumption was largely provided through biomass products (69 per cent; comprised of wood, charcoal, and sugar cane residue) and petroleum products (30 per cent; comprised of gas, diesel, oil, and kerosene). As of early 2014, only 1 per cent of the nation’s energy was provided by electricity, through the state-owned EDH. Given that petroleum products were imported into the country, operating costs were highly vulnerable to rising and unstable oil prices. The market for energy provided through biomass products was $200 million per year, while overall energy consumption approached $800 million, including a $200 million subsidy to EDH from the government of Haiti.

Energy was consumed mainly in the residential sector (62 per cent) for the purpose of cooking and everyday living. The remaining energy was consumed in the industrial sector (21 per cent), and by transportation (14 per cent) and services (3 per cent) (see Exhibit 6). Although annual energy consumption per capita was approximately 60 kilowatt-hours (kWh) in 1990, it fell and fluctuated dramatically between 1990 and 2012 due to extreme weather, the earthquake, and a deteriorating infrastructure. In 2012, average consumption per capita was approximately 32 kWh.

With the lack of available energy, a market of informal power producers emerged alongside the formal market. Small, less sophisticated industrial and commercial users began subcontracting energy to other dealers and small entrepreneurs. These small-scale generating facilities were relatively inefficient and came with very high production costs. The government, however, allowed this informal market to continue given the general lack of available electricity supply.

Small remote communities of Haiti posed additional challenges for the provision of energy. With small population sizes, these areas had relatively low power needs, ranging from 125 kW to 1 MW. Because the capital investment for reaching these communities and building a local power generation unit far exceeded the potential revenue stream, many areas were served through low power diesel generators, which were costly to operate as a result of their dependency on imported fuel. Potential energy sources for these areas included solar, micro-hydro, wind, and urban waste.

ÉLECTRICITÉ D'HAÏTI

In 2013, Haiti had the lowest electricity coverage in the western hemisphere with only 12.5 per cent of the population having regular, legal access, and an additional 12.5 per cent having illegal connections. EDH, the state-owned electricity provider, was established in 1971 as a vertically integrated monopoly, responsible for the production, procurement, and distribution of electricity throughout Haiti.[[3]](#footnote-3) Although the original intent was for EDH to produce most of the electricity it supplied, over the years, EDH unbundled its service such that most power generation was assigned to independent power producers (using power purchasing agreements), with EDH as the single buyer. There were some exceptions to this legislation, however. First, independent power generation was authorized for self-use, which encouraged private businesses to generate their own power. Second, the government legislated “free zones” and industrial park power production, where operators were authorized to generate and distribute electricity (for a fee) within a specified boundary.

Governance

In 2013, the government of Haiti, through the Ministry of Economy and Finance, earmarked $140 million for the energy sector, 5 per cent of its overall budget, to be shared among the four ministries associated with energy (see Exhibit 7). The Ministry of Public Works, Transport, and Telecommunications (MTPTC) was responsible for the management of the energy sector, including energy policy and regulation, but this played only a small part of the ministry’s overall responsibilities. The MTPTC shared the government’s energy funding with three other ministries: the Ministry of Commerce and Industry, which regulated petroleum products; the Ministry of Agriculture, Natural Resources, and Rural Development, which regulated biomass products; and the Ministry of the Environment, which regulated protected areas. The Ministry of Economy and Finance covered payments that the state-owned EDH was unable to make.

The MTPTC included three main organizations, one of which was the Office of the Minister Delegate of Energy Security, Jean-Jumeau’s department. His department was responsible for developing regulations and policies. Jean-Jumeau, however, did not have full authority over the electricity sector. The Bureau of Mines and Energy, another of MTPTC’s three organizations, previously had responsibility for energy policy, but with the creation of Jean-Jumeau’s department, the bureau played less of a role. Finally, EDH itself sat within the MTPTC, with the Minister of MTPTC acting as EDH’s chairman of the board.

Challenges

EDH, and the provision of electricity in Haiti, faced a number of challenges. In 2013, the government of Haiti subsidized EDH with $170 million in response to damages caused by the 2010 earthquake and subsequent storms. In addition, lack of investment in—and maintenance of—equipment and ongoing vandalism had led to significant deterioration of the equipment, not only increasing overall operating costs but also reducing efficiency. In 2013, although EDH’s installed capacity was 270 MW, EDH was only able to provide 166 MW. Peak power demand prior to the 2010 earthquake reached 500 megawatt-hours (MWh). Demand was expected to grow to over 5,000 MWh in 10 to 20 years.

Diesel plants were EDH’s primary source of electricity, supplying about 80 per cent of its overall electrical capacity. EDH management estimated that by converting to a different energy source, such as heavy fuel, EDH could reduce its cost by 30 per cent. The supply of electricity was generally unpredictable and expensive, with limited access (see Exhibit 8). Most of the installed capacity was based in the metro areas (75 per cent), with the remaining capacity provided in remote areas through the diesel generators.

EDH dealt with electricity theft and only billed for a fraction of the electricity provided, collecting an even smaller portion of what was billed. Poor internal systems and controls, lack of metering systems, limited security measures, and an inability to effectively track accounts receivables led to a cash recovery index of, on average, 40 to 50 per cent, compared to a minimum required value of 70 per cent. Collections reached an all-time low of 10 per cent during the period immediately after the earthquake in 2010. None of this accounted for the electricity that was illegally obtained.

Opportunities

EDH experimented with other sources of electricity in an effort to reduce its dependency on petroleum products. It operated a full-scale hydro power production facility in Péligre, but with old and failing equipment and ongoing repairs, the facility did not operate at full capacity: of the available 187 MW, only 62 MW were used. The plant’s solar energy radiation averaged 5 kilowatt-hours per square metre per day (kWh/m2/day).[[4]](#footnote-4)

In addition to its full-scale hydro power production facility, EDH operated six micro-hydro units, but they too were in a state of disrepair and not operating to their combined 150 MW capacity. EDH felt, however, that these micro-hydro units were a worthwhile investment. Although the initial capital requirements were significant, planning, building, maintaining, and operating a micro-hydro unit was not technically difficult. The benefit also meant a reduction of the use of biomass fuels, thereby protecting the significantly eroded landscape of Haiti, which had been brought on by the burning of biomass fuels. EDH also considered other technologies that could reduce reliance on imported petroleum projects and deforestation, including liquefied natural gas generation and wind generation.

International Investment

EDH jointly managed a number of small projects and studies with various international agencies funding the projects. These projects were often initiated by the international agency itself, and managed as a stand-alone activity with varying objectives and outcomes. For example, the Inter-American Development Bank was involved in the rehabilitation of distribution circuits in Port-au-Prince. In 2013, the World Bank provided EDH with $11 million to cover losses, and was considering a $90 million grant for a new project. The United States Agency for International Development refurbished a number of small hydro plants and was considering an investment in northeast Haiti for a large, renewable-energy rural supply. The International Atomic Energy Agency (l’Agence Internationale de l'Énergie Atomique) contributed toward the preparation of the country’s 2007–2017 strategic plan for electricity. The Canadian International Development Agency had a long history in Haiti as a semi-autonomous distribution utility and was interested in expanding its scope. It also played a role coordinating international donations.

In 2011, the United Nations Development Programme launched a small-scale hydro power development project valued at $3 million that, by the end of 2014, would create regional grids and eventually employ local Haitians to manage and operate the plants. This project would also reduce carbon emissions by 850,000 tons. The Norwegian government, already having experience in Nicaragua, contributed toward this project and had $3 million available in escrow for future investment.

ENERGIZING HAITI

Jean-Jumeau began considering the various options required to support Haiti’s socio-economic reform. With the country’s push for increasing foreign direct investment, it was critical that the energy infrastructure undergo a significant transformation in order to provide competitively priced, reliable electricity to businesses. In addition, the residents of Haiti were in dire need of a low-cost, reliable solution that would allow them to move away from biomass and petroleum products, which were expensive and bad for the environment.

The minister looked at the opportunity from an investment perspective. Although EDH’s assets were in need of investment, the state-owned enterprise had a large installed base and numerous partnerships with the private sector. Haiti itself had a labour force that was ready and willing to work, at a highly competitive cost (see Exhibit 9). Additionally, there were micro-financing opportunities for local energy production and distribution, along with technologies such as mobile phones (60 per cent penetration rate) that could assist with collections. Given its climate, Haiti also offered a number of opportunities for solar and wind energy.

While Jean-Jumeau explored the options for energizing Haiti, he began to structure his presentation. For his meeting with the prime minister, he wanted to propose a strategy that would consider the three major components of the energy value chain (production, distribution, and commercialization) and the types of public–private partnerships at his disposal; for example, a build–operate–transfer project, buyout of existing EDH assets, a mixed public–private company, or a concession to a private company to operate EDH in exchange for a royalty. He also needed to consider the specific needs and opportunities of each of the four geographic regions. Jean-Jumeau began to outline the components of his proposal and the required decision criteria to ensure that he proposed a sound strategy to the prime minister.

Exhibit 1: Top 25 Contributors to Haiti’s Gross Domestic Product

|  |  |  |
| --- | --- | --- |
| **Rank** | **Company Name** | **2012 Earnings**  **(in US$ millions)** |
| 1 | Unigestion Holding S.A. | 1,843.4 |
| 2 | Brasserie Nationale d'Haiti (BRANA) S.A. | 1,051.6 |
| 3 | Compagnie des Tabacs Comme Il Faut S.A. | 625.4 |
| 4 | Unibank S.A. | 461.1 |
| 5 | Société Générale Haïtienne de Banque S.A. | 401.8 |
| 6 | Distributeurs Nationaux S.A. | 364.9 |
| 7 | Électricité d'Haïti | 345.1 |
| 8 | Cimenterie Nationale S.E.M. | 309.8 |
| 9 | National Telecom S.A. | 263.7 |
| 10 | Office Nationale d'Assurance Vieillesse | 260.6 |
| 11 | Brasserie de La Couronne S.A. | 200.4 |
| 12 | American Airlines, Inc. | 199.9 |
| 13 | Hinoto S.A. | 191.6 |
| 14 | Capital Bank S.A. | 171.0 |
| 15 | Total Haiti S.A. | 170.0 |
| 16 | Tropic S.A. | 167.4 |
| 17 | Valerio Canez S.A. | 142.9 |
| 18 | Telecom Solutions, S.A. | 140.5 |
| 19 | Les Moteurs Réunis S.A. | 135.0 |
| 20 | Communication Cellulaire d'Haïti S.A. | 126.8 |
| 21 | Carribex, S.A. | 122.1 |
| 22 | Operateurs Portuaires Réunis S.A. | 109.6 |
| 23 | Séjourné S.A. | 106.3 |
| 24 | Office Assurances Véhicules Contre Tiers | 103.5 |
| 25 | Alternative Insurance Company | 101.2 |

Source: Government of Haiti, Department of Energy Security.

Exhibit 2: The Northern Region

**Tourism**: La Citadel (biggest fortress in Western Hemisphere); Labadie (cruise ship destination) with 600,000 visitors per year; international airport in Cap-Haïtien

**Agricultural Potential**: Strong

**Geography**: le passage du Vent/Windward Passage (potential for trans-shipment and industrial development); border with the Dominican Republic; L’île de la Tortue/Tortuga (mountainous, rocky, rich history, and often connected to fictional pirate narratives)

**Infrastructure**: New 250-acre industrial park with 27 MW power plant in northwest area of Caracol

**Unique Energy Aspects**: High and steady wind flows in northwest region; natural potential for hydro and solar energy

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Description** | **Total Population** | **Less than 18 Years of Age** | **Number of Houses** | **Surface Area (km²)** | **Population Density** | **Type of Energy Generation** | **Installed Capacity (MW)** | **Available Capacity (MW)** | **Energy Produced per Day (MWh)** | **EDH Fuel Consumption (gal./day)** | **EDH Fuel in Stock (gal.)** | **Client Base** |
| All Areas | 1,991,549 | 915,078 | 398,555 | 5,841 | 341 | Mixed | 20.69 | 17.45 | 287.7 | 10, 540 | 164,000 | 22,650 |
| Rural | 1,224,771 | 581,204 | 242,493 | 5,741 | 213 | - | - | - | - | - | - | - |
| Suburban | 124,705 | 55,618 | 24,677 | 26 | 4,829 | - | - | - | - | - | - | - |
| Cities | 642,073 | 363,817 | 131,385 | 73 | 8,836 | - | - | - | - | - | - | - |
| Cap-Haïtien | 249,541 | 103,671 | 48,384 | 54 | 4,664 | Thermo H | 15.00 | 14.00 | 285.6 | 10,540 | 162,700 | 15,000 |
| Caracol | 7,015 | 3,197 | 1,713 | 75 | 94 | Hydro | 0.08 | 0.50 | 2.1 | 0 | 0 | 100 |
| Fort-Liberté | 31,315 | 14,100 | 6,959 | 240 | 130 | Thermo G | 0.40 | 0.40 | 0.0 | 0 | 279 | 0 |
| Môle-Saint- Nicolas | 30,795 | 14,777 | 5,935 | 227 | 136 | - | - | - | - | - | - | - |
| Ouanaminthe | 96,515 | 46,329 | 19,438 | 199 | 485 | Thermo D | 1.60 | 1.30 | 0.0 | 0 | 180 | 1,500 |
| Port-de-Paix | 185,494 | 84,415 | 37,095 | 352 | 527 | Thermo D | 2.50 | 1.00 | 0.0 | 0 | 668 | 2,000 |
| Saint-Louis-du-Nord | 105,808 | 49,492 | 19,827 | 126 | 842 | - | - | - | - | - | - | - |

Note: EDH = Électricité d’Haïti; gal. = U.S. liquid gallons; km2 = square kilometre; MWh = megawatt-hour; Thermo G = Gasoline, Thermo H = Heavy Fuel Oil, Thermo D = Diesel, Thermo M = Mixed.

Source: Government of Haiti, Department of Energy Security.

Exhibit 3: The Central Region

**Tourism**: Potential for 50,000 tourists per year; Bassin Zim (20 metre waterfall, beautiful scenery, and an underground cave network); Saint-Marc (the location for some of Haiti’s most popular beach resorts)

**Agricultural Potential**: Strong

**Geography**: Adjacent to the central border of Dominican Republic; Artibonite River (320 kilometres long and most important river on the island)**Infrastructure**: Port of Gonaives; potential for 50 acres of green land to become an industrial park

**Unique Energy Aspects**: Hydro dam in Péligre with a capacity of 36 MW and a potential for expansion ranging up to 100 MW; average construction cost of hydroelectricity US$7 million per MW

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Description** | **Total Population** | **Less than 18 Years of Age** | **Number of Houses** | **Surface Area (km²)** | **Population Density** | **Type of Energy Generation** | **Installed Capacity (MW)** | **Available Capacity (MW)** | **Energy Produced per Day (MWh)** | **EDH Fuel Consumption (gal./day)** | **EDH Fuel in Stock (gal.)** | **Client Base** |
| All Areas | 2,195,646 | 1,012,254 | 511,440 | 8,374 | 262 | Mixed | 70.6 | 47.8 | 1,050.0 | 41.7 | 8,789 | 25,900 |
| Rural | 902,562 | 424,927 | 351,317 | 8,275 | 109 | - | - | - | - | - | - | - |
| Suburban | 56,862 | 24,720 | 14,208 | 24 | 2,401 | - | - | - | - | - | - | - |
| Cities | 1,236,222 | 562,607 | 145,915 | 76 | 16,242 | - | - | - | - | - | - | - |
| Gonaïves | 324,043 | 136,750 | 67,190 | 574 | 565 | Thermo M | 15.0 | 14.0 | 285.6 | 0.0 | 3,714 | 16,000 |
| Hinche | 109,916 | 46,682 | 23,663 | 588 | 187 | Thermo G | 2.8 | 0.0 | 0.0 | 0.0 | 5,000 | 1,200 |
| Mirebalais | 88,899 | 39,771 | 21,087 | 331 | 269 | Hydro | 36.0 | 28.0 | 672.0 | 0.0 | 0 | 2,200 |
| Saint-Marc | 242,485 | 101,932 | 55,109 | 557 | 436 | Mixed | 13.4 | 2.9 | 61.5 | 0.0 | 75 | 4,000 |

Note: EDH = Électricité d’Haïti; gal. = U.S. liquid gallons; km2 = square kilometre; MWh = megawatt-hour; Thermo G = Gasoline, Thermo H = Heavy Fuel Oil, Thermo D = Diesel, Thermo M = Mixed.

Source: Government of Haiti, Department of Energy Security.

Exhibit 4: The Western Region

**Tourism**: Beach resorts with 1,300 rooms on coast; Toussaint Louverture International Airport

**Agricultural Potential**: Weak

**Geography**: Adjacent to lower part of Dominican Republic; Île de la Gonave (largest island of Hispaniola, which is hilly, barren, and composed of limestone); largest population and heavy population density

**Infrastructure**: Industrial park; international port; national road system; ready for international connectivity to Dominican Republic grid

**Unique Energy Aspects**: Largest EDH facility

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Description** | **Total Population** | **Less than 18 Years of Age** | **Number of Houses** | **Surface Area (km²)** | **Population Density** | **Type of Energy Generation** | **Installed Capacity (MW)** | **Available Capacity (MW)** | **Energy Produced per Day (MWh)** | **EDH Fuel Consumption (gal./day)** | **EDH Fuel in Stock (gal.)** | **Client Base** |
| All Areas | 4,239,913 | 1,716,820 | 928,510 | 7,017 | 604 | Mixed | 190.9 | 126.4 | 1,253.3 | 37,830 | 514,015 | 149,400 |
| Rural | 1,369,604 | 730,142 | 305,764 | 6,786 | 202 | - | - | - | - | - | - | - |
| Suburban | 110,047 | 45,815 | 24,957 | 3 | 3,355 | - | - | - | - | - | - | - |
| Cities | 2,760,262 | 1,075,430 | 709,461 | 2,215 | 1,245 | - | - | - | - | - | - | - |
| Grand-Goâve | 124,135 | 50,065 | 31,890 | 243 | 511 | - | - | - | - | - | - | - |
| Jacmel | 170,289 | 71,801 | 39,435 | 444 | 384 | Thermo D | 3.8 | 2.9 | 20.9 | 1,522 | 6,616 | 6,000 |
| Léogoâne | 181,709 | 73,971 | 42,380 | 385 | 472 | - | - | - | - | - | - | - |
| Petit-Goâve | 157,296 | 64,842 | 36,827 | 388 | 406 | Thermo G | 6.0 | 5.5 | 132.0 | 0 | 0 | 4,000 |
| Port-au-Prince | 897,859 | 329,895 | 193,540 | 36 | 24,913 | Thermo D/M | 178.0 | 115.6 | 1,094.4 | 36 185 | 506,805 | 109,500 |

Note: EDH = Électricité d’Haïti; gal. = U.S. liquid gallons; km2 = square kilometre; MWh = megawatt-hour; Thermo G = Gasoline, Thermo H = Heavy Fuel Oil, Thermo D = Diesel, Thermo M = Mixed.

Source: Government of Haiti, Department of Energy Security.

Exhibit 5: The Southern Region

**Tourism**: Île-à-Vache (beach resort with 300 rooms, potential to grow to 18,000 rooms); Port-Salut (potential tourist town with large cave networks, untouched luscious green landscape, waterfalls, and long natural beaches)

**Agricultural Potential**: Medium

**Geography**: le passage du Vent/Windward Passage (potential for trans-shipment and industrial development)**Infrastructure**: Road reconstruction in Les Cayes; three airports in construction (Les Cayes, Île-à-Vache, Côtes-de-Fer); international port in Miragoâne

**Unique Energy Aspects**: Hydro with potential for growth to 30 MW; average construction cost of hydroelectricity US$7 million per MW; strong wind potential in Grand’Anse

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Description** | **Total Population** | **Less than 18 Years of Age** | **Number of Houses** | **Surface Area (km²)** | **Population Density** | **Type of Energy Generation** | **Installed Capacity (MW)** | **Available Capacity (MW)** | **Energy Produced per Day (MWh)** | **EDH Fuel Consumption (gal./day)** | **EDH Fuel in Stock (gal.)** | **Client Base** |
| All Areas | 1,442,135 | 640,065 | 309,188 | 5,834 | 247 | Mixed | 13.7 | 9.1 | 60.2 | 1,384.6 | 225.0 | 15,850 |
| Rural | 1,155,259 | 516,860 | 247,662 | 5,707 | 202 | - | - | - | - | - | - | - |
| Suburban | 36,027 | 15,493 | 8,067 | 62 | 581 | - | - | - | - | - | - | - |
| Cities | 250,849 | 107,285 | 53,459 | 65 | 3,871 | - | - | - | - | - | - | - |
| Camp-Perrin | 40,962 | 17,592 | 8,346 | 134 | 306 | Thermo D | 3.7 | 1.0 | 0.0 | 0.0 | 0.0 | 1,000 |
| Île-à-Vache | 14,004 | 7,097 | 2,558 | 46 | 305 | Hydro | 2.4 | 1.6 | 11.0 | 0.0 | 0.0 | 400 |
| Jérémie | 122,149 | 51,995 | 25,774 | 427 | 286 | - | - | - | - | - | - |  |
| Les Cayes | 137,952 | 55,342 | 28,722 | 219 | 630 | Thermo D | 7.0 | 6.0 | 49.2 | 1,382.6 | 0.0 | 10,000 |
| Miragoâne | 56,864 | 32,554 | 13,889 | 186 | 306 | - | - | - | - | - | - | - |
| Port-Salut | 17,368 | 9,598 | 3,625 | 49 | 356 | - | - | - | - | - | - | - |

Note: EDH = Électricité d’Haïti; gal. = U.S. liquid gallons; km2 = square kilometre; MWh = megawatt-hour; Thermo G = Gasoline, Thermo H = Heavy Fuel Oil, Thermo D = Diesel, Thermo M = Mixed.

Source: Government of Haiti, Department of Energy Security.

Exhibit 6: Energy Consumption in Haiti (2013)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sector** | **Oil Products (%)** | **Biomass (%)** | **Electricity (%)** | **TOEs '000s** | **Consumption (% of total)** |
| Industry | 32.9 | 65.9 | 1.2 | 504 | 20.0 |
| Transport | 100.0 | 0.0 | 0.0 | 451 | 18.0 |
| Residential | 5.5 | 94.1 | 0.5 | 1,480 | 50.0 |
| Other | 0.0 | 85.4 | 14.6 | 41 | 2.0 |

Notes: TOEs = tons of oil; 1 MWh = 0.086 toe; 1 toe = 11,630 kWh.

Source: Government of Haiti, Department of Energy Security.

Exhibit 7: Government of Haiti Ministries associated with Energy

Note: EDH = Électricité d’Haïti; BMSE = Bureau du Ministre à la Sécurité Énergétique [Department of Energy Security].

Source: Government of Haiti, Department of Energy.

Exhibit 8: Estimated Electricity Costs in Haiti

|  |  |  |
| --- | --- | --- |
| **Type of Client** | **Consumption (kWh)** | **Cost (US$/kWh)** |
| Residential | 0–200 | 0.11 |
| Above 200 | 0.29 |
| Commercial | 0–30 | 0.26 |
| 31–200 | 0.30 |
| Above 200 | 0.32 |
| Industrial |  | 0.31 |
| Public Institution |  | 0.32 |

Source: Government of Haiti, Department of Energy Security.

Exhibit 9: Cost Comparison Matrix

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cost Category** | **Notes** | **Unit** | **Haiti** | **Dominican Republic** | **Mexico** | **India** | **China** | **Pakistan** | | **Bangladesh** | | **Cambodia** | |
| Labour costs |  | US$/hour | 0.48 | 0.90 | 1.86 | 0.83 | 1.44 | 0.55 | 0.32 | | 0.33 | |
| Hours worked | Without overtime | Normal hours/ operator/day | 8 | – | 8 | 8 | 8 | 8 | 8 | | 8 | |
| Without overtime | Normal hours/ operator/week | 48 | 44 | 44 | 48 | 48 | 49 | 48 | | 42 | |
| National holidays | Days/year | 16 | 13 | 14 | 17 | 11 | 18 | 10 | | 25 | |
| Without overtime, per year (less holidays and assumed 10 days of vacation) | Hours/year/ worker | 2,288 | 2,104 | 2,096 | 2,280 | 2,328 | 2,324 | 2,336 | | 1,960 | |
| Electricity | Cost to industry | US$/kWh | 0.960 | 0.140 | 0.150 | 0.086 | 0.065 | 0.071 | 0.053 | | 0.170 | |
| Building | Cost of industrial space construction | US$/square metre | 160 | 220 | 250 | 140 | 97 | 150 | 120 | | 130 | |
| Transport | From factory to source port | US$/40-foot container | 0 | 0 | 800 | 400 | 470 | 300 | 250 | | 600 | |

Source: Government of Haiti, Department of Energy Security.

1. All dollar amounts are in US$ unless otherwise specified. [↑](#footnote-ref-1)
2. “Trade Preference Programs for Haitian Textiles and Apparel,” Office of Textiles and Apparel (OTEXA), International Trade Administration, U.S. Department of Commerce, accessed February 3, 2017, web.ita.doc.gov/tacgi/eamain.nsf/6e1600e397213

   16c852570ab0056f719/abf187b4c9ffc0f9852574d00058ff56. The *Haitian Hemispheric Opportunity through Partnership Encouragement (HOPE) Act of 2006*, implemented by the U.S. Congress in 2007, provided duty-free entry of Haitian-manufactured garments to the United States. In 2008, the U.S. Congress passed legislation that extended HOPE in breadth and duration, and added requirements for labour reform (HOPE II). After the earthquake in 2010, the U.S. Congress enacted the *Haiti Economic Lift Program (HELP) Act of 2010*, which extended further the support originally provided under the HOPE programs and balanced U.S. and Haitian policy interests in the apparel sector. [↑](#footnote-ref-2)
3. “Bienvenue,” Électricité d’Haïti, accessed February 3, 2017, www.edh.ht [in French]. [↑](#footnote-ref-3)
4. Solar energy radiation or “solar insolation” was a measure of the amount of sunlight falling on a specific location at a specific time, indicating the potential solar energy available in that location over a period of time (usually reported per day). An average of 5 kWh/m2/day was considered to be high to very high. Source: “Solar Insolation, What is It?,” Solar Insolation, January 15, 2012, accessed February 6, 2017, http://solarinsolation.org. [↑](#footnote-ref-4)