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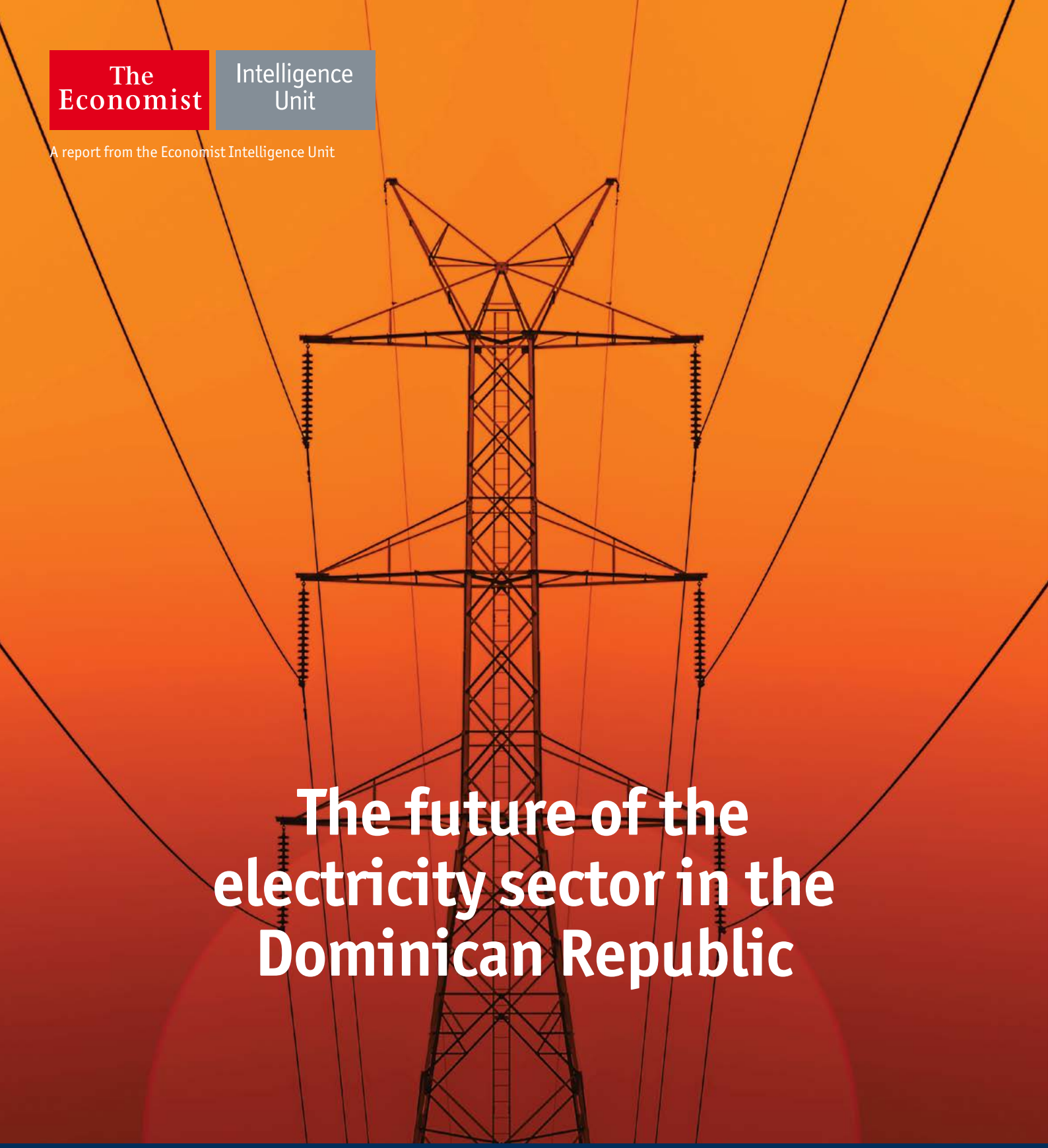

The future of the electricity sector in the Dominican Republic

Commissioned by

FUNGLODE
FUNDACIÓN GLOBAL DEMOCRACIA Y DESARROLLO

Contents

About The Economist Intelligence Unit

The Economist Intelligence Unit (EIU) is the research arm of The Economist Group, publisher of *The Economist*. As the world's leading provider of country intelligence, it helps governments, institutions and businesses by providing timely, reliable and impartial analysis of economic and development strategies. Through its public policy practice, the EIU provides evidence-based research for policymakers and stakeholders seeking measureable outcomes, in fields ranging from gender and finance to energy and technology. It conducts research through interviews, regulatory analysis, quantitative modelling and forecasting, and displays the results via interactive data visualisation tools. Through a global network of more than 350 analysts and contributors, the EIU continuously assesses and forecasts political, economic and business conditions in more than 200 countries. For more information, visit www.eiu.com.

About the Fundación Global Democracia y Desarrollo

Founded in 2000 by a former president of the Dominican Republic, Dr Leonel Fernández, the Fundación Global Democracia y Desarrollo (Funglode) is a non-governmental, non-profit organisation that seeks to promote economic and social development and strengthen democracy in the Dominican Republic. Funglode is dedicated to formulating innovative proposals of a strategic and cyclical nature on topics relevant to the Dominican Republic, analysing global issues in the context of national development, contributing to the development of public policies for democratic governance and sustainable development, and promoting artistic and cultural activities.

Acknowledgements

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Introduction

The Dominican Republic has achieved some of the strongest economic growth rates in the Latin American and Caribbean region in recent years. Economic policymakers have also been able to steer the country through several recent global crises, including the 2008-09 financial crisis, commodity price spikes and, more recently, financial and currency volatility in emerging markets, with little damage domestically. The fiscal and external accounts have improved since 2012, and inflation has been contained. However, despite such relatively sound macroeconomic indicators, the country's competitiveness fundamentals remain generally weak. Among the factors undermining industrial competitiveness and productivity is the electricity sector, which is inefficient and has been mired in crisis for many years. Efforts to reform the sector have been undertaken repeatedly, and there have been some advances, but these have not solved the fundamental problems affecting the sector. In early 2015 the country again embarked on a national discussion of how best to address the sector's long-standing troubles.

The discussion to agree on an "electricity pact" (Pacto Nacional para la Reforma del Sector Eléctrico, or pacto eléctrico), initiated by the government of the president, Danilo Medina, in January 2015, comes at an opportune time. According to a recent editorial in *The Economist* newspaper ("Seize the day", January 17th 2015), "the fall in the price of oil and gas provides a once-in-a-generation opportunity to fix bad energy policies". Policies that need to be reassessed in many countries include those that involve costly and distorting energy subsidies, particularly for dirty fuels; clean-energy and conservation programmes; energy security; energy taxes; and tariff structures. The Dominican Republic, too, is at a crossroads in its efforts to devise new policies and to address these and other challenges that affect the energy sector and its impact on the overall economy.

This report, "The future of the electricity sector in the Dominican Republic", forms part of a series of reports produced by The Economist Intelligence Unit (EIU) for the Fundación Global Democracia y Desarrollo (Funglode), starting in 2004, which have examined a range of development challenges affecting the country and potential solutions to address them. It aims to describe the current state of the electricity system; review some of its past reform experiences and the main issues hampering electricity provision; and to broadly suggest possible future electricity sector policies and reforms that can put the industry on a sustainable path for the long term. It also presents case studies of other countries that have faced similar challenges in the power sector, and how they have tackled them, with the goal of highlighting lessons from these experiences that can be useful to the Dominican Republic and its policymakers. ■

1 Current state of the electricity sector

A. Background

The Dominican Republic's electricity industry has been in crisis for decades, as a result of many years of low output capacity, poor management of the sector, rising demand and weak governance—as well as widespread theft, non-payment, and technical (transmission and distribution) losses. Its financial problems constitute a major challenge for government policy and for the public finances owing to the burden of subsidies, and are a major economic weakness that damages the country's business environment, productivity and competitiveness. The need to rely on back-up generators, in particular, has significantly increased the cost of doing business as well as the cost of living in the Dominican Republic, and the lack of a solution to the sector's problems has complicated private investment planning.

Although in the past the government has developed a number of plans to address deficiencies in the electricity sector, these have often been incomplete or inconsistently implemented. Additionally, regulatory and institutional weaknesses, including deficiencies in management structure and operations, have hampered progress. So too have policy reversals (particularly at the time of changes of government), the opposition of vested interests, and controversy over how far the government should intervene in the sector. Relations between the government, which owns the three electricity distributors, and the privately run generators have often been difficult, as the state has had trouble paying off consistently large arrears to the power producers.

Experts agree that sustainability in the energy sector will not be achieved until the core problems are fully resolved. Among the areas where practical actions are required are the following:

1. decide on the appropriate role of the state versus the market in the energy sector;
2. redefine and separate the functions of the regulatory institutions in the sector and make their operations more transparent;
3. depoliticise decision-making processes at all levels of the sector;
4. reorganise the state-owned electricity companies and revamp their management structures;
5. prepare a plan to meet the long-term investment needs of the distribution sector;
6. address non-payment for and losses of electricity, and their causes;
7. apply a tariff scheme that more accurately reflects the real costs of generation, transmission and distribution while protecting the poorest sections of society;
8. assess the appropriate energy matrix in order to further diversify away from oil; and
9. formulate a national energy-efficiency and energy-conservation programme.

In focus: **Structure of the system**

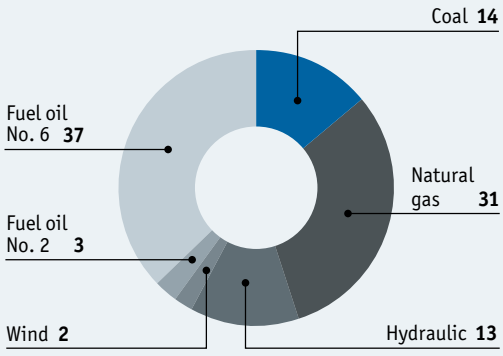
The electricity generation matrix in the Dominican Republic has evolved since the 1990s, when the state-owned electricity system was partially privatised. However, it remains predominantly hydrocarbons-based, and over many years this has made the sector highly vulnerable to external shocks related to volatility in world oil prices—one of the core problems affecting the industry and its financial condition.

Before 2000 fuel oil supplied 90% of energy in the system, while hydroelectricity constituted the rest. There has been substantial progress towards diversification away from purely fuel oil-based generation: today the generation mix is 40% fuel oil, 31% natural gas, 14% coal and 13% hydroelectricity, according to the Corporación Dominicana de Empresas Eléctricas Estatales (CDEEE), the state power holding company, and the Superintendencia de Electricidad (SIE), the electricity sector regulator. By 2017 the government aims to change this proportion to 55% natural gas, 25% coal, 13% hydro, and 3% solar and wind technology. In the longer term, by 2020, the goal is to reach a split of 46% natural gas, 37% coal, 12% hydro, and 5% solar and wind energy, according to the CDEEE.

The system comprises a total of 15 generators, two of which are not utilities but independent power producers (IPPs). Three generators, AES Dominicana, Empresa Generadora de Electricidad Haina (EGE Haina) and the state-owned Empresa de Generación Hidroeléctrica Dominicana (EGEHID), provide over 61% of total generation. The power grid's total installed capacity amounted to 3,702 MW in 2013, while total demand was approximately 2,000-2,200 MW. However, industry experts note that most of the country's installed capacity is plagued by inefficiencies and losses in distribution and transmission, which prevent the system from adequately meeting demand. The grid includes the Los Cocos wind farm, owned by EGE Haina, in the southern province of Pedernales. The first utility-scale wind-energy farm in the country, at a cost of US$180m, the Los Cocos facility started operations in 2011. It consists of 40 wind-turbine generators with an installed capacity of 77 MW.

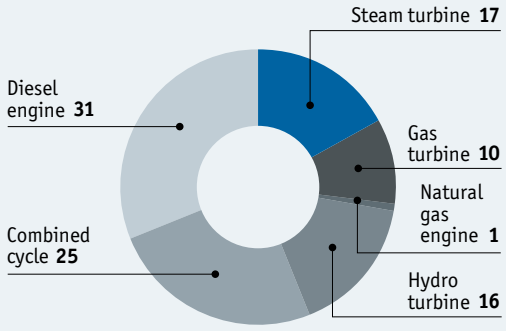
Electrical power transmission in the Dominican Republic is provided via the state-owned Empresa de Transmisión Eléctrica Dominicana (ETED). The transmission system encompasses 4,723.95 km of transmission lines, with installations of 345 kV, 138 kV and 69kV. Distribution is in the hands of three state-owned enterprises: Empresa Distribuidora de Electricidad del Sur S.A. (Edesur Dominicana), Empresa Distribuidora de Electricidad del Norte S.A. (Edenorte Dominicana) and Empresa Distribuidora de Electricidad del Este S.A. (Edeeste). In 2013, total energy supplied to the grid amounted to 13,850.9 GWh. ■

Generation mix, 2013
(%)



Sources: Corporación Dominicana de Empresas Eléctricas Estatales (CDEEE); Superintendencia de Electricidad (SIE).

Installed capacity by technology, 2013
(%)



Source: AES Dominicana.

Some efforts to reform the tariff structure, address the issues of non-payment and subsidies, and attract greater investment have been made over the years. Other goals often suggested include returning the electricity distributors to the private sector, expanding generation capacity, and further altering the energy mix to reduce reliance on imported oil and increase the use of renewables. While progress has been made in some areas (for example, a notable reduction of the share of imported fuel oil in the energy mix), many of the practical steps required to make the energy sector more efficient and sustainable are still lacking. These steps would improve the country's overall economic competitiveness, particularly for the industrial and export sectors.

Sustained and stable future economic growth and productivity improvements, along with gains in other development indicators, cannot be guaranteed without a well-functioning energy sector. The reduction of government subsidies would also help to strengthen the fiscal accounts. A proper strategy addressing subsidies and tariffs and other necessary changes will require substantial discussion across various sectors of society to ensure support for reform, similar to the process that is now getting under way to reach an "electricity pact" in the country.

This section of the report provides background to the current state of the industry, and briefly describes past reform efforts and why some did not fully succeed. Subsequent sections of the report will look more directly at possible ways to address the challenges listed above.

B. Energy sector deficiencies and challenges

Among the energy sector's various problems, the following challenges stand out as some of the most significant.

High distribution and other losses

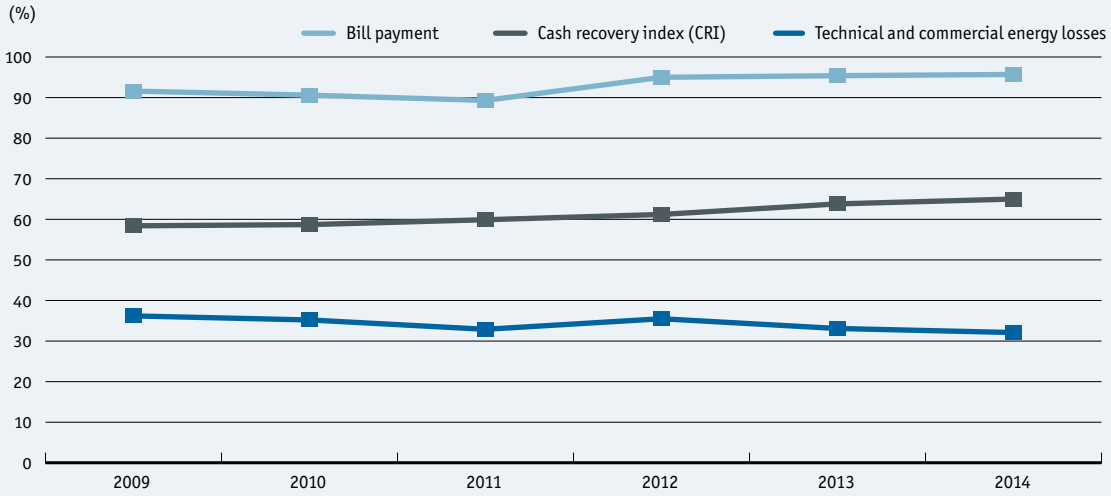
At the heart of the electricity sector's problems lies a financial deficit caused by the large technical and non-technical losses incurred by the electricity distribution companies. This is exacerbated by an inadequate tariff structure that fails to reflect the real costs of generation, distribution and transmission. Inadequate cash flows in the sector have in turn led to a lack of investment, and cash earmarked for investment has often been used as current transfers to cover losses in distribution, pay arrears to generators and other current expenditure within the sector.

According to data published by the state power holding company, the Corporación Dominicana de Empresas Eléctricas Estatales (CDEEE), the distribution companies' technical and non-technical losses averaged 33.1% in 2013 across the three energy distribution companies. Twenty-two percent of purchased energy was lost as a result of non-technical factors, namely electricity theft and fraud. Some progress has been made in recent years in reducing these losses, through loss-reduction programmes designed to reduce theft and encourage more efficient energy use, and more progress can be expected if additional measures are put in place in the near term.

The remaining 11% of losses are technical, resulting from outdated equipment, inadequate tension levels and other inefficiencies in the distribution process. Payment has improved, with 95.4% of consumers who received electricity bills in 2013 paying them, compared with 91.6% in 2009, but the distributor's cash recovery index (CRI) averaged only 65%—in other words, 35% of the power that distributors purchased from generators was not billed or "recovered"[1].

1 The CRI methodology was modified in 2012.

Total distributor financial indicators



Source: Informe De Desempeño Diciembre 2014, Corporación Dominicana de Empresas Eléctricas Estatales (CDEEE).

A related issue is the lack of proper accounting for losses in the system. There is no separate reporting for unregulated and regulated customers in the distributors' accounts. This constitutes a lack of transparency, and could act to mask the extent of the relatively poorer performance of the regulated sector.

Inadequate tariff scheme and price distortions

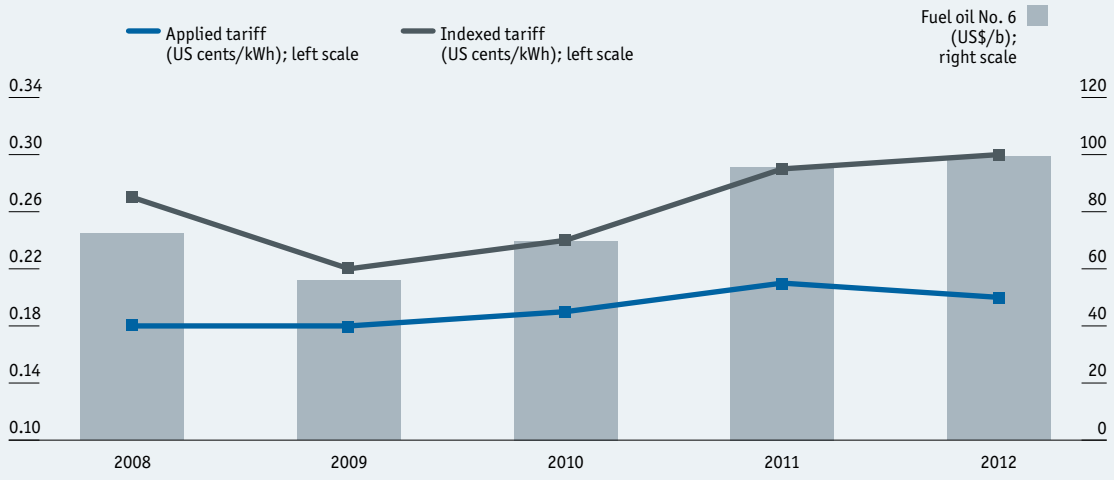
Another factor damaging the electricity distributors' cash flow is the tariff scheme. According to industry experts, the existing tariff level does not reflect real costs or demand, and its structure does not consider important factors such as consumers' willingness or capacity to pay for electricity services.

The Ley General de Electricidad (General Electricity Law) enacted in 2001 mandated the application of a "technical tariff" that reflected the real costs of generation, transmission, distribution and commercialisation within eight years of the partial privatisation (referred to as "capitalisation") of the sector, which took place in the late 1990s. However, the application of a technical tariff was postponed, and instead the government adopted a temporary scheme that indexed tariffs on a monthly basis to international fuel prices. As oil prices steadily increased, starting in the early 2000s, this had a knock-on impact on the costs of generation. As a result, the government introduced an "applied tariff" in 2001, which is published periodically by the Superintendencia de Electricidad (SIE), the electricity sector regulator.

The applied tariff is consistently below both the indexed and technical tariff levels, and this creates a gap between the actual cost of production and the price at which the distributors can sell electricity. The difference between the applied and indexed tariffs between 2009 and 2012 can be seen in the chart below, in which these tariffs are also compared with the average price of fuel oil No. 6. The applied tariff was 47% below the indexed tariff in 2012, for example. Also, the chart illustrates how the applied tariff did not keep up pace with the increasing cost of fuel oil. This situation generates operative and financial losses to the distributors, in addition to other technical and non-technical losses, which have to be compensated for with public subsidies. The SIE does not disclose the criteria used to calculate the applied tariff, which undermines transparency and increases uncertainty.

Furthermore, the existing tariff scheme differs across segments of the population depending on each consumer's total consumption, so that the poorest tiers of society pay less for their electricity services. This has resulted in cross-subsidies

Indexed vs applied tariffs



Source: Jimenez Bichara, R., 2013.

between consumer segments (whereby one segment of consumers subsidises another owing to differentiated tariffs)—a situation that encourages arbitrage by those who consume larger amounts of electricity, so as to take advantage of subsidised rates.

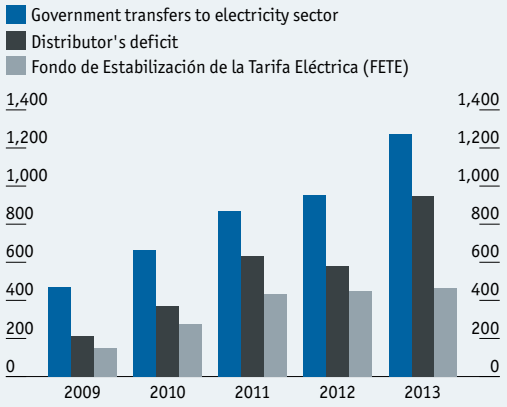
The application of a technical tariff reflecting the actual costs of generation, distribution and transmission has been discussed intermittently since 2003, but successive administrations have avoided its introduction, owing to the perception that an increase in tariffs, especially to residential customers, would carry a high political cost. There have been three increases to the applied tariff, in 2002, 2009 and 2011, yet the adjustments have only partially reflected the real costs of production, so that the tariff continues to fall short of real costs. Furthermore, owing to the fact that they have not been accompanied by other necessary measures, such as a revision of subsidies and an overhaul of the overall tariff scheme, the rate increases have served mainly to encourage non-payment. Future tariff changes will therefore best be considered as part of a broader medium- and long-term assessment of the sector's structure and needs.

Costly subsidies and fiscal impact

Since 2003 the electricity sector has been heavily subsidised by the central government. Subsidies are channelled through the Bonoluz programme (formerly the Programa de Reducción de Apagones, the blackout-reduction programme), a government scheme that reduces the cost of energy for almost 500,000 disadvantaged families across the country (around 23% of all households). In addition to Bonoluz, huge transfers go to the distribution companies in the form of lines of credit to cover the gap between generation costs and distribution prices and tariffs to consumers, as well as the operating costs of the three distribution companies. The Fondo de Estabilización de la Tarifa Eléctrica (tariff stabilisation fund), a reserve mechanism to cover fuel-price variations, is another significant recipient of government transfers.

In 2013 these subsidies amounted to US$1.27bn, equivalent to around 2% of GDP. This represented a huge increase from US$471m (1% of GDP) in 2009. These transfers, which have tended to increase each year, are often underestimated in the annual budgets, and revisions via supplementary budgets have become commonplace in order to increase the spending limit to cover the

Electricity sector finances
(US$ m)



Source: Asociación Dominicana de la Industria Eléctrica (ADIE).

energy sector's needs (there was at least one supplementary budget in each year between 2009 and 2012, increasing expenditure for the sector, among other extra needs). This subsidy amount does not include accumulated government arrears to the private generators, which as of January 25th 2015 amounted to US$747.5m, according to ADIE.

Implications for competitiveness

The Dominican Republic's economic competitiveness, particularly with regard to its manufacturing and export sectors, is consistently viewed as being harmed by the problems in the electricity sector. The Dominican Republic was ranked 128th (out of 144 countries) for quality of the electricity supply in the World Economic Forum's Global Competitiveness Report 2014-15, whose rankings are a widely recognised comparative indicator of the competitiveness of countries globally. The Dominican Republic's ranking on this indicator was higher only than those of Haiti and Venezuela in the Latin American region. In the World Bank's Doing Business 2015 ranking, the Dominican Republic stands in 84th position overall, out of 189 economies (an improvement from 117th in 2013). However, the country ranks 119th with regard to accessing electricity, owing to the lengthy and expensive procedures required: it takes an average of 82 days to get electricity services running. Furthermore, the World Bank's 2010 Enterprise Surveys indicated that more than 20% of firms in the Dominican Republic (the highest figures for any issue) listed electricity as the biggest obstacle to doing business.

The situation in the energy sector and the losses sustained by distributors have led to frequent power outages over the years. There have been some improvements in provision, and service interruptions are sometimes scheduled; however, according to the World Bank, the typical company experiences 25 blackouts a month, compared with only four in Latin America and 8.8 worldwide. As a result, companies and residential consumers resort to alternative methods of energy generation. In 2005, the World Bank estimated that US$400m was spent on self-generation by the commercial and industrial sectors, while residential self-generation costs totalled US$150,000-200,000 (most middle-class homes are equipped with emergency generators). (Self-generation estimates include the cost of purchasing and maintaining emergency generators, including fuel and fuel transport; energy inverters; and in many instances kerosene lamps and even wax candles.) This increases the cost of living, as well as the cost of doing business. Power outages also have a large negative impact on productivity and overall economic growth.

C. Reform experiences

Before undergoing profound reform in the late 1990s, the electricity system in the Dominican Republic was wholly state-owned and vertically integrated. The sector was plagued by inefficiencies and a low output capacity, and losses were rampant, resulting in frequent power outages and electricity rationing across the country. As the pace of economic growth increased and boosted demand for electricity, this exacerbated the sector's shortcomings and made reform essential. Numerous efforts were made to implement reforms, and these experiences are described briefly below.

Regulatory overhaul, capitalisation and privatisation (1990-2002)

Prior to the 1990s, the sector was controlled by the state-owned Corporación Dominicana de Electricidad (CDE, the Dominican Electricity Corporation). The system was characterised by large electricity losses, underinvestment and low installed capacity. To address these problems, the sector was opened to privatisation (referred to locally as "capitalisation") in the 1990s, and independent power producers were welcomed into the country in 1992 under individual contracts with the CDE in order to help provide the necessary generation capacity to meet the country's growing demand.

The reform required a regulatory overhaul. Private investment in the sector was encouraged by the passage in 1990 of the Ley de Incentivo al Desarrollo Eléctrico Nacional (the Law for Incentives and Development of the Electricity Sector). In 1993 the Comisión Nacional de Energía (CNE, the National Energy Commission) was formed to oversee the formulation of policy for the sector, while the Ley General de Reforma de la Empresa Pública (Public Enterprise Reform Law) of 1997 provided the framework for privatisation and foreign investment in the sector. A year later, the CDE was split into five separate companies: two thermal electricity generation companies (Empresa Generadora de Electricidad Haina and Empresa Generadora de Electricidad Itabo), and three distribution companies (Empresa Distribuidora de Electricidad del Norte (Edenorte), Empresa Distribuidora de Electricidad del Sur (Edesur) and Empresa Distribuidora de Electricidad del Este (Edeeste). The Corporación Dominicana de Empresas Eléctricas Estatales (CDEEE) was formed to replace the CDE in its role of sectoral leader, as well as to provide direct oversight of the Empresa de Transmisión Eléctrica Dominicana (ETED, the Dominican Transmission Company) and the Empresa de Generación Hidroeléctrica Dominicana (EGEHID, the Dominican Hydroelectric Generation Company), both of which remained publicly owned.

In 1999, the three distribution companies and two generators were unbundled and capitalised (50%-privatised), with interests sold to Spanish and US companies. The government signed five-year "capitalisation contracts" with the generators for the purchase of energy by the new distribution companies; after the contracts' expiry, the distributors would be able to renegotiate new contacts via public tenders.

In 2001 the General Electricity Law was passed, creating the regulatory framework for the sector. The law assigned energy generation and distribution to the private sector, leaving transmission and hydroelectric generation in state hands. It created the Organismo Coordinador del Sistema Eléctrico (OC), the body responsible for the administration of the wholesale power market and transmission of power via the grid, and a new Superintendencia de Electricidad (SIE) to regulate the electricity sector.

The creation of a new regulatory framework for the energy sector was a laudable achievement and established a foundation for the industry going forward. However, the privatisation model that had been expected to provide solutions for the industry's shortcomings came up against major obstacles when international oil prices rose sharply and caused a supply-side crisis, starting in the early 2000s. This forced the government to intervene with controls in order to alleviate the impact of high energy costs on the population. In turn, this exacerbated the problems in the sector.

Energy price spikes, the Madrid Agreement and economic crisis

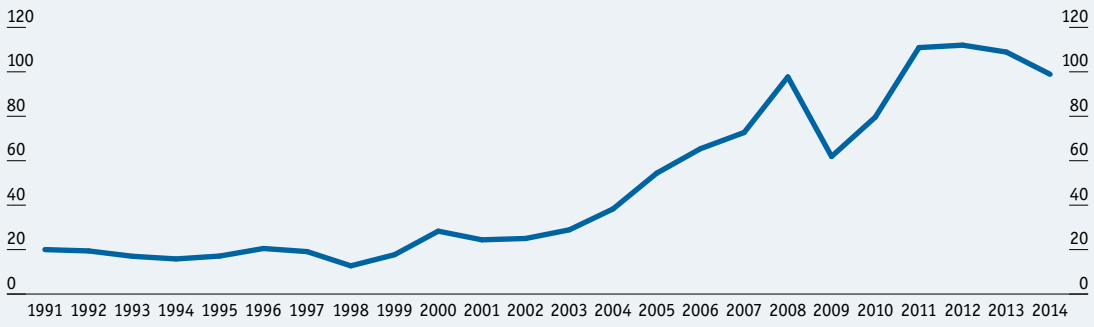
Soaring international oil prices starting in the early 2000s acted as a destabilising factor for the Dominican electricity sector, as the price increases raised the cost of energy generation. The government responded by freezing tariffs and directly subsidising the distributors for the widening difference between generation costs and distribution prices. The energy distributors also continued to be affected by distribution losses and inefficient bill collection. August 2001 saw the signing of the Madrid Agreement, under which the government renegotiated the contracts under which the distributors purchased energy from the generators, which had been due to expire in 2004, and extended their terms for another 15 years, until the end of 2016. This was meant to grant the distributors a longer breathing space during which to regain their operational and financial footing. In addition, the purchase price of energy from the generators was indexed to fuel oil No. 6 (bunker C), instead of the more expensive fuel oil No. 2 (gasoil) used in the original contracts. The agreement also included the application of the provisional indexed energy tariff, postponing the application of a technical tariff scheme.

This situation proved unsustainable, however, after a banking crisis in 2003 prompted a government bail-out that nearly tripled the public debt/GDP ratio and internal and external debt service soared. The bank failures, together with rising international fuel prices, triggered macroeconomic and fiscal imbalances that led to a loss of confidence and a sharp depreciation of the Dominican peso. The depreciation required a compensatory increase in electricity tariffs to meet investors' fuel and financing costs, which were largely contracted in foreign currency. However, the government at the time instead chose to reimpose a tariff freeze after civil unrest threatened stability, and a financial crisis in the electricity sector ensued. One outcome was the exit of a Spanish power company, Unión Fenosa, from its management of two of the three distribution units, Edenorte and Edesur, with the government buying back its shares and assuming large debts from the two companies in October 2003, and controlling interest being transferred to the newly formed state entity, the CDEEE.

More setbacks, followed by second-generation reforms

The sector has remained in a state of crisis since the early 2000s, even as the broader banking and economic crises have ended. Subsidies to the industry have also increased, in order to cover its losses. In 2001 the government created the Programa Nacional de Reducción de Apagones (PRA, the blackout-reduction programme, which preceded the current Bonoluz programme), a scheme that provided subsidised electricity services to low-income consumers. The Fondo de Estabilización de la Tarifa (FETE, the tariff stabilisation fund) was formed soon after, along with the introduction of an applied tariff, which

World oil prices, 1991-2014
(US$/b; Brent crude)



Sources: International Energy Agency (IEA); The Economist Intelligence Unit.

has been used ever since. The PRA was initially envisioned as a two-year subsidy, but was subsequently extended until 2009, by which time it had become inefficient and prone to fraud. In 2004 the CNE elaborated a National Energy Plan for 2004-15, which included targets to make the sector self-sustainable, reduce tariffs for final consumers and promote more efficient use of the electricity service.

A large spike in international oil prices in 2008 again exposed the sector's problems and triggered another currency crisis. Consequently, the cost of power generation skyrocketed again, yet electricity tariffs remained unchanged, so that the distribution companies continued to register heavy losses. As the government became unable to meet promptly the electricity sector's subsidy requirements, the financial situation of Edeeste, the one distributor that remained in private hands, worsened, and in March 2009 the company was renationalised.

A series of second-generation reforms have followed since, but have resulted in only modest advances. The US Agency for International Development (USAID), in co-ordination with the World Bank, worked with the Dominican Republic's government to design a National Electricity Sector Revitalisation Programme to stabilise the electricity sector by reducing subsidies and losses and increasing tariffs. In turn, this spawned a host of initiatives backed by the Inter-American Development Bank (IDB) and other multilateral organisations. Projects included steps to enhance the management of power rationing, improve bill payment and cut theft, and reduce the operating costs of the distributing companies with a view to transferring the sector back to private management. Detailed elements of the plan have included revising the tariff-adjustment formula, the settlement of arrears payments and a financial recovery plan. Practical steps to improve supply and conserve energy have also been taken, including the distribution of free energy-saving light bulbs.

In 2006, during the second presidential term of Leonel Fernández, the government created a comprehensive plan for the sector for 2006-12, the Plan Integral del Sector Eléctrico, which was aimed at promoting the efficient use of energy, reducing prices for final consumers, and improving the financial standing of the sector by reducing energy theft (which achieved some increases in invoicing as well as greater coverage of the Bonoluz programme). In 2007 the electricity law was modified, making electricity theft (in the form of illegal connections, non-payment, etc.) a crime and imposing penalties such as fines and/or prison terms. The law was not effectively implemented, however, and did not succeed in reducing theft.

The Medina plan: Expansion of generation and the electricity pact

The electricity sector has been transformed since the 1990s, as a result of the adoption of a new regulatory framework, partial privatisation, and the establishment of an organisational structure that has increased the Dominican Republic's ability to attract substantial foreign and local investment into generation. However, serious problems remain. The industry continues to face challenges such as electricity theft and non-payment, which have burdened the sector's finances and have undermined its operational efficiency. As a result, new attempts at energy sector reform are being undertaken by Mr Medina's administration.

Overall policymaking under the current administration is being guided by the Estrategia Nacional de Desarollo (END), a 20-year strategic plan that establishes the main economic, social, institutional and environmental goals that should guide policy until 2022. The END mandates three "pacts" to be reached between the government and civil society on the country's three most pressing priorities: educational reform, fiscal reform and energy sector reform. In terms of concrete policies in the energy sector, so far Mr Medina's administration has focused on expanding generation capacity and further diversifying away from the use of fuel oil. The centrepiece of the initiative is the construction of a 769.8 MW thermoelectric coal-fired complex consisting of two plants in Punta Catalina, in the south-western

province of Baní, at an estimated final cost of around US$2bn. In May 2013 the CDEEE conducted an international tender for the construction project, which was awarded to a Brazilian-owned contractor, Constructora Norberto Odebrecht. By January 2015 the government had announced that it had secured the required financing for the project.

When completed, the two coal-fired plants will not only supply much-needed electricity but will also give the government more leverage to bargain for lower prices with the private generators in 2016, when the existing contracts to purchase fuel oil begin to expire. Nevertheless, some aspects of the government's approach have raised concerns. Shortly after launching the tender, Mr Medina issued an executive order to fast-track the process for the plants, bypassing most of the requirements of the law that supervises government procurement. Some critics argued that this move had compromised the transparency of the process. Furthermore, the project is not being backed by multilateral lenders such as the World Bank and the IDB, owing to environmental concerns, even though these entities until recently supported the government's proposed reforms related to the electricity sector. In addition, some private-sector actors view the government's direct intervention in the business of energy generation as unnecessary, asserting that investment should go instead towards improving transmission and distribution—areas that are in need of modernisation. Also facing criticism is the decision to invest in coal-fired power generation, as coal is considered a "dirty" energy source. However, government authorities maintain that it is by far the most cost-effective alternative, and have largely based their decision on this criterion.

In January 2015 Mr Medina convened the long-anticipated discussions on the electricity pact. This aims to reach a social consensus on reform of the sector by empowering the Consejo Económico y Social (CES), an institutional and economic council composed of representatives of a cross-section of society, to engage in discussions with the government to find a long-term solution for the sector. The pact is to be reached within six months of the start of talks. To be successful, the talks will have to result in a long-term strategy for the power sector that will address the range of issues discussed in this section and in the remainder of this report. Once the talks have concluded, the CES is likely to begin work on a fiscal pact, which will be closely linked to the problems affecting the power sector because of the issue of subsidies.

In focus: **PetroCaribe and the Dominican Republic**

Despite diversification in the Dominican Republic's energy mix during the past decade, the country still relies heavily on imported oil. In 2013 the oil import bill totalled US$4.4bn, accounting for 26% of total imports and equivalent to 7.1% of nominal GDP, up from US$1.4bn (18.4% of total imports and 6.5% of GDP) a decade earlier. The country relies on oil for 40% of its power production, on natural gas for 31%, on coal for 14% and on hydroelectricity for 13%. Only around 2% of its energy supply is derived from sources considered renewable (notably wind power). The large number of emergency generators used by residences and industry further heightens the Dominican Republic's dependence of imported fuel.

In 2008-12, 23% of the total volume of imported oil came in under Venezuela's PetroCaribe programme, accounting for 13% of the national oil bill. Building on the earlier San José and Caracas energy accords (signed in 1998 and 2000 respectively), PetroCaribe, which was created in 2005, allows signatories to buy 185,000 barrels/day (b/d) of crude oil at market value. Although 60% of the cost must be paid within 90 days (with a possible two-year grace period), the remainder is financed by Venezuela at a preferential interest rate of 1% with a 25-year repayment term, or may be repaid through the export of goods or services to Venezuela. PetroCaribe currently has 17 members in the Caribbean and Central America.

The Dominican Republic's share of PetroCaribe financing has risen steadily in the past few years because of the country's rising oil demand. It is the largest recipient of financing under the scheme, and has an assigned quota ceiling of 50,000 b/d at crude market value. The Dominican Republic receives 18.5% of all oil supplied to member countries; this is the largest share of any country with the exception of Cuba, which benefits from separate terms under the regime. In 2010 Venezuela became the Dominican Republic's main bilateral lender. According to the Dirección General de Crédito Público (the Dominican Republic's public debt office), the accumulated debt owed to PetroCaribe amounted to US$3.7bn at the end of 2013, or 24.7% of the total accumulated external debt. Since 2010, the Dominican Republic has met some of its debt-servicing obligations to Venezuela through the export of goods, including beans, pasta and other foodstuffs.

The scheme has in effect insulated member states from oil price increases in recent years, while creating a fiscal dependence on Venezuela and perpetuating an economically unsound overreliance on petroleum in their energy-consumption mixes. PetroCaribe subsidies also distort price signals, in many cases discouraging the substitution of imported oil with less expensive energy sources such as liquefied natural gas (LNG) or non-hydropower renewables. At the same time, however, PetroCaribe financing has freed up funds for other purposes, such as budgetary support or specific social and economic development projects, making it particularly attractive to cash-strapped governments.

However, recent economic and fiscal difficulties in Venezuela, along with dwindling oil output from its hydrocarbons industry and declining international oil prices, have raised concerns about the future of PetroCaribe. Should Venezuela's government be forced to trim or eliminate its financing, dependency on PetroCaribe's soft loans would be a threat to the financial stability of some member states. Indeed, the need to pay unsubsidised prices would exacerbate imbalances in the public finances and current accounts of member countries.

The financial impact would vary by country, but the risk is accentuated in the case of large recipients, such as Jamaica and the Dominican Republic. However, the Dominican Republic has made advances in diversifying its energy mix since 2005, reducing its dependence on imported oil. Moreover, perhaps anticipating the potential collapse of PetroCaribe, and also seeing an opportunity to take advantage of Venezuela's cash flow problems, in January 2015 the Dominican government announced that it would buy nearly all of its PetroCaribe debt at a steep discount of 52% (paying US$1.93bn for debt with a face value of US$4.1bn as of end-2014). However, it said that this would not signal an end to its membership in PetroCaribe, and that the country would continue to purchase oil under the programme. ■

D. What went wrong?

As the government and civil-society representatives embark on and continue their discussions of potential new reforms, it is worth examining some of the factors that have prevented past initiatives from fully remedying the sector's problems. Below, we look at some of the issues that have influenced the lack of success of past reform efforts.

Debate over the government's role in the electricity sector

Fifteen years after the sector's first overhaul, government actions continue to be sharply criticised. At the heart of the matter lies what is perceived by some critics as excessive government intervention in the sector, which has politicised processes and policies, undermined governance and distorted the proper incentives of a free market. This intervention has been especially marked throughout the sector's post-privatisation/capitalisation history in the government's active management of the tariff scheme, which has distorted price signals and has required ever-growing public subsidies. By contrast, rationalisation of the tariff scheme would enable the distribution companies to achieve financial sustainability, reducing their operational deficits. At the same time, some commentators also argue that various reform efforts were not given sufficient time to show results, as changes in government resulted in abrupt shifts in policy.

Reluctance fully to tackle non-payment problems and management inefficiencies

There is broad agreement that successive governments have not addressed the issue of non-payment head on, owing to the fear that the measures required—such as disconnecting non-paying customers, effectively criminalising electricity theft and addressing other forms of malfeasance—could alienate voters and damage the popularity of the government and the ruling party. Efforts to educate consumers (both companies and individuals) regarding the benefits of economical use of electricity are also lacking. More fundamentally, however, non-payment is rooted in inadequate provision of electricity (and the prevalence of blackouts) and an overall lack of attention to customer needs—problems that have reduced consumers' willingness to pay for poor-quality electricity services.

Furthermore, the government's management of the distribution companies has not yielded sound financial results, and the firms are plagued with inefficiencies, bloated payrolls and high operational costs. In this regard, improvements to the operational aspects of distribution are vital for the sector's sustainability; such measures would include the implementation of proper strategic financial planning and financial controls, better regulation, and transparent procurement processes.

Institutional and regulatory weaknesses

The weakness of its institutions has been seen as another major factor contributing to the sector's troubles. There is a lack of clarity as to the roles of each institution involved in the sector's various different spheres, and this often results in overlapping responsibilities and a lack of co-ordination, and provides few incentives for institutions to improve efficiency and cut costs. Regulatory transparency has also been undermined at times by corruption scandals and allegations of mishandling of public funds in institutions such as the CDEEE. A turf war between the SIE, the newly formed Ministerio de Energia y Minas and the CDEEE has also weakened regulation, harmed standards of governance in the sector and limited accountability. This has damaged the Dominican Republic's ability to attract fresh private investment into electricity distribution and has weakened confidence in the reform process.

Early reforms to the sector sought to attract private investment and improve the efficiency of electricity services, as well as to reduce the fiscal burden of subsidies. Some important investments and improvements were made, but the overhaul of the sector's regulatory framework came only later, in 2001. Numerous studies have found that one

hallmark of successful electricity reform is the creation of an adequate regulatory environment in advance of the actual transfer of state assets into private hands. Many of the ills besetting electricity supply in the Dominican Republic can be traced back to the disposal of assets prior to the creation of such a regulatory framework and institutions.

Case studies underscore the fact that creation of such institutions is essential to successful electricity sector reform, but that institution-building takes time and experience and must be tailored to the particular operating conditions prevailing in each market. The time lag between privatisations and the development of adequate regulatory structures in the Dominican Republic has contributed to the difficulties affecting the power sector there.

Transparency issues and mixed signals to investors

Private-sector investment has been crucial to the sector's development. Between 2000 and 2013 installed generation capacity in the sector rose by 46%, with the bulk of the new capacity being financed and operated by the private sector. According to figures published by ADIE, inflows of private capital to the sector amounted to US$2.5bn between 2000 and 2012, adding over 2,000 MW in generation capacity to the matrix. The sector has also received important inflows of foreign direct investment (FDI): between 1999 and 2001, when the electricity sector's privatisation occurred, 34% (or around US$1.5bn) of FDI inflows to the Dominican Republic went into the electricity sector, according to figures published by the Banco Central de la República Dominicana (the Central Bank). Even after privatisation, the sector continued to attract investment: between 2008 and 2012 the electricity industry garnered US$1.4bn in FDI, or 9% of total foreign investment flows into the country during the period.

However, future investment in the sector will depend on the creation of a more transparent business climate and a stronger institutional context. Greater inflows of capital to the sector have taken place during times of institutional strengthening, such as the capitalisation process in the late 1990s and early 2000s, and in periods when the country has had specific performance criteria for the electricity sector in place in the context of loan arrangements with the IMF (the latest such agreement, a stand-by arrangement, expired in March 2012). IMF agreements provided a framework and monitoring that bolstered investor confidence in the country.

The uncertain scenario for private generators illustrates how a lack of transparency and the absence of a strong institutional framework can deter investment. This is related not only to the state's substantial arrears to the generating companies, but also to the uncertainty surrounding the imminent renegotiation by the government of the energy-purchase contracts negotiated under the Madrid Agreement, which will start in 2016. Although the legislative framework calls for a tender to take place, the transparency of this process could be called into question, given the low levels of confidence—and past allegations of irregularities—in the Dominican Republic's public procurement and tender processes.

In focus: **Renewable energy in the Dominican Republic**

As it continues to address the troubles of its traditional power industry, the Dominican Republic will also have to consider the benefits of alternative energy options in order to reduce its reliance on imported oil and its exposure to the fluctuations of world oil prices. Recently, attention has focused on the opportunity presented by the competitively priced natural gas now being exported from the US as a possible game changer for the Dominican energy sector. Other opportunities include wind, solar and wave technology, along with the production of biofuels and other renewables, which could become a more significant part of the country's energy mix in the long term. There is strong potential for domestic expansion of such alternative energy sources, but significant investment would be required to grow these fledging industries, and the costs associated with this expansion would have to be factored in to a longer-term strategy.

The country already has taken some steps to reduce its oil dependence by promoting the production of renewable energy. In 2007, the Ley de Energías Renovables (the Renewable Energy Law) came into force, and its byelaws were signed in 2008. The law grants several incentives for renewable energy projects, including: a 100% exception on import taxes for renewable energy machinery as well as other related goods and services; a waiver of the Impuesto a la Transferencia de Bienes Industrializados y Servicios (ITBIS, the value-added tax) for all transactions; a 75% income tax credit for self-producers (both residential and industrial); a ten-year tax exemption on production of biofuels; and a feed-in tariff through 2018. The law has the ambitious goal of making 25% of the Dominican Republic's energy production renewable by 2025, and at least 10% by 2015.

These levels of renewable energy production are unlikely to be met on this timetable, however. The renewables sector's growth is hindered by hurdles such as unclear rules and bureaucratic processes, especially those related to obtaining government concessions and benefiting from the law's tax incentives. Furthermore, a fiscal reform implemented in 2012 eliminated the law's biggest tax breaks, including the waiver on the ITBIS and tax waivers for biofuel production; it also reduced other incentives, such as the lowering of the tax credit for self-producers (to 40%). Long-term financing for new projects is also difficult to come by, often due to low purchase tariffs offered by the Corporación Dominicana de Empresas Eléctricas Estatales (CDEEE) and other price distortions; steep transaction costs; high government subsidies for fossil-fuel consumption and other market distortions; and a shortage of proper hedging products. In addition, the local capital markets are still immature and undiversified. Most importantly, the government's large arrears to the generation sector, including wind farms, are a drain on the sector's finances and discourage proper financing and new investment in renewables technology.

In 2012 the Dominican Republic joined the UN Climate and Clean Air Coalition, which makes the country eligible for international financing for clean-energy projects, and this has attracted the interest of international firms seeking to develop projects in the country. However, to date only two projects have been set up under this programme: the Bionersis Project (France) on the La Duquesa landfill, and the Guanillo (Spain) wind farm.

The government has granted a substantial number of concessions since 2006—according to the Comisión Nacional de Energía (the National Energy Commission), there were over 30 concessions granted in 2013. However, only a handful were for long-term projects that will result in additional energy production for the country. Wind energy is by far the most widely prevalent renewable technology, and in 2012, when the Dominican Republic saw the highest level of investment in renewables since the legislation was passed, 95% of the tax breaks in the sector were granted to wind projects. The government has pledged its support for clean energy in other realms; for example, a project for a large-scale solar park was announced in late 2013 and was under construction in 2014. Yet this support must be accompanied by the rationalisation and co-ordination of processes, including transparent and competitive procurement, so as to place the country in an advantageous position in terms of international investment. ■

E. Next steps: Moving towards solutions

The critiques mentioned above do not represent a comprehensive list of all of the factors that have affected the success or failure of past reform efforts (there would not be space in this briefing paper to provide such a detailed and complete historical analysis). However, they do underscore the mounting impatience among businesses and Dominicans generally with the slow pace of electricity reform efforts and the lack of more tangible benefits so far, as well as frustration with the continued high incidence of power outages and a loss of confidence in the government's ability to deliver improvements. In this regard, Mr Medina's plan to involve the government directly in the area of generation is viewed with scepticism by some industry experts, who instead consider that funding and efforts should be directed at improving distribution and transmission.

Many experts insist that the electricity sector is in need of a strategy that not only addresses capacity issues but also tackles the entire range of the industry's problems, with measures to reduce losses, raise efficiency and rationalise tariffs, to increase investment in priority areas (such as transmission), and to improve governance and institutional performance. The sector also requires rigorous financial planning and strict controls and oversight, along with concrete commitments from every player in the sector, all with pre-established targets and timeframes. By initiating discussions on the electricity pact, Mr Medina took an important step toward beginning the process of devising such a sector-wide strategy. Yet it is still too early to determine whether the process will yield the necessary reforms. ■

2 Power sector reforms in other economies

This section of the report focuses on the experiences of some other countries that have tackled the challenges of power sector reforms, from organising efficient energy infrastructure to instituting the correct regulatory framework. Among the fundamental aspects of the political reality of implementing electricity market reform are social and equity issues, and in particular the "social contract" with the poor. No vision for restructuring is viable without a plan that ensures security of affordable supply and increases the number of connections to low-income households. One of the commonest themes in reforms that fail to address this concern—those that attempt to raise the tariffs paid by the poor without a compensating plan to protect their access to vital electricity services—is that they quickly provoke political opposition and usually fail.

Another weakness of many market reforms is a lack of attention paid to the design of institutions, and especially to the critical role of independent regulators, which in many countries do not have the authority or the information that they need to fulfil the role of public service regulator.

In addition, in markets that have liberalised successfully, there is a clear trend of falling electricity prices for industrial consumers in both nominal and real terms. But this trend is less evident, and has been much less pronounced, for household consumers. The tariffs paid by consumers do not always reflect the costs of producing and transmitting electricity, as is the case in the Dominican Republic. Some groups of consumers subsidise other groups and different parts of the value chain, and prices do not fully reflect generation, transport and distribution costs. Electricity rates and taxes are not related in a transparent way. Consequently, the need to develop appropriate and transparent tariff structures is one of the main concerns of policymakers in their attempts to support financially viable, efficient and fair power sectors.

The case studies below illustrate how countries have dealt with specific issues affecting the energy market, and, in the case of Chile, how the country adopted a more comprehensive reform. By examining the comparative experiences of these countries, we have drawn some broad general conclusions and highlighted a number of specific lessons that might be helpful for future policymaking in the Dominican Republic.

Chile: Shifting from crisis to a comprehensive energy-security strategy

Like the Dominican Republic, Chile is in a vulnerable position because of its heavy dependence on imported energy, and it has suffered from crises in the recent past when import prices have spiked or when energy supplies have suddenly been cut off. It is one of the best models in the Latin American region for

its more comprehensive approach to addressing its vulnerabilities.

Chile imports around 70% of its primary energy needs in the form of oil, gas and coal. Hydroelectricity makes up most of the remainder, but this source is vulnerable to falls in output due to droughts caused by the La Niña weather phenomenon. In the past Chile was also reliant on Argentina as a supplier of natural gas, but these supplies were reduced in 2005 as Argentina cut its exports in order to meet its domestic energy needs. Chile's demand for electricity is growing rapidly, exacerbating the problem.

After years of severe energy insecurity, including the threat of power rationing, under recent governments Chile has adopted a wide-ranging strategy to build long-term energy security. The plan has included efforts to increase energy autonomy via additional power-generation concessions, diversification of the energy matrix (in terms of fuels and suppliers) and enhanced energy efficiency.

Moving towards long-term thinking

Following a La Niña occurrence in 1999, Chile's government responded to public outrage over rising electricity tariffs by removing force majeure provisions in the regulatory regime, thereby preventing power companies from passing on increased costs to consumers. This proved to be a blunder, as it triggered an abrupt end to construction of electricity generation projects. The government then reversed its 1999 electricity regulations with a new pricing formula that allowed generating firms to pass on cost increases to consumers. Another law, enacted in 2005, provided further incentives for generation through a new system of indexed contracts of a minimum of ten years between generators and distributors. This dramatically increased the attractiveness of the electricity sector for private investors.

But the need to compensate for reduced gas imports from Argentina starting in 2005 was a bigger problem, and prompted the Chilean government to issue its new Energy Security Policy in 2006. This was a framework of short- and long-term strategies for increasing production, diversifying supplies and reducing consumption. The strategy involved seeking deals with foreign investors worth about US$10bn to supply the country with 5,000 MW of additional electricity-generating capacity.

Initiatives to diversify supply included the construction of an LNG terminal at Quinteros, completed in 2009. A second LNG terminal was subsequently built in Mejillones, in the north. The government also altered electricity regulations to encourage diversification of sources away from natural gas and into LNG and coal. Prospecting for oil and natural gas also increased.

Consumption-reduction measures were delivered through a National Energy Efficiency Programme, with new initiatives aimed at housing, transport, manufacturing, mining and the public sector. Chile's government also set specific targets for increasing the share of renewable energy sources in the energy matrix. These include wind, solar and biomass resources, as well as biofuels. Officials initially aimed for a 15% share of non-conventional renewable energy (NCRE) in new installed capacity by 2010; this compared with 2.4% of installed capacity in 2008.

Officials also encouraged government agencies and the private sector to use less energy. Public institutions were required to reduce their electricity consumption by at least 5%, and private-sector entities were invited to implement their own energy-saving plans. Further, the law included regulations providing for an electricity-rationing system that could be introduced as soon as the need arose, with the authorities having to give only 36 hours' advance warning about the rationing schedule for each geographic area and category of electricity consumer. Finally, the Chilean government committed itself to keeping substantial funds in its Fuel Price Stabilisation Fund to help to cushion the impact of fluctuations in international oil prices.

Renewables gain momentum

More recently, the government led by Michelle Bachelet, who returned to office as president in

2014, has made development of the NCRE sector a key pillar of its energy policy for 2014-18. The policy states that 45% of new capacity installed between 2014 and 2025 must use NCRE sources, and that 20% of the country's energy matrix must be NCRE-based by the end of 2025.

In the first seven months of 2014, 601 MW of NCRE projects came on stream, more than doubling the amount of NCRE capacity installed in all of 2013. According to estimates from the Comisión Nacional de Energía (CNE), Chile has the potential to develop 40 GW of wind, 12.5 GW of hydro, over 1,000 GW of solar and 2 GW of geothermal projects. As of September 2014 more than 17 GW in new NCRE projects had been submitted to the environmental evaluation service, and more than 6 GW had been approved. In the meantime, Chile's government has begun to work on a new, long-term energy strategy via the Energía 2050 plan.

In addition to NCRE, Ms Bachelet's government will increase LNG imports and work towards the construction of a third LNG terminal to supply central-southern Chile, making LNG a major component of the country's energy mix. In addition to the third terminal, the government wants to use in full all existing capacity at the Quintero plant—which will be expanded to 20m cu metres/day—and the Mejillones plant, which are already in operation.

Another element of the government's programme is the effort to secure popular approval for its initiatives. As part of the long-term energy strategy, the government will begin a dialogue with all stakeholders, with the aim of drafting a national policy that will be socially, politically and technically viable by 2025.

Lessons for the Dominican Republic

- Crisis situations provide the impetus for re-evaluating and reformulating energy policies. However, periods of reduced stress—such as the recent period of rapidly falling global oil prices—can also provide breathing space to develop and put in place a long-term energy-security strategy.
- A comprehensive strategy must be multifaceted, including expansion of generation capacity, energy-consumption measures, an improved pricing and regulatory framework to encourage private investment, diversification of imported energy supplies, and development of domestic renewable sources. All elements must be considered.
- Government leadership is crucial, but a long-term plan will be most successful if all stakeholders are invited to participate in its design and fully understand the proposed policies and initiatives.
- Development of a renewables sector diversifies the energy mix and could also help to extend coverage to rural areas that are not linked to the national grid or have precarious power supply, while providing options for urban consumers who invest in costly back-up generation systems.

Chile's market-driven regulation and pricing

The Chilean case is also valuable as a model for a market-driven regulatory system. Chile was an early adopter of such a model, with market-based prices but a continued strong—but appropriate—role for regulators.

Chile began restructuring its state-owned power sector during the 1970s, unbundling and then privatising power companies. Policymaking and regulation were assigned to the Comisión Nacional de Energía (CNE), which was created in 1978. The Electricity Law (DFL-1) was passed in 1982, followed by new regulations in 1998. Together, these reforms established a market-based regulatory system.

Under this regime, the Ministry of the Economy grants non-exclusive concessions for generation, transmission and distribution companies, with free entry into the sector for both local and foreign firms. There are two interconnected electricity systems, the Sistema Interconectado Central (SIC) and the Sistema Interconectado del Norte Grande (SING), each of which is co ordinated by autonomous industry groups known as Centros de

Despacho Económico de Carga (CDECs). Membership in the relevant CDEC is mandatory, as the groups are responsible for managing the dispatch system and also for planning and co ordinating capacity increases. There are also a few independent systems in remote areas and in large industrial complexes that generate their own electricity.

The CNE managed the regulatory system through the Superintendencia de Electricidad y Combustibles. Electricity sales are allocated within each system first to the producer with the lowest marginal cost. Only when all of that company's power has been sold is the next-lowest-cost producer brought on line. High-cost producers must buy lower-cost power in the spot market to meet their contractual obligations before using their own capacity. The CNE regulates certain prices according to specific market-based criteria set out in the Electricity Law and Regulations, and has only limited discretionary powers. Regulated tariffs for small consumers are kept low based on a formula that ties them to market-determined prices. Individual municipalities are empowered to negotiate their own price deals with small producers with less than 1.5 MW of capacity. Large customers with consumption of more than 2 MW are not regulated and negotiate prices directly with suppliers. Transmission companies are required to provide "open access" to new users that agree to contribute capital to expand the system.

These reforms achieved their objective of establishing market-determined prices with built-in incentives for producers to improve efficiency, minimise marginal costs and extend electricity coverage. They also provided small consumers with regulated prices that are a function of market-determined prices. The sector was depoliticised by embedding in the law price formulas that limit the discretion of regulators. These measures created attractive incentives for private investment in the sector.

Price controls and cross-subsidies

At the same time, the government continued to regulate some prices in the form of price controls to cross-subsidise small consumers, thereby helping Chile to avoid the massive public protests over privatisation seen in other countries in Latin America. A pricing-band system (precios de nudos) protects customers with a maximum consumption of less than 2 MW. The pricing parameters are established according to what the CNE considers an efficient distribution model. The system has protected small consumers, but industry analysts believe that it has acted as a disincentive to investment.

The Chilean government recognised this problem, and acted to implement further reforms to make the regulatory environment more transparent and to attract new investment. An electricity law known as the Short Law was enacted in 2003. It established a new commission to regulate transmission tolls as a means of simplifying the system of resolving disputes. The law also narrowed the spread between the regulated precios de nudos and the free-market price. This benefited the distribution companies and helped to encourage investment.

Lessons for the Dominican Republic

- Boosting private-sector participation in the energy sector is desirable to increase investment, foster the sector's efficiency, attract technical expertise and ensure more dependable access to energy. But a strong and fair regulatory framework is required before investors will take interest.
- If genuine competition is encouraged wherever possible throughout the electricity system, substantial efficiency improvements can be achieved.
- It is possible to depoliticise the dynamics of the industry, while preserving sufficient regulation to ensure an orderly market and protect small consumers.
- Cross-subsidies for small consumers are most effective if they are expressed as a function of free-market prices negotiated between producers and large consumers. Cross-subsidies also help to prevent the social unrest that can follow an abrupt switch to market prices, but they eventually have to be phased out.

Kenya's power-pricing reforms: Changing the tariff structure while protecting the poor

Power-pricing reforms in Kenya have proved quite successful, with tariffs increasing in line with costs since the mid-2000s and the government subsidising connection costs rather than electricity prices. The latter measure has helped to expand coverage to poor, rural areas. At the same time, the calculation of tariffs is transparent, and the tariff structure has supported the sector's financial viability and investment attractiveness.

Prior to the reforms, electricity tariffs in Kenya during the 1990s and the early 2000s did not reflect the real costs of generation, transmission and distribution, thus constraining financial performance of companies operating in the sector. However, as in the Dominican Republic, much of Kenya's population required some form of assistance (such as lower tariffs and subsidies) in order to access electricity at an affordable rate. A balance needed to be struck between social equity and cost recovery by power operators.

Efforts to reform the power sector began in the mid-1990s, when the government unbundled electricity generation from transmission and distribution and opened the industry to participation by the private sector. Although the process took years, it ultimately led to the development of the 2004 Energy Policy and the 2006 Energy Act, which emphasised developments in renewable energy and changes to the tariff structure. The creation of an independent regulator, the Energy Regulatory Commission (ERC), provided oversight of the restructuring process.

Multi-block tariff regime introduced

A new formula for calculating tariff rates was introduced in 2005 to reflect long-run marginal costs. In addition to the basic rate of charge, generation-related fuel costs and fluctuations in the exchange rate are automatically passed on to consumers. Information on the tariff schedule, including the calculation of tariff adjustments and the dates from which adjustments will take effect, is published on the ERC's website, providing transparency regarding tariff calculations.

For residential consumers, electricity tariffs are based on an increasing block tariff (IBT) scheme, whereby the unit price per kilowatt-hour increases based on the following consumption levels per month: consumption exceeds 1,500 kWh; consumption is in the range of 51-1,500 kWh; and consumption remains below 50 kWh. All residential consumers are expected to pay a fixed fee that at least covers the cost of generation, and the lowest block, called a "lifeline" tariff (owing to the fact that it is designed to assist poorer households), is cross-subsidised by larger consumers (although not from urban to rural customers), which in turn encourages lower consumption by larger consumers. Commercial, industrial and government consumers are each charged different flat rates that are not based on an IBT scheme.

The Kenyan government faced significant resistance to an increase in tariffs at the beginning of the reform process, particularly from large consumers—such as manufacturers and cement producers—that would be subject to the higher tariffs. However, by communicating the goals and potential benefits of reform, the government was able to secure their co operation. Emphasis was placed on the potential for foreign investment to be attracted by a tariff structure that reflected the real costs of generation, transmission and distribution. In addition, the government committed funds from higher energy costs paid by consumers to the development of domestic sources of renewable energy, which would ultimately lead to a reduction in power costs and strengthen competitiveness in the medium and long term.

Between 2000 and 2009, tariff rates increased from an average of 7 US cents/kWh to a cost-recovering 19 US cents/kWh, while at the same time the government was able to maintain the lifeline tariffs for those that required them.

Attracting private-sector investment in generation

Electricity tariff reform has led to some improvements in the financial standing of companies in the Kenyan power sector, which in turn has created an environment more conducive to investment by the private sector, particularly in generation. Focused government intervention that aims to reduce risk and financing costs in the development of new generation capacity (whether through public- or private-sector channels) has provided an additional incentive to investors. Although the publically owned Kenya Electricity Generating Company (KenGen) is the dominant player in generation, it does not receive preferential treatment in the market. Rather, the company works with the private sector and is currently pursuing public-private partnerships as a minority shareholder to attract private investors. Another public company, the Geothermal Development Company (an entity within the Ministry of Energy), provides services to potential private-sector developers and tenders contracts for independent power producers (IPPs), to which it will act as a steam supplier.

Lessons for the Dominican Republic

- An important policy challenge for the Dominican Republic is the management of social and equity issues (the social contract). Distributing the benefits of electricity market reforms and maintaining the social contract with the poor will be two of the main tests of the success of electricity reform.
- Tariff increases should be accompanied by expanded capacity and improvements in access and the quality of service delivery. This is a time-consuming process, as expanded capacity often requires up-front investment.
- Government intervention must be focused, and a regulatory framework and an effective and independent regulatory agency that is not subject to political interference should be created. This would also improve the Dominican Republic's attractiveness as a destination for foreign investment in the electricity sector.
- Information regarding the regulatory agency's operations, including the regulation of tariff rates, should be made publically available, making the tariff-setting process fully transparent.
- Political commitment to revising the tariff structure must remain strong. Consistent dialogue with stakeholders and transparency regarding the intended goals of tariff increases will be required.

India: Controlling theft and reducing losses

Reforms implemented by the Indian states of Andhra Pradesh and Gujarat to tackle electricity theft and improve revenue from state-owned power-distribution companies offer valuable insights for the Dominican Republic, which is experiencing similar problems.

In the period from 1990 to 1997 financial losses suffered by the Andhra Pradesh State Electricity Board (APSEB) totalled US$900m, while in fiscal year 1999/2000 (April-March) transmission and distribution losses reached an estimated 38% of total electrical output. Likewise, in fiscal year 2000/01 the Gujarat Electricity Board (GEB) posted a financial loss of around US$500m. Transmission and distribution losses reached 35% of total output in that year.

The unbundling of the states' power sectors in 1999 (APSEB) and 2003 (GEB) led to the creation of four new distribution companies in each states. As in the Dominican Republic, the two Indian states' power utilities were subject to high levels of electricity theft and revenue leakage as a result of weak energy-accounting systems. Power lines were tapped, and meters were tampered with or bypassed altogether, with utility staff and local politicians often being complicit in the theft. This, combined with failures to enforce disconnection policies and weaknesses in metering, billing, connection and internal control systems, meant that transmission and distribution losses increased and that state finances were stretched even further.

New laws, stronger enforcement and an anti-corruption drive

The Andhra Pradesh and Gujarat state governments developed similar approaches to controlling theft and improving accountability in the system, although each had its own individual characteristics. Reform measures, beginning in 2000 in Andhra Pradesh and in 2003 in Gujarat, included enacting legislation to address electricity theft, strengthening enforcement, boosting anti-corruption mechanisms, and improving management and customer service.

Both governments enacted legislation that made electricity theft an offence subject to stringent penalties. Special emphasis was placed on criminalising collusion by utility staff and politicians, and this was supported by institutional changes in the utilities to strengthen their anti-corruption departments. In Andhra Pradesh, the head of the anti-corruption department was promoted from an advisory to an executive position on the electricity utility board. In addition, a new system for tracking progress from inspection to a fine or prosecution was developed, and included tracking the identification numbers on both an officer's inspection report and a customer's receipt for payment of a fine (the latter could be paid on the spot). These developments were necessary to foster public support for the new laws; holding those in power accountable and maintaining transparency in utility service operations helped to change public perception regarding electricity theft.

Additionally, specialised police units were created in both states to monitor theft, and any cases of theft discovered were made public. In Andhra Pradesh, special courts and police stations were established in each of the state's 24 administrative districts to promote more efficient theft detection and prosecution of offenders. Likewise, the Gujarat government set up five police stations across the state with a similar purpose. It also introduced a cash reward scheme as an incentive to encourage those with knowledge of theft to submit information to the police units. The reward was based on the amount of electricity recovered as a result of the submission of the information, and the informant's personal information was kept confidential to protect people from possible reprisals.

Upgrades and new tools also needed

In addition to legislation and enforcement mechanisms, upgrades to power infrastructure and management control systems were required. New feeder installations were provided with tamper-proof electronic meters, connections were sealed and protective boxes were installed on transformers, among other upgrades. In Andhra Pradesh, the authorities developed a centralised customer database called a "customer analysis tool", which includes information on metering, billing and collection performance. The database facilitates data processing and report generation, allowing for quicker corrective action when irregularities are detected.

Reforms in both states have proved effective. According to World Bank data, the authorities in Andhra Pradesh pursued more than 150,000 theft cases in the first three years after the reform law was enacted, up from 9,200 cases in the previous ten years. Some 2.25m formerly unauthorised connections were regularised between 2003 and 2008, and transmission and distribution losses fell from 26% to less than 20% in the same period. CRISIL, a global analytics company, ranked Andhra Pradesh the best-performing Indian state with respect to power governance in 2003 and 2005; Gujarat was ranked second in 2005. Theft cases in Gujarat fell from 107,985 in 2003/04 to 77,068 in 2006/07, and transmission and distribution losses fell to 21.5% in 2006/07. Although reforms have ultimately led to higher prices in the state, the pay-off has been a more reliable supply of electricity. Gujarat is now one of the few states in India with a consistent power surplus.

Lessons for the Dominican Republic

- It would be useful to develop a public campaign to acknowledge the problem of electricity theft and to place it under public scrutiny. This must include holding accountable any utility staff and politicians who are found to have been complicit in electricity theft.

- The legal and regulatory arrangements governing transmission-system security need to be enhanced, with the aim in particular of clarifying responsibilities and accountability.
- It is both politically and fiscally prudent to target those most able to pay in the first round of any initiative to improve bill collection and prevent theft. Targeting better-off neighbourhoods first, before expanding the campaign to poorer districts, will send a clear signal the government is not favouring the rich over the poor.
- Energy consumption audits could be provided to consumers and businesses as a means of encouraging energy conservation. Such a scheme would also provide the government with a highly visible method of demonstrating its concerns and its intention of taking practical steps to assist consumers. By recruiting consumers to the cause of resolving the power dilemma, the government has an opportunity to build a sense of shared responsibility for the problem.
- Opportunities to renew or install secure metering equipment and other infrastructure to detect theft and optimise bill collection should be considered. Due regard needs to be given to the balance between cost and potential revenue improvements.
- Although tariff reform will ultimately lead to higher prices, reliability of electricity supply and improvements to customer service will help to prevent any public backlash.

Puerto Rico: Coping with poor industry structure and governance

The case of Puerto Rico illustrates how inefficiencies and poor governance at the main state power company can exacerbate existing problems of a lack of energy independence, poor energy provision, inadequate infrastructure and financial instability. New efforts now being put in place to rectify the situation appear promising in principle.

Like the Dominican Republic, Puerto Rico, a neighbouring island with a small population of 3.6m, is heavily reliant on imported fossil fuels for its energy needs. In 2012, petroleum accounted for 65% of electricity generation in Puerto Rico, according to the US Energy Information Administration. The remaining capacity came from natural gas (18%), coal (16%) and renewable sources (1%). A lack of diversity in its electricity sources makes Puerto Rico vulnerable to fossil-fuel price volatility: retail electricity prices have more than doubled in the past decade, from 12 US cents/kWh in 2004 to 26 US cents/kWh in 2014.

Inadequacies at PREPA

Puerto Rico's reliance on fossil fuels for electricity generation, and the resulting high cost of electricity, can be largely attributed to the structure and poor governance and oversight of its state-run Puerto Rico Electric Power Authority (PREPA). This self-regulating company owns the electricity-distribution system for the main island as well as for the islands of Vieques and Culebra, and also owns all but two generating stations. The distribution system lacks interconnection, thus requiring PREPA to maintain a larger reserve margin in generation capacity to ensure reliability in distribution. This has led to higher capital, operating and maintenance costs.

Much of PREPA's existing generation capacity is supplied by outdated and inefficient oil-fired facilities with both steep operating costs and high emissions. Recent plans have focused on rehabilitating these facilities rather than investing in newer, more efficient ones. URS, a US-based engineering, construction and technical services provider, estimated that US$100m of the US$104m in planned investment for 2012 was to be used in rehabilitation efforts, such as dual-fuel capabilities and environmental improvements. Investment plans are subject to PREPA's current challenging financial situation (as of mid-2014 its debt stood at US$8.6bn), which has limited the scope of utility upgrades.

Despite promises from the company that operations will improve, little progress has been

made. Electricity theft, administrative inefficiencies and poor customer service remain major problems. Efforts to approve interconnections to the grid through net-metering have been slow, limiting consumers' ability to sell excess power produced off-grid to PREPA. Attempts to boost renewable energy supplies from the private sector have fallen short.

Although Law 73, passed in 2008, required PREPA to establish regulations and pricing mechanisms for private power producers to lease its grid by January 2010, the company dithered, leaving some private-sector participants to take matters into their own hands. Renewable Power Development (RDA), a US-based developer, requested arbitration in April 2014 to force the company to open up the grid. PREPA would be paid for leasing out the grid but would face competition for the first time. Private-sector distributors, particularly those that supply electricity from renewable sources, may lead to greater efficiency and lower costs in the Puerto Rican electricity sector.

Independent oversight in the works

Current efforts to hold PREPA more accountable look promising in principle. In May 2014 the Puerto Rican government passed the Energy Transformation and Relief Law, which will create an external regulatory board to monitor PREPA's efforts to achieve a reduction in power costs, meet future electricity demand and diversify the power matrix. The board will be granted oversight of PREPA's electricity rates, and will require the company to submit a plan to the board for reaching a target of 60% of highly efficient fossil-fuel generation. If the plan is not submitted, or is rejected, the board will tender to the private sector for bids for the construction of new power plants. The intention is to prevent PREPA from using resources on outdated, inefficient power plants. In addition, the legislation adopts new rules and standards on net-metering and wheeling to ensure that PREPA allows interconnections to its grid.

Lessons for the Dominican Republic

- An electricity regulator should be independent and must not be subject to pressure from either state-owned or private-sector utilities. A clear remit must also be established for the regulator to operate in a transparent manner.
- The legal and regulatory framework governing electricity distribution must be strengthened and properly administered to enable and encourage private-sector participation in the system. Additional distribution resources should ultimately lead to greater efficiency and reduced electricity costs.
- Funds invested in upgrading and retrofitting existing, highly inefficient generation facilities might be better spent on newer, natural-gas-fired facilities, although this will require considerable private-sector participation.

Uruguay's renewables revolution

The Uruguayan case highlights the importance of a top-level, long-term strategy to reduce dependence on imported fuels and create a sustainable renewables strategy that can lead to energy self-sufficiency, lower costs, better provision and even new potential for exports.

Like the Dominican Republic, Uruguay, a small country with a small population (3.5m), has no known oil and gas reserves and once depended mainly on imported oil and its derivatives to meet its energy needs. In peak years in the past decade, fossil fuels accounted for 70% of the total primary energy supply matrix. However, that figure fell to 48% in 2010 and is forecast to drop to 45% by 2016, with renewable sources supplying 55%, according to the Dirección Nacional de Energía (National Energy Directorate, DNE).

Significant changes in Uruguay's energy provision are the result of expansion of generating capacity to meet rising demand and policies to reduce reliance on fossil fuels. This has lowered energy costs and made the country less vulnerable to fluctuations in world oil prices. It also promises to make Uruguay self-sufficient in energy in the near future. Installed power capacity is expected to

increase by 80-100% in the short term compared with 2010 levels, owing to new sources of generation, and in particular wind, biomass, solar and natural gas. In addition, Uruguay may soon become an energy exporter to neighbouring countries.

A long-term strategy guides policy

Key to this transformation is a long-term strategy, the 2005-30 Energy Policy, which established the legal framework for the sector. The Energy Policy was formulated by the government in 2008 and was endorsed by a multi-party energy commission in Congress (the legislature) two years later. It involves a strong commitment to diversifying the energy matrix and increasing the share of domestic renewable sources. To this end, since 2005 Uruguay has invested more than 3% of GDP each year in transforming its energy system.

The DNE estimates that renewables will account for 55% of the primary energy matrix by 2016, with biomass accounting for 27%, firewood 12%, hydroelectric power 10%, wind power 5% and solar power 1%. This is an ambitious goal compared with the global average for renewables of 17% and a European average of 20%. Considering electricity supply alone, by 2013 fully 83% came from renewable sources, mainly hydroelectricity, and the figure is expected to rise to 90% by 2016.

Meanwhile, Uruguay has not stopped investing in oil and gas exploration. Foreign companies and the state-run petroleum company, Ancap, are investing around US$1.9bn in oil and gas exploration, of which offshore exploration accounts for US$1.6bn. There is also expected to be an increase in the share of natural gas in the primary energy mix, to 5% by 2016, assuming that the country's first floating LNG import terminal, off the coast by the capital, Montevideo, is operating by then.

Taking advantage of biomass and wind potential

Uruguay is taking advantage of all its available industrial, agricultural and forest waste to generate power. Several industries that process agricultural commodities have installed plants to generate electricity from sawdust, rice husks, "black liquor" from cellulose paste mills, and sugarcane, soya and sorghum residues, which feed their own production processes and sell any surplus power to Uruguay's state-owned electricity company, the Administración Nacional de Usinas Transmisiones Eléctricas (UTE). Around 200 MW in biomass generating capacity is expected to be added by 2015, owing to the start-up of ten new biomass projects.

There is even greater potential for grid-connected wind power because of the favourable conditions (high and relatively constant wind speeds) prevailing in parts of the country. Two wind farms owned by Spanish companies were inaugurated in 2014. Each is made up of 25 wind turbines, each of which has a 50-MW installed capacity. Twenty-three wind farms are expected to be operating by 2016, at a total investment cost of US$2.5bn and with a total generation capacity of 1,300 MW, equivalent to 30% of total capacity.

Incentives encourage investment

The government offers several financial mechanisms to promote renewable energy ventures. A 2009 decree grants corporate income tax exemptions of 90% until 2017, 60% until 2021 and 40% until 2023 on processes, services, and local equipment and machinery production related to power generation from non-traditional sources. A regulatory decree of the Investment Promotion Law grants various fiscal benefits to wind farms and biomass plants. The state-owned Banco de la República offers soft long-term loans to new ventures that aim to produce clean energy.

With these incentives in place, Uruguay is likely to become self-sufficient in electricity generation by mid-2016, with the incorporation of well over 2,000 MW of capacity (1,300 MW in wind power, 200 MW in biomass, 200 MW in solar and 530 MW from the Punta del Tigre plant). Electricity tariffs are expected to fall as a result, and this should contribute to reduced domestic industrial production costs and make the prices of locally manufactured goods more competitive abroad.

"Green" airport and export prospects

In addition, the government aims to convert Uruguay's Carrasco International Airport into the world's first sustainable airport. At a cost of US$10m, the airport will use solar and wind generators as its sources of power. In addition, Montevideo is testing its first electric taxis, and the government's aim is that all of Uruguay's public transport will be powered by electricity.

Positive prospects for new capacity could turn Uruguay into a net energy exporter in the coming years, with power generation projected to exceed domestic electricity demand in 2016. Uruguay began exporting electricity to Argentina in 2014, and these exports are expected to rise in 2015.

Some of the key factors that have made Uruguay's transformative energy policy a success are strong political will, a role for public enterprises alongside private companies, and a state policy devised through a multi-party agreement. While some goals may not be met in full (targets for wind power, for example, may not be achievable because of delays that have occurred in the installation for some wind farms), Uruguay's successes to date in the area of renewables are a model for other countries in the region.

Lessons for the Dominican Republic

- A strong political and national commitment, as well as a forward-looking legal framework, are key to guiding state policy towards energy diversification and independence, including development of domestic renewable sources.
- A multi-party agreement, like that envisioned in the "electricity pact" in the Dominican Republic, can form the basis for consensus across society on transforming the legal framework, the energy matrix and energy consumption habits.
- Investment incentives and other government support, including low-cost financing, are needed to attract sufficient foreign capital into the development of renewables projects.
- Transformation of the energy system requires substantial public investment—in Uruguay's case, this has exceeded 3% of GDP every year since 2005. Such investment pays off in the form of greater self-sufficiency, reduced electricity costs and improved economic competitiveness. ■

3 Policy recommendations for the Dominican Republic's electricity sector

A comprehensive solution to the long-standing problems affecting the Dominican Republic's energy sector must be multifaceted in order to address the major issues identified earlier in this report: the role of the state; the most efficient structure for, and the responsibilities of, regulatory agencies; management and governance of the sector; the financial condition of the distributors; and tariff rates and structure, among other matters. This section of the report, informed by research and expert insights, provides a series of specific policy recommendations and guidelines designed to address each problem and to start the process of putting the electricity sector on a sustainable path for the long term.

The role of the state in the electricity sector

A fundamental issue that lies at the core of the electricity sector's troubles is the need to determine the proper role of the state. As noted earlier in this paper, over the years, and following several reform efforts, the state has partially exited and then re-entered various operational areas, with mixed results. These reversals in the state's involvement in the market have contributed to the lack of continuity in policy and reform implementation, the politicisation of decisions, a lack of transparency and other difficulties affecting the sector. Potential areas for improvement include the following:

- The state's principal role in the electricity sector should be that of supervisor and regulator. Government leadership is crucial, but a long-term plan for the sector will be most successful if all stakeholders participate in its design and fully understand proposed policies and initiatives. Furthermore, it is critical that the plan be based on an agreed set of data, indicators and goals, and that it include a structured follow-up plan for all participants. It must also include a clear set of consequences for non-compliance.
- The state's proper role in the market should be a core topic of discussion in the electricity pact and should be included in the subsequent long-term strategic plan for the sector, alongside specific targets and timeframes for implementation.
- The longer-term plan for the sector should include at least partial privatisation of some operational areas, including distribution and possibly also the coal-fired complex in Punta Catalina currently under construction. The proposed structure for the privatised entities is explained later in this section.
- State-owned entities remaining in the electricity sector should operate under, and be subject to, the same market conditions as private-sector players.

The role and structure of regulatory entities

A review of the respective roles and structure of the regulatory bodies in the sector should be undertaken to avoid an overlap of functions,

prevent the politicisation of processes and decisions, and improve governance and supervision. As there are presently overlapping responsibilities among the various policymaking and supervisory entities in the industry, the unification of all regulatory responsibilities under a single regulator would be most efficient, but this would be a long-term goal whose attainment would depend on sector-wide consensus. In the short and medium term, it is advisable instead to better define and separate the roles of the existing bodies, as noted below.

- The Ministerio de Energía y Minas (the energy ministry) should be the sector's sole and ultimate policymaking body, responsible for formulation of policies and their implementation (through the agents of the sector, as appropriate).
- The Comisión Nacional de Energía (CNE) should be transferred to the energy ministry, as either a subsidiary or a division within the ministry's structure. The CNE must keep its status as an independent body, and its role must be limited to that of an adviser—particularly on technical issues—in support of the ministry, responsible for strategic planning and for providing other strategic advice. In that regard, the ministry must take on the functions currently carried out by the CNE, in order to eliminate overlap in the duties of the two entities. (Short- to medium-term change.)
- The Superintendencia de Electricidad (SIE) should be an independent regulator, operating within a defined policy framework and not subject to pressure from either state-owned or private-sector entities. Its direct link to the CNE should no longer be necessary in practice, as the policy advisory role of the CNE would instead feed into the energy ministry; however, this link may have to continue in the short term, until it becomes appropriate to amend legislation. (Short- to medium-term change.)
- If converted into a holding company for—and supervisor of—the state-owned enterprises, as we recommend (see below), the Corporación Dominicana de Empresas Eléctricas Estatales (CDEEE) would be stripped of its policymaking responsibilities.
- The SIE superintendent, CNE advisers and CDEEE senior managers should be appointed either for periods that extend beyond the four-year presidential terms (potentially six years) or for a shorter period, but their terms should be staggered so that they span between presidential terms. The goal would be to avoid politically motivated appointments, and to provide stability and continuity despite changes of government. Failure to perform adequately, however, would be grounds for early termination. Commissioners appointed by the executive should have a range of relevant experience of the electricity sector, thus ensuring their technical competence, and should reflect the interests of stakeholders, especially both large and small consumers. (Medium-term change.)

Ensuring transparency in the sector

Besides the structure of regulatory agencies, another key component of a properly functioning electricity sector is transparency. This involves establishing proper auditing and reporting requirements and processes, with the following recommendations:

- A carefully specified audit of data in 2016 should be conducted to ensure that the baseline data used for performance measurement and monitoring are accurate. An external audit of the CDEEE and the distributors was conducted in 2006-07, at the suggestion of the World Bank. The audit's conclusions were not substantive, perhaps because it focused on the calculation of the cash recovery index figure and therefore missed issues related to under-billing and the treatment of unregulated customers that were subsequently identified by management. (Medium-term change.)
- Separate accounting for regulated and non-regulated price segments should be implemented. The performance of the sector cannot be gauged and evaluated accurately at present because the distributors combine data

from regulated and unregulated customers. This disguises the poorer performance of the regulated sector (in terms of higher losses and lower collection rates), which is offset by the indicators of the unregulated sector supplied directly by the distributors, which generally show a better performance. Regulatory best practice suggests that, where competition and monopoly overlap, a separate accounting of the profits and cash flows of the two subsectors should be kept. This would enable stakeholders and management to assess more clearly and consistently performance in the regulated sector only (and would allow the regulator to monitor behaviour in the competitive market). (Medium-term change.)

- There must be strict adherence of all state-owned entities and regulators to the transparency laws that all government entities are required to follow, within a specified time period.

The structure of energy sector institutions

A shift in the organisation of state-owned enterprises in the sector is recommended to generate efficiency, eliminate duplication of responsibilities and ensure economies of scale. There is no perfect answer to the organisational structure, but an early decision on the way forward would enable the management teams to be chosen and to prepare ahead of a change of government in 2016. Greater centralisation of management and control would facilitate the efficient implementation of major sectoral projects, while modern work-management systems could enable efficient decentralised (localised) delivery of those projects. Recommendations include the following:

- In the light of the political implications of a privatisation process and the timing of the discussion and approval process, it is recommended that the three distribution companies (Edesur Dominicana, Edenorte Dominicana and Empresa Distribuidora de Electricidad del Este) be streamlined and consolidated into a single, more efficient entity. (Initially, this would be seen as an administrative change, as modifying legislation might have to be postponed to a more appropriate juncture in the medium term. Current regulatory reporting by company would have to continue until then.) Recent developments in energy distribution and supply businesses around the world suggest that the optimal size for a distributor's customer base is in excess of 2m, indicating that the division of the Dominican sector into separate regional entities with fewer than 700,000 paying customers each is no longer the best option. The introduction of improved customer-, work- and asset-management systems would allow for a streamlined central management approach, but with decentralised and focused delivery of services. If the single energy-distribution company remains in public-sector hands, control should be transferred to an independent board of directors.
- As a first preference, the CDEEE would be responsible for exercising the effective supervision of a unified distribution company under the new proposed structure. However, another option would be to contract out the company's management to private hands, under strict contractual guidelines and stringent controls. The contracts for private management would include a minimal duration period. Board appointments should be structured carefully to allow for early termination and reasonable compensation for the same if management is to be contracted out to the private sector. (Medium-term change, but with planning in the short term.)
- The CDEEE should operate as a holding and management company for the state-owned electricity enterprises, including the unified distribution companies, the Empresa de Transmisión Eléctrica Dominicana (ETED) and the Empresa de Generación Hidroeléctrica Dominicana (EGEHID). (Medium-term change.)
- It is recommended that the thermoelectric coal complex in Punta Catalina be incorporated into the market and into the governance and management structures of the CDEEE if it is to

remain in the state-owned sector. Furthermore, the project should be reoriented commercially through incorporation as a separate company and through a power purchase agreement (PPA) selling electricity to the CDEEE as single buyer. Upon completion of the construction, implementation of the operating contract, and agreement of the PPA, the project could be subject to private participation or a full sale—any holding through the CDEEE would then be a temporary management arrangement. Sale of the power station would help to generate funds for the state, including the higher taxes that result from the private sector's improvement of business performance. (Medium- to long-term change, with short-term planning.)

- A single board of directors should be created to act on behalf of the state-owned entities in the sector. This board would replace the six separate boards that exist today (one each for the CDEEE, ETED, EGEHID, EDESur, EDENorte and EDEEste). The criteria for the board positions must be strict in terms of minimum academic and professional requirements, and must include proven professional experience in the sector. In addition, it is recommended that the terms for these board members be extended to six years, from four at present, in order to separate them from the four-year electoral cycles and allow the board members' terms to span two presidential terms. This would help to limit the likelihood of political appointments and the disruption that accompanies the change of high-level positions during transitions from one administration to another. The board should include the chief executive officer(s) of the companies and perhaps one other full-time executive. Executive teams would manage the individual businesses (distribution, transmission and hydro generation), with representation from the main CDEEE board. (Medium-term change, with short-term planning.)
- A single management structure should be adopted in the distribution sector, with a specialist manager for each primary business activity: losses in circuits requiring rehabilitation (C and D), losses in regularised circuits (A and B), asset management and general customer management. In order to avoid the complications that would be involved in changing the Electricity Law in the short term, there would be a need to handle regulatory and corporate accounting for the existing companies through an administrative process. Potentially, the asset-management function could also incorporate transmission. The top-level management team could serve as the executive team and the board for the distributors as divisions or subsidiary companies. (Short-term planning, medium-term implementation.)

Management and governance of the industry

Politicisation in the electricity sector is a major problem and has hampered performance and the effective implementation of reform; it has also resulted in a general lack of transparency. It is recommended that the state-owned entities in the sector be managed like private enterprises, complete with market-based incentives, performance-based compensation schemes and other business best practices. These include, but are not limited to:

- A compensation-based incentive scheme for technicians and other employees in the distribution companies should be introduced to ensure optimal performance and to improve company results. The chosen scheme must also include objectives for top and middle management. Appropriate management performance targets within each specialist function can form the basis for incentive schemes to encourage the correct behaviour and the desired outcomes throughout the organisation and also from contractors. (Medium-term change.)
- Management contracts for individual general managers and their senior teams should be extended beyond the four-year political cycles to ensure management continuity. (Medium-term change.)
- Processes that are unrelated to the core

businesses and prone to inefficiencies should be outsourced.
- Within the distribution business, it would be best to establish a model with a single buyer acting for the regulated market to guarantee a strong bargaining position for the offtake of power from commercial PPAs. The competitive sector would remain, particularly in the unregulated market, and could be extended in due course when cross-subsidies are resolved. (Short- to medium-term change.)
- Competitive procurement processes across the board for all state-owned institutions must be the norm.

The financial problems of the distribution sector

The poor quality of services, a lack of customer engagement, and infrastructure inefficiencies have led to years of distribution losses and non-payment of electricity services. Non-payment by the government sector is another complicating problem. Although distribution losses have been reduced, improvements have stalled in recent years. Furthermore, the figure for the regulated market may be worse than it appears: it is not clear to what extent the results are influenced by unregulated supplies, as there is no separate accounting for the two market segments in the state-owned sector.

Data show that the bulk of electricity losses originate from informal circuits where historically customers were not identified, there was no metering and unauthorised consumption was normal. Less than one-quarter of total losses arise from rehabilitated circuits with 24-hour electricity service. This indicates that there are two specific elements to the underlying problem of electricity losses: (1) relatively sophisticated fraud and corruption in well-to-do areas (circuits A and B) where the quality of service is adequate; and (2) opportunistic fraud and non-payment in poorer areas with informal networks (circuits C and D) where the quality of service is poor. The split of losses between technical and non-technical is not known, and improved asset management is needed to reduce technical losses in both distribution and transmission by, for example, reducing the number of overloaded and underloaded transformers. Collection performance is worst in circuits C and D, but evidence indicates that a combination of network rehabilitation, improved customer service and interaction, and prepayment metering can overcome problems of both electrical losses and non-payment.

Addressing these problems is central to improving the finances of the distribution sector and putting an end to power outages and other service problems. Recommendations include the following:

- Funding should be secured for much-needed investment and upgrades in the distribution network, and particularly for the rehabilitation of circuits. This is a component of any plan to reduce losses. Given the correlation between 24-hour service and the timely payment of electricity bills observed in the past in the Dominican Republic, priority should be given to the provision of 24-hour electricity supply. To accomplish this, ring-fenced funding should be identified and allocated to distribution projects over a period of at least four years to rehabilitate all C and D circuits and regularise supplies to customers on the basis of providing a 24-hour supply. Funding could come from the government, multilateral lenders or through specific adjustments in a transitional tariff formula to allow the recovery of the capital and revenue costs in distribution value added (VAD), plus an appropriate return (spread across all customers). Beyond this four-year period, a potentially longer timeframe should be contemplated during which guaranteed and consistent financing will be made available for other future investment needs. (Short- to medium-term planning, medium- to long-term delivery.)
- The investments will cover a new secure connection, associated metering with effective anti-tampering controls, a payment agency system to enable prepayment, and the cost of customer communication and information. Typically, the capital cost (the cost of

infrastructure) for such investment is around US$500 per customer, while the information and customer-service element is around US$100 per customer. Funding would be dependent on effective ring-fencing of the cost and activities to prevent the funds from being used merely to pay off debts to generators or for other projects that might become politically desirable. (Short-term decision.)

- A target should be established of no more than 15% of unpaid energy (technical and non-technical losses plus non-collection) in the regulated market, within a specific timeframe. This would entail establishing a schedule with programmed annual loss reductions, in tandem with a previously agreed transitional tariff scheme (see next section). This plan should be made public, and should be approved by the energy ministry as policymaker and by the SIE as the regulator in the sector. (Medium-term change.)
- A "focused management" scheme should be implemented, based on the commercial viability of each circuit, instead of relying on traditional management. This is facilitated by the ability to determine losses and collection data circuit by circuit and the means to allocate available power to circuits in accordance with their commercial viability. The trend away from general management is typical in more developed electricity sectors, such as those in North America and Europe, especially where there is competition in supply. (Medium-term change.)
- Proper billing procedures, as well as the widespread installation of prepaid meters, should also be introduced to optimise collection and prevent theft. Prepaid meters have been used successfully in South Africa, Colombia, Brazil and Malawi and should be implemented in the Dominican Republic, primarily in the C and D circuits. Collection performance is worst on circuits C and D, but evidence from the El Manguito project indicates that a combination of network rehabilitation, customer service and interaction, and prepayment metering can overcome the problems of electrical losses and non-payment. This is consistent with the experience reported by CEPM, the private-sector distribution company in the east of the country. (Medium-term change.)
- It would be useful to develop a new public campaign to acknowledge the problem of electricity theft and to place it under public scrutiny. This must include holding accountable any utility staff and public-sector workers who are complicit in electricity theft. (See India case study in Section 2 of this report.) (Short- to medium-term change.)
- Government institutions should be among the eventual prepaid service recipients if they have a poor payment record, although leeway to provide exemptions may be necessary in some cases, such as public hospitals. Collection of debts from the central government and municipalities is frequently slow, including those related to the "no cortables" supplies– those entities that cannot be disconnected from the electricity grid. Other countries with endemic problems of this type, such as Malawi and Nigeria, have resorted to prepayment metering even for government supplies. (Medium-term change.)
- A customer-oriented management model is essential, aimed at engaging the end client, improving customer service and providing new incentives to pay for electricity services, thereby boosting payment rates. This includes improving overall service and eliminating blackouts, but also introducing and expanding the use of e-wallets and other forms of financial-inclusion schemes designed to facilitate payment for service, as well as other incentives to improve payment rates. (Medium-term change.)
- Significant investment also is needed to upgrade the transmission network to meet new demand and connect new generation facilities. The 138-kV system can manage demand only up to around 2,500 MW and individual generation units up to 300 MW. With demand for electricity rising at 3-5% per year, plus the opportunity to bring into the system isolated demand currently

met by private diesel generation, it has become urgently necessary to put in place a transmission spine of 350 kV or 400 kV to ensure that future demand can be met securely. In addition to its critical role in enabling security of supply, an upgraded transmission network will also reduce technical losses. (Medium- to long-term change.)

Cash flows, tariff rates and tariff structure

Investment in the sector has been constrained by the weakness and uncertainty of operating cash flows. Government finances have carried the risk of changes in prices for oil and other fuels, exchange-rate risk, and shortfalls from the change in the tariff mix as more small consumers have been incorporated in the customer base. The combination of a fixed government budget and tariff freezes has repeatedly led to cash flow deficiencies, arrears to generators (increasing costs further) and funding problems for the government. A further problem is the large debts that the state companies owe to generators and banks (estimated at US$800m in total in April 2015).

As an example of the risks involved, the Dominican peso has depreciated by around 120% in nominal terms since 2001, when the Madrid Agreement was signed. This means that US dollar-denominated fuel and PPA prices have increased accordingly. The tarifa técnica, as set out in the Electricity Law, requires generation costs to be passed on to customers, and this implies regular adjustments to tariffs, but these have not been implemented fully or consistently. Governments in other countries, such as Bangladesh, have recognised that they cannot continue to carry these risks and have implemented changes, including pricing systems based on models akin to the tarifa técnica, combined with a provision for financing subsidies (in the form of contingency funds held in an escrow account or similar financial vehicle) if these are deemed necessary at times of high energy costs.

Another politically charged issue is the progressive tariff scheme. Although this method is a popular way of helping the poor (assuming that low electricity use corresponds to high poverty levels), the experience in the Dominican Republic has given way to non-payment and fraud. Recommendations to address this problem include the following:

- Currently, low world oil prices provide an opportunity to move towards the application of a transitional tariff structure in the medium term. The application of a technical tariff reflecting the real costs of generation, transmission and distribution should be a long-term goal. (Short- to medium-term change.)
- A tariff level should be adopted that reflects real costs less any agreed subsidy and any achievable efficiency savings, along with the maximum annual losses targeted for the energy distributors. Currently, it would not be possible politically to pass on the costs of the sector's inefficiency to customers, and so there is a need for a lengthy transitional period during which the state continues to provide subsidies to cover high electricity losses and low collection rates in the regulated market. (Short- to medium-term change, but extended into the long term.)
- One problem with the subsidy mechanism to date has been that the full risk associated with oil prices and peso devaluation has been carried by the government because tariffs have been frozen. By introducing regular tariff adjustments to reflect changes in fuel costs and exchange rates, the government would enable itself to budget more effectively for the subsidies that would still be necessary during the transition. Small, progressive adjustments would be easier for consumers to accept and would be less politically difficult to implement.
- The progressive tariff scheme currently in place should be reviewed, with the goal of reducing market distortions. This should be done in collaboration with the Ministerio de Economía (the economy ministry) in order to ascertain the real impact of proposed changes on the country's population.
- Information regarding the regulation of tariff

rates and any planned changes should be made publicly available, to ensure that the tariff-setting process is fully transparent. Regular dialogue with stakeholders, and especially consumers, about the intended goals of tariff increases is essential. Although tariff reform will ultimately lead to higher prices, reliability in electricity supply and improvements to customer service will help to mitigate any public backlash. (See Kenya case study, Section 2 of this report.) (Medium-term implementation.)

Public subsidies to the energy sector

The need for subsidies is the result of electricity losses, network inefficiencies, an ineffective tariff structure, and political decisions to impose fuel price and exchange-rate risks on the taxpayer despite the burden that these transfers place on the public finances. Cross-subsidies have been subject to abuse, with some users adjusting their consumption to fit into consumer segments that receive subsidies. With the ending of the blanket subsidy to the areas covered by the former Programa Nacional de Reducción de Apagones (national blackout-reduction programme), the introduction of the focalised Bonoluz subsidy was a positive development. However, there is a pressing need to limit subsidies in general. Recommendations include the following:

- The problems underlying distribution losses and inefficiencies should be remedied, as these are the root causes of the need for subsidies.
- The existing subsidy on consumption of up to 700 kWh per month should be eliminated, although this would have broad political implications. International experience suggests that low "lifeline" tariffs up to 50-100 kWh per month are effective. (Medium- to long-term change.)
- A new study is needed to determine the target group that requires a subsidised electricity service ("focalisation"). Strict criteria for subsidies and cross-subsidies would then be established. This effort could be made in collaboration with the economy ministry. (Short- to medium-term change.)
- A clear link should be established between economic and allowed tariffs, with independent regulation, so that the government must decide on subsidy levels while ensuring that it has the proper funding and contingencies in place. This is the case in Bangladesh, for example, where the regulator determines the required tariffs, taking into account fluctuations in fuel prices—potentially monthly. If the government finds a proposed increase unacceptable, it can draw on a pre-established subsidy fund—at least up to a specific cap set by the legislature through the budget process. The decision is therefore transparent and effectively controlled. (Short- to medium-term change.)
- Any gradual reduction in transfers to the industry should be accompanied by clear information and transparent timetables, to allow the companies to plan for the reduction of this support, and to serve as an incentive to them to reduce inefficiencies and losses. At the same time, the electricity companies should present their own verifiable investment plans and programmes for loss reduction.
- Subsidies should have three distinct, quantified and ring-fenced components: payments under social schemes to poor households (Bonoluz), grants towards the rehabilitation of C and D circuits, and "transitional" payments to cover distribution-sector inefficiencies that cannot be passed on to customers. Subsidies should not carry the costs and, more importantly, the risks associated with fluctuations in fuel prices and exchange rates. Where the government carries risks, the budget should incorporate a contingency sum, or hedging strategies should be considered. (Short- to medium-term change.)

Optimal energy mix and generation sources

Historically, the Dominican electricity sector has been dependent on petroleum-based generating plants built when oil prices were low. Expansion of natural gas, coal, hydro and wind as energy sources has helped to reduce the share of oil-fired generation to below 50%, but more diversification

is required if oil-fired generation is to be reduced to its appropriate role as peak or emergency generation, competing as mid-merit generation only at times of low oil prices. (Mid-merit generation fills the gap between base load and peak load.)

Demand studies in 2009 indicated a need for around 1,200 MW of new capacity (coal or natural gas) before 2016, when the Madrid Agreement contracts expire. In 2011 the CDEEE said that 1,500 MW would be more prudent, and a procurement process was begun. The 770-MW coal plants being constructed by the government will therefore provide only part of the requirement between 2016 and 2020 if the role of oil-fired generation is to be reduced to meeting peak demand.

The Dominican government has not defaulted on PPAs since 2002, and, despite habitual delays in making payments to generators, the procurement process that was halted in 2012 demonstrated an appetite among investors to promote coal and natural-gas projects. Although the current energy mix in the Dominican Republic is adequate and sustainable, increased investment in generation is needed. However, the commercial risks associated with the inefficient distribution companies, as well as the market distortions introduced by the Madrid Agreement, act as barriers to investment in the sector. Moreover, the process of tendering for expanded generation has been hampered by a lack of transparency and continuity. The willingness of investors to make commitments to the sector will increase only if these issues are addressed, and if the tariff and cash flow problems affecting distributors are resolved. Recommendations include the following:

- A strong strategic and financial plan should be developed with regard to the energy mix. Included in this may be the expansion of the liquefied natural gas (LNG) terminal, a hedge for fuel prices, and a second LNG terminal to hedge against the risk of hurricanes while reducing the monopoly power of AES in LNG supplies. The terminals' essential facilities should be subject to independent regulation and transparent third-party access. (Medium-term change.)
- Wind power and hydro projects have helped to diversify supply, and there is room for further expansion. However, massive additional development of these two sources would not be economically viable, in large part reflecting the recent fall in oil prices and the expectation for continued low prices in the medium term.
- Incentives for development of renewable sources, such as low-cost financing, should be retained or expanded. Modest additional development of a domestic renewable energy sector could help to extend coverage to rural areas that are not adequately linked to the national grid or have precarious energy supply, while providing options for urban consumers who currently utilise costly back-up generation systems. (Medium-term change.)
- Until the distribution companies are consolidated into a single entity, contracts should be negotiated with the energy generators as a single buyer, rather than on the basis of separate contracts with each distributor. It may be possible to include in negotiations any issues relating to arrears under existing contracts, as this overhang will need to be cleared. A competitive and transparent tender process is generally the preferred way forward in developing countries. (Short-term planning, with medium- to long-term delivery.)
- The role in the market of the Punta Catalina thermoelectric coal-fired complex should be determined via a new PPA before the complex becomes operational (in 2017). Without such an agreement, it will be difficult for the distribution sector to contract for its other needs from either existing generators or other new projects. Should the decision be made to operate the coal plants as a separate corporate entity, a PPA would help to move them away from day-to-day control by the CDEEE and allow them within a predetermined period to be operated in accordance with a market-oriented structure under private management. (Short-term planning, long-term delivery.)

National energy-efficiency and energy-conservation programmes

The combination of network rehabilitation and improved asset management in both transmission and distribution should lead to a reduction in technical losses, which must underlie any plans to improve energy efficiency and conservation in the Dominican Republic. In addition to this, the following recommendations follow from the above analyses:

- Existing energy-efficiency initiatives should be continued and expanded in both the private and public sectors. These programmes must aim to reduce peak demand and overall energy consumption. Evidence from the network rehabilitation projects suggests that moving to a 24-hour supply will not increase demand in the short term, as demand is merely spread over a longer period. As efforts to improve payment rates succeed and as customers begin to pay for their electricity in tandem with better service, especially through prepayment meters, they will reduce their consumption and use electricity more wisely. (Medium-term change.)
- Authorities should review likely demand and the need for new capacity in the regulated market from 2016 onwards. In 2013 the CNE commissioned a study on demand in the long term, which might be of use in this exercise. Energy consumption audits could be offered to consumers and businesses as a means of encouraging conservation. The scheme could also provide the government with a way to demonstrate its concern and its intention of taking practical steps to assist consumers. By recruiting consumers to the cause of resolving the power dilemma, the government has an opportunity to build a sense of shared responsibility for the problem. (See Uruguay case study, Section 2 of this report.) (Medium-term change.) ■

4 Implementation of policy recommendations for the electricity sector

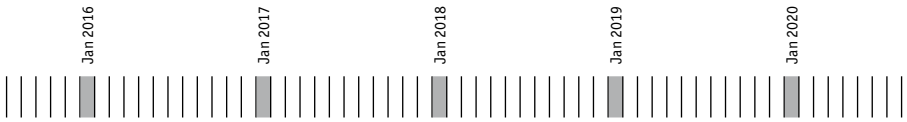
The recommendations presented in Section 3 of this report have been developed into a general outline plan that allows for planning and decision-making in the run-up to the inauguration of a new government in August 2016. Implementation of the plan can then commence quickly. Policy analysis would continue, running in parallel with project and management implementation in distribution (by the CDEEE), this being the most critical area in which problems must be addressed immediately.

In order to meet the objective of resolving the distribution sector's problems by mid-2020 (by the end of the next presidential term), it will be essential that new managers and teams are ready to begin implementation as soon as possible. Ideally, plans, funding and communications would already be in place. Other key areas, such as subsidies and tariff strategy, will need further analysis in order to get to the stage of detailed policy proposals for implementation over a longer period of time in order to avoid provoking social unrest.

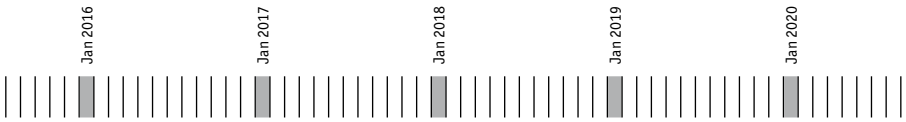
The chart contained below lays out a general framework and timeline for policy changes and their implementation over the short, medium and long terms, while keeping in mind that the strategy would be largely implemented between 2016 and 2020. Immediate tasks involve redefining the management structure for the CDEEE and reassessing the roles of the various institutions in the sector—a process that should begin before August 2016. This should be followed by specific actions in the remainder of 2016 to begin to correct the problems affecting the distribution sector. Other institutional and governance changes would also be initiated in this period, and would be followed in 2017 by decisions related to new single-buyer contracts, the status of the new coal plants, and additional source funding for the upgrades needed in the distribution sector. Steps to address longer-term issues, such as the tariff structure, rehabilitation of circuits and customer management, would be ongoing beyond 2017.

This report and the outline presented below are not intended to include ever possible policy recommendation for the Dominican Republic's energy sector. Instead, they are designed to illustrate what the Economist Intelligence Unit believes to be the most critical components of a strategy that will put the long-ailing electricity industry on a financially and operationally sustainable path and allow it to improve service and customer satisfaction. This, in turn, should contribute to improved economic competitiveness and overall economic performance. We have based these recommendations on expert insights gleaned during the course of our research and advisory-board meetings, as well as on the experience of other countries that have experienced similar problems in their power sectors. The proposals are intended to provide input and insights for policymakers in the Dominican Republic, rather than to hand them a fully developed and definitive plan of action with specific target dates. That will be the responsibility of decision-makers in the country, who clearly see the urgency of the task. ■

General timeframe for policy change and implementation



Management structure
Identify and align Corporación Dominicana de Empresas Eléctricas Estatales (CDEEE) management team
Decide on management structure for distribution system
Management roles in CDEEE
Allocate people to roles
Establish a single-buyer model
Customer management roles
C/D circuits management roles
A/B circuits management roles
Asset management roles
Source funding for distribution investment for years one and two
Plan immediate actions in distribution
Prioritise projects - C/D circuits
Develop strategy regarding coal plant
Develop strategy regarding Madrid Agreement contracts
Develop prepayment strategy
Develop communications strategy
Implement new management structure for the distribution system
Define roles of institutions
Ministerio de Energía y Minas
Superintendencia de Electricidad (SIE) away from Comisión Nacional de Energía (CNE)
CNE to Ministerio de Energía y Minas
CDEEE to manage, not to develop policy
Agree regulatory arrangements regarding new distribution structure
Communicate changes
CDEEE governance changes
Define governance structure
Agree to protocols
Appoint boards
Decide new contract durations
Appoint CDEEE managers
Appoint SIE commissioners
Appoint CNE advisers
Appoint personnel with new contract durations



Review tariff and subsidy strategy
Undertake policy review
Assess economic and social implications
Develop transitional tariff
Propose tariff and subsidy strategy
Implement new tariff and subsidy strategy
C/D circuits
Implement C/D circuits plan
Identify funding for years three and four
Activate funding for years three and four
Complete C/D circuits rehabilitation
Transparency
Separate regulated and non-regulated customer reporting
Reset reporting data for previous two years
Commence new reporting
Management incentives
Determine incentive schemes
Implement incentive schemes
Customer management
Implement prepayment strategy in C/D circuits
Implement prepayment in slow-paying government supplies
Achieve target of 15% unpaid energy
Single buyer
Review coal plant status
Implement coal plant strategy
Agree power purchase agreement (PPA) and other contracts for coal plant
Implement strategy regarding Madrid Agreement contracts
New PPA structure in place
Commence competitive procurement process for new capacity
Award contracts for new capacity
Energy policy
Review strategy: demand and mix; renewables
Review energy efficiency policy
Agree to energy policy

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