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EANDIS: FINANCING THE ROLLOUT OF SMART METERS IN A REGULATED ENVIRONMENT

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At the end of 2014, Walter Van den Bossche, the chief executive officer (CEO) at Eandis System Operator CVBA[[1]](#footnote-1) (Eandis), a Belgian power distribution system operator (DSO), was reviewing his company’s investment program. Eandis operated one of the leading low- and medium-voltage electricity networks in Europe. The company’s financial plan was more complex than it had been in previous years because the company needed to decide whether to roll out smart meters to their Belgian customers—a decision that could be seen as an opportunity for growth.

At the same time, Van den Bossche was aware of the regulatory risk that came with such large investments in his field. Thus far, the company had been operating in a regulated monopoly governed by a cost-plus (cost+) pricing regime. In that regime, the company recovered all of its costs from the fees grid users paid to access the electricity distribution network. The charges were expressed in volumetric tariffs of euros per energy unit.

The cost+ regime had motivated Eandis to invest in the grid infrastructure; however, that regime was about to be replaced by an incentive regulation scheme—a pricing regime that would involve either a price cap, an upper limit on the unit prices charged to network users, or a revenue cap (an upper limit on the total revenue the DSO could earn). With the anticipated change in revenue structure, the company needed a new financial analysis for the company’s planning processes; the new analysis would need to anticipate the potential changes in regulatory structure and how the changes would affect a decision to invest in smart metering. The CEO summarized, “With the funding needs ahead for the DSO industry, it is important to prove to potential institutional investors and other stakeholders that we have looked at all reasonable scenarios to assess the impact on profitability, equity, debt, turn over . . . you name it.”

The Power Grid Industry in Europe

The power grid industry was rapidly changing, and low- to medium-voltage grid operators, which were asset-intensive owners of vast infrastructures, merited attention. Electricity DSOs played an important role in Europe’s energy system: they linked the transmission system with 260 million connected customers, delivering approximately 2,700 terawatt hours (TWh) of electrical energy per year.[[2]](#footnote-2) Europe’s DSOs collectively employed approximately 240,000 people. Distribution grids had been previously regarded as merely the last mile in the delivery of low- and medium-voltage electricity; however, with more technology penetrating the grids, the future role of DSOs was increasingly a topic of discussion. Europe’s DSOs, approximately 2,400 in number, were likely to become the central hub and backbone of future intelligent power systems.

Several forces were challenging the status quo of electrical distribution. An increasing number of generators creating electricity from renewable resources (renewable generators) were being connected to the networks at the distribution level, and the grids were increasingly driven by information technology (IT)—a process known as “becoming smart.” Large, centralized power generators, such as those involving hydro, nuclear energy, coal, and gas, were giving way to a range of dispersed units, such as co-generation plants, photovoltaic panels (solar panels), and wind turbines. Millions of these small-scale units were already generating electricity all over Europe. Further, as smart meter systems were added to the system, electricity consumers could use the information and communication technologies to participate in the distribution system. These clients, which were unlikely to change in number, represented 99 per cent of all final customers.

The evolving context was not only changing the business model of power generation but also affecting the grid operations and investments of network companies, which included DSOs. Regulation was advancing, and it triggered the need for adequate financial planning models to complement existing tools of analysis. In addition to being used in project analysis, where, for example, the net present value of projects or investments was calculated for a cost-benefit analysis (CBA) and to assess profitability, financial modelling tools were needed to calculate the impact of a project or investment on the rate of tariffs.

EANDIS: THE BELGIAN POWER GRID OPERATOR

Eandis was the regional electricity DSO in Flanders, the northern, Flemish region of Belgium, servicing a market that covered 78 per cent of the Flemish municipalities. With a network of 94,000 kilometres (km) (61,000 km in low voltage and 33,000 in medium voltage), Eandis supplied 2.5 million clients, engaged 4,750 employees, and generated €3 billion[[3]](#footnote-3) in operating revenue from a base of €3 billion in total assets.

Basic Financial Statement for Eandis

In 2014, Eandis serviced a consumption of 30 TWh at a regulated price of €39.17 per megawatt hour (MWh). The company’s return on equity was 7 per cent, with equity costs of €140 million for a total equity of €2,000 million (€2 billion) (see Exhibit 1).[[4]](#footnote-4)

A depreciation cost of €220 million for the regulated asset base (RAB)[[5]](#footnote-5) of €5,000 million (€5 billion) indicated that under a simplified linear depreciation model, the existing assets were assumed to have an average lifetime of about 23 to 26 years. This was realistic for power grid companies, which typically had a mixed composition of heavy infrastructure assets with a lifetime of up to 40 years (e.g., cables and overhead lines) and lighter assets with shorter lifetimes (e.g., IT equipment).

Main Assumptions for Cost+ Pricing

In the cost+ scenario, the regulatory regime was assumed to remain as it was (see Exhibit 2). The annual increase of operating expenses, other costs, and consumption for the projected years 2015–2024 was assumed under business as usual.

In this scenario, the change in the RAB was the net effect of the ongoing asset depreciation of €230 million per year, corrected for the investments that were planned to replace depreciated assets of €400 million per year. For the new investments, a depreciation rate of 2.5 per cent per year was assumed, implying an asset lifetime of about 40 years. It was also assumed that positive changes to the financing needs (an increase in the RAB) or negative changes to the financing needs (a decrease in the RAB) were shared between debt (60 per cent) and equity (40 per cent).

Moreover, equity was equal to the shared capital in 2014, implying the absence of any reserves. As of 2015, the company would have accumulated reserves because a portion of the profit was paid out as dividends, while another portion was kept in the company.

Financial Planning for Regulatory Changes

If the regulatory structure changed, revenues would vary. The cost+ regime covered all cost positions, and the revenues had to provide the profits, which equalled the allowed return on equity. This was assumed to be 7 per cent of equity, as in 2014. Under this regime, the revenues no longer guaranteed a fixed return on equity. Instead, the revenues included the costs that the regulator accepted to be recovered from consumers, the allowed change in operating expenses, and the allowed capital expenditure. The difference between the allowed costs and actual costs determined the net profit and, thus, the company’s performance.

Under the cost+ regime, the company had an implicit weighted average cost of capital (WACC) of 5.5 per cent, but in 2014, the regulator had limited the WACC to 5 per cent. The regulator had set the starting value for operating expenses based on the DSO’s expected cost, but the allowed operating expense was capped at a 2 per cent increase per year, even if the DSO argued that the operating expenses would grow at 2.4 per cent per year and that investing in smart meters would further increase the operating expenses.

If the regulatory regime changed to price cap regulation, revenues would depend on the price cap set by the regulator and the volume customers consumed (see Exhibit 3). In this scenario, the volume risk would be assumed by the company.

This possible change to price cap regulation posed the threat that the regulator might not allow grid tariffs to increase more than 2 per cent per year. This threat was taken seriously because the investments had a lifetime of more than a decade, while the regulatory period in which the regulated parameters were fixed was typically for four to five years.

Investment program

Eandis was considering a slow but almost complete rollout of smart meters (see Exhibit 4). The costs would be high in the first two years because the company would need to assume costs to prepare the company systems for rollout. Moreover, these investments had a depreciation rate of 10 per cent, which was set by the regulator based on the expected lifetime of a meter.

The Challenge

Using the financial information and assumptions, van den Bossche needed to develop a financial planning model that would help him evaluate the smart meter investment program under the different regulatory regimes and assumptions.

Use the accompanying Student Spreadsheet (Ivey product no 7B19N003) to determine whether Eandis should undertake the investment in smart meters under the different regulatory regimes and, if so, under what conditions the investment might be attractive to Eandis’s equity investors. The financial planning model should include a detailed income statement, a cash flow statement, and balance sheets for Eandis.

Exhibit 1: Company Results, 2014 (in € millions, except where indicated)

|  |  |
| --- | --- |
| Regulatory asset base | 5,000 |
| Equity | 2,000 |
| Debt | 3,000 |
| Operating expenses | 250 |
| Depreciation | 220 |
| Cost of equity | 140 |
| Cost of debt | 135 |
| Other costs | 430 |
| Total costs | 1,175 |
| Consumption | 30,000,000 MWh |
| Consumer price for electricity (in €) | €39.17/MWh |

Note: € = euros; MWh = megawatt hours.

Source: Created by the case authors.

Exhibit 2: Business as Usual, 2015–2024 (in percentages, except where indicated)

|  |  |
| --- | --- |
| RAB growth (replacement investments) | €400 million/year |
| Equity (financing new investments) | 40.0 |
| Debt (financing new investments) | 60.0 |
| Interest rate on debt | 4.5 |
| Dividend payout ratio | 90.0 |
| Operating expenses growth | 2.4 |
| Depreciation for new investments | 2.5 |
| Other costs growth | 2.0 |
| Consumption growth | 1.0 |

Note: RAB = regulatory asset base.

Source: Created by the case authors.

Exhibit 3: Parameter Settings for Regulatory Regimes

|  |  |  |
| --- | --- | --- |
| Cost+ | Return on equity | 7.0% |
| Revenue cap | WACC | 5.0% |
| Operating expense cap, 2015 | €256 million |
| Operating expense cap, increase per year | 2.2% |
| Price cap | Price cap, 2015 | €39.9/MWh |
| Price cap, increase per year | 2.0% |

Note: WACC = weighted average cost of capital.

Source: Created by the case authors.

Exhibit 4: Expenditures for the Smart Meter Investment Program

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| --- | --- | --- |
|  | **Capital Expenditures (%)** | **Operational Expenses (**€ **millions)** |
| 2015 | 100 | 0 |
| 2016 | 100 | 0 |
| 2017 | 60 | 2 |
| 2018 | 60 | 3 |
| 2019 | 60 | 6 |
| 2020 | 50 | 9 |
| 2021 | 50 | 12 |
| 2022 | 60 | 16 |
| 2023 | 50 | 19 |
| 2024 | 50 | 22 |
| Depreciation | 10% |  |

Source: Created by the case authors.

1. CVBA designated an organization as a co-operative limited liability company in Belgium. [↑](#footnote-ref-1)
2. “Energy Resources,” Confused About Energy, accessed August 15, 2018, www.confusedaboutenergy.co.uk/index.php/energy-resources; “Energy Consumption in Belgium,” World Data, accessed August 15, 2018, www.worlddata.info/europe/belgium/energy-consumption.php. A watt (W) was a unit of power; a 1W device running for one hour consumed 1 watt per hour (Wh). A modern LED lightbulb running for one hour consumed approximately 5 Wh; a high-speed electrical train consumed approximately 25,000 Wh or 25 kilowatt hours (kWh) per kilometre. In 2015, per capita consumption of electricity in Belgium was 7,207 kWh for a total consumption in Belgium of 81.96 billion kWh, or 8.196 terawatt hours (TWh). [↑](#footnote-ref-2)
3. € = EUR = euro; all currency amounts are in €; the approximate exchange rate at the end of 2014 was €1 = US$1.24861. [↑](#footnote-ref-3)
4. The figures and exhibits are based on Eandis’s performance, but they have been modified for illustration. [↑](#footnote-ref-4)
5. Regulated asset base, also known as rate base, was the value of the investment that the network operator was allowed to earn at a specific rate of return, in accordance with rules set by a regulatory agency. [↑](#footnote-ref-5)