Enterprise & Society (2024), 1–44
doi:10.1017/eso.2024.10

ARTICLE

The Role of Forecasts in Planning for Energy Infrastructure: A Historical Look at Past Futures in Postwar Quebec

Clarence Hatton-Proulx

Forecasts play a central role in the development of energy infrastructure. Since building energy infrastructure is long and costly, energy system planners try to anticipate future demand to avoid both shortages and overcapacity. But energy demand forecasts aren't neutral: they represent a certain vision of the future that forecasters hope to bring into being. This article uses a historical case study to open the black box of forecasting and the world it contains. It studies electricity demand forecasts made by Hydro-Québec, one of the biggest industrial firms in North America, from the 1960s to the 1980s. Based on linear extrapolation models forecasting exponential demand and endless growth, the state-owned firm embarked on huge hydroelectric megaprojects with deep consequences on the environment and Indigenous lands. The energy crisis of the 1970s, by disturbing energy systems, led to criticism from the provincial government and civil society towards Hydro-Québec's bullish forecasts that justified its expansionist agenda. This uncertain context favored other methods of predicting the future, like scenario analysis, and brought scrutiny towards the hydroelectric powerhouse's business. At the crossroads of business history, energy history, and science and technology studies, the article argues that energy forecasts are used by actors like energy suppliers and governments to produce and project power relations onto the future. They become performative when powerful interests coalesce around their vision of the future to implement it.

Keywords: forecasts; Hydro-Québec; energy megaprojects; history of the future

"The future only exists as a present future, the past only as a present past"
-Reinhart Koselleck, 1988 [*2018*][1]

Email: clarencehatton@gmail.com

1. Koselleck, *Sediments of Time.*

Introduction: From Crystal Balls to Regression Models

In March 1979, four French Canadians arrived in California. They were not there to escape the Canadian winter. On behalf of the provincial government of Quebec, Canada, and its public electric utility Hydro-Québec, these state officials went to Menlo Park, a Silicon Valley hotspot,[2] to seek expert advice on the future of energy. They were introduced to the World Energy Model by employees of SRI International, known as the Stanford Research Institute until 1977. Using more than 2,000 math equations and 100,000 data points, this model offered predictions on a wide variety of energy topics, from the evolution of oil prices to the future importance of renewable energy.[3] Mixing econometric analysis with expert input, it offered an outline of tomorrow's global energy industry. For the Quebec delegation, scientific models that included geophysical and economic variables, crunched via cutting-edge Silicon Valley-based computers, were the state of the art. Yet, in a way, this journey resembled the ancestral consultation of oracles, by which perplexed pilgrims paid a visit to convincing diviners sharing prognoses in exchange for remuneration. Econometrics and computer models replaced poultry entrails and crystal balls. American research institutes took over from the Oracle of Delphi. Still, the quest to find order in the face of an open and uncertain future remained.

Energy infrastructure lies at the heart of modern states, providing the basic services that power factories, light streets, and keep houses and offices warm. The power stations, pipelines, and transmission lines that produce and transport energy to users are costly to build and take years to complete. For this reason, the energy sector needs to predict and plan for the future use of its products. Yet this is not an innocent nor removed activity. In doing so, energy forecasters and planners take part in shaping and transforming energy demand, too. This paper studies energy forecasting in the province of Quebec, Canada from the 1960s to the 1980s. It is particularly focused on predictions related to electricity demand. It is attentive to evolutions in forecasting practices at Hydro-Québec, a public monopolistic electric utility reigning over Quebec's massive hydroelectric potential. It also scrutinizes tensions and conflicts concerning electricity demand forecasts stemming both from the provincial government and civil society. It argues that forecasts are deployed to reproduce and extend certain power relations into the future. Actors involved in energy systems use them as coordination devices to embark on expansionist programs. When powerful interests coalesce around a certain vision of the future translated into these models, forecasts become performative. When these interests clash, models are criticized, and their performativity stops.

This argument is nourished by two main strands of research. The first is the critical study of forecasts. In the energy domain, forecasts have long been a decisive tool to determine where and when to invest. Firms, governments, and nonprofit organizations use energy forecasts to predict the evolution of energy supply and demand, energy prices, or the relative share that different energy sources—coal, oil, gas, etc.—will take up in a given energy mix. In retrospect,

2. O'Mara, *The Code.*

3. Guérin et al., *Compte-rendu. World Energy Model. Réunions réunissant des représentants du Stanford Research Institute International (SRI), du gouvernement du Québec et d'Hydro-Québec, tenues les 14, 15 et 16 Mars 1979 à Menlo Park, Californie.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

many of these forecasts have turned out to be incorrect.[4] For example, modelers and geologists have frequently erred in identifying peak oil. They also have tended to underestimate the quantity of oil reserves present in the world.[5] Electricity demand forecasts have also frequently missed the mark.[6] The inaccuracy of forecasts goes beyond the sole domain of energy and extends to water infrastructure[7] and macroeconomics.[8] Yet, if forecasts keep on being formulated despite their inexactitude, it is because they serve other ends. Actors use them to coordinate their actions and stabilize their expectations toward an uncertain future.[9] If their predictions seem orientated toward the future, they aim to bring about changes to the present.

These forms of anticipation can become self-fulfilling prophecies: when actors buy into a certain vision of the future, they align their actions with this vision and bring it into being. Take Moore's Law in microelectronics, according to which the number of transistors on an integrated circuit doubles every two years. It is not a law of physics, but it turned into an organizing principle for this industry and proved right through time.[10] Research in economic sociology and science and technology studies has also insisted on the fact that economic knowledge, like macroeconomic forecasts, shapes the economy, going beyond a mere description of the system from the outside.[11] Following the sociology of expectations applied to technological systems,[12] models and visions of the future of energy and the economy can become performative, leading to infrastructural changes with material consequences on supply and demand.[13] For models to become performative, they need to be used by powerful actors in suitable social contexts. Following these theoretical insights, forecasts are more about shaping the present than guessing the future.[14] By attempting to colonize the future, they play a crucial role in modern attempts to control risk and reduce uncertainty.[15]

These risks and uncertainties were particularly salient in the postwar era that this article focuses on, leading to a proliferation of forecasts after 1945. It was during this period that futurology emerged as a way of thinking about the future, regrouping prospective, scenario

4. Bezdek and Wendling, "A Half Century of Long-Range Energy Forecasts."

5. Bowden, "The Social Construction of Validity in Estimates of US Crude Oil Reserves"; Dennis, "Drilling for Dollars"; Wachtmeister, Henke, and Höök, "Oil Projections in Retrospect."

6. Bernard, Bernard, and Lafrance, "La précision de la prévision de la demande d'électricité par Hydro-Québec."

7. Walker, "A Critical Examination of Models and Projections of Demand in Water Utility Resource Planning in England and Wales."

8. Evans, "Soothsaying or Science?"; Fritsche, Köster, and Lenel, *Futures Past. Economic Forecasting in the 20th and 21st Century.*

9. Lenel, Köster, and Fritsche, "Introduction."

10. MacKenzie, *An Engine, Not a Camera*; Mody, *The Long Arm of Moore's Law.*

11. MacKenzie, "Is Economics Performative?"; MacKenzie, "A Material Political Economy"; Reichmann, "Epistemic Participation."

12. Borup et al., "The Sociology of Expectations in Science and Technology"; Brown and Michael, "A Sociology of Expectations"; Geels and Smit, "Failed Technology Futures"; Konrad et al., "Performing and Governing the Future in Science and Technology."

13. Coutard and Shove, "Infrastructures, Practices and the Dynamics of Demand."

14. Beckert, "Imagined Futures," May 1, 2013; Beckert, *Imagined Futures*, 2016.

15. Daston, "What Is an Insurable Risk? Swiss Re and Atomic Reactor Insurance"; Graber, "Le futur dans l'action. Anticipation savante dans les projets d'alimentation en eau"; Mohun, *Risk. Negotiating Safety in American Society*; Mohun, "Risikogeschichte"; Pietruska, *Looking Forward. Prediction and Uncertainty in Modern America.*

analysis, and forecasting.[16] Following these evolutions, the second strand of research that inspires this article is the political history of the future. Despite the end of World War II, nations were still confronted with multiple existential threats and disasters foretold such as nuclear war and overpopulation. In the Cold War context, institutional actors stemming from the American military–industrial complex played an important role in developing anticipation techniques. Supercomputing and research into nuclear warfare boosted climate modeling.[17] The RAND Corporation developed the Delphi method during the 1950s.[18] This anticipation method amasses the opinions of selected experts evaluating the likelihood of certain events taking place in the future. The results are then adjusted to reflect a majority opinion.[19] The Ford Foundation also delved into energy forecasting, for instance through its Energy Policy Project.[20] As forecasting critic Herman E. Daly argued, in a North American context, these actors looked to offer coherent visions of the future without resorting to socialist central planning.[21] Walt Whitman Rostow's explicitly anticommunist modernization theory, among others, responded to the same objective of proposing an alternative theory of history and future development than what Marxism offered.[22] Multinational corporations like the oil firm Royal Dutch Shell also used scenario forecasting to raise the specter of oil scarcity in the late 1960s.[23]

As these examples show, at least since the Cold War era, the future has been a battleground on which visions of the future, articulated through different forecasting techniques, compete and where power and control are key. Far from being an esoteric practice, futurology has attracted interest, funding, and resources in the singular context of the Cold War—although it was far from a coherent or unified movement.[24] Taking up Daly's criticism, who argued that forecasts reflect the interests of those that produce them, this article shows how energy actors have deployed forecasts to conceal their development strategy behind allegedly objective models detached from the very interests of the actors that formulate them.[25] They have confused the likelihood that a scenario will happen with the desire that it will materialize. This vision of the future has sometimes become performative, and this desire translated into reality.

This article contributes to these two strands of history and science and technology studies (STS) by offering a unique and empirically rich case study.[26] It profits from the retrospective

16. Andersson, "The Great Future Debate and the Struggle for the World"; Andersson and Prat, "Gouverner le « long terme »"; Fressoz, "La « transition énergétique », de l'utopie atomique au déni climatique."

17. Dahan, *Les modèles du futur*; Edwards, *A Vast Machine*; Turnbull, "California's Quandary."

18. Dayé, "How to Train Your Oracle."

19. Rowe and Wright, "The Delphi Technique as a Forecasting Tool."

20. Ford Foundation, *A Time to Choose. America's Energy Future. Final Report by the Energy Policy Project of the Ford Foundation.*

21. Daly, "Energy Demand Forecasting."

22. Rostow, *The Stages of Economic Growth (A Non-Communist Manifesto)*; Andersson, "The Great Future Debate and the Struggle for the World."

23. Andersson, "Ghost in a Shell."

24. Andersson, *The Future of the World*; Connelly et al., "General, I Have Fought Just as Many Nuclear Wars as You Have"; Gewirtz, "The Futurists of Beijing"; Rindzevičiūtė, "A Struggle for the Soviet Future."

25. Daly, "Energy Demand Forecasting."

26. This article is based on a chapter from my PhD thesis: Hatton-Proulx, "Une histoire sociale et matérielle des transitions énergétiques urbaines."

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

Type of forecast	Period of emergence	Actors	Description	Political context	Associated values
Simple linear extrapolation	1950s	-Engineering head office, Hydro-Québec	Calculation of the average variation rate of a variable in a past period and projection of this rate on a selected period in the future	-Trente Glorieuses -Fast economic growth -Consumerism -Hydroelectric nationalism in Quebec	-The future is linear -Growth is infinite -The past is a mirror of the future
Linear extrapolation integrating economic and demographic factors	1960s	-Economic Research department, Hydro-Québec -Energy head office, government of Quebec	Econometric models calculate past evolution of the interaction between economic and demographic variables (GDP growth, household formation, etc.) and project the interaction between these factors (coefficients, elasticity) as observed in the past onto the future	-Trente Glorieuses -Rise of the economy as a governable entity through economics	-The future is determined by the evolution of the economy and population -The interaction between factors in the past will be the same in the future -Economics is the best discipline to determine energy futures
Qualitative scenario analysis	1970s	-GAMMA -Science Council of Canada	Appeal to experts who assess the likelihood that certain events will happen in the future. The results are then adjusted to reflect a majority opinion	-Energy crisis -Uncertain energy future -Future shock	-Expertise takes precedence over quantitative models -The future is open and shapeable -It is possible to select normatively the most desirable future path
Quantitative scenario analysis	1970s	-Engineering head office, Hydro-Québec -Energy head office, government of Quebec	Execution of multiple linear extrapolations that take into account different variations of economic and demographic variables in the future	-Energy crisis -Uncertain energy future -Future shock -Power struggle between Hydro-Québec and the provincial government	-The future is open and shapeable -Quantitative models must inform decision-making regarding different futures -It is possible to select normatively the most desirable future path

Figure 1. The four kinds of energy forecasts produced in postwar Quebec.

Source: Hatton-Proulx, 2023.

gaze that historical analysis allows us to look back over two decades and assess the evolution and effects of forecasts after the fact. This is made possible thanks to exclusive access to archival documents that allow me to open the black box of forecasts to see what influences their production and to go beyond discourses of objectivity produced by forecasters. Documents were sourced from Quebec's national archives and Hydro-Québec's. The article is loosely divided into two historical periods, each roughly corresponding to a vision of the future and a way of predicting it (see Figure 1)—I use vision to refer to a broad set of assumptions about what the energy future will be like and how to work toward it, not as a grand agenda implemented coercively by energy elites. The first historical period, from the end of World War II until the oil shock of 1973, was marked by the *Trente Glorieuses* era, a moment of economic growth, material prosperity, and hope for the future. This period was linked to models of exponential growth for electricity demand, whose most iconic incarnation was the law of electricity demand doubling every decade. Under a tacit agreement with the provincial government targeting capacity growth, Hydro-Québec used standard modeling techniques of the time to plan for and justify major infrastructural expansion programs. Infused with postwar optimism, it sought to boost economic growth, industrial development, consumerism, and hydroelectric nationalism among French Canadians in Quebec through energy system growth.

The second historical period was defined by the energy crisis that started in 1973 and spanned the rest of the decade. The oil shocks of the 1970s led to a deep reflection on the security, price, and finitude of energy supply worldwide. Hydro-Québec felt external and internal pressures to integrate new modeling techniques, such as scenario analysis, by which analysts conceived different plausible future scenarios to then select the most desirable one. While it superficially did, its strong engineering culture, commitment to megaprojects, and financial pressures from bond markets led it to stick to extrapolations to justify system growth, new megaprojects on Indigenous lands, and a projected nuclear energy program. This forecasting agenda and its material implications were vehemently contested by civil society and politicians, taking issue with their environmental, social, political, and economic implications. Environmental groups criticized Hydro-Québec's self-serving forecasts, gigantism, centralization, and obsession with growth. The provincial government understood the dangers of overreach on faraway Indigenous lands and international financial markets. To play on the same field as Hydro-Québec, it produced its own, more moderate, forecasts. As an aside, it is important to stress that Hydro-Québec was not the RAND Corporation; the different forecasting techniques presented throughout this article were never developed in-house but circulated in planning circles.[27] As we will see, the law of doubling demand based on extrapolations came from Électricité de France, and scenario modeling was introduced by Royal Dutch Shell. Following the spirit of the times and the technological apparatus available, they were appropriated by forecasters within the firm to boost its aspirations. This is a case of diffusion, not invention, of business ideas and planning techniques.

Hydro-Québec, the most important forecasting actor in Quebec in terms of energy during the period studied, is this story's main actor. By the 1970s, it was the biggest industrial firm in Quebec and the third-largest utility in North America.[28] As this article shows, Hydro-Québec has tended to propose optimistic narratives of the future through forecasts of exponential electricity demand for both internal reasons—a strong engineering culture geared toward megaprojects—and external—high expectations of industrialization and prosperity placed on its shoulders by a new French-Canadian elite. By following a major industrial firm's forecasting activity and its relationship with outside actors, this article attempts to enrich business history literature by showing the importance of future-making activities for industrial firms. Its main argument is that energy forecasts have been used to project power relations and actor coalitions into the future. They have worked and shaped the future as intended by the people who produced them until the coalition broke down and influential external actors took issue with the models and the world they contained.

Hydroelectric Nationalism and Linear Extrapolations

The province of Québec, home to 6 million inhabitants in 1970, is around three times the size of France and hosts more than a million lakes and streams. Since the late 19th century, it has been an important producer of hydroelectricity.[29] Although Quebec is Canada's hydroelectric powerhouse, it sits alongside other provinces that have profited from Canada's geological and hydrological conditions to make hydroelectricity the main source of electricity generation in the country, putting Canada in the top three largest hydroelectric power generating countries in the world today with important consequences for Indigenous

27. For a study of energy forecasting at the RAND Corporation, see: Turnbull, "California's Quandary."
28. Hydro-Québec, *Financial Highlights.*
29. Bellavance, *Shawinigan Water and Power, 1898-1963. Naissance et déclin d'un groupe industriel au Québec.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

peoples and patterns of energy consumption and industrial development.[30] Until the mid-20th century, most of the hydroelectric capacity in Quebec was owned by English Canadians in a province mostly populated by French Canadians.[31] This started to change in 1944 when the monopolistic utility reigning over Montréal, Quebec's main city, was expropriated by the provincial government and taken over by the newly created Hydro-Québec. In 1963, this crown corporation—owned by the province and tasked with providing electricity at the lowest rates compatible with healthy finances[32]—became the sole owner and administrator of electricity production, transport, and distribution infrastructure in the whole province.[33] The nationalization of the electric sector was one of multiple welfare state reforms enacted during the 1960s that led to this period being called the Quiet Revolution.[34]

It demonstrated the leadership of a new French Canadian ruling class seeking to reign over the province's natural resources, whose extraction up to that point was mostly left to English Canadian and American capital. This new elite lamented Quebec's economic backwardness compared to its prosperous neighbors, the province of Ontario and the United States, both boasting higher standards of living and productivity.[35] It saw in Hydro-Québec a potential industrial catalyst in attracting more extractive industries dependent upon cheap energy, such as pulp and paper, aluminum, and metals. By uniformizing rates over the province—which were known to vary widely under private ownership—it also placed high hopes in electricity's potential to develop far-flung regions of the province and bring about equality between different populations and places.[36]

Suffice it to say that huge expectations were placed on Hydro-Québec's shoulders. In the immediate postwar era, it was to accelerate industrialization and economic growth, increase equality between constituents, bring about material comfort, and celebrate Francophone independence and prowess. Politicians and engineers then believed in what historians Nina Möllers and Karin Zachmann have coined the energy–civilization equation: the belief that civilizational advancement and economic growth are tied to energy consumption.[37] For instance, Hydro-Québec's director of Economic Research classified countries' industrial advancement by their energy consumption per capita.[38] This measure became a proxy for economic prosperity, industrial prominence, and high standards of living. In short, the province's industrialization and economic growth depended on an abundant and cheap supply of

30. For important work on the history of the hydroelectric sector in Canada, see: Armstrong and Nelles, *Monopoly's Moment*; Sandwell, *Powering Up Canada*; Evenden, *Allied Power*; Macfarlane and Watson, "Hydro Democracy"; Macfarlane, *Fixing Niagara Falls*; Martin and Hoffman, *Power Struggles*; Froschauer, *White Gold*; Luby, *Dammed.*

31. Hogue, Bolduc, and Larouche, *Quebec.*

32. Assemblée législative du Québec, *Chapitre 86. Loi d'Hydro-Québec.*

33. Save for a few municipalities and private producers, notably the Aluminum Company of Canada (Alcan).

34. This historical label is rightfully contested for its lack of nuance, but this historiographical debate is beyond the scope of this paper. See Linteau, 1999.

35. Sarra-Bournet, "L'économie du Québec et le modèle libéral duplessiste dans une perspective comparée."

36. Zins, *Le rôle de l'Hydro-Québec dans l'aménagement régional.*

37. Möllers and Zachmann, *Past and Present Energy Societies.*

38. Hydro-Québec, "Entre-Nous," 1970.

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

energy. Hydro-Québec, sitting on a monopoly of the only modern energy source in Québec—devoid of coal, gas, and oil deposits—was responsible for the province's economic development. It was to profit from the province's abundant water resources to turn them into productive forces for its population.[39] To carry out this mission, it needed to plan and predict the future.

Such a mission required careful attention and planning. It typically takes from 8 to 20 years for a hydroelectric project to be completed. In this context, the official purpose of electricity demand forecasts is to assess the worth of building a new dam or not; if forecasts predict rising demand that surpasses current capacity, then they justify new energy projects. In the early 1960s, as the electric sector in Québec was integrated by the state into the monopolistic Hydro-Québec, linear extrapolation was the dominant forecasting method. It started by selecting a historical period deemed representative of present and future dynamics. It then determined the annual variation rate of a variable, such as electricity demand, in the form of a percentage. Finally, it applied this variation rate over a projected period in the future (see Figure 3).[40] This straightforward forecasting method was typical of the *Trente Glorieuses* era. After the Great Depression of the 1930s and World War II, Western states achieved high economic growth and material prosperity.[41] This Great Acceleration was facilitated by the exponential extraction of fossil fuels and the widespread consumption of electricity,[42] allowing households to extend their consumption of energy-hungry goods and services.[43] In Québec, for instance, real wages increased by 37% during the 1950s,[44] demonstrating a newfound prosperity that translated into more energy-intensive lifestyles. Between 1944 and 1964, Hydro-Québec's customers multiplied their average annual electricity consumption by six, as electricity rates were divided by two.[45]

Witnessing these trends, Hydro-Québec's planners based their development strategy on a law according to which electricity demand doubles every decade. This formula was devised by engineers at Électricité de France, the French equivalent to Hydro-Québec, soon after the end of World War II. Comparing annual electricity demand growth rates in 20 different countries, they observed that most were around 7%, which translated into a doubling of demand every ten years.[46] This law became a potent formula at Électricité de France during the 1950s and 1960s. It was adopted by its administrators and shared by the Commissariat général au Plan, the French institute tasked with planning and advising the central government over economic development.[47] It appeared in Hydro-Québec's 1962

39. Schmidt, *Water.*

40. Caron and Delavelle, *Prévision de la consommation énergétique à long terme au Québec, 1975-1990 : Méthode de régression tendancielle.*

41. Boismenu, *Les Trente Glorieuses au Canada*; Fourastié, *Les Trente Glorieuses ou la révolution invisible.*

42. McNeill and Engelke, *The Great Acceleration.*

43. Cohen, *A Consumers' Republic.*

44. Saint-Pierre, *Histoire de l'assurance de personnes. Des sociétés de secours mutuels aux grandes institutions d'assurance.*

45. Hydro-Québec, "Entre-Nous," 1964.

46. Berrier-Lucas, "Émergence de la dimension environnementale de la RSE"; Yon, "Building a National Machine: The Pricing of Electricity in Postwar France."

47. Aykut, "Reassembling Energy Policy."

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

annual report[48] and was cited by executives in public speeches and subsequent annual reports.[49] After the expropriation of multiple private companies and the merging of their operations under one banner, this law and the idea of exponential demand became a guiding principle at Hydro-Québec. Together, they helped the different divisions coalesce around a common goal: that of meeting an exponential demand by increasing capacity. Based on this principle, Hydro-Québec launched its first megaproject during the 1960s: the Manic-Outardes hydroelectric complex of seven power stations along the Manicouagan and Outardes rivers around 600 kilometers from Montréal.

At first, Hydro-Québec's forecasting activity was limited. In the early 1960s, two of its economists lamented the lack of a real service dedicated to energy forecasts that would employ both engineers and economists. The absence of such a department could "be a cause for delay in the race for the province's economic development."[50] Pressures like these led to the creation of a planning department in the mid-1960s. In 1967, it published a report predicting supply and demand until 1982.[51] This report was the first global and detailed forecast conducted by the crown corporation. Previous forecasts were either very general—the law of doubling demand—or too local in their scope, divided into different divisions inherited from private firms expropriated in 1963. This 1967 report compiled peak loads and monthly consumption since 1951 for all nationalized firms and spanned the whole province. Thanks to number crunching provided by an IBM 1410 supercomputer, it concluded that demand did conform to an exponential law, using a simple linear extrapolation model.

This was the first of many such annual reports produced by engineers from the Planning Department, which reported back to the Engineering head office. Their estimation of annual electricity demand growth over the next 15 years oscillated between 7.6% and 7.85% depending on the year of publication (see Figure 7). The aim of these reports was to inform the firm's production equipment program by identifying potential mismatches between production capacity and future demand. They influenced decision-makers at Hydro-Québec in launching new projects to increase production. For instance, the following year's report in 1968 expressed fear that power deficits might manifest themselves the next winter because of delays in the construction of Outardes 3 and 4 hydroelectric stations.[52] Without a new supply expansion program, these deficits would only grow, reaching up to 2,500 MW per year by the end of the 1970s, equivalent to almost a third of Hydro-Québec's total installed capacity of 1968 (see Figure 2). For Hydro-Québec's planners, the solution to avoid these announced shortages was to develop a nuclear energy program, a topic I will come to. Robert-A. Boyd, the crown corporation's chief executive, expressed this turn to nuclear power by appealing to the law of doubling demand every decade at the end of the 1960s.[53]

48. Hydro-Québec, *Rapport Annuel 1962.*

49. Baribeau, *À la recherche d'énergie. Conférence.*

50. Zins and Labrie, *Projet de mise sur pied d'un service de recherche économique à l'Hydro-Québec*, 5.

51. Direction de la Planification, *Prévision de la demande ferme et de la production du réseau intégré. 1967-68 à 1981-82.*

52. Direction de la Planification, Fontaine, and Désilets, *Prévision de la demande du réseau intégré. 1968-69 à 1982-83.*

53. Hydro-Québec, "Entre-Nous," 1969.

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

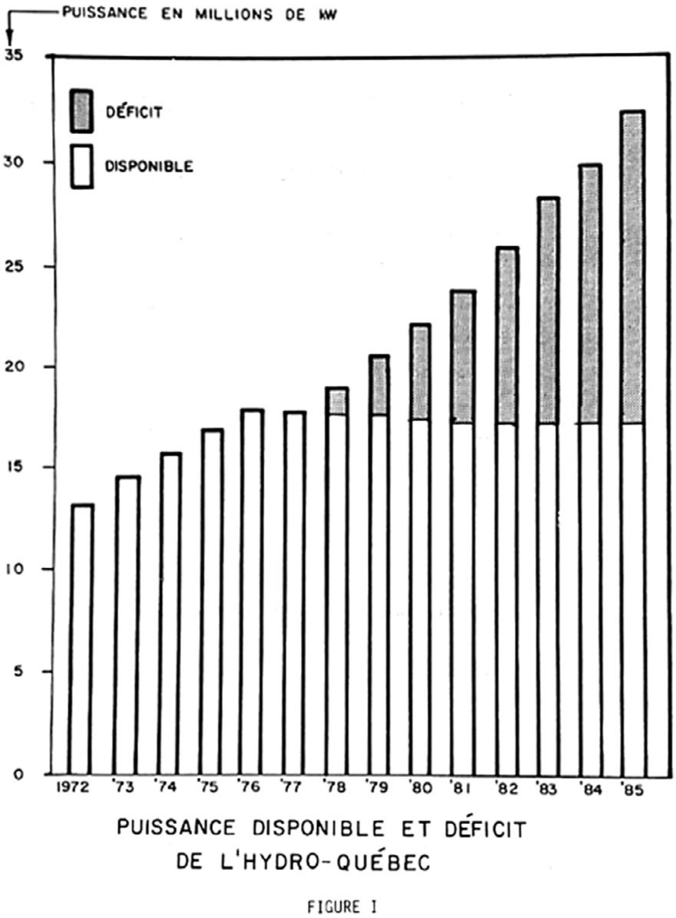

Figure 2. Forecast of available electricity capacity at Hydro-Québec between 1972 and 1985. White indicates the infrastructure currently under construction until 1977. Gray indicates the deficit between currently planned infrastructure and projected demand.

Source: Évolution et prévision des besoins d'électricité au Québec, Hydro-Québec, Archives d'Hydro-Québec, 1973. Used with permission.

Economists were also involved in forecasting at Hydro-Québec. The Economic Research Department created in 1963 mobilized econometrics to produce forecasts that used economic theory and statistical techniques.[54] These forecasts integrated economic variables like gross domestic product (GDP) growth, since more economic activity means more goods are produced in electricity-powered factories, more electricity-heated homes are built, and so on.[55]

54. Hydro-Québec, "Hydro-Presse," 1971.

55. Service de l'Information and Direction Relations publiques, *La prévision de la demande d'électricité au Québec, 1976-2000.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

They also considered the weight of demographic growth over electricity demand, tracking the evolution of population growth and household formation. Between 1962 and 1973, the population of Quebec grew by 25% and the number of its households by 58%.[56] The baby boom explains this gap: postwar teenagers departed the family household younger, and multigenerational households were less prevalent.[57] This impressive growth in household formation played a role in rising electricity demand.

Technology adoption factors were also reflected in some models, which assumed that new electrical technologies would be invented and adopted at the same rhythm in the future as in the past.[58] A citation from Hydro-Québec's internal journal summarized the effects that these trends have on demand: "When a couple is formed and moves into a new house, half-a-dozen electrical devices add right-away to the network. When their income rises, it's another device that increases demand."[59] Economists from the Economic Research Department criticized "naive" forecasting models that started from the hypothesis that the past was the mirror of the future to then deploy simplistic linear extrapolation models.[60] They preferred explicative models that considered the weight of economic and demographic factors on future electricity demand. Without naming them directly, they took aim at the forecasts formulated by engineers from the Planning Department. They seemed to lament the fact that Hydro-Québec's expansion program was based on these techniques, and not on their more refined econometric models of anticipation, in the context of the growing importance of economics for decision-making.[61]

Despite those disagreements, since both naive and explicative models projected past tendencies over the future, both economists and engineers were equally bullish about the future of electricity demand because the past that they integrated into their models was that of the prosperous *Trente Glorieuses.* And, in retrospect, they have turned out to be quite accurate. For example, actual annual electricity demand growth between 1965 and 1975 on Hydro-Québec's network was 7,9%, surpassing the 7.74% projected by the Planning Department in 1967 (see Figure 8). Based on these forecasts, Hydro-Québec's executives embarked on two hydroelectric megaprojects in postwar years. These megaprojects' social and environmental consequences have been studied copiously.[62] Still, it is necessary to mention them briefly, even if only to evidence the very real material consequences of forecasts on Indigenous peoples and ecosystems.

56. Hydro-Québec, *Évolution et prévision des besoins d'électricité au Québec.*

57. Fahrni, *Of Kith and Kin.*

58. Bátiz-Lazo, Haigh, and Stearns, "How the Future Shaped the Past"; Dunn, Durand, and Poirier, *Prévision de la consommation d'électricité au Québec pour le secteur domestique et agricole. Étude par usages.*

59. Hydro-Québec, *Évolution et prévision des besoins d'électricité au Québec*, 9. All quotes are translated from French by the author.

60. Durand and Poirier, *Considérations générales sur la prévision. Les Objets de la prévision.*

61. Missemer, *Les économistes et la fin des énergies fossiles*; Mitchell, "Carbon Democracy."

62. Bélanger and Comeau, *Hydro-Québec. Autres temps, autres défis*; Caron, "De Manic-Outardes à La Baie James"; Desbiens, "Un nouveau chemin vers les rapides. Chisasibi/La Grande et les relations nord-sud au Québec"; Desbiens, *Power from the North*; Gagnon and Gingras, "La baie James"; Maxwell et al., "Locked on Course: Hydro-Québec's Commitment to Mega-Projects"; Roy, "Le groupe SDBJ et le développement du Nord au cours du projet de la Baie-James (1971-1984)"; Savard, *Hydro-Québec et l'Etat québécois.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

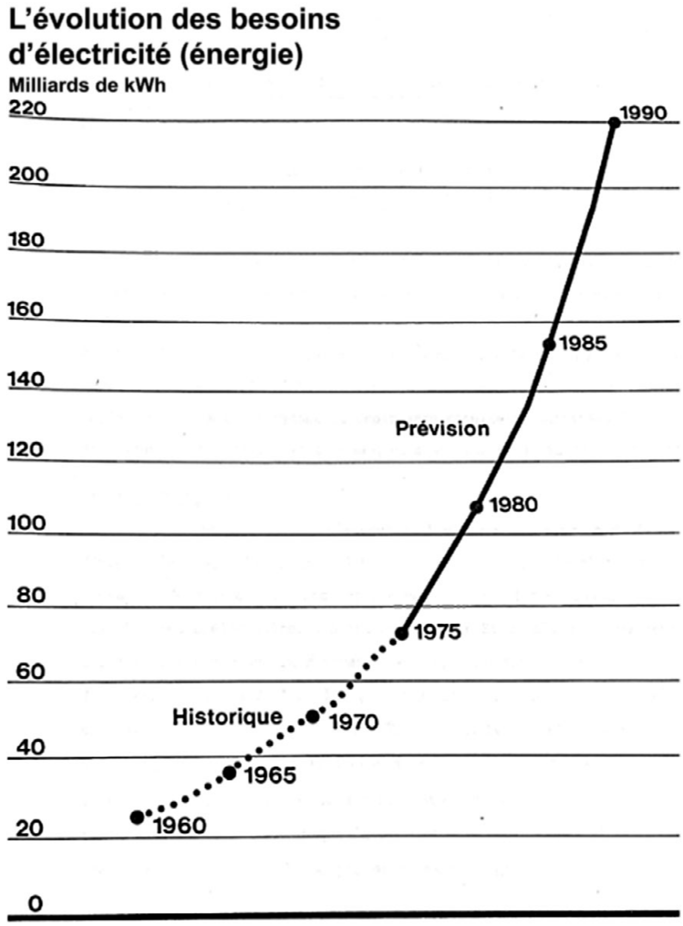

Figure 3. Graph representing the historical evolution of electricity demand (dotted line) and a linear extrapolation forecast of future demand (solid line).

Source: Dossier argumentaire sur l'Hydro-Québec, Division Relations Collectivités, Service de l'information et Direction Relations Publiques, Archives d'Hydro-Québec, 1977. Used with permission.

Based on exponential growth forecasts and optimistic visions of the future, Hydro-Québec's hydroelectric adventurism has shaped Québec's political and material history, confirming the connection between the ideal and the material worlds.[63] Manic-Outardes, the defining project of the 1960s, has led to the construction of seven hydroelectric power stations around 600 kilometers northeast of Montréal (see Figure 4). This huge technological intervention has broken the ecological equilibrium of the Manicouagan reservoir by flooding large parts of the region. It has devastated the traditional hunting and fishing grounds of the Innu, an Indigenous nation present in the area for 7,000 years.[64] Their ancestral way of life has been upended, a

63. Lipartito, "Reassembling the Economic."
64. Nadeau, "Barrage Daniel-Johnson: Pas de quoi fêter selon les Innus."

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

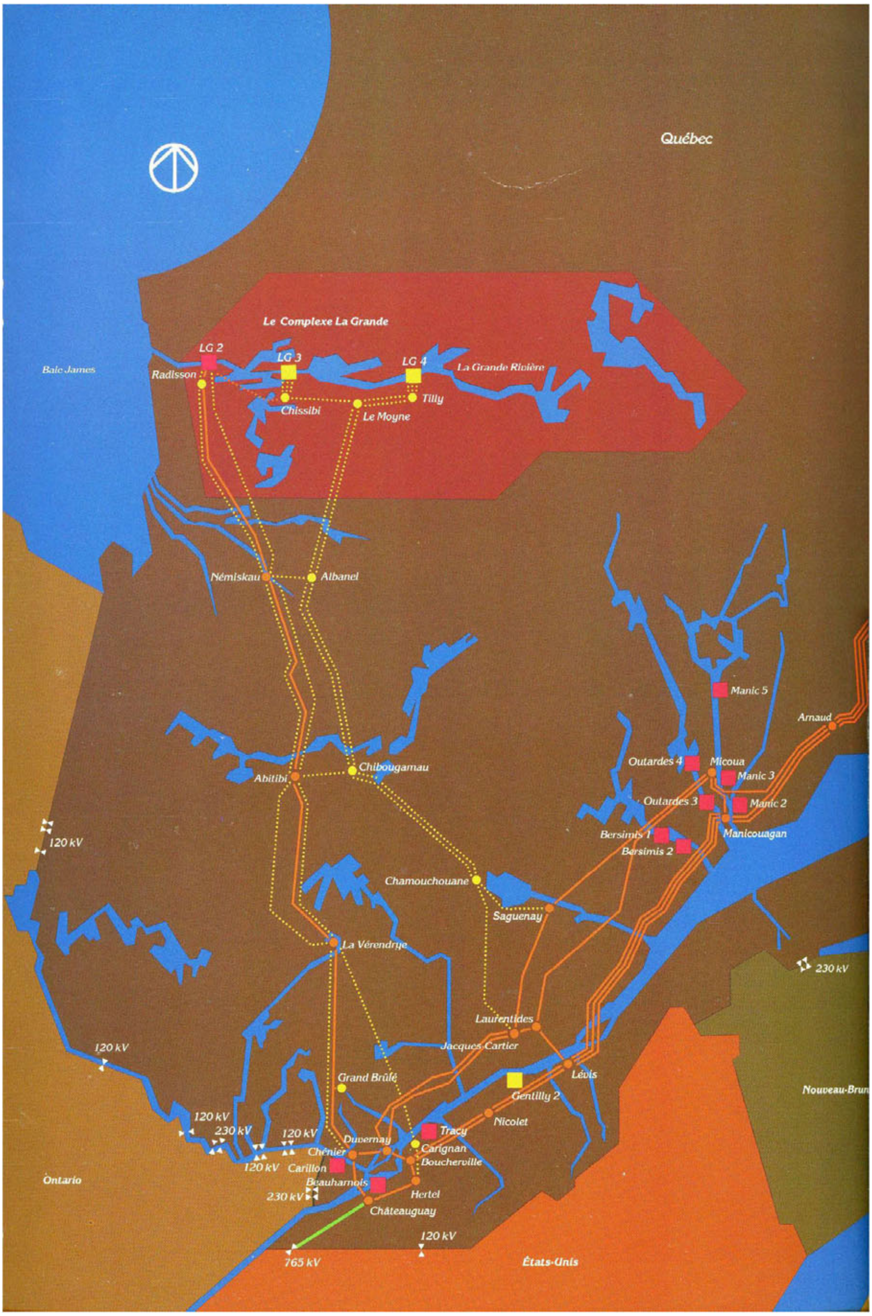

Figure 4. Map showing Hydro-Québec's network in 1979. The province of Québec is dark brown, Ontario light brown, New Brunswick green, and the United States orange. The area of the James Bay project is in red. The Manic-Outardes project is in the center-right of the map. Transmission lines are in orange (already built) and dotted yellow (to be built). Power stations with an installed capacity over 500 MW are indicated by red squares (already built) and yellow squares (under construction). Orange dots indicate major transmission substations.

Source: Annual Report, Hydro-Québec, Archives d'Hydro-Québec, 1979. Used with permission.

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

phenomenon made worse by the forced enrollment of Innu children in colonial residential schools tasked with assimilating them into Euro-Canadian culture.[65] The Innu have only obtained a derisory $150,000 compensation in 1965 for the troubles caused by Québécois hydroelectric adventurism.[66]

Even larger in scale, the second hydroelectric megaproject based on optimistic growth forecasts is situated more than 1,000 kilometers north of Montréal in the James Bay region. Launched in 1970 after being a major electoral promise of Liberal Prime Minister of Quebec Robert Bourassa, it is composed of 11 hydroelectric power stations built over four decades in a territory of more than 200,000 square kilometers (see Figure 4). Its main power station, La Grande-2, is the biggest hydroelectric power plant in Canada and the 12th largest in the world. Inhabited by the Cree (*Eeyou*) Indigenous nation, this land has been completely remade by human interventions, as three rivers were diverted to fill huge reservoirs, flooding over 13,000 square kilometers of land equivalent to 26 times the surface of the island of Montréal. The Cree have been able to negotiate more generous compensation with the provincial government but the social and environmental consequences of this second megaproject are damning.[67] This case is one of many examples of unilateral appropriation of Indigenous land for urban and industrial expansion.[68] This short aside, although insufficient, reminds us that forecasts and future-making activities can have tremendous social and material consequences when they become performative.

The Energy Crisis and the Scenario Method

In the 1970s, the vision that underpinned these projects and the forecasts that justified them was upset. After the end of the war, the 1950s and 1960s seemed to inaugurate an era of endless economic growth predicated upon booming energy production and consumption. In these exceptional times of abundance, the future started to be understood as promising, and growth as plannable, regular, and infinite.[69] This view of the future fitted well with linear extrapolation models of electricity demand widely adopted by Hydro-Québec to justify its hydroelectric expansion, based on the belief reified as a law that demand would double every ten years, or even less. Yet, a few trends came to trouble this conception of the future. The emergence of pollution as a public problem during the 1960s was accompanied by a newfound recognition that human activities had consequences on the climate and ecosystems. This came to engender criticisms of industrial modes of production and consumerism.[70] Questions of pollution

65. Massell, *Quebec Hydropolitics.*

66. Binette, "La Cour Suprême et Manic 5."

67. Maraud and Desbiens, "Eeyou Istchee – Baie James, vers un capital environnemental mixte ?"; Maxwell et al., "Locked on Course: Hydro-Québec's Commitment to Mega-Projects"; Radu, House, and Pashagumskum, "Land, Life, and Knowledge in Chisasibi: Intergenerational Healing in the Bush."

68. White, *The Organic Machine*; Desbiens, "Appreciating difference?"; Luby, *Dammed*; Needham, *Power Lines.*

69. Groupe de travail no. 12, *Étude du plan d'expansion. Rapport du groupe no. 12 des études à long terme-Programme d'équipement.*

70. Frioux, *Une France en transition*; Pessis, Topçu, and Bonneuil, *Une autre histoire des « Trente Glorieuses »*; Rome, *The Bulldozer in the Countryside.*

arose internally at Hydro-Québec in the late 1960s. A few years later, the publication of the Limits to Growth report by the Club of Rome attracted attention inside the firm.[71] This article published by Hydro-Québec's internal journal on the report deserves to be quoted at length:

> "Everyone seemed to agree, at least since the last war, on the following point: at the root of progress—both of man and society—lies economic progress, GDP growth. […] Reconciling ideologies, races, and nations, growth had become the religion of the century. Production and productivity were its dogmas; competition and statistics its sacraments. And now a few punch card maniacs announce that all leaders, whether capitalists or communists, are barking up the wrong tree. They in face lead us towards famine, unbearable social tensions, and definitive economic crisis."[72]

The article's sarcastic tone expressed an unfavorable view of the Meadows report for it clashed with Hydro-Québec's expansion agenda and view of the future. Yet, the following year's oil shock brought about deeper reflections on the province's energy path. Around the world, oil prices shot up, slowing down demand for energy and causing recessions in 1974–1975, as the specter of shortages and even privation loomed large.[73] The crisis imposed energy as an umbrella concept in public debate, no longer split into different fuels.[74] It disrupted the vision of the future as linear and plannable as foretold by linear extrapolation models, with important consequences on financial markets.[75] Responding to a shifting social, political, environmental, and economic context, these were met with criticism both internally and externally. As soon as 1965, an annotation in an internal forecasting document at Hydro-Québec calculating demand by linear extrapolation until 2001 read as such: "Astronomical numbers. IMPOSSIBLE. […] The curve indicates no tendency to reach a certain plateau."[76]

Right after the first oil shock, an economist from its Economic Research Department criticized Hydro-Québec's demand forecasts for they did not incorporate the relative prices of other energy sources, nor the effects of inflation, which galloped during the 1970s in part because of rising energy prices.[77] Externally, linear extrapolation models were also denounced during the 1970s. In the middle of the decade, a group of university professors—mostly economists—based in Montréal formed the GAMMA research group. Producing reports on the future of industrialized nations commissioned by different ministries at the provincial and federal levels and the United Nations, it found fault in linear extrapolations. First, there was no consensus on the length of the historical period over which

71. Meadows et al., *The Limits to Growth.*

72. Hydro-Québec, "Hydro-Presse," 1972, 7.

73. Lévesque, "Les responsables politiques du Québec face au choc pétrolier de 1973"; Jacobs, *Panic at the Pump*; Lifset, "A New Understanding of the American Energy Crisis of the 1970s"; Bösch and Graf, "Reaktionen Auf Antizipationen. Energiekrisen Und Energiepolitik in Den 1970er Jahren. Eine EinführungReacting to Anticipations"; Levinson, *An Extraordinary Time.*

74. Trentmann, "Getting to Grips with Energy: Fuel, Materiality and Daily Life"; Turnbull, "'No Solution to the Immediate Crisis.'"

75. Wellum, "Energizing Finance."

76. Huot, *Demande en pointe et énergie de l'Hydro-Québec pour les années 1963-64 à 2000-01.*

77. Durand, *Critique du modèle économétrique de prévision de la demande de la direction Recherche économique.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

variables were calculated to then be projected onto the future. This left latitude to the forecaster to select a period that would tell the story they wanted based on the future they saw as most desirable.[78]

Further, the annual variation rate projected over many years, if not decades, was supposed a linear trend that evacuated acceleration or deceleration in the pace of change. For members of the GAMMA group, linear extrapolation models "add mathematical illusion to the illusion of precedent."[79] They took issue with the underlying assumption of extrapolations, according to which the past spells out the future: "If this were true, scientific research could be carried out with a hand calculator."[80] Moreover, if real electricity rates fell during the postwar era, particularly after the 1963 nationalization, they began to wind upward in the early 1970s.[81] These trends and actors started to question the upward linearity of electricity consumption during the 1970s. Forecasters at Hydro-Québec thus turned to methods of anticipating the future that could accommodate for uncertainty and risk, brought back to the fore by the oil shock of 1973. Beyond the time horizon of 10 years, they started to use explicative models, expert advice, and the scenario method.[82]

More qualitative methods allowed them to consider the future influence of trends that were harder to quantify. Those could be political or social, such as antipollution or energy efficiency measures, which started to gain prominence during that decade.[83] These trends pushed the firm into creating three new divisions concerned with environmental topics: the Committee for the Protection of the Environment in 1970, the Environment Department in 1973, and the Guidance Committee for Network Implantation Practices in 1975—the latter tasked with improving relations with local communities affected by new power lines.[84] Employees from the Environment Department, including trained ecologists, attempted to alert engineers from the Planning Department to the novel social pressures that constrained Hydro-Québec's activities. In a 1977 report, they leaned on scientific literature to show how the province's natural resources were vulnerable to growing human intervention.[85] They argued that, if the crown corporation was to maintain its dominant position and positive image, it had to raise public awareness of the risks of growing electricity demand. It also had to encourage users to question their consumption practices to manage peak demand and reduce general electricity consumption in the long run. This was not a benign position to hold within a growth-oriented firm like Hydro-Québec.

Interest in the scenario method was linked with futurology. Emerging in the Cold War context, this heterogeneous approach sought to present possible scenarios for the future of a

78. Valaskakis, "Prospective, rétrospective et perspective."

79. Jouandet-Bernadat, *La notion de prospective*, 4.

80. Faculty of Graduate Studies and Research, *Report of the McGill Advisory Committee to the Executive Committee*, 5.

81. Direction de l'Environnement, *Éléments d'analyse du contexte futur de la mission principale de l'Hydro-Québec : L'électricité.*

82. Durand and Poirier, *Considérations générales sur la prévision. Les objets de la prévision.*

83. Dunlop, "Energy Efficiency"; Hydro-Québec, "Hydro-Presse," 1973.

84. Known in French as the Comité d'orientation des pratiques d'implantation des réseaux.

85. Direction de l'Environnement, *Éléments d'analyse du contexte futur de la mission principale de l'Hydro-Québec : L'électricité.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

certain issue to inform decision-making.[86] As mentioned earlier, the GAMMA group was an important actor in the field of futurology in the Canadian context. To make the case for the importance of futurology and prospective, it referenced the future shock theory developed by American writer Alvin Toffler—associated with futurism writ large but disconnected from the expert kind of futurology that came out of places like RAND and the Hudson Institute—according to which technological innovations accelerated social and economic change.[87] To reduce the future shock and anticipate abrupt change, states and businesses needed to acquire robust prospective capacities.[88] The GAMMA group offered such services, prioritizing qualitative methods to imagine potential futures for topics ranging from telecommunications to international development.[89] The crux of its work centered around the conserver society concept. Funded by the federal government of Canada, it carried out a Delphi exercise over multiple months with federal state officials to produce five growth scenarios for Canada.

The final report, quite normative, condemned consumerism and suggested replacing it with a conserver society, made of more efficient production processes and sobriety in consumption.[90] Futurologists partly embraced normativity, since they insisted on the plurality of futures that existed and on the capacity of planners to handpick a future over another. An Environment Canada report on the future of energy explained that "while limited to only one past and one present, the human race faces a multiplicity of potential futures. […] All such futures are possible and, therefore, realistic."[91] Actors mobilizing futurology, including the Science Council of Canada, were influenced by counter-cultural intellectuals like Ivan Illich and E. F. Schumacher who criticized Western technocracy and advocated for small-scale and decentralized technological and energy systems.[92] After having consulted experts, futurologists drew out qualitative scenarios and insisted on the openness of the future. Planners and decision-makers could then select the most desirable scenario and implement it.

Futurology percolated at Hydro-Québec, although, as we will see, its actual influence over infrastructure planning turned out to be meager. In the early 1970s, the president of its environmental protection service attended a conference organized by the Hudson Institute, presented as the world's most prominent futurology organization.[93] Forecasters integrated some aspects of the scenario method. Take a report published by the Economic Research Department in 1976.[94] It started by noting the recent slowdown in energy demand growth

86. For a full history of futurology, see Andersson, *The Future of the World.*

87. Toffler, *Future Shock.*

88. Groupe interuniversitaire pour une prospective québécoise, *Prospective du système socio-économique québécois. Projet de recherche visant à l'identification d'avenirs alternatifs du Québec à l'horizon 1995.*

89. Groupe associé Montréal, McGill pour l'étude de l'avenir, *Activities Report 1974-1978.*

90. Valaskakis, Sindell, and Smith, *La Société de conservation sélective. Volume 1. Rapport-synthèse. Seconde phase. Projet de la société de conservation.*

91. Sewell and Foster, *Images of Canadian Futures: The Role of Conservation and Renewable Energy*, 1–2.

92. Illich, *Energy and Equity*; Schumacher, *Small Is Beautiful: A Study of Economics As If People Mattered.* For analysis of their work, see: Leonard, "E. F. Schumacher and the Making of 'Buddhist Economics,' 1950-1973"; Boyle, "Rethinking Energy Studies." On their popularity in Canadian countercultural environmental movements, see: Coates, *Canadian Countercultures and the Environment.*

93. Hydro-Québec, "Hydro-Presse," 1972.

94. Bolullo et al., *Analyse globale de l'environnement énergétique du Québec, 1975-2000.*

since 1970. It spoke of a pessimistic forecasting environment, using the Meadows report on limits to growth as an example. Considering these uncertainties, it reckoned that economic growth would slow down in industrialized countries because of a deceleration in demographic growth and productivity gains. The report then proposed three scenarios for the future of electricity demand in Quebec until 2000, each associated with an annual growth percentage: slow growth at 7%, medium growth at 7.75%, and high growth at 8.5%. It was then up to Hydro-Québec's executives to pick the more desirable scenario.

The scenario method as well as some aspects of futurology—a newfound consideration for risk and for the ability of planners to pick and choose between different futures—started permeating Hydro-Québec, under newfound social and environmental pressures. However, within the walls of this energy juggernaut, old methods were tenacious. The Engineering head office still based its production expansion program on linear extrapolations produced by the Planning Department. The mean annual growth rate for electricity demand forecast by this department stayed relatively stable during the 1970s, even after the oil shock. In its 1977 demand forecast report, it recognized the growing criticism leveled against its extrapolation forecasting method and its material implications.[95] It retorted that its results had been highly satisfactory in the past. Between 1951 and 1975, the actual annual electricity demand growth rate of Quebec fluctuated between 7.7% and 8% on average due to the extension of its network but also to effective demand growth per household. So, forecasts of 7.75% annual growth were about right. Further, engineers from the Planning Department found fault in explicative and qualitative methods. They criticized their lack of mathematical precision and their inability to apprehend energy systems in their globality.[96]

It was based on these forecasts that the state-owned firm launched into the James Bay megaproject of the 1970s. Hydro-Québec, guided by its *Trente Glorieuses* optimism, turned to nuclear energy production in its long-term expansion program. It started exploring this fashionable avenue by building Gentilly-1 in 1967, a nuclear power station located 100 kilometers northeast of Montreal. Despite the relative failure of this endeavor, the crown corporation still wanted to bet on nuclear power during the 1970s. In 1976, based on linear extrapolations, it estimated that nuclear-powered electricity would be necessary as soon as 1985 and that by 2000 it would overtake hydroelectricity by importance.[97] The oil crisis reinforced the belief at Hydro-Québec that hydraulic energy and nuclear electricity were better than petroleum, a resource absent from the province's soil, whose reserves were whittling globally and whose import was subject to geopolitical tensions and required the use of foreign currency. The firm's engineers attempted to electrify heating; a crucial energy service predominantly provided by oil in the cold province. For this reason, if they estimated that energy demand in general would slow down, they saw electricity demand growth as similar or even more impressive than in the past.[98]

95. Direction de la Planification et al., *Prévision de La Demande. 1977-78 à 1991-92*.

96. Direction de la Planification, *L'incertitude de l'évolution de la demande d'électricité et ses effets sur la planification des équipements.*

97. Hydro-Québec, "Hydro-Presse," 1976.

98. Service de l'Information and Direction Relations publiques, *La prévision de la demande d'électricité au Québec, 1976-2000.*

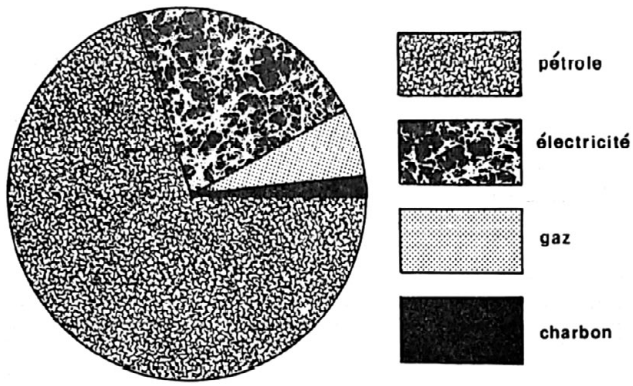

Figure 5. Quebec's energy mix in the mid-1970s.

Source: Bilan énergétique du Québec (1958-1974), Pellegrin, Bibliothèque et Archives nationales du Québec, 1974. Used with permission.

Planning for a Nuclear Future

Hydro-Québec's representatives pushed this agenda at the 1977 Parliamentary Commission on Energy convoked by the Parti Québécois.[99] The previous year, this left-of-center French Canadian nationalist party was elected. It promised to hold a referendum on the independence of Quebec from Canada. One month after the elections, Prime Minister René Lévesque—a key supporter of nationalization as minister of Natural Resources in the early 1960s—named a minister delegate of Energy, Guy Joron. Responsible for Hydro-Québec at the National Assembly of Quebec and at the council of ministers, he convened a parliamentary commission tasked with studying the future of energy in Quebec. In the context of the energy crisis, the government was preoccupied with oil's dominance in the province's energy mix, representing around 70% of all energy used in 1974 (see Figure 5). For the Parti Québécois, Quebec needed to become a country. If it was to do so, it had to secure a safe energy supply. And, to ensure energy sovereignty, it had to free itself from oil, imported both from overseas and from the western Canadian province of Alberta.

At the commission, vice-president Robert-A. Boyd presented Hydro-Québec's plans for the province's energy future.[100] They were based on work conducted internally the previous year by a dozen working groups put in place to analyze the firm's equipment program.[101] Boyd, mobilizing their conclusions, distinguished between two forecasting horizons. The horizon from 1977 to 1985 was easily predictable, defined by an annual electricity demand growth rate of 7.75%. This corresponded to the figure pushed by the Planning Department since the start of its annual forecasts for electricity demand in the mid-1960s. The horizon between 1985 and 2000 was fuzzier. Since uncertainty was higher, the crown corporation introduced three

99. For scholarship on a similar endeavor in the neighbouring province of Ontario, see Conway, 2014.

100. Boyd, *Recommandations de l'Hydro-Québec pour une politique énergétique québécoise.*

101. Groupe de travail no. 12, *Étude du plan d'expansion. Rapport du groupe no. 12 des études à long terme-Programme d'équipement.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

different scenarios responding to either slow, medium, or high economic growth, which influenced the evolution of electricity demand. Following these three scenarios, the average annual electricity demand growth rate would be 4.6%, 6%, or 7.5% (see Figure 6). It then prioritized the most optimistic scenario of 7.5% yearly growth. Its objective was to increase the share of electricity in Quebec's energy mix from 22% in 1974 to 45% in 2000. However, hydroelectric sources at an economically viable distance from consumption centers would not suffice to meet the exponential demand of the 7.5% scenario.

For this reason, Quebec had to gradually turn nuclear: this source would make up 9% of its electricity mix in 1985 to reach 33% in 2000. For Hydro-Québec's engineers, this energy source was the most reliable after hydroelectricity. They saw renewable energy sources such as solar and wind as not marketable yet and needing more research and development.[102] Since Quebec's subsoil was deprived of hydrocarbons, nuclear was the most viable way to generate electricity. This appetite for nuclear energy can be explained by different factors.[103] First, it was in the spirit of the times. Technological elites saw it as the energy of the future. They feared an expertise lag if Quebec were to pass on this opportunity. Further, Hydro-Québec's engineers sensed that, if demand continued to expand exponentially, hydroelectric reserves would meet a breaking point.[104] Over 15,000 MW of hydraulic energy exploited, they would have to harness the only watershed yet untouched by the company's activities, at Ungava, and would modify the last great rivers of Quebec's North. The closer they came to exploiting all the province's watercourses, the more cumulative effects on biology and hydrology were likely to lead to dangerous environmental thresholds. Conversely, the firm's engineers perceived nuclear risk as limited.[105] Public opinion on the topic was highly fraught and they feared nuclear's lack of social acceptability. Still, from their expert point of view, the real risks of nuclear power were lower than those associated with the exploitation of all possible sources of hydroelectricity in Quebec.

Why did Hydro-Québec opt for the most optimistic electricity demand growth scenario that was to lead to an impressive nuclear energy program? After all, as we have seen earlier, this huge organization was permeable to social trends coming from the outside, which led it to create internal divisions tasked with addressing concerns from civil society as well as slightly opening its doors to futurology. In its report addressed to the 1977 parliamentary commission, it recognized the criticism leveled at unchecked energy demand growth and its environmental consequences.[106] It noted the questioning of consumerism and growth. These external and internal pressures played a role in its partial adoption of the scenario method, although its decision-makers still went for the most optimistic growth scenario when planning for future

102. Comité directeur Études à long terme, *Rapport intérimaire. Les nouveaux modes de production de l'électricité.*

103. Khelfaoui, "Le nucléaire dans la stratégie énergétique du Québec, 1963-2012."

104. Comité directeur Études à long terme, *Rapport intérimaire. Les activités du comité directeur Études à long terme.*

105. Groupe de travail no. 12, *Étude du plan d'expansion. Rapport du groupe no. 12 des études à long terme-Programme d'équipement.*

106. Hydro-Québec, *Recommandations sur quelques éléments d'une politique énergétique québécoise.*

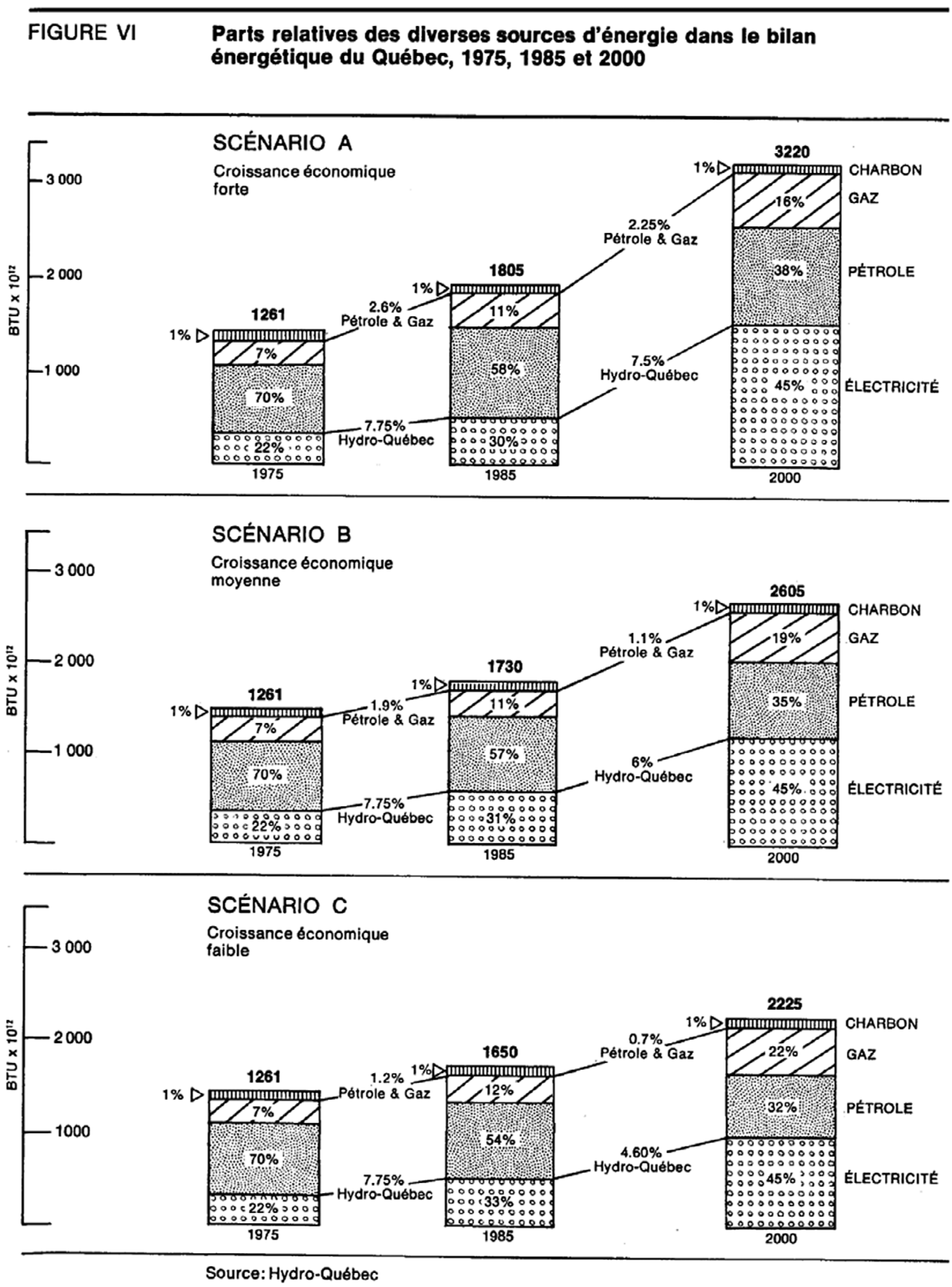

Figure 6. Presentation of three different energy scenarios predicted by Hydro-Québec until 2000. Scenario A is the most optimistic one regarding economic growth and electricity demand, and scenario C is the most pessimistic.

Source: Recommandations de l'Hydro-Québec pour une politique énergétique québécoise, Boyd, Archives d'Hydro-Québec, 1977. Used with permission.

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

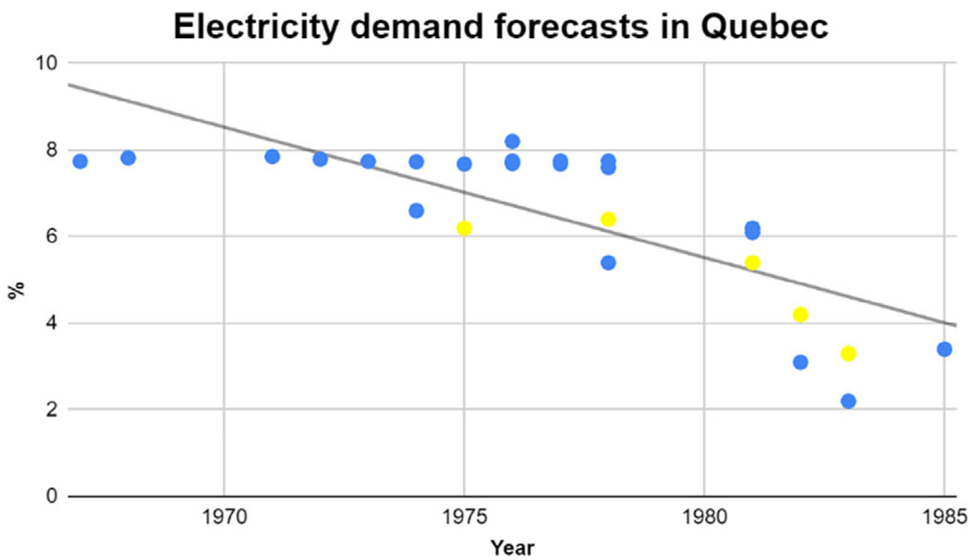

Figure 7. Forecasts of future average annual electricity demand growth produced by Hydro-Québec (blue dots) and the provincial government of Quebec (yellow dots) from 1967 to 1985.

Source: Hatton-Proulx, 2023.

Period	Average annual electricity sales growth in Quebec
1965-1969	5.42%
1970-1974	10.40%
1975-1979	5.80%
1980-1985	4.85%

Figure 8. Average annual electricity consumption growth on Hydro-Quebec's network divided by five-year periods.

Source: Hydro-Québec's annual reports, 1965-1985.

expansion programs, at the parliamentary commission like elsewhere. To justify this choice, they argued that it was easier to forecast more power than needed than not enough.[107]

By being overly optimistic in its forecasts, leading to too much capacity being added, Hydro-Québec would simply need to build fewer facilities and slow down its construction

107. Comité directeur Études à long terme, *Rapport intérimaire. Les activités du comité directeur Études à long terme.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

program going forward. Were that to be insufficient, the surplus capacity could be exported to neighboring networks.[108] On the contrary, predicting insufficient supply related to demand would imply higher costs to speed up the construction of new energy infrastructure. It could lead to relying on costly and polluting energy sources like hydrocarbons. Worse, it could mean electricity shortages, costly imports from neighboring networks, forced shedding, and even power cuts in the industrial sector. The economic consequences would be unprecedented. The threat of shortages, both real and constructed, consistently served to promote the agenda of energy boosters such as Donald K. McIvor, chief executive of Imperial Oil—the Canadian arm of American oil major Exxon—speaking in the following terms in 1977:

> "It seems only common sense to err in the direction that would create the greatest domestic energy supply base possible. If we find 10 or 15 years hence that we've overdone it to some degree, then there are a number of relatively simple policy options to adjust to that situation. At least at that point we'd have options open to us. If we err in the opposition direction, the legacy we leave may be economic decline and a frantic search for other energy and for scapegoats."[109]

According to Hydro-Québec's calculations, the costs of adapting to higher demand than expected would be between 3 and 15 times those of adapting to lower demand. In other words, an underestimating demand forecast would be catastrophic, while an overzealous one would only mean premature immobilization costs for infrastructure that would eventually become profitable.[110] To further make the case for optimistic anticipation, planners at Hydro-Québec pointed at institutional inertia as a hindrance in the state's ability to tame the pace of growth in electricity demand.[111] They argued that it is extremely complex to change ideologies and individual values, such as the belief in growth. Hence their conclusion that the imprint of past choices justified the continuation of future growth at the same rate:

> "For the next fifteen years, the future should be the consequence of phenomena or past actions which we no longer control, […] upcoming interventions in the system will only bring about significative results in the longer term and […], for this reason, the historic growth pace can be taken as representative of the future."[112]

In a way, this was an argument in favor of the performativity of forecasts: once Hydro-Québec decided to build energy infrastructure based on anticipation, consumption growth would evolve linearly without the possibility of control over its trajectory. Hydro-Québec, responding to the winds of change blowing over the 1970s, did incorporate the scenario method into its forecasting arsenal. However, for the reason stated above, its General Planning Committee still

108. Direction de la Planification, *L'incertitude de l'évolution de la demande d'électricité et ses effets sur la planification des équipements.*

109. McIvor, *Canada's Energy Future. An Address to the Prospectors & Developers Association*, 15.

110. Groupe de travail no. 12, *Étude du plan d'expansion. Rapport du groupe no. 12 des Études à long terme-Programme d'équipement.*

111. Direction de la Planification et al., *Prévision de la demande. 1978-79 à 1992-93.*

112. Direction de la Planification et al., 6.

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

selected optimistic linear extrapolation scenarios to plan for its future development. Formed in 1976, this committee was composed of Hydro-Québec's president, its commissioners, and regional directors. If it did conceive the future to be malleable and uncertain, it ended up betting on an optimistic future that fitted with the firm's agenda as an electricity supplier. Because of the state-owned firm's demiurgic importance in the making of a modern Quebec, engineers tasked with producing and then implementing forecasts by building new dams and transport infrastructure were excessively hawkish in their view of the province's electric future, instrumentalizing the scenario method used by economists within the firm to push through an expansionist agenda of supply and demand. In this sense, futurology within Hydro-Québec was a sort of fig leaf, covering for a plan geared toward exponential supply and demand growth.[113]

Contesting Forecasts

This vision was far from hegemonic, however. A multitude of actors ranging from politicians to environmental groups challenged it throughout the 1970s. Questioned by Hydro-Québec's internal journal in 1976, scientists working at its research center deemed the current pace of electricity demand growth to be unsustainable. For chemist Antoine Théoret, "if consumption doubles every ten years, when will we stop? It's inconceivable that it continues at this pace."[114] Alongside some of his peers, he challenged the end goal of meeting demand at whatever cost. The community of solar energy boosters that formed during this decade, influenced in part by Amory Lovins' work, was also critical of exponential energy consumption growth forecasts since they did not consider potential energy savings.[115] Even consumer groups like the Institut de promotion des intérêts des consommateurs, based in Montréal, took issue with the implications of eternal growth: "We never stopped to wonder whether this demand is excessive or if we should encourage citizens to reduce their consumption or, at the very least, its annual growth rate."[116] The critique against Hydro-Québec's boosterish and nuclear vision was made salient at the 1977 Parliamentary Commission on Energy discussed earlier. Dozens of actors, from individuals to environmental organizations, submitted briefs and took part in debates with the province's elected officials. The energy question was widely debated in the public sphere, notably because the James Bay hydroelectric megaproject started earlier in the decade. Its numerous setbacks, from labor conflicts to corruption allegations, drew scrutiny toward Hydro-Québec's activity.[117] Hence the commission's large media coverage of more than a hundred newspaper articles, according to the state-owned firm's watchful press services.[118]

113. I thank Reviewer 1 for this observation.
114. Hydro-Québec, "Hydro-Presse," 1976.
115. Solar Energy Society of Canada, *The potential of solar energy for Canada.*
116. Boulanger, "Catastrophe ou nouvelle société," 21.
117. Roy, "Le groupe SDBJ et le développement du Nord au cours du projet de la Baie-James (1971-1984)."
118. Charest, *Commission parlementaire sur la politique énergétique du Québec. La couverture de presse. Les opinions des journalistes et des intervenants sur l'Hydro-Québec.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

Numerous briefs found fault with forecasts of electricity demand exponential growth and their concrete implications. The Comité de protection de l'environnement de Lotbinière, a rural region located near Quebec City, was formed to oppose Hydro-Québec's plans to build a thermonuclear power station in the small town of Sainte-Croix. In its brief read during the commission, it denounced the forecasts that legitimized the nuclear option: "Hydro-Québec justifies its nuclear program through geometric demand growth. This demand is but an extrapolation of past tendencies. When we look to predict future energy needs, it's fundamental to wonder about what kind of society we want to build and what type of growth we wish for."[119] Western societies were based on wastefulness, especially in Quebec where abundant hydroelectric sources "have allowed us to dream in color."[120] Basing the energy future on this past was to perpetuate the waste society which ends up calling for the "monstrous absurdity that is the use of electro-nuclear."[121] Questioning forecasts that led to massive nuclear energy programs was not unique to Quebec. In France, the Institut économique et juridique de l'énergie, attached to the Université de Grenoble, published a study that contested the scenarios that underpinned France's nuclear energy program in the mid-1970s. It proposed its own models to counterbalance the French state's forecasting arsenal.[122]

Another citizen group, the Regroupement pour la surveillance du nucléaire, denounced the resource allocation problem that a vast nuclear program implied. Invested capital for energy megaprojects could be used for other ends, such as improving social services or supporting small businesses.[123] The Société pour vaincre la pollution also published a brief. One of Quebec's most prominent environmental groups, it was vocal on a range of issues during the 1970s such as fighting automobile hegemony and urban renewal in Montréal.[124] In its brief, it argued that modeling the future on the past and betting that demand growth would always be exponential was ill-founded. More than an objective reality, it was to become a prophecy that Hydro-Québec then tried to make happen. The brief also questioned the crown corporation's alarmism, according to which insufficient production would inevitably lead to catastrophic shortages: "Will we hear that our hospitals and schools will close because of a lack of electricity to justify the nuclear option? Isn't it rather to face Hydro-Québec's uncontrollable expansion needs that we are embarking on this «nuclear adventure»?"[125]

The brief used a relatively widespread comparison among environmentalist circles with Sweden, a country with grossly similar climatic and socioeconomic conditions to Quebec but with a much lower energy footprint.[126] Rather than increasing energy production and going

119. Comité de protection de l'environnement de Lotbinière, *Centrales nucléaires : aventure technique coûteuse, dangereuse et inutile*, 6.

120. Comité de protection de l'environnement de Lotbinière, 6.

121. *Ibid.*

122. Beltran, "La politique énergétique de la France au XXe siècle : une construction historique."

123. Regroupement pour la surveillance du nucléaire, *Mémoire de l'énergie à la Commission parlementaire des ressources naturelles du Québec.*

124. Poirier, "« L'autoroute est-ouest, c'est pas le progrès ! »"; Poirier, "Expertise, Local Knowledge, and the Construction of the Automobile as an Environmental Risk in Montreal, 1960s–70s."

125. Société pour vaincre la pollution, *Mémoire présenté par la Société pour Vaincre la Pollution à la Commission parlementaire sur l'énergie.*

126. Veilleux, *Consommation d'énergie : Essai de comparaison Québec-Suède.*

nuclear, it advanced that it would be wiser to bet on energy conservation to get closer to Sweden's more sustainable energy profile. The document also condemned the opacity of Hydro-Québec's decision-making. It blamed the state-owned firm's lack of public consultation and fondness for gigantic, complex, and fashionable technologies.[127] From a professional point of view, it was more rewarding for its engineers to work on huge hydroelectric and nuclear projects than on small-scale and decentralized technologies such as wind and solar energy, let alone mere maintenance and repair work.[128]

The Société pour vaincre la pollution, like the environmentalist movement in general, was influenced by eclectic figures of the 1970s such as Ivan Illich, Amory Lovins, E. F. Schumacher, and Alvin Toffler. It prioritized decentralized energy systems, energy sobriety, and democratic participation in technological decision-making.[129] It was also skeptical of technical expertise: "Those that essentially think in terms of econometric extrapolation, marginal cents by kWh, and centralized electrification are not the right planners to treat our energy problems in the most constructive way."[130] Environmentalist figure Michel Nadeau, as part of a special week on energy at the Université du Québec à Montréal a few years after the commission, also lamented self-serving energy forecasts: "Hydro-Québec's equipment program is what happens when 200 engineers dictate how they see their job in the next decade."[131] This special week on energy at one of Quebec's main universities gathered 80 pressure groups that sought to bring about a public debate on energy. Ralph Nader, the American activist known for fighting for environmental and consumer protection, was the keynote speaker. Among many talking points, the speakers pointed out that Hydro-Québec's demand forecasts were way higher than in Ontario and the United States.

During the 1977 parliamentary commission, the arguments deployed by groups fighting Hydro-Québec's vision for the future of energy were widely relayed by the media. They were well received by elected officials, particularly the Société pour vaincre la pollution's brief. Guy Joron, minister delegate for Energy and the commission's main interlocutor, described it as the most interesting brief of all those received, which included some by oil firms and other for-profit actors. In a discussion with Robert-A. Boyd from Hydro-Québec, the minister described electricity and energy consumption forecasts produced by Hydro-Québec as the key point of discussion at the National Assembly.[132] Picking up on environmentalist talking points, Joron questioned energy forecasts as an end. For him, energy producers posed the question backward. The energy question had to be preceded by deeper reflections starting

127. Maxwell et al., "Locked on Course: Hydro-Québec's Commitment to Mega-Projects."

128. Vinsel and Russell, *The Innovator's Delusion: How Our Obsession with the New Has Disrupted the Work That Matters Most.*

129. Hajer, "Ecological Modernisation as Cultural Politics"; Jarrige and Vrignon, *Face à la puissance. Une histoire des énergies alternatives à l'âge industriel.*

130. Société pour vaincre la pollution, *Mémoire présenté par la Société pour Vaincre la Pollution à la Commission parlementaire sur l'énergie*, 13.

131. Hydro-Québec, *Front commun pour un débat public sur l'énergie. Semaine sur l'énergie à l'UQAM. Compte-rendu des activités*, 25.

132. Assemblée nationale du Québec, *Journal des débats de la Commission permanente des richesses naturelles et des terres et forêts.*

from the kind of social order that a society desires, the fundamental needs that this order leads to, and the type of economic growth that it wishes to attain:

> "Most speakers give us future forecasts based on the past. I understand that it's not their role to decide for the government but, in a way, I would've liked if more had reflected on this. We don't determine how much energy we want for a specific year for fun. We do it because we want to meet a need. So we have to talk about needs and about economic development."[133]

In this way, he took issue with framing eternally insatiable demand as the sole driver of additional energy capacity construction. Talking about needs meant opening the black box of demand to distinguish between basic needs and superfluous consumption habits, some of them pushed by energy suppliers to drive demand upwards.[134] Joron challenged Hydro-Québec's optimistic electricity demand forecasts: describing himself as an ardent lector of Amory Lovins, he advocated for energy efficiency and renewable energy. He criticized the weak efforts of Hydro-Québec in promoting energy efficiency and conservation.[135] Federal state officials held similar views of energy gigantism. Canadian Prime Minister Pierre Elliott Trudeau condemned his country's excessive energy consumption: "We stand second in the world in per capita consumption of energy, largely because we squander it in a manner which betrays no recognition of the reality which is staring us in the face. Conservation and much more careful stewardship of our resources must surely be prominent characteristics of the new society we need to create."[136] The conserver society movement, which had many supporters at the federal level, questioned the energy-civilization equation.

Trudeau himself, beyond obvious geopolitical preoccupations linked to energy, was sensitive to these questions, having discussed them many times with members of the Club of Rome throughout the 1970s.[137] It was no longer self-evident that economic well-being and linear growth in energy consumption were directly linked. Analysts started to wonder about energy intensity, or energy consumption per unit of GDP. They noticed that Quebec, like Canada, boasted high energy intensity: it needed to consume lots of energy to produce economic value, contrary to countries like France, Sweden, or Japan. Confirming the extractivist state of its economy, Joron noticed that 35% of electricity consumption in Quebec came from two industrial sectors: pulp and paper and primary metallurgy, which only produced 16.7% of the industrial added value in the province. To turn toward a service economy, a move favored by Joron and the Parti Québécois, would allow the province to reduce its energy consumption and intensity without harming its economic growth.

133. Assemblée nationale du Québec, B-184.

134. Jones, *Routes of Power*; Trentmann and Carlsson-Hyslop, "The Evolution of Energy Demand in Britain"; Shove et al., "Comfort in a Lower Carbon Society"; Hatton-Proulx, "Creating Supply, Creating Demand: Gas and Electricity in Montréal from the First World War to the Great Depression."

135. Hydro-Québec, "Hydro-Presse," 1977.

136. The Conserver, "Federal Government Announces New Conservation Measures to Cut Energy Waste."

137. Orr, "Environmental Aspirations in an Unsettled Time."

Toward a New Energy Policy

In formulating an energy policy, the first in the province's history, the Parti Québécois took note of these diverse oppositions to Hydro-Québec's expansionist project. In the report that positioned the provincial government in regard to energy, Minister Delegate Guy Joron started by summarizing the current energy situation.[138] The province, per capita, was one of the most energy-hungry jurisdictions in the world. It was highly dependent upon petroleum. However, geologists anticipated a rapid decrease in conventional world petroleum reserves: global demand could exceed available reserves by the late 1980s. In 1977, Quebec spent two billion Canadian dollars on purchasing hydrocarbons imported from overseas and Western Canada—amounting to the province's whole commercial trade balance.[139] Oil represented 20% of the province's total imports. But it was not the only energy source at fault. The report also pointed a finger at hydroelectric megaprojects. Galloping inflation during the 1970s made these capital-intensive schemes extremely costly. Equipment costs rose due to the increasing geographic distance between dams and consumers. For these reasons, provincial energy investments went from 6% of total government investment in 1961 to 20% in 1978, since hydroelectric megaprojects were written onto the province's balance sheet.

Based on these considerations, the government of Quebec produced its own forecasts through its Energy head office. Created in 1970 and attached to the Ministry of Natural Wealth, its forecasters used extrapolation econometric models to study the interaction between explicative variables like GDP, household formation, and energy prices to then project them onto the future.[140] In contrast to most of Hydro-Québec's 1970s forecasts, the provincial government took potential energy savings into account. For this reason, the annual electricity demand growth predicted by the Energy head office until 1990 was 6.4%, while Hydro-Québec's was around 7.5%.[141] The government saw this slower growth pace as a good thing: its financial resources, less mobilized by hydroelectric megaprojects, would be freed up for other purposes. Its environment would be better preserved. And it would not have to rely on nuclear energy. This position was a bit surprising when you consider that, before its election in 1976, the Parti Québécois was pronuclear. It estimated that the costs of nuclear energy would fall and that it would turn into the ideal energy source for the future: missing this turn would be costly.[142] Yet, once in power, the party's conception of nuclear energy changed. It believed that uncertainty around nuclear waste disposal was too great to complete a full nuclear turn. It also bemoaned the fact that nuclear expertise was majorly Ontarian, while uranium needed to be imported from other provinces and countries. For the party's members, who aimed for political independence and energy sovereignty, these factors were highly problematic. Without surprise, nuclear power did not figure in government forecasts before the year 2000. Hydroelectricity and, to a lesser extent, renewable energy sufficed to meet Quebec's consumption.

138. Direction générale de l'Énergie, *La politique québécoise de l'énergie. Assurer l'avenir.*

139. Joron, *Mémoire au conseil des ministres. Création d'un ministère de l'Énergie.*

140. Direction générale de l'Énergie and Direction des Études et prévisions, *Prévision de la demande d'énergie totale et de l'énergie électrique. Québec : 1980-1994. Annexe au rapport.*

141. Hydro-Québec, "Hydro-Presse," 1978.

142. Khelfaoui, "Le nucléaire dans la stratégie énergétique du Québec, 1963-2012."

Underlying tensions underpinned the differing visions of the future of energy between Hydro-Québec and the provincial government. The relationship between these two actors changed over the 1960s and 1970s. Hydro-Québec's foundational mandate was to supply energy to municipalities, firms, and citizens at the lowest rates compatible with sound financial administration.[143] By 1978, its board of directors was composed of nine members, including one chief executive for the whole firm and one chief executive for Hydro-Québec's spinoff for the James Bay megaproject.[144] The state named these members. It also owned the firm's assets. Hydro-Québec could borrow money and issue bonds. The state guaranteed its loans.

In 1978, after the Commission on Energy, the National Assembly moved that Hydro-Québec was to be given the mandate to "predict Quebec's energy needs and ways to satisfy them in the framework of energy policies that the [*state*] can establish."[145] This article of law attempted to better delimit the relationship between Hydro-Québec and the provincial government, making up for "quasi-indifference"[146] on behalf of the provincial government as Hydro-Québec's legislator before the late 1970s, giving it free reins to dictate Quebec's energy path. After the new law, Hydro-Québec became subordinate to the energy policy formulated by provincial elected officials. Within this frame, the crown corporation was tasked with formulating forecasts and developing infrastructure programs, acting under provincial control. Its rate increases were discussed with the minister delegate of Energy, with the cabinet, and finally in the parliamentary commission.[147]

As we have seen earlier, during the postwar period, Hydro-Québec and the provincial government went hand in hand, as the crown corporation was tasked with polishing Quebec's new image. The Montréal office of Jean Lesage, Prime Minister of Quebec in the early 1960s, was located in Hydro-Québec's headquarters. When the firm negotiated a 300 million Canadian dollar bond issue in the United States to buy the shares of freshly expropriated private electricity firms in 1963, Lesage himself went to New York to complete the transaction. This bond issue, extending over 25 years at an annual interest rate of 5%, was at the time the biggest bond emission by a Canadian firm on American markets.[148] The firm's expansion during the 1960s and 1970s depended on numerous bond emissions on international markets.[149] Thanks to its hydroelectric megaprojects, its assets—as well as its debt—grew at an impressive rate, making it Canada's biggest firm and the third most important utility in North America after American Telephone and Telegraph (AT&T) and General Telephone and Electronics.

Hydro-Québec's image was crucial for its funding campaigns. Historians of the economy and finance have demonstrated how reputation and trust are at the center of financial transactions.[150] A bondholder looks for stability when investing over a long period. When buying a

143. Assemblée législative du Québec, *Chapitre 86. Loi d'Hydro-Québec.*

144. Assemblée nationale du Québec, *Chapitre 41. Loi modifiant la loi d'Hydro-Québec et la loi du développement de la région de la Baie James.*

145. Assemblée nationale du Québec, 614.

146. Hydro-Québec, "Hydro-Presse," 1977, 1.

147. Direction générale de l'Énergie, *La politique québécoise de l'énergie. Assurer l'avenir.*

148. Assemblée législative du Québec, *Journal des débats de l'Assemblée législative. 27e législature, 1re session. Le vendredi 1 Février 1963 - N° 9.*

149. Vallières, *Courtiers et entrepreneurs.*

150. Barreyre and Delalande, *A World of Public Debts*; Jenkins, *The Bonds of Inequality.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

bond, they bet that the bond issuer will be financially rational and that their activities and revenues will grow for issuers to honor their debt. For this reason, Hydro-Québec's reputation was central to its expansion desires. At first, it was not necessarily beaming. In the eyes of North America's financiers, a state that expropriated private firms—whose administrators and most stockholders were part of the continent's financial elite—nationalized their assets and named inexperienced Francophone administrators to manage them was estranged from the guiding principles of liberal capitalism. Nevertheless, Hydro-Québec was not an isolated case. Ontario, France, and the United Kingdom all nationalized their electric sector during the 20th century. Economic theory recognized that public services like electricity were natural monopolies that should preferably be managed by a single organization. Further, as we've seen earlier, results were impressive: demand growth and infrastructural expansion at Hydro-Québec during the 1960s and 1970s were tremendous.

The Tense Bonds of Hydro-Québec

Linear extrapolations of electricity demand were connected to Hydro-Québec's financing campaigns on international capital markets. Bond buyers looked to ensure the long-term profitability of their placement. For Hydro-Québec to repay its debt, its earnings needed to keep growing at a fast pace. According to Edmond Lemieux, Hydro-Québec's chief financial executive during the 1970s, the firm's massive borrowings were not problematic if they served to pay for investments that would create future revenues. In other words, as long as demand grew in the future, the firm's extensive debt was not to be feared.[151] Forecasters at Hydro-Québec expressed this idea in an internal document: "The demands of financial markets essentially rest upon the ability of borrowing firms to maintain stability in their net revenue growth and, thereby, reassuring investors regarding their capacity to service debt."[152] Linear growth forecasts responded to Hydro-Québec's financial constraints. They were a way to comfort bondholders of their investment's soundness: since growth in electricity demand would be regular and linear, Hydro-Québec bonds promised safe returns.

In this sense, energy demand forecasts must be understood as key indicators around which actors coalesce to make sense of the present and coordinate their actions in the future. Within a corporation as huge as Hydro-Québec, with more than 12,000 employees during the 1970s, they served as instruments to orient the actions of different divisions and trades.[153] Guy Boissé, head of the Production Equipment service at the Engineering head office, expressed this very idea: "You can't need the James Bay [*hydroelectric megaproject*] one year and not need it the next."[154] Forecasts brought stability and coordination within complex organizations in the industrial world. Planners at the state-owned firm understood this very well: "Regarding the availability of human and material resources, the key for Hydro-Québec is to

151. Hydro-Québec, "Hydro-Presse," 1976.

152. Groupe de travail no. 12, *Étude du plan d'expansion. Rapport du groupe no. 12 des études à long terme-Programme d'équipement*, 6–7.

153. Comité de la prévision d'entreprise, *Cycle 1981 de la planification générale. Prévision de la demande d'électricité. 1981-1997.*

154. Hydro-Québec, "Hydro-Presse," 1975.

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

state in advance the orientation of its equipment program and stick with it."[155] Forecasters were not stupid: they knew, for the most part, that their models were not exact.[156] Yet models mattered for other reasons.

If, in the early 1960s, Hydro-Québec and the provincial government had an excellent relationship, it soured quickly. As we have seen, the provincial government lamented the fact that the state-owned firm pursued its expansionist agenda without thinking too much about sustainability, costs, energy efficiency, or the environmental consequences of megaprojects. In California, similar considerations led the state government to ask the RAND Corporation to come up with more refined energy consumption models than those produced by utilities.[157] For its part, Hydro-Québec tried to keep the state at arm's length, since it feared partisan interventions that would politicize its decision-making. According to its planners, if Hydro-Québec were to be perceived as the political weapon of the province's politicians, it would harm financing campaigns on international capital markets. Indeed, financial questions were at the center of tensions. The provincial government quickly feared competition between bonds emitted by Hydro-Québec—which are backed by the state—and by the state itself on capital markets.[158] Investments made by Hydro-Québec were massive: they represented 10% of Quebec's GNP in 1973, 8.7% in 1975, 12.7% in 1975, and 13.2% in 1976, during the James Bay era.[159]

On top of different understandings of the effects of energy efficiency on demand, this financial weight also explains why electricity demand forecasts produced by the provincial government were less optimistic than Hydro-Québec's. Guy Joron explained as such in an interview for Hydro-Québec's internal journal:

> "In 1977, we devoted 20% of all our investments in Quebec to energy production. Next year, this proportion will approach 25%. Think about it, it means that one out of four dollars invested in Quebec will go towards energy production. There are limits to this. We can't imagine that this proportion can indefinitely grow. We are at the limit. This must be reflected in forecasts."[160]

Another reason why the provincial government was less bullish regarding future electricity demand growth had to do with the James Bay project's legacy. As we have seen earlier, this project was undertaken in 1970 by the Liberal Party of Quebec based on forecasts of exponential demand growth produced by Hydro-Québec. Then Prime Minister Robert Bourassa made it his pet project, dubbing it the project of the century. Still, it was extremely controversial. Although it was situated on their ancestral land, the Cree indigenous nation was not consulted at all. It learned about Hydro-Québec's intentions when construction started. In reaction, it

155. Groupe de travail no. 12, *Étude du plan d'expansion. Rapport du groupe no. 12 des études à long terme-Programme d'équipement*, 8.

156. Hydro-Québec, "Hydro-Presse," 1971; Silvast et al., "What Do Energy Modellers Know?"

157. Turnbull, "California's Quandary."

158. Hydro-Québec, "Entre-Nous," 1966.

159. Groupe de travail no. 12, *Étude du plan d'expansion. Rapport du groupe no. 12 des études à long terme-Programme d'équipement.*

160. Hydro-Québec, "Hydro-Presse," 1978, 4.

brought the state-owned firm to court to stop the project. The litigious legal tribulations led to the signing of the James Bay and Northern Quebec Agreement in 1975.[161] Labor relations on James Bay construction sites were also conflictual. Difficult negotiations between the main labor unions for workers, the Fédération des travailleurs du Québec, and Hydro-Québec led to numerous strikes and the ransacking of worker camps in 1974. The Cliche Commission condemned dubious labor union practices and found members of the Liberal Party guilty of corruption. The James Bay megaproject ended up being politically delicate, highlighting the complexity of managing energy megaprojects. The galloping inflation and high interest rates of the 1970s did not help the cause of hydroelectric projects, which implied high construction costs. The Parti Québécois looked to avoid new energy megaprojects to distance itself from the contested legacy of the Liberal Party.

Internal and external pressures ended up tainting Hydro-Québec's optimism for the future. Forced by the government's new energy policy and the 1978 law change, it had to collaborate more with state officials in formulating forecasts and a vision for the province's energy future.[162] A shifting context caused forecasts to be less bullish. Between 1980 and 1982, Canada went through a severe recession after the second oil shock of 1979. In 1981, inflation was at a record high since the end of World War II at an annual rate of 12.5% in the country. This confirmed a slowing down of the electricity demand growth rate. Because the present was changing, forecasters' vision of the future changed as well. In 1981, in front of the National Assembly, Hydro-Québec announced that future electricity demand would grow at an average annual pace of 6.2%, revising downwards its 7.5% estimate formulated in 1977. As soon as the first units of the James Bay's power stations started coming online, engineers detected signs of growth slowdown, even degrowth, of electricity demand.[163] In 1982, electricity demand decreased by 2.7% compared to the previous year.[164] Eventually, after the recession's end, Hydro-Québec went back to formulating relatively optimistic electricity demand growth forecasts.[165] Yet it has still to embark on a new major hydroelectric megaproject to this day.

Conclusion: Hanging onto Exponential Curves

Far from being objective models disconnected from the social and political contexts in which they are formulated, this article has insisted on the influence of the present over the anticipation of the future. It has done so through a historical approach, particularly insightful on two levels: first, for its retrospective look that has allowed for an ex-post assessment of ex-ante

161. Desbiens, *Power from the North*; Savard, "Les communautés autochtones du Québec et le développement hydroélectrique."

162. Faucher and Bergeron, "Approche politique : politiques gouvernementales en matière énergétique"; Planification générale, *Dossier préparé en réponse aux questions du gouvernement du Québec.*

163. Neveu, *Demand Forecasting at Hydro-Québec.*

164. Direction générale de l'Administration, *Quelques notes sur le document du groupe de l'Analyse quantitative et de l'information statistique : DGA (Septembre 1983). Prévisions d'évolution de la demande d'électricité 1981-1995. Analyse des évaluations d'Hydro-Québec.*

165. Bernard, Bernard, and Lafrance, "La précision de la prévision de la demande d'électricité par Hydro-Québec."

forecasts; second, for its mobilization of exclusive internal archival documents that have allowed me to open the black box of forecasting. The article has used the case of postwar Quebec, a demographically small North American polity with huge hydroelectric resources, to study trends that have manifested all over the industrialized world since World War II, namely the advent of forecasting as an expert discipline, the multiplication of energy megaprojects, and the criticism of industrial gigantism. It argued that energy forecasts are used by actors like energy suppliers and governments to produce and project power relations into the future. They become performative when powerful interests coalesce around them and the world they contain.

After the catastrophes of the Great Depression and World War II, Quebec entered the *Trente Glorieuses* with hope for the future. The final creation of Hydro-Québec in 1963 boosted the agenda of a new provincial elite looking to place French Canadians in the province's control rooms. Hydro-Québec became a credibility machine[166] for a new ruling class looking for political recognition, demonstrating that it also knew how to turn natural resources into productive forces. The state-owned firm, one of North America's biggest industrial powerhouses, promoted hydroelectricity as an equalizing force: uniformizing and lowering rates would bring about social equality and industrialization to the levels of prosperous neighbors. Optimistic forecasts acted as demonstration devices of its future profitability.[167] The provincial government, which founded Hydro-Québec to implement this agenda, gave it free rein to expand energy production and consumption.

These two actors coalesced around a certain vision of the future and partly brought it into being through their forecasting activity. Thanks to their hegemonic power in postwar Quebec and the alignment of their respective agendas, their actions became performative, reminding us of Donald MacKenzie's observation that actual performativity implies power dynamics and a specific balance of power.[168] To implement this joint vision, forecasters at Hydro-Québec adopted linear extrapolation techniques, simply projecting the past growth of recent years into the future. Until the 1970s, this forecasting technique worked, as electricity demand grew around 7% to 8% every year on average, close to previsions made by engineers at Hydro-Québec. It justified colossal bond issues on international capital markets that financed two hydroelectric megaprojects: Manic-Outardes starting in the 1960s and James Bay starting in the 1970s. However, the 1973 oil shock shook the vision of the future as linear and of future energy supply and demand as eternally expanding. The specter of shortages came back. Industrialized nations realized that the postwar economic miracle laid upon a colossal mobilization of energy.

During this decade, consensus over the province's energy future broke down. Within Hydro-Québec, ecologists questioned the environmental impacts and the social acceptance of hydroelectric megaprojects. From the outside, environmentalist groups criticized overly optimistic electricity demand forecasts for the values they represented—endless growth and centralized industrial productivism—and the nuclear world they sought to bring about. The

166. I thank Damian Clavel for suggesting this expression.

167. Doganova and Eyquem-Renault, "What Do Business Models Do?"; Giraudeau, "Proving Future Profit"; Graber and Giraudeau, *Les Projets. Une histoire politique (XVIe-XXIe siècles).*

168. MacKenzie, "Is Economics Performative?"

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

Parti Québécois, in power since 1976, was also preoccupied by the state-owned firm's boosterish agenda that it failed to reign over. For political and financial reasons, it sought to distance itself from costly and destructive megaprojects. It proposed its own forecasts of electricity demand, less bullish and betting on energy efficiency to meet future needs without having to resort to new megaprojects. Under fire, Hydro-Québec explored other forecasting techniques. The scenario method, influenced by futurology and prospective, was popular among decision-makers of the time. The state-owned firm rejected its qualitative and most open-ended form. Instead, it opted for a half-baked version whereby it conceived the future of electricity in Quebec to be open and did consider different avenues. However, because of an internal balance of power that favored engineers over economists and ecologists in planning for the firm's expansion, Hydro-Québec still bet on the most optimistic demand growth scenarios that ended up reproducing linear extrapolations. This led it to pursue an impressive expansionist agenda that profoundly transformed Quebec's natural environment and traditional Indigenous land and lifestyles. Forecasts, as intellectual objects, have had deep and long-lasting material effects.

This article has insisted on the historical importance of forecasts in energy infrastructure development. Its lessons hold today. If the energy sector is so interested in them, it's because they are useful. They allow different actors to share an understanding of the actions to take in the present to shape a future that will satisfy them. Still, forecasts on their own do not act on the future. Their performativity and efficiency depend on the social and political weight of the actors that produce them. In this story, as long as Hydro-Québec was omnipotent, it generated self-fulfilling prophecies. From the moment when the provincial government broke free from the original predictive coalition and attempted to take back control over energy policy after a shifting global energy situation, criticism from local environmentalist groups, and pressure from international financial markets, these prophecies became contested. Hydro-Québec could not push through with its nuclear program since the hegemonic forecasting system it presided over broke down in the second half of the 1970s.

In this sense, this article has partially confirmed the views of forecasting critics like Herman E. Daly,[169] who argued that forecasts are a way for energy firms to hide their political and economic agenda behind supposedly scientific models, something that planners in Quebec recognized internally.[170] Without great surprise, forecasts generally align with the interests of forecasters.[171] For instante, electricity demand forecasts produced by oil firms in Quebec have been way more moderate than Hydro-Québec's for the same period, ranging from 2.2% to 4.5%.[172] For forecasters and the planners they serve, the likeliest scenario is the most desirable one. Today, black-boxed energy forecasts abound and influence the world. This article has argued that they are shaped by their social context and reflect their producers' interests. Rather than taking them as objective anticipations, their fabrication must be interrogated, alongside the kind of society they bring into being.

169. Daly, "Energy Demand Forecasting."

170. Cao and Direction générale de l'énergie, *Documents de référence sur les prévisions de la demande d'énergie (1980-1996).*

171. Dooley, *Long-Range Forecasting and Planning. Ontario Electrical Energy Case.*

172. BP Canada, *Mémoire de BP Canada Limited à la Commission parlementaire des richesses naturelles et des terres et forêts sur la politique de l'énergie*; Home Oil Company and Purvin & Gertz, *Energy demand forecast.*

https://doi.org/10.1017/eso.2024.10 Published online by Cambridge University Press

CLARENCE HATTON-PROULX is a postdoctoral researcher at Université Paris 1 Panthéon-Sorbonne.

Acknowledgments

I wish to thank Sophie L. Van Neste, Alain Beltran, Maylis Avaro, Damian Clavel, and two anonymous reviewers for their comments on earlier versions of this text. I also want to thank archivists at BAnQ and Hydro-Québec for helping me access the documents upon which this article is based.

Bibliography of Works Cited

Books

Andersson, Jenny, *The Future of the World: Futurology, Futurists, and the Struggle for the Post Cold War Imagination*. Oxford: Oxford University Press, 2018.

Armstrong, Christopher, and Henry Vivian Nelles. *Monopoly's Moment: The Organization and Regulation of Canadian Utilities, 1830-1930*. Toronto: University of Toronto Press, 1988.

Barreyre, Nicolas, and Nicolas Delalande, eds. *A World of Public Debts: A Political History*. London: Palgrave Macmillan, 2020.

Beckert, Jens. *Imagined Futures: Fictional Expectations and Capitalist Dynamics*. Cambridge: Harvard University Press, 2016.

Bélanger, Yves, and Robert Comeau. *Hydro-Québec. Autres temps, autres défis*. Québec: Presses de l'Université du Québec, 1995.

Bellavance, Claude. *Shawinigan Water and Power, 1898-1963. Naissance et déclin d'un groupe industriel au Québec*. Montréal: Boréal, 1994.

Boismenu, Gérard. *Les Trente Glorieuses au Canada*. Montréal: Del Busso, 2020.

Coates, Colin M., ed. *Canadian Countercultures and the Environment*. Calgary: University of Calgary Press, 2016.

Cohen, Lizabeth. *A Consumers' Republic: The Politics of Mass Consumption in Postwar America*. New York: Vintage, 2003.

Dahan, Amy, ed. *Les modèles du futur*. Paris: La Découverte, 2007.

Desbiens, Caroline. *Power from the North: Territory, Identity, and the Culture of Hydroelectricity in Quebec*. Vancouver: UBC Press, 2014.

Edwards, Paul N. *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming*. Cambridge: MIT Press, 2010.

Evenden, Matthew. *Allied Power: Mobilizing Hydro-Electricity during Canada's Second World War*. Toronto: University of Toronto Press, 2015.

Fahrni, Magda. *Of Kith and Kin: A History of Families in Canada*. Oxford: Oxford University Press, 2022.

Ford Foundation. *A Time to Choose. America's Energy Future. Final Report by the Energy Policy Project of the Ford Foundation*. Cambridge: Ballinger, 1974.

Fourastié, Jean. *Les Trente Glorieuses ou la révolution invisible*. Paris: Fayard, 1979.

Fritsche, Ulrich, Roman Köster, and Laetitia Lenel, eds. *Futures Past. Economic Forecasting in the 20th and 21st Century*. Berlin: Peter Lang, 2020.

Froschauer, Karl. *White Gold: Hydroelectric Power in Canada*. Vancouver: UBC Press, 2000.

Graber, Frédéric, and Martin Giraudeau, eds. *Les Projets. Une histoire politique (XVIe-XXIe siècles)*. Paris: Presses des Mines, 2018.

Hogue, Clarence, Andre Bolduc, and Daniel Larouche. *Hydro-Québec. L'héritage d'un siècle d'électricité*. 3rd ed. Montréal: Libre expression, 1989.

Hydro-Québec. *Rapport annuel*. Montréal: Hydro-Québec, 1962.

Hydro-Québec. *Recommandations sur quelqueséléments d'une politique énergétique québécoise*. Québec: Commission parlementaire sur l'énergie, 1977.

Illich, Ivan. *Energy and Equity*. New York: Harper & Row, 1974.

Jacobs, Meg. *Panic at the Pump: The Energy Crisis and the Transformation of American Politics in the 1970s*. New York: Hill and Wang, 2016.

Jarrige, François, and Alexis Vrignon, eds. *Face à la puissance. Une histoire des énergies alternatives à l'âge industriel*. Paris: La Découverte, 2020.

Jenkins, Destin. *The Bonds of Inequality: Debt and the Making of the American City*. Chicago: University of Chicago Press, 2021.

Jones, Christopher F. *Routes of Power: Energy and Modern America*. Cambridge: Harvard University Press, 2016.

Koselleck, Reinhart. *Sediments of Time: On Possible Histories*. Stanford: Stanford University Press, 2018.

Levinson, Marc. *An Extraordinary Time: The End of the Postwar Boom and the Return of the Ordinary Economy*. New York: Basic Books, 2016.

Luby, Brittany. *Dammed: The Politics of Loss and Survival in Anishinaabe Territory*. Winnipeg: University of Manitoba Press, 2020.

Macfarlane, Daniel. *Fixing Niagara Falls: Environment, Energy, and Engineers at the World's Most Famous Waterfall*. Vancouver: University of British Columbia Press, 2020.

Frioux, Stéphane, ed. *Une France en transition: Urbanisation, risques environnementaux et horizon écologique dans le second XXe siècle*. Ceyzérieu: Champ Vallon, 2021.

Home Oil Company, and Purvin & Gertz. *Energy demand forecast: Canada (Ontario and Quebec) 1970-1985*. Calgary: Home Oil Company, 1971.

Jouandet-Bernadat, Roland. *La notion de prospective.* Groupe de recherche sur l'avenir: HEC, 1981.

MacKenzie, Donald. *An Engine, Not a Camera: How Financial Models Shape Markets*. Cambridge: MIT Press, 2006.

Martin, Thibault, and Steven M. Hoffman, eds. *Power Struggles: Hydro Development and First Nations in Manitoba and Quebec*. Winnipeg: University of Manitoba Press, 2008.

Massell, David. *Quebec Hydropolitics: The Peribonka Concessions of the Second World War*. Montréal & Kingston: McGill-Queen's University Press, 2011.

McNeill, J. R., and Peter Engelke. *The Great Acceleration: An Environmental History of the Anthropocene since 1945*. Cambridge: Belknap Press, 2016.

Meadows, Donella H., Dennis L. Meadows, Jørgen Randers, and William W. Behrens. *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*. New York: Universe Books, 1972.

Missemer, Antoine. *Les économistes et la fin des énergies fossiles*. Paris: Classiques Garnier, 2017.

Mody, Cyrus C. M. *The Long Arm of Moore's Law: Microelectronics and American Science.* Inside Technology. Cambridge: MIT Press, 2017.

Möllers, Nina, and Karin Zachmann, eds. *Past and Present Energy Societies: How Energy Connects Politics, Technologies and Cultures.* Science Studies. Bielefeld: Transcript Verlag, 2012.

Needham, Andrew. *Power Lines: Phoenix and the Making of the Modern Southwest*. Princeton: Princeton University Press, 2014.

O'Mara, Margaret. *The Code: Silicon Valley and the Remaking of America*. Illustrated edition. New York: Penguin Press, 2019.

Pellegrin, Jean-Pierre. *Bilan énergétique du Québec, 1958*-1974. Québec: Direction générale de l'énergie, 1975.

Pessis, Céline, Sezin Topçu, and Christophe Bonneuil, eds. *Une autre histoire des « Trente Glorieuses »*. Paris: La Découverte, 2016.

Pietruska, Jamie L. Looking Forward. *Prediction and Uncertainty in Modern America*. Chicago: University of Chicago Press, 2017.

Regroupement pour la surveillance du nucléaire. *Mémoire de l'énergie à la Commission parlementaire des ressources naturelles du Québec*. Québec: Commission permanente des richesses naturelles et des terres et forêts, 1977.

Rome, Adam. *The Bulldozer in the Countryside: Suburban Sprawl and the Rise of American Environmentalism*. Cambridge: Cambridge University Press, 2001.

Rostow, Walt Whitman. *The Stages of Economic Growth (A Non-Communist Manifesto)*. Cambridge: Cambridge University Press, 1960.

Saint-Pierre, Diane, ed. *Histoire de l'assurance de personnes. Des sociétés de secours mutuels aux grandes institutions d'assurance*. Québec: Presses de l'Université Laval, 2015.

Sandwell, Ruth W., ed. *Powering Up Canada: The History of Power, Fuel, and Energy from 1600*. Montréal & Kingston: McGill-Queen's University Press, 2016.

Savard, Stéphane. *Hydro-Québec et l'Etat québécois: 1944-2005*. Québec: Septentrion, 2014.

Schmidt, Jeremy J. Water *: Abundance, Scarcity, and Security in the Age of Humanity*. New York: New York University Press, 2017.

Schumacher, E. F. *Small Is Beautiful: A Study of Economics As If People Mattered*. London: Blond & Briggs, 1973.

Société pour vaincre la pollution. *Mémoire présenté par la Société pour Vaincre la Pollution à la Commission parlementaire sur l'énergie*. Québec: Commission parlementaire sur l'énergie, 1977.

Solar Energy Society of Canada. *The potential of solar energy for Canada*. Ottawa: National Research Council of Canada, 1975.

Toffler, Alvin. *Future Shock*. New York: Random House, 1970.

Valaskakis, Kimon, Peter G. Sindell, and J. Graham Smith. *La société de conservation sélective. Volume* 1. *Rapport-synthèse. Seconde phase. Projet de la société de conservation.* Montréal: GAMMA, 1976.

Vallières, Marc. *Courtiers et entrepreneurs: Le courtage financier au Québec, 1867-1987*. Montréal: Septentrion, 2019.

Veilleux, Roch. *Consommation d'énergie : Essai de comparaison Québec-Suède.* Collection nationale, BAnQ. Québec: Direction générale de l'énergie, 1978.

Vinsel, Lee, and Andrew L. Russell. *The Innovator's Delusion: How Our Obsession with the New Has Disrupted the Work That Matters Most.* New York: Random House, 2020.

White, Richard. *The Organic Machine*. New York: Hill and Wang, 1996.

Articles, Book Chapters, Dissertations, Papers, Reports

Andersson, Jenny. "Ghost in a Shell: The Scenario Tool and the World Making of Royal Dutch Shell." *Business History Review* 94, no. 4 (2020): 729–51. https://doi.org/10.1017/S0007680520000483.

Andersson, Jenny. "The Great Future Debate and the Struggle for the World." *The American Historical Review* 117, no. 5 (2012): 1411–30. https://doi.org/10.1093/ahr/117.5.1411.

Andersson, Jenny, and Pauline Prat. "Gouverner le « long terme »." *Gouvernement et action publique* 4, no. 3 (2015): 9–29.

Assemblée législative du Québec. *Chapitre 86. Loi d'Hydro-Québec*. Québec: Assemblée législative du Québec, 1964.

Assemblée législative du Québec. *Journal des débats de l'Assemblée législative. 27e législature, 1re session. Le vendredi 1 février 1963 - N°9*. Québec: Assemblée législative du Québec, 1963.

Assemblée nationale du Québec. *Chapitre 41. Loi modifiant la loi d'Hydro-Québec et la loi du développement de la région de la Baie James*. Québec: Assemblée nationale du Québec, 1978.

Assemblée nationale du Québec. *Journal des débats de la Commission permanente des richesses naturelles et des terres et forêts*. 31e législature, 2e session. Québec: Commission parlementaire sur l'énergie, 1977.

Aykut, Stefan Cihan. "Reassembling Energy Policy: Models, Forecasts, and Policy Change in Germany and France." *Science & Technology Studies* 32, no. 4 (2019): 13–35. https://doi.org/10.23987/sts.65324.

Bátiz-Lazo, Bernardo, Thomas Haigh, and David L. Stearns. "How the Future Shaped the Past: The Case of the Cashless Society." *Enterprise & Society* 15, no. 1 (2014): 103–31. https://doi.org/10.1093/es/kht024.

Beckert, Jens. "Imagined Futures: Fictional Expectations in the Economy." *Theory and Society* 42, no. 3 (2013): 219–40. https://doi.org/10.1007/s11186-013-9191-2.

Beltran, Alain. "La politique énergétique de la France au XXe siècle : une construction historique." *Annales des Mines*, 1998, 6–10.

Bernard, Jean-Thomas, Serge Bernard, and Gaétan Lafrance. "La précision de la prévision de la demande d'électricité par Hydro-Québec: une approche comparative." *Energy Studies Review* 8, no. 2 (1997): 130–42. https://doi.org/10.15173/esr.v8i2.388.

Berrier-Lucas, Céline. "Émergence de la dimension environnementale de la RSE : une étude historique franco-québécoise d'EDF et d'Hydro-Québec." Doctorat en gestion, Université Paris-Dauphine, 2014. https://basepub.dauphine.fr//handle/123456789/14651.

Bezdek, Roger H., and Robert M. Wendling. "A Half Century of Long-Range Energy Forecasts: Errors Made, Lessons Learned, and Implications for Forecasting." *Journal of Fusion Energy* 21, no. 3 (2002): 155–72. https://doi.org/10.1023/A:1026208113925.

Borup, Mads, Nik Brown, Kornelia Konrad, and Harro Van Lente. "The Sociology of Expectations in Science and Technology." *Technology Analysis & Strategic Management* 18, no. 3–4 (2006): 285–98. https://doi.org/10.1080/09537320600777002.

Bösch, Frank, and Rüdiger Graf. "Reacting to Anticipations: Energy Crises and Energy Policy in the 1970s. An Introduction." *Historical Social Research / Historische Sozialforschung* 39, no. 4 (2014): 7–21. https://doi.org/10.12759/HSR.39.2014.4.7-21.

Bowden, Gary. "The Social Construction of Validity in Estimates of US Crude Oil Reserves." *Social Studies of Science* 15, no. 2 (1985): 207–40. https://doi.org/10.1177/030631285015002001.

Boyle, Evan. "Rethinking Energy Studies: Equity, Energy and Ivan Illich (1926–2002)." *Energy Research & Social Science* 95 (2023): 102903. https://doi.org/10.1016/j.erss.2022.102903.

BP Canada. *Mémoire de BP Canada Limited à la Commission parlementaire des richesses naturelles et des terres et forêts sur la politique de l'énergie*. Québec: Commission permanente des richesses naturelles et des terres et forêts, 1977.

Brown, Nik, and Mike Michael. "A Sociology of Expectations: Retrospecting Prospects and Prospecting Retrospects." *Technology Analysis & Strategic Management* 15, no. 1 (2003): 3–18. https://doi.org/10.1080/0953732032000046024.

Caron, Carl. "De Manic-Outardes à la Baie James : la gestion des choix techniques à Hydro-Québec." In *Grands projets et innovations technologiques au Canada*, edited by Philippe Faucher, 95–124. Politique et Économie. Montréal: Presses de l'Université de Montréal, 2000. http://books.openedition.org/pum/12129.

Caron, Jean-Roch, and Christian Delavelle. *Prévision de la consommation énergétique à long terme au Québec, 1975-1990: méthode de régression tendancielle*. Collection nationale, BAnQ. Québec: Direction générale de l'énergie, 1975.

Comité de protection de l'environnement de Lotbinière. *Centrales nucléaires : aventure technique coûteuse, dangereuse et inutile*. Québec: Commission parlementaire sur l'énergie, 1977.

Connelly, Matthew, Matt Fay, Giulia Ferrini, Micki Kaufman, Will Leonard, Harrison Monsky, Ryan Musto, Taunton Paine, Nicholas Standish, and Lydia Walker. "'General, I Have Fought Just as Many Nuclear Wars as You Have': Forecasts, Future Scenarios, and the Politics of Armageddon." *The American Historical Review* 117, no. 5 (2012): 1431–60.

Conway, Christopher D. "Ontario's Electrical Future: Global Environmental Limits, Systems Thinking, and Electrical Power Planning in Ontario, 1974-1983." *Scientia Canadensis: Canadian Journal of the History of Science, Technology and Medicine* 37, no. 1–2 (2014): 34–58.

Daly, Herman E. "Energy Demand Forecasting: Prediction or Planning?" *Journal of the American Institute of Planners* 42, no. 1 (1976): 4–15. https://doi.org/10.1080/01944367608977700.

Daston, Lorraine. "What Is an Insurable Risk? Swiss Re and Atomic Reactor Insurance." In *Managing Risk in Reinsurance. From City Fires to Global Warming*, edited by Niels Viggo Haueter and Geoffrey Jones, 230–47. Oxford: Oxford University Press, 2017.

Dayé, Christian. "How to Train Your Oracle: The Delphi Method and Its Turbulent Youth in Operations Research and the Policy Sciences." *Social Studies of Science* 48, no. 6 (2018): 846–68. https://doi.org/10.1177/0306312718798497.

Dennis, Michael Aaron. "Drilling for Dollars: The Making of US Petroleum Reserve Estimates, 1921-25." *Social Studies of Science* 15, no. 2 (1985): 241–65. https://doi.org/10.1177/030631285015002002.

Coutard, Olivier, and Elizabeth Shove. "Infrastructures, Practices and the Dynamics of Demand." In *Infrastructures in Practice: The Dynamics of Demand in Networked Societies*, edited by Elizabeth Shove and Frank Trentmann, 10–22. London: Routledge, 2018.

Desbiens, Caroline. "Appreciating difference? A view from Indigenous rivers." *The Canadian Geographer / Le Géographe canadien* 63, no. 4 (2019): 540–52. https://doi.org/10.1111/cag.12578.

Desbiens, Caroline. "Un nouveau chemin vers les rapides. Chisasibi/La Grande et les relations nord-sud au Québec." *Globe* 9, no. 1 (February 15, 2011): 177–210. https://doi.org/10.7202/1000802ar.

Doganova, Liliana, and Marie Eyquem-Renault. "What Do Business Models Do?" *Research Policy* 38, no. 10 (2009): 1559–70. https://doi.org/10.1016/j.respol.2009.08.002.

Dooley, James. *Long-Range Forecasting and Planning. Ontario Electrical Energy Case*. Bowness-on-Windermere: Public Utilities Forecasting Conference, 1977.

Dunlop, Tessa. "Energy Efficiency: The Evolution of a Motherhood Concept." *Social Studies of Science* 52, no. 5 (2022): 710–32. https://doi.org/10.1177/03063127221096171.

Evans, Robert. "Soothsaying or Science?: Falsification, Uncertainty and Social Change in Macroeconomic Modelling." *Social Studies of Science* 27, no. 3 (1997): 395–438. https://doi.org/10.1177/030631297027003002.

Faucher, Philippe, and Johanne Bergeron. "Approche politique : politiques gouvernementales en matière énergétique." In *Énergie, aménagement, environnement de demain. Les jeudis d'Hydro-Aménagement*, edited by Faculté de l'aménagement and Hydro-Québec, 103–15. Montréal: Université de Montréal, 1985.

Fressoz, Jean-Baptiste. "La « transition énergétique », de l'utopie atomique au déni climatique: États-Unis, 1945-1980." *Revue d'histoire moderne & contemporaine* 69, no. 2 (2022): 114–46. https://doi.org/10.3917/rhmc.692.0115.

Gagnon, Robert, and Yves Gingras. "La baie James : de territoire à laboratoire." *Bulletin d'histoire politique* 7, no. 3 (1999): 67–78. https://doi.org/10.7202/1060352ar.

Geels, Frank W., and Wim A Smit. "Failed Technology Futures: Pitfalls and Lessons from a Historical Survey." *Futures* 32, no. 9–10 (2000): 867–85. https://doi.org/10.1016/S0016-3287(00)00036-7.

Gewirtz, Julian. "The Futurists of Beijing: Alvin Toffler, Zhao Ziyang, and China's 'New Technological Revolution,' 1979–1991." *The Journal of Asian Studies* 78, no. 1 (2019): 115–40. https://doi.org/10.1017/S0021911818002619.

Giraudeau, Martin. "Proving Future Profit: Business Plans as Demonstration Devices." *Osiris* 33, no. 1 (2018): 130–48. https://doi.org/10.1086/699293.

Graber, Frédéric. "Le futur dans l'action. Anticipation savante dans les projets d'alimentation en eau." *Cahiers COSTECH* 3 (2019). http://www.costech.utc.fr/CahiersCOSTECH/spip.php?article107.

Hajer, Maarten A. "Ecological Modernisation as Cultural Politics." In *Risk, Environment and Modernity: Towards a New Ecology*, edited by Scott Lash, Bronislaw Szerszynski, and Brian Wynne, 246–68. Theory, Culture & Society. London: SAGE, 1996.

Hatton-Proulx, Clarence. "Creating Supply, Creating Demand: Gas and Electricity in Montréal from the First World War to the Great Depression." *Journal of Energy History / Revue d'Histoire de l'Énergie [Online]* 5 (2020).

Hatton-Proulx, Clarence. *Une histoire sociale et matérielle des transitions énergétiques urbaines. Le cas de Montréal, 1945-1980*. PhD thesis in history and urban studies. Montréal: Institut de la recherche scientifique et Sorbonne Université, 2023.

Khelfaoui, Mahdi. "Le nucléaire dans la stratégie énergétique du Québec, 1963-2012." *Scientia Canadensis* 37, no. 1–2 (2015): 105–32. https://doi.org/10.7202/1030642ar.

Konrad, Kornelia, Harro Van Lente, Christopher Groves, and Cynthia Selin. "Performing and Governing the Future in Science and Technology." In *The Handbook of Science and Technology Studies*, 465–94. Cambridge: MIT Press, 2017.

Lenel, Laetitia, Roman Köster, and Ulrich Fritsche. "Introduction." In *Futures Past. Economic Forecasting in the 20th and 21st Century*, edited by Laetitia Lenel, Roman Köster, and Ulrich Fritsche, 11–29. Berlin: Peter Lang, 2020. https://doi.org/10.3726/b16817/10.

Leonard, Robert. "E. F. Schumacher and the Making of 'Buddhist Economics,' 1950-1973." *Journal of the History of Economic Thought* 41, no. 2 (2019): 159–86. https://doi.org/10.1017/S1053837218000731.

Lévesque, Alexandre. "Les responsables politiques du Québec face au choc pétrolier de 1973." *Globe* 13, no. 2 (2011): 151–67. https://doi.org/10.7202/1001134ar.

Lifset, Robert D. "A New Understanding of the American Energy Crisis of the 1970s." *Historical Social Research / Historische Sozialforschung* 39, no. 4 (150) (2014): 22–42.

Linteau, Paul-André. "Un débat historiographique : l'entrée du Québec dans la modernité et la signification de la Révolution tranquille." *Francofonia*, no. 37 (1999): 73–87.

Lipartito, Kenneth. "Reassembling the Economic: New Departures in Historical Materialism." *The American Historical Review* 121, no. 1 (2016): 101–39. https://doi.org/10.1093/ahr/121.1.101.

Macfarlane, Daniel, and Andrew Watson. "Hydro Democracy: Water Power and Political Power in Ontario." *Scientia Canadensis: Canadian Journal of the History of Science, Technology and Medicine* 40, no. 1 (2018): 1–18. https://doi.org/10.7202/1048923ar.

MacKenzie, Donald. "A Material Political Economy: Automated Trading Desk and Price Prediction in High-Frequency Trading." *Social Studies of Science* 47, no. 2 (2017): 172–94. https://doi.org/10.1177/0306312716676900.

MacKenzie, Donald. "Is Economics Performative? Option Theory and the Construction of Derivatives Markets." *Journal of the History of Economic Thought* 28, no. 01 (2006): 29–55. https://doi.org/10.1080/10427710500509722.

Maraud, Simon, and Caroline Desbiens. "Eeyou Istchee – Baie James, vers un capital environnemental mixte ?" *Norois. Environnement, aménagement, société*, no. 243 (2017): 71–88. https://doi.org/10.4000/norois.6095.

Maxwell, James, Jennifer Lee, Forrest Briscoe, Ann Stewart, and Tatsujiro Suzuki. "Locked on Course: Hydro-Québec's Commitment to Mega-Projects." *Environmental Impact Assessment Review* 17 (1997): 19–38.

Mitchell, Timothy. "Carbon Democracy." *Economy and Society* 38, no. 3 (2009): 399–432. https://doi.org/10.1080/03085140903020598.

Mohun, Arwen P. "Constructing the History of Risk. Foundations, Tools, and Reasons Why." *Historical Social Research / Historische Sozialforschung* 41, no. 1 (2016): 30–47. https://doi.org/10.12759/HSR.41.2016.1.30-47.

Mohun, Arwen P. *Risk. Negotiating Safety in American Society*. Baltimore: Johns Hopkins University Press, 2013.

Orr, Christopher J. "Environmental Aspirations in an Unsettled Time: Pierre Elliott Trudeau, the Club of Rome, and Canadian Environmental Politics in the 1970s." *Canadian Journal of History* 57, no. 2 (2022): 246–79. https://doi.org/10.3138/cjh-57-2-2021-0101.

Poirier, Valérie. "Expertise, Local Knowledge, and the Construction of the Automobile as an Environmental Risk in Montreal, 1960s–70s." *Canadian Historical Review* 101, no. 3 (2020): 397–423. https://doi.org/10.3138/chr-2018-0102.

Poirier, Valérie. "« L'autoroute est-ouest, c'est pas le progrès ! » : environnement et mobilisation citoyenne en opposition au projet d'autoroute est-ouest à Montréal en 1971." *Bulletin d'histoire politique* 23, no. 2 (2015): 66–91. https://doi.org/10.7202/1028884ar.

Reichmann, Werner. "Epistemic Participation: How to Produce Knowledge about the Economic Future." *Social Studies of Science* 43, no. 6 (2013): 852–77. https://doi.org/10.1177/0306312713498641.

Rindzevičiūtė, Eglė. "A Struggle for the Soviet Future: The Birth of Scientific Forecasting in the Soviet Union." *Slavic Review* 75, no. 1 (2016): 52–76. https://doi.org/10.5612/slavicreview.75.1.52.

Rowe, Gene, and George Wright. "The Delphi Technique as a Forecasting Tool: Issues and Analysis." *International Journal of Forecasting* 15, no. 4 (1999): 353–75. https://doi.org/10.1016/S0169-2070(99)00018-7.

Roy, Mathieu. "Le groupe SDBJ et le développement du Nord au cours du projet de la Baie-James (1971-1984)." *Bulletin d'histoire politique* 30, no. 2 (2022): 125. https://doi.org/10.7202/1092610ar.

Sarra-Bournet, Michel. "L'économie du Québec et le modèle libéral duplessiste dans une perspective comparée." *Bulletin d'histoire politique* 24, no. 1 (2015): 56. https://doi.org/10.7202/1033393ar.

Radu, Ioana, Larry M. House, and Eddie Pashagumskum. "Land, Life, and Knowledge in Chisasibi: Intergenerational Healing in the Bush." *Decolonization: Indigeneity, Education & Society* 3, no. 3 (2014): 86–105.

Savard, Stéphane. "Les communautés autochtones du Québec et le développement hydroélectrique: Un rapport de force avec l'État, de 1944 à aujourd'hui." *Recherches amérindiennes au Québec* 39, no. 1–2 (2010): 47–60. https://doi.org/10.7202/044996ar.

Shove, Elizabeth, Heather Chappells, Loren Lutzenhiser, and Bruce Hackett. "Comfort in a Lower Carbon Society." *Building Research & Information* 36, no. 4 (2008): 307–11. https://doi.org/10.1080/09613210802079322.

Silvast, Antti, Erik Laes, Simone Abram, and Gunter Bombaerts. "What Do Energy Modellers Know? An Ethnography of Epistemic Values and Knowledge Models." *Energy Research & Social Science* 66 (2020): 1–8. https://doi.org/10.1016/j.erss.2020.101495.

Trentmann, Frank. "Getting to Grips with Energy: Fuel, Materiality and Daily Life." *Science Museum Group Journal* 9 (2018). https://doi.org/10.15180/180901.

Trentmann, Frank, and Anna Carlsson-Hyslop. "The Evolution of Energy Demand in Britain: Politics, Daily Life, and Public Housing, 1920s-1970s." *The Historical Journal* 61, no. 3 (September 2018): 807–39. https://doi.org/10.1017/S0018246X17000255.

Turnbull, Thomas. "California's Quandary: Saving Energy at the RAND Corporation." *Environmental History*, 2023. https://doi.org/10.1086/726450.

Turnbull, Thomas. "'No Solution to the Immediate Crisis': The Uncertain Political Economy of Energy Conservation in 1970s Britain." *Contemporary European History* 31, no. 4 (2022): 570–92. https://doi.org/10.1017/S0960777322000625.

Valaskakis, Kimon. "Prospective, rétrospective et perspective : un essai de modélisation du temps." *L'Actualité économique* 51, no. 2 (1975): 209–28. https://doi.org/10.7202/800618ar.

Wachtmeister, Henrik, Petter Henke, and Mikael Höök. "Oil Projections in Retrospect: Revisions, Accuracy and Current Uncertainty." *Applied Energy* 220 (2018): 138–53. https://doi.org/10.1016/j.apenergy.2018.03.013.

Walker, Gareth. "A Critical Examination of Models and Projections of Demand in Water Utility Resource Planning in England and Wales." *International Journal of Water Resources Development* 29, no. 3 (2013): 352–72. https://doi.org/10.1080/07900627.2012.721679.

Wellum, Caleb. "Energizing Finance: The Energy Crisis, Oil Futures, and Neoliberal Narratives." *Enterprise & Society*, 2019, 1–36. https://doi.org/10.1017/eso.2019.26.

Yon, Guillaume. "Building a National Machine: The Pricing of Electricity in Postwar France." *History of Political Economy* 52 (2020): 245–69.

Newspapers and Magazines

Binette, André. "La cour suprême et Manic 5." *Le Devoir*, August 6, 2021.

Hydro-Québec. "Entre-Nous." *Entre-Nous* 44, no. 4 (1964).

Hydro-Québec. "Entre-Nous." *Entre-Nous* 46, no. 17 (1966).

Hydro-Québec. "Entre-Nous." *Entre-Nous* 49, no. 7 (1969).

Hydro-Québec. "Entre-Nous." *Entre-Nous* 50, no. 5 (1970).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 51, no. 17 (1971).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 52, no. 20 (1972).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 52, no. 3 (1972).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 53, no. 18 (1973).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 55, no. 12 (1975).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 56, no. 14 (1976).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 56, no. 20 (1976).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 56, no. 13 (1976).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 57, no. 5 (1977).

Hydro-Québec. "Hydro-Presse." *Hydro-Presse* 58, no. 14 (1978).

Nadeau, Jean-François. "Barrage Daniel-Johnson: pas de quoi fêter selon les Innus." *Le Devoir*, October 2, 2019.

Archives

Baribeau, Benoît. *À la recherche d'énergie. Conférence.* Archives d'Hydro-Québec (AHQ) fonds H01 loc. 5347. Montréal: Hydro-Québec, 1964.

Bolullo, Louis, Alain Lavallée, Pierre Lecocq, Éric Maillé, Jacques Nepveu, Normand Grégoire, Louise Charette, and Direction Recherche économique. *Analyse globale de l'environnement énergétique du Québec, 1975-2000. AHQ loc.* 251. Montréal: Hydro-Québec, 1976.

Boulanger, Virginie. "Catastrophe ou nouvelle société." *Le réveil du consommateur*, AUQAM, fonds 69P, chemise 660/7, 6, no. 2 (1977): 20–28.

Boyd, Robert-A. *Recommandations de l'Hydro-Québec pour une politique énergétique québécoise*. AHQ fonds H01 loc. 930. Montréal: Hydro-Québec, 1977.

Cao, Michel H., and Direction générale de l'énergie. *Documents de référence sur les prévisions de la demande d'énergie* (*1980-1996*). BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, S1, 1993-11-003/69). Québec: Direction générale de l'administration, 1981.

Charest, Francine. *Commission parlementaire sur la politique énergétique du Québec. La couverture de presse. Les opinions des journalistes et des intervenants sur l'Hydro-Québec*. BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, S999, 1985-02-009/16). Québec: Commission parlementaire sur la politique énergétique du Québec, 1977.

Comité de la prévision d'entreprise. *Cycle 1981 de la planification générale. Prévision de la demande d'électricité. 1981-1997.* AHQ loc. 5718. Montréal: Hydro-Québec, 1981.

Comité directeur Études à long terme. *Rapport intérimaire. Les activités du comité directeur Études à long terme*. AHQ loc. 8507. Montréal: Hydro-Québec, 1977.

Comité directeur Études à long terme. *Rapport intérimaire. Les nouveaux modes de production de l'électricité*. AHQ loc. 8507. Montréal: Hydro-Québec, 1977.

Direction de la Planification. *L'incertitude de l'évolution de la demande d'électricité et ses effets sur la planification des équipements.* AHQ fonds H01 loc. 930. Montréal: Hydro-Québec, 1977.

Direction de la Planification. *Prévision de la demande ferme et de la production du réseau intégré*. 1967-*68 à 1981-82.* AHQ loc. 13327. Montréal: Hydro-Québec, 1967.

Direction de la Planification, Yves Dumais, Carol Mercier, and Gilles Roy. *Prévision de la demande*. 1977-*78 à 1991-92.* AHQ loc. 873. Montréal: Hydro-Québec, 1977.

Direction de la Planification, Jacques Fontaine, and Marcel Désilets. *Prévision de la demande du réseau intégré. 1968-69 à 1982-83.* AHQ loc. 13327. Montréal: Hydro-Québec, 1968.

Direction de la Planification, Carol Mercier, André Rochon, Gilles Roy, and Normand Salman. *Prévision de la demande. 1978-79 à 1992-93.* AHQ loc. 873. Montréal: Hydro-Québec, 1978.

Direction de l'Environnement. *Éléments d'analyse du contexte futur de la mission principale de l'Hydro-Québec : l'électricité*. BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, S999, 1985-02-009/5). Montréal: Hydro-Québec, 1977.

Direction générale de l'Administration. *Quelques notes sur le document du groupe de l'analyse quantitative et de l'information statistique : DGA (septembre* 1983*). Prévisions d'évolution de la demande d'électricité 1981-1995. Analyse des évaluations d'Hydro-Québec*. BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, 2014-07-007/13). Québec: Direction générale de l'administration, 1983.

Direction générale de l'Énergie. *La politique québécoise de l'énergie. Assurer l'avenir.* AHQ fonds H01 loc. 930. Québec: Gouvernement du Québec, 1978.

Direction générale de l'Énergie, and Direction des Études et prévisions. *Prévision de la demande d'énergie totale et de l'énergie électrique. Québec : 1980-1994. Annexe Au Rapport*. BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, 2014-07-007/13). Québec: Direction générale de l'énergie, 1979.

Division Relations collectivités, Service de l'information, and Direction Relations publiques. *Dossier argumentaire sur l'Hydro-Québec.* AHQ fonds H01 loc. 2624. Montréal: Hydro-Québec, 1977.

Dunn, Roger, René Durand, and Jacques Poirier. *Prévision de la consommation d'électricité au Québec pour le secteur domestique et agricole. Étude par usages*. AHQ loc. 2423. Montréal: Hydro-Québec, 1974.

Durand, René. *Critique du modèle économétrique de prévision de la demande de la direction Recherche économique*. AHQ loc. 2423. Montréal: Hydro-Québec, 1973.

Durand, René, and Jacques Poirier. *Considérations générales sur la prévision. Les objets de la prévision*. AHQ loc. 2423. Montréal: Hydro-Québec, 1974.

Faculty of Graduate Studies and Research. *Report of the McGill Advisory Committee to the Executive Committee*. AMG, Records Group 0036, Container 0215, File 00173. Montréal: McGill University, 1977.

Groupe associé Montréal, McGill pour l'étude de l'avenir. *Activities Report 1974-1978.* AMG, Records Group 0036, Container 0624, File 04089. Montréal: GAMMA, 1979.

Groupe de travail no. 12. *Étude du plan d'expansion. Rapport du groupe no. 12 des études à long terme-Programme d'équipement.* AHQ loc. 8507. Montréal: Hydro-Québec, 1978.

Groupe interuniversitaire pour une prospective québécoise. *Prospective du système socio-économique québécois. Projet de recherche visant à l'identification d'avenirs alternatifs du Québec à l'horizon 1995.* AMG, Records Group 0036, Container 0215, File 00173. Québec: Office de planification et de développement du Québec, 1975.

Guérin, Jean, Gilles Tousignant, Louis Bolullo, Lyne Grondin, Direction générale de l'énergie, and Direction Recherche économique. *Compte-rendu. World Energy Model. Réunions réunissant des représentants du Stanford Research Institute International (SRI), du Gouvernement du Québec et d'Hydro-Québec, tenues Les 14, 15 et 16 mars 1979 à Menlo Park, Californie.* BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, 1997-05-002/3). Montréal: Hydro-Québec, 1979.

Huot, J. *Demande en pointe et énergie de l'Hydro-Québec pour les années 1963-64 à 2000-01.* AHQ loc. 13327. Montréal: Hydro-Québec, 1965.

Hydro-Québec. *Évolution et prévision des besoins d'électricité au Québec.* AHQ loc. 2423. Montréal: Hydro-Québec, 1973.

Hydro-Québec. *Financial Highlights.* AHQ loc. 5718. Montréal: Hydro-Québec, 1980.

Hydro-Québec. *Front commun pour un débat public sur l'énergie. Semaine sur l'énergie à l'UQAM. Compte-rendu des activités.* AHQ fonds H01 loc. 930. Montréal: Hydro-Québec, 1981.

Joron, Guy. *Mémoire au conseil des ministres. Création d'un ministère de l'Énergie.* BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, S999, 1985-02-009/18). Québec: Direction générale de l'énergie, 1979.

McIvor, Donald K. *Canada's Energy Future. An Address to the Prospectors & Developers Association.* BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, S999, 1985-02-009/24). Toronto: Imperial Oil, 1977.

Neveu, Gilbert. *Demand Forecasting at Hydro-Québec.* AHQ fonds H01 loc. 1611. Montréal: Hydro-Québec, 1985.

Planification générale. *Dossier préparé en réponse aux questions du gouvernement du Québec.* BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, S1, 1993-11-003/69). Montréal: Hydro-Québec, 1980.

Service de l'Information, and Direction Relations publiques. *La prévision de la demande d'électricité au Québec, 1976-2000.* AHQ fonds H01 loc. 2624. Montréal: Hydro-Québec, 1976.

Sewell, W. R. Derrick, and Harold D. Foster. *Images of Canadian Futures: The Role of Conservation and Renewable Energy.* BANQ Québec, Fonds Ministère de l'Énergie et des Ressources naturelles (E78, S999, 1985-02-009/24). Ottawa: Environment Canada, 1976.

The Conserver. "Federal Government Announces New Conservation Measures to Cut Energy Waste." *The Conserver*, AMG, School of Urban Planning Collection, Box C-SUPC1-36, 1, no. 1 (1976): 1.

Zins, Raymond. *Le rôle de l'Hydro-Québec dans l'aménagement régional.* AHQ fonds H01 loc. 1093. Québec: ACFAS, 1963.

Zins, Raymond, and Roger Labrie. *Projet de mise sur pied d'un service de recherche économique à l'Hydro-Québec.* AHQ H2/1931 loc. 27. Montréal: Hydro-Québec, 1962.

Cite this article: Hatton-Proulx, Clarence. "The Role of Forecasts in Planning for Energy Infrastructure: A Historical Look at Past Futures in Postwar Quebec." *Enterprise & Society* (2024): 1–44.