LOOKING FOR ANSWERS IN THE GARBAGE CAN

Using the Garbage Can Model

to Analyze

Hydro Quebec's Decision to Incorporate Windpower

in its Generating Mix

by

ANGELO PHILIPPAS

A thesis submitted to the Department of Political Science
in conformity with the requirements for
the degree of Master of Arts

Carleton University
Ottawa, Ontario, Canada
August, 1996

ISBN 0-612-19448-5

Name _____

Dissertation Abstracts International is arranged by broad, general subject categories. Please select the one subject which most nearly describes the content of your dissertation. Enter the corresponding four-digit code in the spaces provided.

SUBJECT TERM

SUBJECT CODE

U·M·I

Subject Categories

THE HUMANITIES AND SOCIAL SCIENCES

COMMUNICATIONS AND THE ARTS

Architecture 0729
Art History 0377
Cinema 0900
Dance 0378
Fine Arts 0357
Information Science 0723
Journalism 0391
Library Science 0399
Mass Communications 0708
Music 0413
Speech Communication 0459
Theater 0465

EDUCATION

General 0515
Administration 0514
Adult and Continuing 0516
Agricultural 0517
Art 0273
Bilingual and Multicultural 0282
Business 0688
Community College 0275
Curriculum and Instruction 0727
Early Childhood 0518
Elementary 0524
Finance 0277
Guidance and Counseling 0519
Health 0680
Higher 0745
History of 0520
Home Economics 0278
Industrial 0521
Language and Literature 0279
Mathematics 0280
Music 0522
Philosophy of 0998
Physical 0523

Psychology 0525
Reading 0535
Religious 0527
Sciences 0714
Secondary 0533
Social Sciences 0534
Sociology of 0340
Special 0529
Teacher Training 0530
Technology 0710
Tests and Measurements 0288
Vocational 0747

LANGUAGE, LITERATURE AND LINGUISTICS

Language
- General 0679
- Ancient 0289
- Linguistics 0290
- Modern 0291

Literature
- General 0401
- Classical 0294
- Comparative 0295
- Medieval 0297
- Modern 0298
- African 0316
- American 0591
- Asian 0305
- Canadian (English) 0352
- Canadian (French) 0355
- English 0593
- Germanic 0311
- Latin American 0312
- Middle Eastern 0315
- Romance 0313
- Slavic and East European 0314

PHILOSOPHY, RELIGION AND THEOLOGY

Philosophy 0422
Religion
- General 0318
- Biblical Studies 0321
- Clergy 0319
- History of 0320
- Philosophy of 0322

Theology 0469

SOCIAL SCIENCES

American Studies 0323
Anthropology
- Archaeology 0324
- Cultural 0326
- Physical 0327

Business Administration
- General 0310
- Accounting 0272
- Banking 0770
- Management 0454
- Marketing 0338

Canadian Studies 0385
Economics
- General 0501
- Agricultural 0503
- Commerce-Business 0505
- Finance 0508
- History 0509
- Labor 0510
- Theory 0511

Folklore 0358
Geography 0366
Gerontology 0351
History
- General 0578
- Ancient 0579
- Medieval 0581
- Modern 0582
- Black 0328
- African 0331
- Asia, Australia and Oceania 0332
- Canadian 0334
- European 0335
- Latin American 0336
- Middle Eastern 0333
- United States 0337

History of Science 0585
Law 0398
Political Science
- General 0615
- International Law and Relations 0616
- Public Administration 0617

Recreation 0814
Social Work 0452
Sociology
- General 0626
- Criminology and Penology 0627
- Demography 0938
- Ethnic and Racial Studies 0631
- Individual and Family Studies 0628
- Industrial and Labor Relations 0629
- Public and Social Welfare 0630
- Social Structure and Development 0700
- Theory and Methods 0344

Transportation 0709
Urban and Regional Planning 0999
Women's Studies 0453

THE SCIENCES AND ENGINEERING

BIOLOGICAL SCIENCES

Agriculture
- General 0473
- Agronomy 0285
- Animal Culture and Nutrition 0475
- Animal Pathology 0476
- Food Science and Technology 0359
- Forestry and Wildlife 0478
- Plant Culture 0479
- Plant Pathology 0480
- Plant Physiology 0817
- Range Management 0777
- Wood Technology 0746

Biology
- General 0306
- Anatomy 0287
- Biostatistics 0308
- Botany 0309
- Cell 0379
- Ecology 0329
- Entomology 0353
- Genetics 0369
- Limnology 0793
- Microbiology 0410
- Molecular 0307
- Neuroscience 0317
- Oceanography 0416
- Physiology 0433
- Radiation 0821
- Veterinary Science 0778
- Zoology 0472

Biophysics
- General 0786
- Medical 0760

EARTH SCIENCES

Biogeochemistry 0425
Geochemistry 0996

Geodesy 0370
Geology 0372
Geophysics 0373
Hydrology 0388
Mineralogy 0411
Paleobotany 0345
Paleoecology 0426
Paleontology 0418
Paleozoology 0985
Palynology 0427
Physical Geography 0368
Physical Oceanography 0415

HEALTH AND ENVIRONMENTAL SCIENCES

Environmental Sciences 0768
Health Sciences
- General 0566
- Audiology 0300
- Chemotherapy 0992
- Dentistry 0567
- Education 0350
- Hospital Management 0769
- Human Development 0758
- Immunology 0982
- Medicine and Surgery 0564
- Mental Health 0347
- Nursing 0569
- Nutrition 0570
- Obstetrics and Gynecology 0380
- Occupational Health and Therapy 0354
- Ophthalmology 0381
- Pathology 0571
- Pharmacology 0419
- Pharmacy 0572
- Physical Therapy 0382
- Public Health 0573
- Radiology 0574
- Recreation 0575
- Speech Pathology 0460
- Toxicology 0383
- Home Economics 0386

PHYSICAL SCIENCES

Pure Sciences
Chemistry
- General 0485
- Agricultural 0749
- Analytical 0486
- Biochemistry 0487
- Inorganic 0488
- Nuclear 0738
- Organic 0490
- Pharmaceutical 0491
- Physical 0494
- Polymer 0495
- Radiation 0754

Mathematics 0405
Physics
- General 0605
- Acoustics 0986
- Astronomy and Astrophysics 0606
- Atmospheric Science 0608
- Atomic 0748
- Electronics and Electricity 0607
- Elementary Particles and High Energy 0798
- Fluid and Plasma 0759
- Molecular 0609
- Nuclear 0610
- Optics 0752
- Radiation 0756
- Solid State 0611

Statistics 0463

Applied Sciences
Applied Mechanics 0346
Computer Science 0984

Engineering
- General 0537
- Aerospace 0538
- Agricultural 0539
- Automotive 0540
- Biomedical 0541
- Chemical 0542
- Civil 0543
- Electronics and Electrical 0544
- Heat and Thermodynamics 0348
- Hydraulic 0545
- Industrial 0546
- Marine 0547
- Materials Science 0794
- Mechanical 0548
- Metallurgy 0743
- Mining 0551
- Nuclear 0552
- Packaging 0549
- Petroleum 0765
- Sanitary and Municipal 0554
- System Science 0790

Geotechnology 0428
Operations Research 0796
Plastics Technology 0795
Textile Technology 0994

PSYCHOLOGY

General 0621
Behavioral 0384
Clinical 0622
Developmental 0620
Experimental 0623
Industrial 0624
Personality 0625
Physiological 0989
Psychobiology 0349
Psychometrics 0632
Social 0451

The undersigned hereby recommend to

the Faculty of Graduate Studies and Research

acceptance of the thesis,

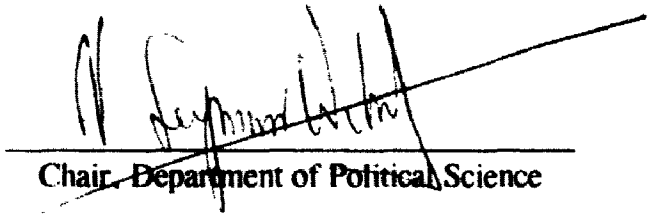
**LOOKING FOR ANSWERS IN THE GARBAGE CAN:
USING THE GARBAGE CAN MODEL TO ANALYZE HYDRO QUEBEC'S
DECISION TO INCORPORATE WINDPOWER IN ITS GENERATING MIX**

submitted by

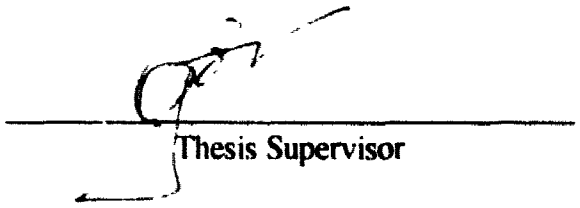
Angelos Philippas, B.A. (Hons.)

in partial fulfilment of the requirements

for the degree of Master of Arts



Chair, Department of Political Science



Thesis Supervisor

Carleton University
August 21, 1996

ABSTRACT

Hydro Quebec is synonymous with hydroelectric power. The utility has earned an international reputation for its expertise with that generating technology. Yet, in the fall of 1994, it chose to add windpower to its generating mix. John Kingdon's garbage can model of public policy-making proves a useful tool in analyzing the factors which led to this unprecedented decision. Specifically, the actions of pro-windpower advocates, coupled with unexpected resistance to Hydro Quebec's preferred generating option, and an equally unforeseen shift in the political environment combined to produce conditions which favoured the utilization of windpower.

TABLE OF CONTENTS

I N T R O D U C T I O N

Setting the Scene

In 1994 Hydro Quebec announced that it would add wind power to its generating mix. This was a perplexing decision for, prior to the announcement, Hydro Quebec appeared committed to the notion that any expansion in supply in the short term, would be met by the hydroelectric option.[1] The utility's Development Plan 1993, which was a poorly disguised justification for the Great Whale project, essentially precluded wind power in the near term. It deemed electricity generated by wind energy as too expensive relative to other means (ie. Great Whale), and condemned it as being of little use except in remote areas.[2] How can this be reconciled to the utility's decision, but one year later, to proceed with a 100 megawatt, $130 million windpower project? What caused the utility to abruptly reverse its policy direction?

Hydro Quebec's relationship with hydroelectric power is inherently linked to its dominant idea. To understand this driving force it is important to understand the circumstances of the utility's birth. Referring to an inanimate object's "birth" may appear to be an inappropriate case of personification, yet with respect to Hydro Quebec it is fully warranted.

The utility is a child of the Quiet Revolution, the decade which witnessed the metamorphosis of the withdrawn French Canadian population into the self-assured, assertive

---

[1] Hydro Quebec, Development Plan 1993.

[2] Ibid.

"peuple Quebecois". The collective attitude was transformed from the intertwined imperatives of cultural and linguistic survival to a state of mind best summed up by the slogan: "Maitre chez nous." This change was reflected in the decline of the Church's significance and the perception of the state as the new protector of the Quebecois. As such it adopted a more pro-active role of intervention in the economy.[3] This strategy was aimed at integrating francophones into sectors of the economy, particularly managerial and technical positions, they had historically been absent from.[4] As a result, both the state and the institutions it created were perceived by the francophone population as symbols of their new-found nationhood. Consequently, they were invested with the hopes, ambitions and desires of the "peuple".

The statist approach yielded only one early success, Hydro Quebec.[5] Prior to the Lesage government's nationalization of electricity in 1963, Hydro Quebec had been a minor crown owned utility. However, once granted monopoly status of the province's electricity markets, it came to embody the entrepreneurial spirit and technical prowess of the

---

[3] Kenneth McRoberts, Quebec: Social Change and Political Crisis, 3rd ed., (Toronto: McClelland & Stewart Co., 1989), 174.

[4] Ibid., 133.

[5] Alain-G. Gagnon and Mary Beth Montcalm, Quebec: Beyond the Quiet Revolution, (Scarborough: Nelson Canada, 1990), 69.

Quebecois.[6] Hence, every project undertaken was a challenge, and each one completed a validation of the existence and abilities of Quebecois society. In this sense, Hydro Quebec fulfilled a legitimizing role similar to that performed by the Church in the old order. In short, the utility

> ...became the first major enterprise under francophone control, and a key component in the strategy of using natural resource wealth to achieve more extensive industrial development both within the province and under francophone control.[7]

Therefore, Hydro Quebec was entrusted with a task far greater than generating electricity. It was to assist in the building of a nation.

From this one may distil the essence of the utility's dominant idea: growth. How can a society flourish if it does not grow? As a symbolic representation of Quebecois society, it is imperative that Hydro Quebec build. Bigger is definitely better. Hydro electric projects satisfy this need and meet additional criteria. Their vast capital requirements and the necessary engineering expertise mark them as endeavours which only developed societies can undertake.

How can the wind power project be reconciled with Hydro Quebec's dominant idea and the criteria it entails? In truth,

---

[6] Gordon Edwards, President of the Canadian Coalition for Nuclear Responsibility, Telephone Interview, 8 November 1995.

[7] Gagnon and Montcalm, Quebec, 54.

done. Hydro Quebec's environmental credentials had been savaged. Consequently, decision-makers were searching for a means to rejuvenate the utility's environmental image while satisfying the imperative of growth. A perusal of the policy stream presented an ideal solution: windpower.

The Political Stream

This stream may be understood to represent the political environment. As such it may be affected by a number of factors such as a change in government, turnover of key personnel, the national mood, a shift in organized political interests, and even bureaucratic turf wars. Due to its numerous components, the political environment can change quite quickly. For example, an election which results in a change of government guarantees an agenda shift as the new administration seeks to act upon its own priorties. Many of the ideas championed by the previous regime will be discarded.

With respect to the case study, a change in government coupled with the turnover of key personnel that it engendered, transformed the dynamics of the political stream with respect to energy policy. An era of unquestioning adherence to the hydroelectric megaproject was over.[12] In its place, a more diversified approach to energy planning was adopted. As a result, the status of new technologies, like windpower, was enhanced.

---

[12] Francois Tanguay, Greenpeace Canada, Telephone Interview, 23 January 1996.

Unlike other public policy making models, the garbage can's focus is on the pre-decision stage of the policy-making process.[5] In other words, its goal is to examine the reason for why an idea / policy alternative can languish for years for want of official attention (wind power in Quebec), and then suddenly become the subject of such attention.

The garbage can model is composed of three streams. Their intersection raises an idea to prominence. A more detailed examination of the theory's dynamics will be undertaken in Chapter 1. For now, a brief overview of each stream shall be presented, and the relevant aspects of the case study introduced.

The Policy Stream

The policy stream, as described by Kingdon, is remarkably similar both in form and function to the notion of a policy community. Ideas, which are later interpreted as either alternatives or solutions, are generated in this stream. Each idea / alternative / solution is championed by advocates who attempt to build coalitions of support. This is an essential step, for when an opportunity arises, only those ideas with networks of support will be seriously considered as policy alternatives by decision-makers.

Wind energy advocates in Quebec did not operate in a vacuum in their attempts to convince Hydro Quebec and

---

[5] Kingdon, **Alternatives**, 1.

government officials of the merits of wind energy. They were not scrambling to construct a best case scenario founded on assumptions. Rather, advocates like the Canadian Wind Energy Association could point to successful wind power undertakings in other parts of the world. These examples offered not only convincing proof of wind energy's commercial and technical viability but also provided the advocates with an established, international network.

Despite [illegible]ciation with hydroelectric projects, Hydro Quebec does fund internal R&D programs. Amongst these is a wind power research group. Bureaucratic behaviour all but dictates that this group was active, seeking to expand its influence and turf, in lobbying the utility's decision makers as to the benefits of wind energy.

It is logical to assume that the lobbying efforts of these vested interests pre-dated not only the decision to shelve Great Whale but even the initial decision to conduct feasibility studies. Regardless of when these efforts actually began, it should be noted that they were incapable of overcoming Hydro Quebec's dominant idea. The decision to allocate resources for Great Whale's environmental impact studies is proof of this. However, the 1994 announcement makes it clear that the arguments of wind energy's advocates were compelling enough when combined with the events which occurred in the problem and political streams.

The Problem Stream

The opportunities which are so eagerly awaited by advocates, are created in the problem stream. From the perspective of the government, or in this case Hydro Quebec, they are not considered opportunities but problems. Problems occur in two possible forms. They may be manifested as a crisis, such as the collapse of a dam.[10] Or a problem may be revealed by what Kingdon terms, leading indicators.[11] For example, the consumption of electricity may undergo dramatic growth necessitating that an expansion of supply be undertaken ahead of schedule. For decision-makers, problems, regardless of the form they take, are a cause for concern. They represent a loss of agenda control and the injection of uncertainty. Solutions must be found to alleviate the problem and therefore, decision-makers look to the policy stream for policy alternatives.

Faithful to its dominant idea, Hydro Quebec planned to meet projected demand by building a hydroelectric megaproject, Great Whale. This decision sparked criticism from both environmental and energy activists who argued that cheaper less environmentally destructive means existed. Opposition slowly spread, gaining momentum until Great Whale had become a public relations crisis for the utility. In the end the megaproject was shelved. However, the damage by then was

---

[10] Ibid., 17.

[11] Ibid., 17.

done. Hydro Quebec's environmental credentials had been savaged. Consequently, decision-makers were searching for a means to rejuvenate the utility's environmental image while satisfying the imperative of growth. A perusal of the policy stream presented an ideal solution: windpower.

The Political Stream

This stream may be understood to represent the political environment. As such it may be affected by a number of factors such as a change in government, turnover of key personnel, the national mood, a shift in organized political interests, and even bureaucratic turf wars. Due to its numerous components, the political environment can change quite quickly. For example, an election which results in a change of government guarantees an agenda shift as the new administration seeks to act upon its own priorties. Many of the ideas championed by the previous regime will be discarded.

With respect to the case study, a change in government coupled with the turnover of key personnel that it engendered, transformed the dynamics of the political stream with respect to energy policy. An era of unquestioning adherence to the hydroelectric megaproject was over.[12] In its place, a more diversified approach to energy planning was adopted. As a result, the status of new technologies, like windpower, was enhanced.

---

[12] Francois Tanguay, Greenpeace Canada, Telephone Interview, 23 January 1996.

The convergence of these unrelated events conspired to drive windpower, an energy resource dismissed by Hydro Quebec's decision-makers, from a fate of remote area applications obscurity to grid-connected prominence. A more detailed application of the garbage can model to the case study will reveal the truth of Kingdon's contention that it is impossible to predict policy and as a result its creation is the result of a chaotic conglomeration of diverse events.

In Chapter 1, the concepts and dynamics of the garbage can model will be presented and examined in greater detail. Chapter 2 will be devoted to informing readers about both wind energy and the high technology industry it has spawned. This is an important section of the thesis, for the case must be made that wind power is a technically and economically viable means of generating electricity. An appendix has been added to inform the reader on the more technical dimensions of wind generated energy production and should be read before Chapter 2.

The purpose of Chapters 3-5 will be to apply the garbage can model to the case study but once again in greater detail. The policy stream will be the subject of Chapter 3, the problem stream of Chapter 4, and the political stream of Chapter 5.

In the final chapter, conclusions will be drawn as to the effectiveness of the garbage can model in explaining Hydro

Quebec's decision to incorporate wind power into its generating mix.

C H A P T E R O N E

An Examination of the Garbage Can Model

Introduction

Victor Hugo once wrote that, "Greater than the tread of mighty armies is an idea whose time has come." Yet this bold statement asks two quiet questions: Where did the idea come from, and why has its time come?

To answer these questions, John Kingdon devised the garbage can model of public policy-making. His research centred on the U.S. departments of health and transportation, two distinct policy communities. Kingdon's efforts revealed certain truths: ideas can come from anywhere; nobody leads anybody else; and an attempt to trace the origins of an idea involves infinite regress.[13]

These characteristics of the public policy-making process provide the parameters within which the garbage can model operates. That ideas come from anywhere illustrates the openness of the policy community. One source may be influential for a particular case but completely uninvolved in another. This, in turn, highlights the fact that there is no monopoly of ideas.[14] Kingdon's research revealed that the proximate origin of an idea may come from a variety of sources both inside and outside of the government.[15] In short, a specific entity can not be pinpointed as the generator of ideas. This leads to the conclusion that "...the key to

---

[13] Kingdon, Agendas, 75-8.

[14] Ibid., 26.

[15] Ibid.

understanding policy changes is not where the idea came from but what made it take hold and grow."[16]

The final truth Kingdon distilled was that a search for an idea's origins is a never-ending task. This is due to the fact that, with respect to the development of ideas, there is nothing new under the sun.[17] The ideas that float around the policy community are not new but simply older ideas repackaged. These ideas are composed of familiar elements which are recombined into a new structure or proposal.[18] Therefore, it is impossible to locate an idea's origins. Various older ideas, each with its own history, have been woven together to create a new idea. Thus, if one were to "...trace the history of a proposal or concern back through time, there is no logical place to stop the process."[19] In fact,

> ...any established policy area, if examined closely enough, seems more like a meandering stream of ideas, arguments, and porposals than it does a finely graduated evolutionary tree.[20]

---

[16] Ibid., 76.

[17] Ibid., 148.

[18] Ibid., 131.

[19] Ibid.

[20] Les Pal, Public Policy Analysis: An Introduction, (Toronto: Methuen, 1992), 126.

This observation is a blow to the comprehensive rational decision-making model which postulates that alternatives are developed in response to the specific definition of a problem. Thus, if the origins of ideas are unclear, the comprehensive rational model is of little use.[21]

Due to these shortcomings, there is...

> ...a continuing search for prescriptive models which suffer from neither the unrealism of the ideal-type rational model or the incompleteness of incremental approaches.[22]

At first glance, this appears to give the advantage to incremental theories. Their reliance on the status quo as the foundation for future policy expansion seems ideally suited to Kingdon's findings. However, incremental models suffer from their own flaws, chief amongst them, the inability to explain rapid and massive changes in policy direction.[23]

Confronted by the failure of existing models to adequately explain the phenomena his research revealed, Kingdon developed the garbage can model. Unlike the comprehensive rational decision-making model, it does not operate from the assumption that the policy-making process is divided into prescribed, evolutionary stages. Nor does it

---

[21] Ibid., 126.

[22] Christopher Ham and Michael Hall, The Policy Process in the Modern Capitalist State, 2nd ed., (New York: Harvester Wheatsheaf, 1993), 80.

[23] Pal, Public, 126.

require that the definition of a problem lead to the development of solutions. Rather, the garbage can model allows for the possibility that solutions may not only predate but play an important role in the definition of the problem.[24] Furthermore, the garbage can, unlike incremental models, is able to explain both gradual and radical agenda change. In short, its flexibility allows it to capture the breaks and discontinuities which truly characterize the policy-making process.[25]

The focus of the garbage can model is on the pre-decision stage of the public policy-making process. It seeks to explain how an idea's time has come. What conditions occur to make an idea flourish? During the course of his research, Kingdon discovered countless examples of ideas that languished for want of official attention. Why was it not forthcoming? What differentiated the ideas that failed to germinate from those that bloomed?

The concept of the agenda and its role will be the first subject addressed. This will be followed by an examination of the factors which may affect the process of agenda-setting, and relatedly, the specification of alternatives. It is during this portion of the discussion that the components of the garbage can model will be introduced and its dynamics presented. Lastly, the governmental centred thrust of the

---

[24] Kingdon, Agendas, 91.

[25] Pal, Public, 126.

model will be reconciled to its use in analysing Hydro Quebec's decision with respect to the use of wind power.

The Agenda: An Instrument of Order

Governments are confronted by an immense number of issues. The process of agenda-setting prioritizes the subjects and indicates which ones shall receive government attention. Thus, the agenda may be defined as,

> ...the list of subjects or problems to which governmental officials, and people outside of government closely associated with those officials, are paying serious attention to at any given time.[26]

An even more select ranking of subjects, the decision-making agenda, delineates those subjects the government is actively seeking to address.[27]

The act of agenda-setting can be perceived as an attempt by the government to impose order on the dynamic environment it operates within and responds to. Simply put, the agenda is a list of things to be done. It acts as a lens to channel efforts at specific tasks. Once a subject has been dealt with, it is replaced on the decision agenda by another from the broader governmental agenda. Thus, ironically, the agenda itself is in a state of flux. However, these changes to the agenda are minor, controlled, and can be used by the

---

[26] Kingdon, Agendas, 3.

[27] Ibid.

government to illustrate its success in dealing with issues. Therefore, agenda control or the perception of it, is of utmost importance to governments.

However, the government's attempts at agenda-setting are hampered by larger societal issues that must be addressed. Leslie Pal notes that,

> no government is ever completely free to set its own agenda. It must indicate some sort or response to the larger questions, even if these questions can be given lower priority for a time.[28]

In addition, it should also be noted that the artificial control imposed by an agenda is fragile. The process of agenda-setting is a subjective one.[29] The government can misinterpret public opinion on an issue, and as a result incorrectly define the problem, putting itself at odds with the general public. Embarrassing pressure campaigns may result as groups organize to combat misguided government priorities. Alienating segments of the electorate does not make winning the next election any easier. In this way, agenda priorities may be re-ordered by the decision-makers.

The government's agenda is also affected by external forces like unpredictable events. Such occurrences splinter government control, forcing a new subject onto the agenda, and

---

[28] Pal, Public, 123.

[29] Ibid., 119.

potentially the decision-making agenda, scattering priorities and leaving the government reeling.

> By definition the unpredictable cannot be incorporated into any systematic understanding. Nonetheless, from the point of view of policy-makers and politicians, the scourge of the unpredictable, the accidental, and the exogenous is a constant threat to agenda management.[30]

Overall, the government's control over its own agenda is tenuous and likely to fail. The continuous lobbying efforts of interested parties to have their concerns added to or upgraded on the agenda magnifies this propensity. The inherent unpredictability of the policy-making process denies the logic of the comprehensive rational decision-making or incremental paradigms. Conversely, the garbage can model captures this dynamism and uncertainty and incorporates it into its conception of the policy-making process. How this is done is an essential part of the theory.

What is in the Garbage Can?

The short answer is, three things. The policy stream, the problem stream and the political stream. A more detailed answer follows.

The Policy Stream

The policy stream refers to the policy community of a given area, and the ideas/ alternatives/ solutions that bubble

---

[30] Ibid., 125.

throughout it. The policy community is composed of specialists both within and outside of government.[31] These policy players interact through both formal and informal channels.[32] This facilitates the diffusion, discussion and evaluation of ideas, a process Kingdon refers to as the policy primeval soup. His reasons for doing so are based on the spectrum of ideas that characterize the policy stream. They range from realistic to the fantastic. As such they bring to mind the notion of a primeval soup where everything and anything is possible. In this Darwinian environment, ideas "...continuously confront one another and are refined until they are ready to enter a serious decision-stage."[33]

The key to an idea's survival is not its source but content. There are two factors which support this. Firstly, an idea must be technically feasible.[34] This consists of working out the bugs which inevitably characterize any new idea. If an idea is to survive, it must show improvement with respect to this criterion for its subsequent presentation to the policy community. Secondly, an idea must be compatible with the values of the policy community. Needless to say, all the members of a policy community do not share the same values but,

---

[31] Kingdon, Agendas, 123.

[32] Ibid.

[33] Ibid., 130.

[34] Ibid., 139.

> ...the bulk of the specialists do eventually see the world in similar ways, and approve or disapprove of similar approaches to problems.[35]

Only ideas which satisfy these two criteria will survive the evolutionary process of confrontation which characterizes the policy stream. Those that do constitute a select few prominent alternatives that "...have risen to the top of the policy primeval soup, ready for policy makers to consider."[36]

As an idea survives confrontations and recombines to improve its appeal to policy specialists, it attracts supporters both within and outside the policy community. Amongst them will be policy entrepreneurs. These individuals decide to champion a particular idea. In the process, they provide the invaluable function of laying a groundwork of support. This consists of spreading the message. The policy community is an obvious target, for the more policy players onside, the greater an idea's legitimacy within the community. This in turn makes it more attractive to the decision-makers when they look into the policy stream in search of an alternative / proposal / solution. To boost the profile of their idea, policy advocates introduce it to the general public. In this way, the public is familiarized with the idea, and there is the potential that a constituency of

---

[35] Ibid., 140.

[36] Ibid., 146.

support may develop. The latter possibility would permit the use of pressure campaigns to further enhance the idea's profile in the public and political realms. Leaving nothing to chance, policy entrepreneurs also seek out decision-makers in an effort to establish yet another beachhead of support. If the entrepreneur's idea eventually emerges as a prominent alternative within the policy community, decision-makers lobbied by the entrepreneur may gravitate to it because they are familiar with it.

Furthermore, gaining access to decision-makers during the softening up stage is important for another reason. It opens a channel of communication between them and the policy entrepreneur. If and when events in the problem or political stream create the need for an alternative / proposal / solution, it is up to the entrepreneur to gain access to decision-makers and define the occurrence in such a way that their idea appears to be the ideal solution.[37] If the entrepreneurs have not established prior access to decision-makers, their position is weakened compared to those who have.

The policy entrepreneur fulfils an invaluable function. Whereas policy specialists generate ideas, it is up to the entrepreneurs to sell them. They build coalitions of support within the policy community, the general public, and amongst decision-makers. When an opportunity presents itself, it is the entrepreneur who links it to the idea. Without...

---

[37] Ibid., 191.

> the presence of the entrepreneur, the linking of the streams may not take pace. Good ideas lie fallow for lack of an advocate. Problems are unresolved for lack of a solution. Political events are not capitalized for lack of inventive and developed proposals.[38]

The Problem Stream

The unpredictable event is classified as an element of the problem stream for the simple reason that from the government's perspective, it bowls over everything else on the agenda, thereby introducing uncertainty and the potential for embarrassment. A crisis is an obvious indicator that a problem exists. The garbage can model provides two other means by which problems can be identified. A change in the levels of an accepted indicator is one of them. For example, if the unemployment rate were to soar, it would be interpreted as a problem for the government. The second indicator is the normal process of program evaluation. These are routinely undertaken to ascertain that a policy is achieving its objectives.

Both of these methods are based on the subjective interpretation of the methodology employed. This allows for the potential injection of personal values and dominant ideas into what should be purely empirical analysis. As such, the data can be skewed to deny the existence of a problem. Those in favour of the status quo tend to benefit from the

---

[38] Ibid.

interpretive flexibility offered by these two methods of problem recognition. Their resources and dominant positions of power give them an advantage in defining the results.

If, however, the vested interests are nonetheless defeated and the situation is redefined, this does not guarantee that the new problem will become a priority on the agenda.[39] If it lacks a ready made solution, or fails to resonate with the public the government may well deem it to be of minor importance and exile it to the margins of the agenda.

Subjects on the periphery of the agenda, and policy entrepreneurs who find their efforts blocked by vested interests, wait for a focusing event. The most powerful and oft-mentioned example of the focusing event is the crisis. It is the bomb that destroys the barricades to agenda change.

> To make an item from a less visible arena move up on a governmental agenda, something must happen, and that something often is a real crisis - the sort of thing government decision makers cannot ignore. Conditions must deteriorate to crisis proportions before the subject achieves enough visibility to become an active agenda item.[40]

Without the focusing event, "...potential agenda items sometimes languish in the background for lack of a crisis that would push them forward."[41] Kingdon refers to the

---

[39] Ibid., 120.

[40] Ibid., 100.

[41] Ibid., 101.

opportunity created by the focusing event as a policy window. It stays open for only a short while. There are several reasons for this. The government is obviously anxious to solve the problem and return to its own agenda priorities. Therefore, it will act quickly, looking to the relevant policy community for a solution. Contributing to the speed with which policy windows close is the fact that policy entrepreneurs have been anticipating such an opportunity and the government does not have to wait while potential solutions are developed: they already exist. At this point, the thoroughness of the softening up process enters into the equation. If the entrepreneur was able to win over decision-makers, his idea / solution enjoys an edge over others. This is especially true if the advocate was equally successful in building support in the policy community and the general public.

The appearance of a policy window represents the intersection of at least two of the streams (policy-problem or problem-political). This guarantees a subject a degree of governmental attention. However, if the third stream is not involved, "...the subject's place on the decision agenda is fleeting."[42] The reason for this will become clear with the presentation of the political stream.

---

[42] Ibid., 187.

The Political Stream

The policy and problem streams appear to interact smoothly. Although the garbage can theory reverses the common conception of problem and solution, their pairing appears natural. How then, does the political stream fit into this relationship? Perceived broadly, this stream reflects the nature of the political environment. As such, it acts as either a promoter or inhibitor of subjects on the agenda. A change in government presents a clear case in point. A new administration, differing in ideological orientation from its predecessor, will set up an agenda with different priorities. A shift in the political climate, "...makes some proposals viable that would not have been viable before, and renders other proposals simply dead in the water."[43]

The turnover of key personnel can achieve essentially the same result at the micro level as the election of a new government at the macro level. A new deputy minister's values may well affect the operation of the department. Dominant ideas may be jettisoned as well, leading to a profound change in departmental orientation. Once again, the result would be the elevation of certain subjects to higher priority and the demotion of others.

Aside from elections and the turnover of key personnel, there are three other factors at work in the political stream.

---

[43] Ibid., 156.

They are; the national mood, the role of organized political forces, and intra-governmental phenomena.[44]

Earlier, a reference was made to how the government was hampered in agenda-setting by factors referred to by Pal as larger societal questions. The national mood can be conceived as one of them. It can be understood as,

> the notion that a rather large number of people out in the country are thinking along common lines, that this national mood changes from one time to another in discernible ways, and that these changes in mood or climate have important impacts on policy agendas and policy outcomes.[45]

The national mood affects the political environment in general. Its impact on individual policy communities varies. Take for example, environmentalism. Its explosive rise since the tail end of the last decade signifies a change in the national mood from a collective attitude of ignorance and indifference to one of growing concern. The impact of this transformation has been felt more heavily in some policy communities than others. Renewable energy resources have benefitted from this change in the national mood. On the other hand, the public is less willing to accept the development of non-renewable energy projects which may adversely effect the environment. As a result, governments

---

[44] Ibid., 153.

[45] Ibid.

are less likely to devote much attention to subjects, or undertake policies which, contravene the national mood.

While the government is somewhat bound by the national mood, the same can not be said for policy players. The specialists in the policy stream are at most only indirectly affected. The national mood might make some ideas untenable but it has no impact on their generation. From the perspective of interest groups, being in harmony with the national mood is an advantage but they do not halt their lobbying efforts if their objectives cease to coincide with it. They may no longer publicly state their case but continue nonetheless to attempt to influence government.

The more powerful the organized interest the more resistant it is to outside pressures, such as the national mood. They are staunch defenders of the status quo. As Kingdon found,

> (i)mportant interests with the requisite resources are often able to block not only passage of proposals inimical to their preferences but even serious consideration.[46]

This leads to the inevitable development of a clientele and the calcification of the policy area. To counter this inertia, competing groups cite the existence of a constituency favouring change.[47] If popular support does exist it is a

---

[46] Ibid., 158.

[47] Ibid., 159.

powerful political weapon. Confronted with a well organized pressure campaign, especially if it is in tune with the national mood, a government can be forced to act. Even if such a constituency is lacking, a fictitious one may be invoked in the hopes that a clash with imbedded interests will lead to one's creation. If such means fail, policy entrepreneurs and their supporters must rely on the problem stream, in particular the focusing event, to dislodge resistance.

Bureaucratic turf wars typify the final category, that of intra-governmental phenomena. There is a common belief that turf wars between departments is an impediment to government action. This is not necessarily true. Another outcome, aside from stalemate, is that the confrontation may "...often actually promote the rise of an item on the governmental agenda."[48] For example, a dispute between the departments of energy and of the environment over an impact assessment study could spark public interest in the issue and lead to the mobilization of opposition to a proposed project.

The outcome a turf war has on a subject's agenda status depends on certain factors. If a current or potential constituency exists, and it is in tune with the national mood, then inter-departmental competition "...may well enhance the chances of the issue rising on the agenda."[49] On the other

---

[48] Ibid., 164-5.

[49] Ibid., 165.

hand, if there is no constituency, or the subject is unpopular, competition leads to stalemate and the very real possibility that its agenda status will suffer.

A Summary of What is in the Garbage Can

The three streams coexist largely independently from one another. Kingdon perceives them as swirling within a garbage can, oblivious to one another except for the rare occasion when they happen to intersect. The result is the opening of a policy window. This may be due to changes in the political stream, or because a new problem has emerged and captured the attention of governmental officials and those close to them.[50] Whatever the case, policy entrepreneurs recognize the opportunity and seek to define it to their advantage. This involves the coupling of their idea to either the problem or the political event which opened the policy window. However, if this is to have any chance of success, the entrepreneur has to have ensured that the solution / proposal enjoys support within the policy community, and has proponents in the political stream as well. If this preliminary groundwork has not been done, the solution / proposal "...will fail to garner the necessary attention and impetus required to be translated into action."[51]

---

[50] Ibid., 176.

[51] Ibid., 174.

It is clear that the three streams complement each other. Each brings a required ingredient to the equation. While two streams may raise the profile of a subject, "...its place on the decision agenda is fleeting."[52] However, if the third stream joins the other two, all of the requisite criteria are involved. There is a problem, and a solution exists which meets the demanded tests of political acceptability.[53] The application of the garbage can model to the case study will illustrate the importance of all three streams being present.

Hydro Quebec and Garbage Cans: A Reconciliation

The garbage can model is based on public policy-making. As such, it is a government-centred model. Yet the focus of this thesis is the analysis of a decision made by Hydro Quebec. Nonetheless, the garbage can paradigm can be applied to the case study due to the fact that the utility is a proprietary Crown corporation. Thus, Hydro Quebec may be conceived of as "...a non-department bureaucratic institution with a corporate form created by the government to perform a public function."[54] As such it is but an arm's length policy instrument. Despite the reality that proprietary Crown corporations enjoy "...substantial freedom in the realm of

---

[52] Ibid., 187.

[53] Ibid., 183.

[54] Richard Van Loon and Michael Whittington, The Canadian Political System: Environment, Structure and Process, 4th, (Toronto: McGraw-Hill Ryerson Limited, 1987), 548.

policy, finance, and personnel..."[55], it is important to note that the directors of such corporations are political appointees who serve for a fixed time at the pleasure of the government. Therefore, while they enjoy operational autonomy,

> ...Crown corporations are ultimately controlled by the legislation that creates them. The terms of reference of a Crown corporation are set down in a statute, which is subject to amendment by the legislature.[56]

In theory, such entities are to be beyond the direct control any minister. Yet, as Richard Van Loon and Michael Whittington remark, "...it is possible for a minister to influence corporation policy informally, but this is difficult to document."[57] Instances of such behaviour make the corporation even more responsive to government policy initiatives that its statute sets out. In conclusion, there are no apparent reasons why the garbage can model should not be applied to Hydro Quebec's decision to incorporate windpower into its generating mix.

---

[55] J.E. Hodgetts, The Canadian Public Service: A Physiology of Government 1897-1970, (Toronto: University of Toronto Press, 1973), 151-2.

[56] Van Loon and Whittington, Canadian, 550.

[57] Ibid., 549.

C H A P T E R T W O

An Examination of Wind Energy

FOREWORD

We all have an intuitive and reasonably sound notion of what energy is. Simply put, energy is what is required to create any change in the environment, be it to heat the house, run the automobile or build a bridge. Sources of energy could be the outcome of a chemical reaction (oil or wood burning), nuclear reaction (fission or fusion) or controlled natural processes (a waterfall, the wind, waves or tides, the radiation from the sun). An associated concept to that of energy is power which is defined as energy (produced or consumed) per second. It is measured in watts (w), kilowatts (1kW = 1000w), megawatts (1MW = 1000kW), or even gigawatts (1GW= 1000MW). Inversely, energy is power times time and can be measured in kilowatt-hours (kWh). Utilities throughout the world charge customers a certain amount of money per kWh. This rate can vary from about 4 cents/kWh in Quebec to four or five times that in energy poor countries.

There are two general categories of energy resources. Conventional or non-renewable (associated with chemical and nuclear reactions) and renewable (associated with controlled natural processes). The former are always accompanied by other by-products which the latter are not. As an example, wood is burned to obtain the energy to heat some water. In the process smoke and ash are produced and the wood itself has been consumed. On the other hand, a pot of water exposed to

the sun will also get hot. However, there are no byproducts and the sun is still shining.

If wind power does not fulfil its promise as a major energy source by the end of the century, it will not be a failure of technology. It will be a failure of vision on the part of society to make the necessary commitment.

Time Magazine, January 13, 1992

INTRODUCTION

The wind has played an important role throughout the development of human civilization. For most of human history, it ranked second only to wood burning as the predominant means of power generation.[58] However, with the invention of steam engines, followed by internal combustion engines and electric motors, wind energy appeared to have sunk into irrelevance.[59] This conclusion, however, has proven false. A broad interest in the development of renewable sources of energy has led to the rejuvenation of the wind industry. Despite its slow development in Canada, it has established markets in the United States, particularly in California, and several European countries, most notably Denmark.

The discussion in this chapter will address the following: (1) the relevence of wind power as an energy resource in the modern world; (2) the status of the wind power industry; and, (3) the constraints that public acceptance places on wind energy.

Windpower and the Modern World

The conventional means of generating large amounts of electric power, essential to any advanced technological society, are coal burning facilities, fossil fuel fired

---

[58] J.L. Schefter, Capturing Energy from the Wind, (Washington, DC: National Aeronautics and Space Administration, 1982), 7.

[59] Ibid., 7.

turbines, or nuclear power plants. However, these methods have been increasingly criticized due to their negative impacts on the environment.[60] Science has yet to convincingly demonstrate that the radioactive waste produced by fission can be safely disposed of. This fact, coupled with the possibility of a nuclear accident has stalled the development of the nuclear industry in general. As for thermal means of generating electricity, the Greenhouse Theory suggests that fossil fuel emissions are causing the earth's average temperature to rise. In the fall of 1995, the theory of global warming received a credible endorsement from the Intergovernmental Panel on Climate Control (IPCC), a United Nations body. The IPCC announced that global warming is a reality.[61] The linkage between fossil fuels and a rise in global temperatures is based on the following realities.

---

[60] In the U.S. electric utilities are the single largest source of CO_2 release, accounting for about one-third of all emissions. Transportation ranked second at 31%. Taken from, J.J. Mackenzie, "Energy and Environment in the 21st Century: The Challenge of Change", in Energy and Environment, J. Byrne and D. Rich, eds., (London: Transaction Publishers, 1992), 25.

[61] In the article, "Who's Afraid of Global Warming? Surprise! It's Big Business That's Worried Now", Mark Hersgaard notes that global insurance companies and international banks are taking the IPCC's pronouncement very seriously. Hersgaard predicts that the leading banks and insurance companies of Europe and Asia may initiate a massive shift of international investment away from fossil fuels and towards solar energy (wind power is categorized as a solar energy resource). For further details, please see, Mark Hersgaard, "Who's Afraid of Global Warming? Surprise! It's Big Business That's Worried Now", The Washington Post, 21 January 1996: C1. Also see, Mark Abley, " Act of God or man?", The Montreal Gazette, 27 July 1996: B1-2.

99.9% of the atmoshpere consists of a stable mix of nitrogen, oxygen, argon and a variable amount of water vapour which fluctuates according to the temperature.[62] The remaining 0.1% is made up of greenhouse gases (GHGs). Chief amongst them (over 50%) is carbon dioxide (CO_2). Other identified GHGs are methane, nitrous oxide, ground-level ozone (smog), and chlorofluorocarbons (CFCs).[63] In normal concentrations these gases make life on earth possible by trapping a portion of the heat emitted by the earth thus causing the temperature to rise. Without the GHGs the average surface temperature would not be the comfortable 15°C that it is but a frigid -18°C.[64]

Logically then, if the levels of GHGs in the atmosphere were to rise, a natural outcome would be warmer global temperatures. Since the Industrial Revolution, the atmospheric concentration of CO_2 has risen by 25%.[65] Furthermore, the overall concentration of all GHGs has risen more rapidly over the same period than it has at any other time in human history. Approximately half of all anthropogenic CO_2 has been added to the atmosphere over the

---

[62] Angela Keller-Herzog, A Dynamic Economic Model of Global Warming: Fossil Fuel Depletion and CO_2 Accumulation, (Carleton: M.A. Thesis, 1994), 13.

[63] Ibid.

[64] Ibid.

[65] Ibid., 16.

last 30 years.[66] To complicate matters there is no practical technology for scrubbing exhaut gases of CO_2. This is particularly troubling due to the global dependence on fossil fuels. As menticned, they play a vital role in the generation of electricity, the lifeblood of modern society. Yet, industry and rapid transportation are both heavy consumers of fossil fuels as well. Thus, the atmospheric concentrations of CO_2 will continue to rise in lockstep with fossil fuel consumption.

The Greenhouse Theory has added to the intensity of research into how to limit GHG emissions. Seeing how emissions controls are worthless with respect to curtailing CO_2, and how the proponents of nuclear energy have yet to succeed in developing a means of dealing with that technology's dangerous by-products, the remaining avenue of investigation would appear to be the development of less environmentally damaging energy resources.

Wind power is well suited to the generation of electricity. Not only does the wind industry presently produce electricity at an affordable price (cents/kWh), and on a large scale (albeit smaller than that of conventional plants) but in addition,

> wind-powered plants neither contribute to thermal pollution nor discharge chemical effluents as do fossil-fuel or nuclear-based plants, and they have the advantage

---

[66] Ibid.

> over hydroelectric systems in that they do not require any flooding of large land areas or major changes to the natural topography.[67]

Michael Brower, in his book Cool Energy, declares that wind energy is not only "...benign to the environment" but also "...poses no threat to public safety."[68] Contrast this to the less than stellar environmental record of the conventional sources of power production. There are no potential Chernobyls in the wind industry. In fact, the opposite is true. The electricity supplied by wind power offsets the polluting emissions of conventional generating sources.[69] Therefore, more grid connected wind turbines equals less radioactive and atmospheric pollution.

In his report, "Environmental Costs of Energy", Richard Ottinger calculated the environmental costs of electricity

---

[67] Nicholas Cherimisinoff, Fundamentals of Wind Energy, (Ann Arbor: Ann Arbor Publishers, 1978), 8.

[68] Michael Brower, Cool Energy: Renewable Solutions to Environmental Problems, (Cambridge, Massachusetts: MIT Press, 1992), 84.

[69] For example, in 1989, the estimated total output of Denmark's 2 800 wind turbines was 500 GWh which precluded the production of 400 000 metric tonnes of polluting emissions (mostly CO_2). From, A.J.M. van Wijk, J.P. Coeling and J.W.C. Turkenbur, Wind Energy: Status, Constraints and Opportunities, December 1991, 4th draft of an unpublished study. Natural Resources Canada, Wind Energy Chapter, 36.

In 1991, California's wind turbines offset the emission of more than 1 200 000 metric tons of carbon dioxide, and over 7 000 metric tons of other pollutants. From, American Wind Energy Association (AWEA) Newsletter. 1992 WIND TECHNOLOGY STATUS REPORT, (Washington, DC), 3.

generated by different means.[70] The study dealt with both conventional and renewable energy resource performance and concluded that oil had the greatest environmental cost while wind power had the least.[71] A recent publication by the Efficiency and Alternative Energy Technology Branch, a division of Natural Resources Canada predicted that, "...in the near future it is likely that all industries will have to bear a financial responsibility for their impact on the environment."[72] Such a trend can already be detected in the United States. The governments of forty-four states have mandated that public utilities account for external costs in their resource plans.[73] The state of Minnesota, recognizing the "clean energy" that wind power supplies, has recently passed a bill that provides a system of energy pricing that

---

[70] Richard Ottinger, Environmental Costs of Energy, prepared for the New York State Energy Research and Development Authority and the U.S. Department of Energy.

[71] The environmental cost of electricity generated by oil was between 3.1 to 7.7 cents/kWh, whereas that of wind power ranged from none to 0.1 cents/kWh. Coal had the second highest environmental cost, ranging from 2.9 to 6.6 cents/kWh and nuclear power's 3.3 cents/kWh gave it a ranking of fourth highest. Ros Davidson, "Discovering Economy in Clean Air", WindPower Monthly, March 1991, taken from the Canadian Wind Energy Association's (CANWEA) Status of Wind Energy Technology: October 1991, 6.

[72] Canadian Wind Energy Technical and Market Potential, 27.

[73] Harold Hubbard, "The Real Cost of Energy", Scientific American, April 1991, taken from, CanWEA, Status of Wind Energy Technology, 7.

internalizes environmental costs[74]. This will raise the cost/kWh of electricity generated by conventional non-renewable means. The negligible impact that wind turbines have on the environment, ensures that their output will not be aversely affected by such legislation. Rather, the competitive position of wind energy will be enhanced.

These examples clearly indicate an emerging understanding that the polluting ways which have characterized the twentieth century must be amended. Wind energy can make a significant contribution to these efforts.

The Status of the Wind Industry

The assertion that wind power can produce electricity at competitive rates has been made. However, before this is addressed, the following question should be asked: "Just how much potential energy is in wind?" Nicholas Cheremisinoff estimates that the total energy capacity of the winds surrounding the earth is in the order of 10^{11} GW.[75] This is, quite simply, a phenomenal amount of potential energy.[76]

Initial interest in wind energy (and renewable resources in general) was revived because of the oil crisis of 1973. A

---

[74] Ros Davidson, "Minnesota Wind Power Underway", Windpower Monthly, September 1991, taken from, CanWEA, Status of Wind Energy Technology, 7.

[75] 1 GW is equivalent to one billion watts. Cheremisinoff, Fundamentals, 5.

[76] Not all of it can be used. For a detailed explanation refer to Appendix A.

number of countries, including Canada, understood that their sovereignty and respective economies were imperilled due to their dependence on imported oil. Renewable energy sources, such as wind energy, were viewed as a possible means to alleviate this strategically unhealthy situation.

In 1980, the first wind turbine was connected to a utility grid. There were over 15,500 by 1993 in California alone.[77] By the end of 1995 there were 27 336 grid connected turbines in the world.[78] Total worldwide sales of wind technology hardware is expected to reach $1 billion (USD), while the sale of wind generated electricity will add nearly $750 million to total revenues.[79] The global generation of electricity by wind power in 1994 exceeded 6 TWh, the highest level to date.[80] If the wind industry continues at the current rate of growth, wind energy will generate 14 TWh of electricity / year by the turn of the century.[81] In other words, in just under four years, output may double. Nor is there any reason to suspect that the application of wind technology will slow. It is more likely to accelerate, fuelled by the continued decline in hardware costs, and tardy

---

[77] AWEA, 1992 WIND TECHNOLOGY, 1.

[78] Raj Rangi, Natural Resources Canada Wind Energy Division, Telephone Interview, 21 June 1996.

[79] CanWEA, Bulletin, 5.

[80] Ibid.

[81] Ibid.

government attempts to meet international commitments to reduce GHGs.[82]

The bulk of the machines in use are examples of first generation technology. It was only in 1993 that second generation machines became commercially available. Kenetech's 33M-VS, an example of second generation technology, was conceived of and brought into production in six short years.[83] Even more astonishing is that the third generation of wind turbines are expected to be on the market by the late 1990s. Such short lead times are an irrefutable indication that wind technology has achieved critical mass. Still more important is the success wind power has had in making inroads into commercial markets. This is due mainly to the enhanced reliability of the equipment.

The question of reliability relates directly to the price at which wind energy supplies electricity. Early wind turbines were plagued with problems. This was to be expected during the development of a new technology. Trial and error were the only way engineers could weed out design flaws. The

---

[82] Jeff Passmore, President of CanWEA and President of Passmore & Associates International, Personal Interview, 1 February 1996.

[83] Douglas Gantenbein, "Energy: Something in the Wind." The Atlantic, (October 1993), 38. Originally, Kenetech was going to use the VS-33M, later renamed KVS-33, in the Gaspe project. However, in 1996, it was decided that the KVS-45 turbine would be used instead. The KVS-45 has a capacity rating of 520KW compared to the smaller machine's capacity of 405. The larger machine is expected to capture more energy in the steady but unspectacular wind regime which characterizes the Gaspe region. For further information, please see, CanWEA, WindSight, Vol.9, No.1. (Ottawa: March 1996), 5.

need to continually repair damaged machines led to high prices for the electricity produced, as owners / operators sought to recoup the additional expenses. It was not until a foundation of design knowledge had been established that the reliability of wind turbines improved.[84] That in turn, led to decreases in both capital and electrical generation costs (cents/kWh). For example, upfront capital costs, which are measured as dollars / kilowatt ($/KW), fell over a ten year period (1985 - 1995), from approximately $1 900 to $700 USD ($/KW).[85] This coincided with the drop in the price of wind generated electricity from 25 cents/kWh in 1981 to only 5-8 cents/kWh by 1991.[86] Thus, as the knowledge base has grown, so too have the abilities of the wind industry to supply electricity at competitive rates.[87] In fact, there is some speculation that the third generation wind turbines might well set the rates. Some predict that they will be able to generate electricity at 3-5 cents/kWh. Not surprisingly, this has led the California Energy Commission to conclude that the wind industry is "...one of the least costly sources of new generating capacity

---

[84] Reliability is measured as a percentage of the following: the turbine is in working order (available) when the wind is above cut-in speeds. Turbine *availability* needs to be near 100% for the turbine to be commercially viable.

[85] Quebec, Ministere des Ressources naturelles, Debat Public sur l'energie au Quebec: La production d'electricite, 1995, 130.

[86] Brower, Cool Energy, 80.

[87] Ibid.

available to the state...[and it is] competitive with coal and nuclear power."[88]

For an idea to have any hope of becoming a proposal / alternative / solution, it must have the support of the relevent policy community. To achieve this, the idea must be deemed technically feasible, and satisfy the values of the community's members.[89] The degree of technical improvements between first and second generation wind turbines, resulting in vastly improved availability ratings and consequent cost savings, offers a clear indication that wind energy has overcome this obstacle to policy community support. Windpower has become a viable energy resource as the aforementioned sales of both hardware and electricity confirm.

Public Concerns About Windpower

A failure to win large scale public acceptance could well act as a barrier to the expansion of wind energy. Like all industrial projects, the wind industry must operate within the constraints of public approval. These are manifested as concerns about the visual and acoustic impact of wind turbines, and the safety of nearby residents. However, it is the linkage of bird deaths to wind energy that provides the

---

[88] AWEA, 1992 WIND TECHNOLOGY, 3.

[89] For elucidation, please refer to Chapter 1 (8), or to Kingdon's Agendas, 138-40.

industry with its most serious obstacle to public acceptance.[90]

There is a perception, held by some, that bird deaths dramatically increase where wind turbines are present. The Research Institute of Nature Management (RIN), in Holland, sought to verify this perception empirically. An impact assessment study was conducted on the effects of 7.5 MW wind farm. It was discovered that the number of bird deaths per kilometre of wind farm "...was up to ten times smaller than that of one km of high voltage transmission line, and comparable with one km of motorway."[91] These findings would appear to contradict the belief that wind energy causes a significant increase in bird deaths. Tall structures in general are hazardous to avifauna. However, there is evidence that birds have learned to fly around wind turbines.[92] This might lead one to conclude that the period of greatest risk to birds is before the local avifauna population have become accustomed to the presence of the turbine(s). Nonetheless, site selection is crucial. The installation of a wind farm in the vicinity of nesting grounds is sure to result in fatalities. Thus, sensitivity to local conditions is essential.

---

[90] Brower, Cool Energy, 85.

[91] van Wijk, Wind Energy, 15.

[92] Ibid., 25-26.

Other reported effects of wind energy on flora and other forms of animal life, are minimal.[33] While wind farms occupy large areas of terrain, only 3% of the area is actually used.[34] As a result, wind energy does not interfere with other potential site uses. Farmers in Europe plant to the base of wind turbine towers, and in California, "...cows can be seen grazing peacefully in their shadow."[35] According to the American Wind Energy Association, public opinion polls have consistently shown that the public prefers wind energy over conventional sources.[36] However, this choice is conditional on the wind turbines being out of sight and therefore out of mind. For example, a wind farm planned for the Cordelia Hills, in Solano County, was opposed by the residents "...simply because they did not want to see turbines sited on the land visible from their windows."[37] Visual impact, then, does have an effect on the decision of whether to proceed with specific wind projects. However, studies have shown that visual uniformity of the rotors, nacelle and tower

---

[33] United States of America, Solar Energy Research Institute, Solar Technical Information Program. Wind Energy Technical Information Guide. (Washington, DC: U.S. Government Printing Office, 1985), 39.

[34] Quebec, Debat, 66.

[35] Brower, Cool Energy, 80.

[36] AWEA, 1992 WIND TECHNOLOGY, 3.

[37] Robert L. Thayer and Heather A. Hansen, Wind Farm Siting Conflicts in California: Implications for Energy Policy, (Centre of Design Research, University of California, Davis., 1991), 83.

reduce aesthetic criticism.[98] Furthermore, the impact of this problem is limited to wind farms located near urban areas. Thus, it does not affect all wind power projects.[99] Ironically, wind farms are often tourist attractions.[100]

The aesthetic issue not withstanding, there is general agreement that wind energy creates very little noise. The noise that wind turbines produce can be categorized as mechanical and aerodynamic. Both can be reduced by structural means. Opinions vary as to actual noise levels from "insignificant" to approximately equal that of a small industrial site.[101] Once again, the isolation of most sites makes this factor moot.

With regard to the structural integrity of wind turbines, there is little to fear. The chance of a blade fracturing and being thrown are all but non-existent.[102] This is due to the creation of national standards which all machines must satisfy. In addition, the International Energy Committee (IEC) has devised a set of international specifications for the wind industry.[103] These are, in some cases, stricter

---

[98] CanWEA, Bulletin, 5.

[99] Tall buildings disrupt wind flow and cause turbulence which is detrimental to the structural integrity of wind turbines, and leads to premature aging of the equipment.

[100] Passmore, Personal Interview, 1 February 1996.

[101] van Wijk, Wind Energy, 26.

[102] Ibid., 27.

[103] Rangi, Personal Interview, 10 November 1993.

than certain national requirements. The overall effect has been a general upgrade in the quality and therefore safety, of the product.

A problem which afflicted earlier generations of turbines was the unfortunate tendency for the blades to cause electromagnetic interference.[104] If a turbine was situated between an antenna and satellite it disrupted the signal. This was true regardless of whether the rotor was in motion or not. The potential challenge posed by this unfortunate reality was overcome with the advent of fibreglass rotor blades.

To summarize, wind energy can generate and supply electricity cheaply, on par with conventional sources. Unlike these conventional sources though, it does so without contributing to the contamination of the biosphere. The competitive position of the wind industry has been further strengthened by a decline in both the costs of wind energy equipment and the price of the electricity that it generates. In the realm of policy, renewable energy sources in general benefit from,

> ...international pressure, emanating primarily from Europe, for national budgetary reform and for the greater use of economic instruments to achieve environmental and sustainable development goals [which] will increase pressure on

---

[104] Cheremisinoff, Fundamentals, 117-118.

legislators to eliminate environmentally deleterious barriers and incentives.[105]

The latest federal budget reflected this. Ottawa made an effort to alleviate the tax treatment differentiation between the renewable and non-renewable energy sectors. The relaxation of "specified energy property" rules facilitated the renewable energy sector's access to financing.[106] This was complemented by the institution of "flow-through share" financing to encourage investment in renewable industries.[107]

An earlier Liberal initiative, government restructuring, also responded, albeit unintentionally, to the above noted pressure. Under the auspices of restructuring the Department of Environment (DOE) was forced to undergo an internal review. That process led to the delineation of five focusing factors. Of relevance to this discussion was, "...mobilizing Canadians and communities for sustainable development...".[108] In terms of policy, this meant "...building a proactive and integrated sustainable development political agenda...", in addition to "...focusing DOE technology development capability on catalyzing a vibrant environmental industry sector."[109]

---

[105] Glen Toner, " Environment Canada's Continuing Roller Coaster Ride", How Ottawa Spends 1996-97: Life Under the Knife, Gene Swimmer ed., (Ottawa: Carleton University Press, 1996), 123.

[106] Passmore, Telephone Interview, 24 July 1996.

[107] Ibid.

[108] Toner, "Environment", 117.

[109] Ibid.

Gradually and inexorably the notion of sustainable development has worked its way along the political spectrum, slowly gaining political respectability until it has become a principle to guide legislators. If current trends of pro-environmental energy legislation continue, the imbalances within the energy pricing field will eventually be remedied. Once a level playing field is in place, the wind industry could well experience a level of growth that will dwarf what it has achieved thus far.

C H A P T E R T H R E E

Applying the Policy Stream

In the previous chapter, windpower was shown to have satisfied one of the policy stream's yardsticks, the intertwined criteria of technical feasibility and value acceptability. Specifically, wind energy had become a cost competitive means of generation and as a result emerged as a prominent alternative for the consideration of policy-makers.[110] The discussion now focuses on the application of the policy stream to the case study.

The Policy Entrepreneurs: Strength in Numbers

Wind energy's cause was championed by a number of groups in Quebec. None of them exerted overwhelming influence, nor could their actions be described as concerted except in the broadest sense: They all favoured the use of windpower. Two of the pro-wind advocate groups were devoted solely to the prospect of advancing wind technology. In this way they very much resembled single issue interest groups. For the other entrepreneurs involved, windpower was but a component, albeit an important one, of a larger policy goal. The importance of wind energy in this larger strategy assured that it was promoted as an alternative energy resource.

Despite the common pro-wind bias of the various entrepreneurs, they did not coalesce into a cohesive alliance. Instead, their interaction can be best described as a loose

---

[110] Earl Davis, Manager Windpower Integration at Electric Research Institute, Telephone Interview, 9 February 1996.

coalition, typified by the absence of concerted action.[111] It was a case of the whole being greater than the sum of the parts. In other words, the autonomous actions of the entrepreneurs synthesized to create an unexpectedly strong case for windpower. Their claim was made even more compelling by the crisis which confronted Hydro Quebec's decision-makers and which will be examined in detail in the next chapter. The point to note, however, is that the policy entrepreneurs were insignificant players relative to the stature and prestige of Hydro Quebec. Yet in the end the figurative David defeated Goliath, and in so doing, illustrated Kingdon's contention that the policy-making process is an unpredictable and messy undertaking.[112]

The Obvious Entrepreneur

The Canadian Wind Energy Association (CanWEA) is a group dedicated to the promotion of wind energy in Canada. It was originally a member of the Solar Energy Society (SES) but separated from that group in 1985. The reason for the split according to Jeff Passmore, CanWEA's president, was due to SES not being aggressive enough in its promotion of windpower.[113] CanWEA is clearly the embodiment of a policy entrepreneur in that its sole goal is to advance the cause of wind energy.

---

[111] Daphna Castel, Mouvement au Courant, Telephone Interview, 18 January 1996.

[112] Kingdon, Agendas, 2.

[113] Passmore, Personal Interview, 1 February 1996.

Yet, the role it played in Hydro Quebec's windpower decision can be described as minor.

While it is a national association, CanWEA is constrained in its lobbying efforts by its lack of resources.[114] At present, aside from its president, it has one part-time clerical employee. This restricts the scope of the association's efforts. In fact, it boasts no operations in Quebec but instead relies on Quebec based members, working on their own initiative and time, to champion wind energy.[115] Any impact CanWEA had on Hydro Quebec's windpower decision was limited to the dissemination of information accomplished during its annual conference. These affairs provide a forum for the presentation of papers on various aspects of wind energy, including the state of the industry, in addition to any advances in wind technology.[116] Utilities and politicians from both levels of government are invited.[117] This yearly event affords the only platform for any interaction between CanWEA and Hydro Quebec, and even so its effectiveness is questionable. The utility is usually

---

[114] Resources are derived from membership dues. Dues range from $32.10 (student) to $1605 (sustaining member).

[115] Passmore, Personal Interview, 1 February 1996.

[116] Ibid. For information on the most recent conference, please see, CanWEA, Bulletin, Vol. 8, No.4.

[117] Ibid.

represented by individuals from its in-house wind research group.[118] In short, CanWEA preaches to the converted.

A brief review of the dual role played by the policy entrepreneur will put CanWEA's contribution in the proper context. First, the entrepreneur is an agent of the softening-up process. The goal is to familiarize the policy community, the public, and most importantly, the decision-makers with the merits of the idea / alternative / solution. Once this function is fulfilled, the entrepreneur patiently waits for an opportunity to perform its second role, forging linkages between the streams. Events in either the problem or political stream provide the entrepreneur with potential linkages. These happenings are interpreted by the entrepreneur in a way which portrays his idea / alternative / solution as the ideal remedy. This highlights the importance that the softening up process be thorough for the more familiar decision-makers are with an idea / alternative / solution, the more likely they are to chose it when confronted with the need for action.

While CanWEA had no contact with Hydro Quebec's decision-makers, and therefore no direct influence, the indirect impact of its annual conferences should not be discounted. These events are a key ingredient in raising windpower's profile, and as such, are a crucial component in the softening-up

---

[118] Passmore, Personal Interview, 29 February 1996.

process.[119] Their perennial nature signifies to the attentive and the general public that wind energy is not a fly-by-night technology but a mature energy resource. The diffusion of the message performed by the conferences is amplified by the fact that they are held in different regions of the country every year. As a result, these events are potential catalysts for the creation of pro-wind constituencies. Furthermore, the annual conference can be perceived as having been a valuable resource for Hydro-Quebec's in-house wind research group. First of all its existence lent credibility to the in-house advocates' efforts. Secondly, the annual gatherings linked disparate policy entrepreneurs to the international windpower policy community. As the next section will reveal the in-house group was a much more influential pro-wind entrepreneur.

The Fifth Column within Hydro Quebec

The policy entrepreneur with the best opportunity to influence Hydro Quebec's decision-makers was the utility's own in-house wind research group. Originally conceived to investigate the possibility of grid-connected turbines, the in-house group's focus was later shifted to assessing the applicability of windpower in remote, off-grid

[119] A copy of the upcoming 1996 CanWEA conference can be found in Appendix B (115).

communities.[120] If viewed in relation to the immense size of Hydro Quebec's bureaucracy, the in-house wind advocate was a minor player verging on insignificance. Their marginalization was enhanced by the attitude of Hydro Quebec's decision-makers towards wind energy which ranged from ambivalence to outright hostility.[121] Furthermore, from 1988 on the utility's ruling clique was committed to the Great Whale megaproject. Confronted with these realities, how effective could the in-house entrepreneur have been?

While its efforts did not result in throwing open the gates of the city, the in-house group was not powerless. Despite its lack of importance and the unpopularity of its idea amongst the decision-makers, the in-nouse windpower advocate enjoyed an advantage over all other wind

---

[120] This change in status was based on a number of factors. Hydro Quebec's interest in wind energy and renewable energy resources in general was sparked by the oil shocks of the 1970s. Fuelled by the seemingly real possibility of soaring energy prices, the utility embarked upon a joint research venture with the National Research Council. Wind regime maps of Quebec were plotted, and efforts were made to understand and design vertical axis wind turbines (VAWTs). This resulted in the construction and field testing of two VAWT prototypes. According to Bernard Saulnier, an engineer involved in both projects, the prototypes were successful in their primary objective, the development of a technology profile. However, they were misperceived by the public, due in part to the expense, over $18 million alone for the second turbine, and the cost of electricity they generated. Shortly after the completion of the second turbine, Hydro Quebec's decision- makers concluded that windpower was more suited to remote area applications.

[121] Passmore, Personal Interview, 1 February 1996. Further evidence of this is provided by the Hydro Quebec's Development Plan 1993 (48), in which it exaggerated the generating costs of windpower.

entrepreneurs; it was a group within Hydro Quebec. As such it was viewed with a greater degree of trust than outside groups. This lent its pronouncements a greater aura of credibility. Of equal importance was that as a member of the utility's bureaucracy, the in-house entrepreneur had access to both formal and informal channels of communication. These proved an invaluable means of disseminating windpower information. The importance of this function should not be underestimated. It provided a means of educating decision-makers and others on the continuously evolving nature of wind energy, the suitability of conditions in Quebec, and the complementarity of windpower and hydroelectricity.

The diffusion of information also provided a rallying point for those disaffected from the energy development strategies Hydro Quebec was engaged in. The sheer size of the utility guaranteed a divergence of opinions and consequently, the existence of factions.[122] It is not unusual for energy development strategies to become a source of division within utilities.[123] The dominant approach, in other words the one favoured by Hydro Quebec's decision-makers, involved the more or less continuous expansion of supply through generation, preferably by hydroelectric megaprojects.[124] Great Whale

---

[122] Castel, Telephone Interview, 18 January 1996.

[123] Bernard Saulnier, Hydro Quebec research and development, Telephone Interview, 15 February 1996.

[124] Edwards, Personal Interview, 17 September 1995.

(1989-94) was the ultimate manifestation of this approach. The soft path provided a countervailing vision. Rather than increase supply to meet demand, it urged the reduction of demand by conservation and efficiency improvements. Remaining demand would be met by less expensive, renewable, non-polluting energy resources such as windpower.[125]

In the late 1980s and into the early 1990s, Hydro Quebec was rocked by virulent internal policy clashes between the contrasting development paradigms.[126] The feud which was already public became more so due to actions taken by the in-house wind group. Frustrated by the enduring refusal of the decision-makers to take action with respect to windpower, a policy entrepreneur leaked information regarding the province's wind potential.[127] The goal of this tactic was more complex than simply to embarrass the opposition by portraying it as unresponsive to cutting-edge technologies. This action is characteristic of a policy entrepreneur

---

[125] Francois Tanguay, Telephone Interview, 23 January 1996. The perception of energy advocated by the soft path is novel in that it equates energy saved as equal to the expansion of supply. In contrast, the traditional hard path strategy does not consider reducing demand. Instead it focuses solely on the expansion of supply. The former approach has been more widely applied in the United States. According to Earl Davis, a utiliy which requests to expand supply through generation must make a case before the public utility regulatory board as to why projected demand must be met by an expansion of supply. The utility must also produce plans for all possible options of meeting projected demand, not simply its preferred means. Furthermore, the calculations predicting future demand must be transparent and reproducible.

[126] Castel, Telephone Interview, 18 January 1996.

[127] Ibid.

confronted by a more powerful opponent.[128] By releasing this information, the in-house group was attempting to establish an outside constituency to strengthen its position and break the entrenched resistance. It is easy for decision-makers to ignore a small group dissatisfied with the status quo and championing their own alternative. However, the legitimacy, and therefore threat, posed by such a group is enhanced if it possesses allies amongst the general and the attentive public.[129]

This tactic failed to induce the creation of a vocal constituency based in the general public but it did succeed in two other significant ways. Firstly, it dispelled the publicly held prejudice that windpower was an old technology without modern applications.[130] Secondly, it provided another set of policy entrepreneurs, a collection of energy and environmental groups, with specialized information which bolstered their soft path arguments. As a result, it enhanced their credibility and thus strengthened their attacks on Great Whale, the embodiment of Hydro Quebec's hard path approach to energy development.

---

[128] As argued in Chapter 1 and Kingdon, 135.

[129] Paul Pross in Group Politics and Public Policy, differentiates between the general and the attentive public. The latter refers to those individuals or groups who are involved in some way in the respective policy community. Those without such ties are classified as the general public.

[130] Saulnier, Telephone Interview, 5 February 1996.

The Entrepreneurs from Left Field

The third grouping of policy entrepreneurs consisted of an eclectic collection of environmental groups (Greenpeace, Environment Jeunese, Union Quebecois pour la conservation de l'environement) and energy groups (Mouvement au Courant, the Canadian Coalition for Nuclear Responsibility). They were unified by their shared allegiance to the soft path approach and hence their opposition to Hydro Quebec's development strategies. Needless to say, Hydro Quebec's decision, and the Bourassa government's agreement, to proceed with Great Whale (1988) was met by an outburst of criticism from these groups. Due to the controversial nature of the hydroelectric megaproject, this latest clash between the perpetual adversaries received considerable news coverage, particularly in the print media. As Pross notes,

> (t)he preferred technique of groups working to influence public opinion is that of trying to persuade the media to focus public attention on them.[131]

Consequently, soft path representatives were a regular feature of such stories. This exposure was used to attack Great Whale, as well as to promote their alternate vision of energy development. As a result, many Great Whale related stories contained arguments expounding upon the benefits of windpower.

---

[131] Pross, Group, 164.

The impact of this collection of entrepreneurs will be revealed more fully in the next chapter. Taken as a whole, the actions of the policy entrepreneurs appear unimpressive. Mostly, it consisted of little more than disseminating information about wind energy's benefits. Viewed out of context this is true. However, as mentioned earlier, the softening up process is a crucial first step. Only once this process has been completed can the entrepreneurs move on to the task of attempting to join the streams. CanWEA's promotion of windpower and its incorporation into the development strategies of environmental and energy groups legitimized the technology both within the policy community and public opinion. For its part, Hydro Quebec's in-house wind research group was active in these information related activities. However, for the most part, the focus of its activities occurred within the utility itself.

Bombarded by information, Hydro Quebec's decision-makers were certainly aware of windpower's potential and suitability to Quebec. Yet, true to the dynamics of the garbage can model, the compelling case made by the various policy entrepreneurs was not sufficient to prompt a policy change. The groundwork was complete. What was required was an event in either of the two streams that could be manipulated by the entrepreneurs in such a way to catapult windpower from its exile on the fringes of the utility's agenda. As the next

chapter will demonstrate, the crisis which enveloped Great Whale proved to be the catalyst.

C H A P T E R F O U R

Applying the Problem Stream

In 1991, Hydro Quebec announced that it was accepting bids to purchase power from private producers (APR 91). This process was necessitated by Hydro Quebec's need for more short term capacity.[132] Due to the long lead times required for the hydroelectric option, the utility was required to investigate other means of generation.[133] A number of bids representing a wide range of generating options were received. Amongst them was a single windpower bid, submitted by Kenetech. Three years later, November 24, 1994 a deal between Hydro Quebec and Kenetech was announced. The contract stipulated that the utility would buy, at a fixed price over a 25 year period, the grid-connected electricity generated by the 100 MW wind array.[134] This was an unexpected development considering that the utility's three year plan, Development Plan 1993, all but dismissed the use of windpower outside of remote areas. This event revisits and reinforces the garbage can model's contention that policy-making is an unpredictable and messy endeavour. The following discussion will reinforce the credibility of this hypothesis by analysing how the controversial Great Whale project played a role in Hydro Quebec's 1994 windpower decision.

---

[132] Paul Paquet, Hydro Quebec Conseils d'economies et financeres, Telephone Interview, 25 January 1996.

[133] Ibid.

[134] Guy Pinchaud, Kenetech Canada, Telephone Interview, 25 September 1995.

Great Whale: A Dam Crisis

In its final form, Great Whale would have flooded over 3 400 square kilometres of land and had a generating capacity of 3 121 MW.[135] To environmental groups in Quebec and the Northeastern United States (New York was the prime export market for the massive block of surplus power which Great Whale was to generate), the environmental devastation that the megaproject would cause was unacceptable. They were supported in their opposition by the Quebec Cree whose land was to bear the brunt of the energy development. The Cree believed that the megaproject would adversely affect their communities. Energy think tanks based in Quebec and the United States were also critical of the proposed project. Judging by how events unfolded, Hydro Quebec was unprepared for the scale and effectiveness of the opposition presented by these groups.

More precisely, Hydro Quebec was unaccustomed to organized effective opposition.[136] This was due to the utility's status in Quebec society. As mentioned earlier, Hydro Quebec was and continues to be a symbol of Quebecois entrepreneurial spirit, technical know-how and ambition. In a sense, the original hydroelectric projects in northern Quebec were a true example of the phrase "projets de

---

[135] The amount of land to be flooded was approximately the size of Prince Edward Island.

[136] Graeme Hamilton, Montreal Gazette, Telephone Interview, 24 January 1996.

societe".[137] They were symbols of the metamorphosis the Quebecois underwent during the Quiet Revolution: transformed from a rural agrarian society into a modern technical society. As the creator of these monuments, Hydro Quebec has benefitted from the popular sentiment that it knew what it was doing.[138] There was a foundation for this belief. According to a Natural Resources Canada document, Electric Power in Canada 1993, the Quebec utility ranked second among all Canadian companies in terms of assets.[139] When compared to all North American utilities, Hydro Quebec was the largest with respect to assets and volume of sales.[140] Over 23 000 people are directly employed by the utility, and it invests between $3-$4 billion annually in Quebec, not to mention the fact that it also happens to be the largest corporate philanthropist in the province.[141] In short, Hydro Quebec is "(p)art sacred cow, part symbol of Quebec savoir-faire...".[142] For many Quebecers it is not just a utility but a mythology.[143]

---

[137] Edwards, Telephone Interview, 12 November 1996.

[138] Hamilton, Telephone Interview, 24 January 1996.

[139] Canada, Electric Power, 3.

[140] Ibid., 3.

[141] Castel, Telephone Interview, 18 January 1996.

[142] Jeff Heinrich, "Hydro Under the Microscope", The Montreal Gazette, 14 March 1994: F8.

[143] During the 8 November 1995 interview, Gordon Edwards revealed that at a public hearing on Great Whale he was approached by an individual from another of the environmental groups present. The environmentalist asked Edwards not to criticize Hydro Quebec

Environmental and energy activists lack the legitimacy relative to the utility to be effective.[144] Their position is further undermined by the positive impact Hydro Quebec's energy development projects have on the provincial economy.[145] As a result, the government favours the expansion of generating capacity, particularly by means of large scale projects. Historically, such endeavours have created jobs, spurred economic growth and won the government favour with both labour and business groups. Consequently, disagreements between government and the utility are infrequent events. When such confrontations do occur, the government, as the defender of public interest, is at a distinct disadvantage. As Natural Resource Minister Guy Chevrette recently conceded, few politicians are experts in the field of energy and therefore are not ideally suited to oversee the utility.[146] Hence there is no real check on Hydro Quebec's development strategies. It is in the enviable position of being encouraged to expand supply. Seeing as there is no regulatory agency charged with establishing

---

but rather to focus his criticism on the provincial government. This comment reveals two things: (1) the reverence in which Hydro Quebec is held, even by the informed public; and (2) that the government was the driving force behind Great Whale.

[144] Hamilton, Personal Interview, 24 January 1996.

[145] Jeff Heinrich, Montreal Gazette, Telephone Interview, 25 January 1996.

[146] Elizabeth Thompson, "Independent board should set Hydro rates", The Montreal Gazette, 3 April 1996: A4.

Quebec's energy needs, that task is left to the utility. Therefore, it is responsible not only for calculating growth in demand but also to designing the dams to meet it.[147] This contrasts with the situation facing utilities in the United States. A utility which requests to expand supply by means of generating capacity must present a case before the state public utility agency as to why projected demand should be met by this means.[148] Implicit in this requirement, is that the utility investigate all possible options for meeting the projected increase in demand, not simply its preferred means.[149] In addition, utilities throughout the United States and Europe are looking at small projects due to low actual demand, and minimal projected growth in demand.[150] Added to this are the cost of larger projects, and the shift in social values favouring the use of soft path alternatives.[151] Conditions in Quebec were similar. Projected demand was expected to grow at a meagre 1.5% per

---

[147] Philip Authier, "Johnson hopes to clean up environmental image", The Montreal Gazette, 16 June 1994: B4.

[148] Davis, Telephone Interview, 9 February 1996.

[149] Ibid.

[150] This theme was stressed during several interviews: Edwards, Telephone Interview, 26 January 1996; Passmore, Personal Interview, 1 February 1996; Pinchaud, Telephone Interview, 25 January 1996; Saulnier, Telephone Interview, 5 February 1996; and Tanguay, Telephone Interview, 23 January 1996.

[151] Passmore, Personal Interview, 1 February 1996; Edwards, Telephone Interview, 26 January 1996; and Tanguay, Telephone Interview, 23 January 1996.

year.[152] Hydro Quebec's debt was over $40 billion and its annual interest payments reach $3 billion.[153] Yet despite this, the utility's braintrust wanted to build Great Whale. In itself, the project's $13.3 billion price tag made it extravagant. Its potential environmental impact made it unacceptable, especially in view of the fact that the vast majority of the power it would produce was not needed even in the export markets. In short, the decision to build Great Whale defied logic. Nonetheless, it satisfied the development criteria applied by Hydro Quebec's decision-makers and underscored the salience of the dominant idea. This is an eloquent indication of how out of touch they had become and how powerfully entrenched the company's dominant idea was.

Things began to unravel for Great Whale when the Cree took the federal government to court over is decision not to exercise its jurisdiction to conduct an environmental impact study of the megaproject's potential repercussions.[154] The courts ruled against Ottawa. This precipitated negotiations between the federal government, its Quebec counterpart and the three native organizations responsible for reviewing Hydro Quebec's Great Whale environmental impact assessment study. A process was eventually worked out to the satisfaction of the five parties. The Cree, however, were not done.

---

[152] Pinchaud, Telephone Interview, 15 September 1995.

[153] Tanguay, Telephone Interview, 23 January 1996.

[154] Castel, Personal Interview, 18 January 1996.

The anti-Great Whale movement was desperate to establish a connection between long-term export contracts with Hydro Quebec and the construction of Great Whale.[155] The megaproject was ultimately meant to meet future demand.[156] Until there was a domestic market for it the surplus would be exported. The revenue accrued would help to defray the project's cost. Hence, if no long-term contacts existed, there was no rationale for the megaproject. The meagre growth in demand could then be met by implementing the soft path paradigm.

In January of 1994, the Cree were joined by the Sierra Club, and the Atlantic Council before a New York state court in an effort to force the New York Power Authority (NYPA) to conduct an environmental impact study on any contracts it had signed with Hydro Quebec.[157] On March 29, 1994 NYPA actually went a step further and cancelled an existing $100 million contract with the Quebec utility. Two reasons were given. The first was excess capacity. In short, NYPA did not need more power. Secondly, as the following statement indicates, even if it did require additional power, NYPA would not buy it from Hydro Quebec if the utility went ahead with Great Whale: David Freeman, NYPA's director declared that New York state,

---

[155] Ibid.

[156] It was expected to generate surplus power for twenty years.

[157] Marie Tision, "Cree, environmentalists tackle Hydro again in U.S.", The Montreal Gazette, 28 January 1994: A6.

"...would not provide a market directly or indirectly for the construction of the Great Whale hydro-electric project in Northern Quebec.[158] Freeman's declaration clearly reveals that the anti-Great Whale groups had been successful in linking long-term export contracts to Great Whale construction. Thus ended any hope Hydro Quebec might have had of finalizing a 20 year contract which would have earned it $8 billion. Ironically, Hydro was partly to blame for this outcome. During their testimony before a New York state environment / conservation committee, Hydro officials were chastised for being evasive, and offering murky answers to pointed questioning about Great Whale's environmental impacts.[159] In fact, the chair of the committee became so enraged by the conduct of Hydro's officials that he walked out during their presentation.[160] Five days after the NYPA decision, Consolidated Edison, a New England based utility, suspended long term contract talks with Hydro Quebec. Its explanation referred to "economic reasons". It was widely suspected that these were rooted in environmental

---

[158] John Davidson, "Hydro Quebec unplugs contract for N.Y. power", The Montreal Gazette, 26 May 1994: A7.

[159] Jeff Heinrich, "Hydro aims for direct sale to N.Y.", The Montreal Gazette, 3 March 1994: A1-2.

[160] Jeff Heinrich, "Hydro mauled at power hearings in New York", The Montreal Gazette, 5 March 1994: D1-2.

concerns.[161] Six days later, the Massachusetts Senate began deliberations on a bill which required out of state hydro projects that wanted to provide Massachusetts with power submit to a state conducted environmental impact study. According to its proponents, the bill had been languishing for years before the Great Whale controversy rejuvenated it.[162] An equally embarrassing blow to Hydro Quebec's credibility was the response of a New England based utility to a Hydro contract offer. Aware that Hydro was hoping for a deal to increase demand and thereby justify the need to build Great Whale, the U.S. based utility made a counter proposal. It offered to improve the efficiency of Hydro Quebec's grid and buy a percentage of the saved power.[163]

These environmental attacks were so damaging to Hydro Quebec's credibility that the Quebec government, which was being tarred indirectly for its approval of the megaproject, was forced to intercede. At a June (1994) meeting of the Northeastern Governors and Eastern Canadian Premiers, Daniel Johnson, Quebec's Premier, took steps to solidify the province's shaken environmental reputation. Johnson proposed the development of a uniform evaluation procedure for all

---

[161] Irwin Block, "New York puts power talks with Hydro Quebec on hold for 18 months", The Montreal Gazette, 2 April 1994: A5.

[162] The Montreal Gazette, "Massachusetts considers review of Great Whale", 8 April 1994: A5.

[163] Passmore, Personal Interview, 1 February 1996.

energy projects in any of the regions represented by the participants. It would involve a "...massive consultation process..." to evaluate the social, environmental and economic impacts of new projects.[164] The Premier's proposal reflected the long standing complaint of environmental and energy critics that Hydro Quebec's energy policy lacked legitimate public input.[165]

Johnson's announcement was but the latest of the government's attempts to distance itself from Great Whale and Hydro Quebec. A few months earlier Energy Minister Christos Sirros publicly questioned Hydro's development policies, mused about the need for a public regulatory body to curb the utility, and extolled the virtues of windpower in addition to acknowledging its applicability in Quebec.[166]

By the summer of 1994 the situation for Hydro Quebec was dire. Despite the fact that it had hired a top of the line public relations firm to represent it, and that it had attempted to raise its philanthropic profile by sponsoring cultural events throughout New England, it was nonetheless losing badly in the battle for public opinion.[167] Criticism

---

[164] Authier, "Johnson hopes", B4.

[165] Edwards, Personal Interview, 17 September 1995.

[166] For more information, please see the following articles by Graeme Hamilton; "Sirros, it is time to rethink approach to energy planning" The Montreal Gazette, 1 February 1994: A1-2; and "Hydro Quebec must turn to windpower, Sirros says", The Montreal Gazette, 21 March 1994: A3.

[167] Hamilton, Telephone Interview, 24 January 1996.

had shifted from questioning the need for the project and the potential for environmental destruction to Hydro's actual environmental impact assessment study. Although the official committee had yet to pronounce on the subject, the study had been roundly criticized by anti-Great Whale groups. The utility sought to defuse the attacks on the impact assessment study by first assembling a number of international experts to review it.[168] This provoked charges that Hydro was attempting to undermine the yet to be released official report. When even this handpicked group was able to find flaws, the utility hired the study's authors to critique and review it.[169] One can only speculate that these bizarre attempts to generate environmental legitimacy did more to harm the utility's credibility than anything the anti-Great Whale groups had been able to accomplish up to that point.

The following quote from G. Bruce Doern and Richard Phidd encapsulates the difficult situation Hydro Quebec was in at the end of the summer in 1994:

> ...the task of maintaining and sustaining the priority list over a significant period of time is notoriously difficult because the domestic and international

---

[168] Paul Wells, "Hydro's Great Whale study called inadequate", The Montreal Gazette, 27 July 1994: A3.

[169] Graeme Hamilton, "Hydro paid its won consultants to assess Great Whale study", The Montreal Gazette, 4 August 1994: A5.

> environment is always undergoing change.[170]

While Hydro Quebec's ruling clique had been able to rely on the utility's status in Quebec society to ignore domestic critics of its policies, this strategy was ineffective against critics located in export markets. Ironically, the renewable nature of hydroelectricity had always been the utility's trump card. However the unexpected surge of environmental concern in New England, coupled with the Cree's efforts to raise the question of native rights, had soured the previously ambivalent attitude of export markets towards hydroelectricity. As a result, Hydro Quebec's braintrust was faced with several unforeseen realities. Firstly, their cherished Great Whale was endangered. The improbability of Hydro being able to secure any large-scale, long-term export contracts all but guaranteed the megaproject's postponement. Secondly, the utility was involved in an on-going press relations disaster that refused to die. Hydro Quebec's reputation and credibility had both been badly undermined in its primary export markets. In effect, Hydro Quebec's ruling clique was faced with a multi-faceted crisis.

---

[170] G. Bruce Doern and Richard Phidd, Canadian Public Policy: Ideas, Structure, Process, 2nd ed. (Scarborough: Nelson Canada, 1992), 106.

Looking for Answers in the Garbage Can

The logic of the garbage can model dictates that when confronted by a crisis which requires a solution, policy-makers look to the policy stream for alternatives. In this way, ideas / alternatives / solutions that had been on the periphery of the agenda may be acted upon.

There are two possible interpretations for Hydro Quebec's decision to opt for windpower. The first relies on the belief that the utility predicted that Great Whale would arouse criticism not only from usual sources but from the export markets as well. Negotiations with Kenetech were not meant to produce a deal. Rather, their purpose was to undermine the expected environmental / soft path criticisms. This serves to explain why despite Kenetech's belief that a "...definitive agreement is expected in 1993..." no deal materialized.[171]

However, this scenario requires that Hydro Quebec's ruling clique have a degree of prescience with respect to public reaction that they clearly did not possess. The humiliating public relations debacles in their export markets is evidence of that. The decision to pursue the Great Whale megaproject, despite economic, environmental and social questions offers irrefutable proof that not only was Hydro Quebec's braintrust out of touch with the energy needs of Quebecers but also that they felt immune from the "mundane pressures of reality".

---

[171] Kenetech, Prospectus: Kenetech, September 1993, 29.

An alternative explanation based on more realistic grounds argues that rather than being a component of the Great Whale strategy, windpower was actually an unrelated option. While Hydro Quebec may have abandoned the idea of grid-connected turbines, advances in the technology had overcome many nagging difficulties. When asked why Hydro Quebec decided to include windpower in its generating mix, interview respondents from environmental and energy groups, as well as from Hydro Quebec and Kenetech responded that it was natural for utilities to investigate advances in energy resource technology.[172] This should not be interpreted as meaning that the utility's decision-makers had changed their opinion of wind energy. Rather, the international interest in, and the use of windpower compelled them to revisit the technology. Proof that their attitude had not changed is supplied the Development Plan 1993, in which wind energy was labelled an expensive generating option suited only to remote off-grid areas.[173] To buttress this false contention, the document inflated the price of wind generated electricity, thereby justifying the utility's position that windpower was not a realistic alternative.[174] Kenetech's bid to APR 91 was

---

[172] Castel, Telephone Interview, 18 January 1996; Passmore, Personal Interview, 1 February 1996; Pinchaud, Telephone Interview, 25 January 1996; Saulnier, Telephone Interview, 5 February 1996; and Tanguay, Telephone Interview, 23 January 1996.

[173] Hydro Quebec, Development Plan 1993, 48.

[174] Tanguay, Telephone Interview, 23 January 1996.

"...government has used Hydro Quebec, especially its development projects, to create thousands of jobs."[189] Graeme Hamilton, also with The Gazette, stated that, with respect to Great Whale, Hydro Quebec was following the government's lead.[190] Another respondent pointed out that within the utility there was resentment over government interference.[191] However, the most persuasive evidence of government involvement in Hydro Quebec's affairs is the admission by a former Energy Minister that the government viewed the utility as a valuable tool for economic development.[192] In short, the government did more than just encourage Hydro Quebec's predilection for large scale hydroelectric endeavours. It was actively involved in shaping the utility's development strategies. The benefits the government accrued from this involvement, such as job creation and short term economic growth, satisfied political criteria. Hydro Quebec benefitted from this capital and labour intensive approach because it enhanced the utility's prestige and reputation, in addition to its generating capacity. For their part, consumers had little reason to complain as their power rates were amongst the lowest in Canada. Yet, serious

---

[189] Andrew McIntosh, Montreal Gazette, Telephone Interview, 20 March 1996.

[190] Hamilton, Telephone Interview, 24 January 1996.

[191] Tanguay, Telephone Interview, 23 January 1996.

[192] Sirros, Telephone Interview, 23 April 1996.

acknowledged to be not only environmentally benign and renewable but also cutting edge. It possessed a progressive aura that Hydro Quebec needed to counter the image that the Great Whale ordeal had hung it with: that of an uncaring environmental destroyer. In short, windpower appeared to be the ideal means to generate desperately needed positive environmental spin.

In this way, Great Whale catapulted wind energy, an idea previously exiled to the outskirts of the agenda, straight onto the decision-agenda. The policy and problem streams had been joined. Yet according to Kingdon, for an idea to have a lasting and real chance at implementation, all three streams must be linked. The importance of the political stream is obvious, for the simple reason that "...the policy process, as a political process, rests on power and interests."[176] Up to this point, the discussion has clearly indicated that windpower was not among the preferred options of the decision-makers. That the political stream intersected the policy and problem streams indicates that there had been a change in the political stream's internal dynamic. The specific linkage which bound the political stream to the other two and thereby created a policy window will be the subject of the next chapter.

---

[176] Pal, Public, 19.

C H A P T E R F I V E

Applying the Political Stream

The two previous chapters offered an insight into how windpower's policy entrepreneurs introduced the energy resource to policy-makers, in addition to making a case as to why the utility's decision-makers eventually chose to incorporate windpower. The case study will now be viewed through the lens of the political stream. This will add a third dimension, the political environment, to the existing picture.

Components of the Status Quo

As has been shown, Hydro Quebec's attitude to energy development rested on the expansion of supply through the addition of capacity. The preferred means was large scale hydroelectric projects. The government of Quebec has proven supportive of the utility's development approach. Premier Robert Bourassa, during his first tenure (1971-75), popularized the notion of harnessing northern Quebec's geography to produce power. In his book, Power from the North, Bourassa described Quebec as "...a hydroelectric plant-in-the-bud...".[177] He envisioned transforming Quebec into the Saudia Arab of electricity.[178]

The political benefits which could be accrued from such an undertaking were numerous. To begin with, the construction of the dams and the requisite infrastructure were capital and

---

[177] Robert Bourassa, Power from the North, (Scarborough: Prentice-Hall, 1985), 4.

[178] Edwards, Telephone Interview, 8 November 1995.

labour intensive undertakings. As such they were guaranteed to stimulate the province's economy. Once on-line, the cheap power produced would boost business competitiveness and enhance Quebec's attractiveness to potential investors. Any surplus power would be exported, thus enhancing Quebec's international profile while earning revenues. In the early 1970s, when these developments were being contemplated, demand was high and expected to grow.[179] The government had the financial capacity to finance such a vast undertaking.[180] In short, the state's means matched the scope of the politician's vision.

The James Bay Agreement provided the framework to turn the concept into reality. The document foresaw two development stages. Phase I consisted of the La Grande series of dams which were built. Phase II was by far the more ambitious. Great Whale was the smallest of the dams foreseen for the second phase of construction.[181] Naturally, the completion of Phase I witnessed the emergence of business and labour constituencies favourable to future hydroelectric megaprojects.[182] A number of Quebec based engineering firms

---

[179] Between the period from 1960-74, the average annual growth in demand grew at 6.6%. For further information please see, Canada, Electric Power, 47.

[180] Christos Sirros, MNA and former Quebec Energy Minister, 23 April 1996.

[181] Edwards, Telephone Interview, 26 January 1996.

[182] Yvan Hardie, Hydro Quebec engineer (retired), 26 January 1996.

gained international recognition based on their involvement in the project.[183] Nor were they the only ones to benefit. As has already been mentioned, the northern developments elevated Hydro Quebec to the status of icon in Quebecois society. The political calculus the government had used to judge the merits of the venture had proven sound. Jobs had been created, the economy stimulated, cheap power produced and the surplus exported. Furthermore, domestic manufacturers and suppliers could meet all the component requirements for hydroelectric projects.[184] The inherent multiplier effects of the hydroelectric option greatly enhanced its attractiveness vis-a-vis other energy resource options. From the government's perspective, hydroelectric developments became equated with good policy.

In theory, the relationship between Hydro Quebec and the government is arm's length. However this is well known to be fiction. Hydro is the cornerstone of the provincial economy.[185] This provides a motive for the government to seek a more intimate relationship with the utility. Hydro Quebec's status as a provincial crown corporation facilitates

---

[183] Castel, Telephone Interview, 18 January 1996.

[184] Yvan Hardie, Hydro Quebec engineer (retired), Telephone Interview, 26 January 1996. Seeing as the government was concerned with the political advantages to be gained by energy development the multiplier effect proved a definite advantage the hydroelectric option enjoyed over other energy resources.

[185] Heinrich, Telephone Interview, 25 January 1996.

the establishment of such a relationship. Take, for example, the fact that Hydro's director is a political appointee. As a result, the government may appoint an individual who is tractable to its views. Suddenly the potential for political influence becomes very real. Richard Drouin, Hydro Quebec's director during Bourassa's second regime (1985-94), was a classmate of the Premier's.[186] Coincidentally, it was in 1988 that Great Whale was given political approval, despite the fact that Hydro Quebec had a massive surplus of power. An equally interesting fact is that the Premier's office in Montreal happened to be on the top floor of the Hydro Quebec building.[187] Was that because the utility was a generous landlord and offered low rent, or did it allow Bourassa, the architect of the James Bay Agreement, better access to the utility's decision-makers?

A common theme of interviews revealed the widespread belief that the provincial government directly interfered in Hydro Quebec's development strategies. Gordon Edwards, President of the Canadian Coalition for Nuclear Responsibility, asserted that the provincial government has pushed its political agenda on Hydro Quebec.[188] Andrew McIntosh, an investigative journalist with The Gazette, stated that "...direct political interference exists..." and that the

---

[186] Tanguay, Telephone Interview, 23 January 1996.

[187] Hamilton, Telephone Interview, 24 January 1996.

[188] Edwards, Personal Interview, 17 September 1995.

"...government has used Hydro Quebec, especially its development projects, to create thousands of jobs."[189] Graeme Hamilton, also with The Gazette, stated that, with respect to Great Whale, Hydro Quebec was following the government's lead.[190] Another respondent pointed out that within the utility there was resentment over government interference.[191] However, the most persuasive evidence of government involvement in Hydro Quebec's affairs is the admission by a former Energy Minister that the government viewed the utility as a valuable tool for economic development.[192] In short, the government did more than just encourage Hydro Quebec's predilection for large scale hydroelectric endeavours. It was actively involved in shaping the utility's development strategies. The benefits the government accrued from this involvement, such as job creation and short term economic growth, satisfied political criteria. Hydro Quebec benefitted from this capital and labour intensive approach because it enhanced the utility's prestige and reputation, in addition to its generating capacity. For their part, consumers had little reason to complain as their power rates were amongst the lowest in Canada. Yet, serious

---

[189] Andrew McIntosh, Montreal Gazette, Telephone Interview, 20 March 1996.

[190] Hamilton, Telephone Interview, 24 January 1996.

[191] Tanguay, Telephone Interview, 23 January 1996.

[192] Sirros, Telephone Interview, 23 April 1996.

shortcomings in this approach to energy planning became evident in the 1980s. That decade was characterized by a massive and enduring surplus. The province was essentially swimming in abundance.[193] The reason for this was quite simple. Hydro Quebec, unfettered by a public utility board, in addition to being responsive to and financed by the government, had overbuilt. Capacity far outstripped demand. Viewed rationally, this was an inefficient application of public resources. Money had been spent to add capacity that was essentially generating surplus electricity. Overall, this was poor investment of public resources. Nor could exporting the surplus much improve the situation. Exported electricity generally sells for half the price it cost to produce, if not less.[194]

The introduction of conservation and efficiency measures at this time would have extended the period of surplus, thereby delaying the need to add costly additional generating capacity. A corallary effect would have been reduced consumption resulting in lower living expenses for Quebecers. Instead Hydro Quebec scaled back the already modest goals of its conservation program.[195] There would seem to be no other

---

[193] McIntosh, Telephone Interview, 20 March 1996.

[194] Tanguay, Telephone Interview, 23 January 1996. During an interview (November 8, 1995), Edwards noted that in the 1980s Hydro Quebec had sold power to Consolidated Edison for as little as 1 cent / kWh. The U.S. utility then sold it to its customers at 13 cents / kWh.

[195] Edwards, Telephone Interview, 8 November 1995.

explanation for this action other than the cynical argument that the utility sought to reduce the size of its surplus in order to deflect charges of poor energy planning. The indirect consequence for consumers was an increase in the cost of living.

The government's response to the surplus capacity was in keeping with its earlier energy strategies. It lured a handful of aluminum companies to Quebec with the promise of severely discounted electricity rates.[196] The process of making aluminum is extremely energy intensive, earning the industry the dubious label of energyvore. The timing of the government's efforts to land not one but several aluminum companies related directly to the province's electricity surplus. Politically this was a win-win situation. In the short-term jobs had been created.[197] However, from the government's perspective, it was the longer term implications of the deal that promised sizable dividends. The establishment of the energyvors in Quebec advanced the date at which new generating capacity would be required. The economic boost of a major hydroelectric development, like Great Whale, was sure to promote the government's standing.

The events and decisions described above vividly illustrate that energy policy in Quebec was of secondary

---

[196] Ibid.

[197] Ibid. In the same interview, Edwards revealed that the deal offered had been so sweet that each job created was subsidized by the public at a cost of $200 000 / year.

importance to political considerations (jobs, economic growth and their effect on electoral support). A public utility regulatory body, similar to those in the United States, would have acted as a barrier to the injection of political considerations into the realm of energy policy. It may be concluded that for this reason the Quebec government consistently refused to establish such an agency, despite the persistent demands of energy activists.[196] Its absence resulted in an energy strategy which elevated the political goals of the government over the energy needs of Quebecers. The groups in favour of the status quo (i.e. the expansion of supply by means of hydroelectric developments), specifically the government, and by extension the decision-makers at Hydro Quebec, as well as a number of business and labour groups were entrenched in positions of political power. As a result, soft path advocates, such as windpower entrepreneurs, were unable to elicit the serious consideration of alternatives. The stalemated turf wars between the defenders of the status quo and soft path advocates, as described in Chapter 3, illustrate this inability. Nor could the national mood be mobilized as an agent of change for it was solidly pro-Hydro Quebec. In short, the political stream was not receptive to new ideas or alternatives. Yet, as the garbage can model predicts, no situation is immutable, and the status quo collapsed due to an unexpected event completely unrelated to energy issues.

---

[196] Castel, Telephone Interview, 18 January 1996.

The New Reality

Premier Bourassa's declining health and subsequent decision to resign, and Daniel Johnson's assumption of that position changed the dynamic of the political stream. Johnson attempted to disassociate his government from that of his predecessor by bringing new blood into cabinet. Amongst the new faces was Christos Sirros who replaced Lise Bacon, a longtime Bourassa loyalist, as Energy Minister. Whereas Bacon was a defender of the energy status quo, the new minister was not. In Sirros, soft path advocates had found an ally.

Unlike his predecessors, Sirros recognized the fact that efficiency improvements and the development of alternative generating technologies had changed the landscape of the energy policy field.[199] This new reality had been ignored by both Hydro Quebec and the Bourassa government. The development approach they employed was more suited to the 1960s-1970s when demand was robust and the state was buying.[200] With current and projected levels of growth in demand being best described as anemic, and the government encumbered by debt, this approach had lost all legitimacy.

---

[199] Sirros, Telephone Interview, 23 April 1996. Also see, Graeme Hamilton, "Sirros, it is time to rethink approach to energy planning", The Montreal Gazette, 1 February 1994: A1-2; The Montreal Gazette, "Sirros wise to question Hydro", 2 February 1994: B2; Hamilton, "Hydro Quebec must turn to windpower, Sirros says", The Montreal Gazette, 21 March 1994: A3; and Jack Branswell, "Sirros proposes integrated energy plan for Quebec, eastern Canada, and U.S.", The Montreal Gazette, 7 April 1994: A6.

[200] Edwards, Personal Interview, 17 September 1995.

> ...when there are no past policies in respect to a discrete policy issue, incremental change is in fact impossible.[221]

Hydro Quebec's decision vis-a-vis wind energy was a complete departure from existing policy. The inability of the incremental model to explain this abrupt change in policy reveals that it too seeks to mould the policy-making process along preconceived lines.[222]

Given these shortcomings, the garbage can model has proven to be more applicable as a framework for analysis. It offers the most encompassing approach to incorporating diverse events which may influence the policy-making process. However, it may be argued that the focus is too broad. It denotes three streams and states that unrelated events which occur in them can intersect and may, if conditions are correct, produce policy change. This leaves plenty of latitude for a favourable interpretation of events. Needless to say, this aspect of the model is a source of criticism, especially when compared to the two paradigms discussed above. Howlett and Ramesh take issue with the garbage can over its vagueness;

---

[221] Dror, "Muddling", 155.

[222] Dror perceives incrementalism to be "...an ideological reinforcement of the pro-inertia and anti-innovation forces prevalent in all human organizations, administration and policy-making." Dror, "Muddling", 155.

The Johnson government assumed power in January 1994. One of its first actions was to scale back plans for the already technically advanced Ste-Marguerite development.[205] Shortly after, Sirros initiated the first steps of a public consultation forum to review Quebec's energy needs.[206] The conclusions reached were expected to reinforce the changes the Minister had begun within Hydro Quebec to make it more responsive to new technologies and open to differing energy strategies.[207] This new approach to energy development enhanced the prestige and effectiveness of soft path advocates within government, Hydro Quebec and the attentive public. By the spring of 1994, when the Great Whale situation began to deteriorate, the government had already decided that it would cancel the megaproject.[208] A public announcement was not made for fear of alienating voters in the upcoming election. According to the Minister, energy policy emphasis had shifted away from large scale development projects and instead was focused on alternative forms of energy.[209]

---

[205] Sirros, Telephone Interview, 23 April 1996.

[206] Ibid. The Parti Quebecois government finalized the organizational arrangements for the public consultation.

[207] Saulnier, Telephone Interview, 5 February 1996 and Tanguay, Telephone Interview, 23 January 1996. Both Saulnier and Tanguay were members of the public consultation forum's committee.

[208] Sirros, Telephone Interview, 23 April 1996.

[209] Ibid.

Clearly a paradigm shift had taken place: the political agenda of the Bourassa regime had been replaced by a rational energy development strategy. The speed with which the change had occurred bolsters Kingdon's assertion that a shift in the political climate, brought on by a change in government,

> ...makes some proposals viable that would not have been viable before, and renders other proposals simply dead in the water.[210]

Thus, the change in government explains Hydro Quebec's reversal of policy with respect to windpower. Development Plan 1993 was a product of the old order. Its sole purpose was to rationalize the construction of Great Whale. In so doing, it downgraded alternate approaches, like windpower. However, the new energy direction instituted by the new government rendered the utility's development plan obsolete. Hence,

> ...the critical factor that explains the prominence of an item on the agenda is not its source, but instead the climate in government or the receptivity to ideas of a given type, regardless of source.[211]

In effect, the balance had been tilted in the opposite direction. What had been impossible in 1993 became a reality in 1994.

---

[210] Kingdon, Agendas, 150.

[211] Ibid., 76.

The confluence of the three streams, brought about by the change in government, presented wind energy entrepreneurs with a policy window. The technology had proven itself internationally, and the new Energy Minister was an ally. The new energy priorities established by Sirros forced Hydro Quebec to reorganize its own agenda. Moreover, the new policy direction's promotion of alternative energy resources dovetailed smoothly with the utility's need to overcome the negative environmental image the Great Whale debacle had left it with. Windpower's case got a further boost from the fact that Hydro Quebec's decision-makers were familiar with the energy resource thanks to the ceaseless lobbying efforts of the in-house wind research group.[212] In this way, a series of unrelated events caused the three streams to converge, thus propelling wind energy from the periphery of the agenda onto the decision-agenda where it was deemed to be both an acceptable **alternative** means of generating electricity and a **solution** to Hydro Quebec's environmental problem.

---

[212] Passmore, Personal Interview, 1 February 1996.

C H A P T E R S I X

Conclusions

Reflections on the Theory

This thesis analyzes Hydro Quebec's policy decision with respect to windpower through the application of the garbage can model. Kingdon's model has proved to be well suited to this task. Unlike mechanistic policy paradigms, such as the rational comprehensive decision-making model, the garbage can model is dynamic and flexible enough to incorporate a broad spectrum of events which may influence both policy direction and its making. As such it seems more suited to the human experience. Conversely, the rational model is "...an attempt to apply scientific detachment to improve the human condition."[213] It perceives a clear and definite linear progression of steps in the policy-making process. This is one of its shortcomings. The subjective nature of policy-making cannot be incorporated into an objective framework. Take for example the rational model's first step, the recognition and definition of a problem. As Michael Howlett and M. Ramesh succinctly note, "...defining and interpreting a problem is a highly nebulous process...". [214] In other words, it is dependent to a certain extent on the values of policy-makers.[215] By their very nature, values are personal and therefore subjective, not uniform and universal. As a

---

[213] Michael Howlett and M. Ramesh, Studying Public Policy: Policy Cycles and Policy Subsystems, (Toronto: Oxford University Press, 1995), 139.

[214] Ibid., 122.

[215] Ibid., 140-1.

result they are anathema to the application of rationality. Thus, what is a rational interpretation of a problem to one individual may very well not be to another. Complicating the matter further, policy-makers are susceptible to other potentially non-rational pressures, such as political and institutional constraints which may affect their judgement and behaviour.

By its very nature, the scientific approach is comprehensive and exacting. Applied to policy-making, this necessitates that all possible alternatives to a problem be considered. Once again the difficulty of subjective perceptions arises as individual policy-makers guided by their opionions, perceptions and values, consider what is or is not an alternative. This requisite stage raises a completely new set of obstacles, specifically the

> ...limited problem solving capabilities [of human beings], the inadequacies of information and costliness of analysis, and...the diverse ways in which problems emerge.[216]

The idea behind the rational comprehensive model is attractive. However, its scientific approach does not appear to be compatible with the reality of the policy-making process. In short, it is an artificial construction based on the unachievable ideal of applying rationality to the policy-

---

[216] Doern and Phidd, Canadian, 7.

making process, thus seeking to hide the policy-making process' chaotic nature under an imposed facade of order.

The incremental model, while more realistic in its approach is nonetheless limited. Yehezkel Dror identified three requisite criteria which circumscribed the incremental model's applicability: (1) satisfaction both on the part of policy-makers and the populace with respect to existing policies; (2) a high degree of continuity in the nature of problems; and (3) an accordingly high degree of continuity in the means available to deal with problems.[217] According to Dror, no modern state is stable enough to meet these criteria.[218] Even if this were not true, the incremental model can not explain Hydro Quebec's windpower decision. It is an inherently conservative model which is evident from its name. It prescribes incremental change founded on existing policies. By association this means that "...it undermines the search for new alternatives...".[219] Quite clearly the case study examined was based on the application of what should definitely be labelled "a new energy alternative". In short, the model is unable to explain radical policy change.[220] As Dror notes,

---

[217] Yehezkel Dror, "Muddling Through - 'Science' or Inertia", Public Administration Review, 24, 3 (1964), 154.

[218] Ibid.

[219] Howlett and Ramesh, Studying, 144.

[220] Doern and Phidd, Canadian, 8.

> ...when there are no past policies in respect to a discrete policy issue, incremental change is in fact impossible.[421]

Hydro Quebec's decision vis-a vis wind energy was a complete departure from existing policy. The inability of the incremental model to explain this abrupt change in policy reveals that it too seeks to mould the policy making process along preconceived lines.[422]

Given these shortcomings, the garbage can model has proven to be more applicable as a framework for analysis. It offers the most encompassing approach to incorporating diverse events which may influence the policy-making process. However, it may be argued that the focus is too broad. It denotes three streams and states that unrelated events which occur in them can intersect and may, if conditions are correct, produce policy change. This leaves plenty of latitude for a favourable interpretation of events. Needless to say, this aspect of the model is a source of criticism, especially when compared to the two paradigms discussed above. Howlett and Ramesh take issue with the garbage can over its vagueness;

---

[421] Dror, "Muddling", 155.

[422] Dror perceives incrementalism to be "...an ideological reinforcement of the pro-inertia and anti-innovation forces prevalent in all human organizations, administration and policy-making." Dror, "Muddling", 155.

> While its key tenets may well be a fairly accurate description of how at times organizations make decisions, in other instances it would be reasonable to expect more order.[223]

Ironically, with respect to the case study, the model's open-ended nature proved a virtue for it gave the paradigm the flexibility to truly reflect the complexity of human society and the unforeseeable effect this had on the policy-making process. In contrast, the weakness of the rational comprehensive and incremental models is that they...

> ...presume a level of intentionality, comprehension of problems, and predictability of relations among actors which simply does not obtain in reality.[224]

For its part, the garbage can model presumes nothing but the existence of the policy, problem and political streams. Thus, rather than attempting to pattern reality around an imposed structure, Kingdon's paradigm seeks to reflect it. Human society is too complex, and the myriad of potential linkages between issues and individuals are too numerous for a predictive framework to be developed.

A summary of the factors which led to Hydro Quebec's windpower decision illustrates this. The change in government was not solely responsible for the eventual wind energy decision. Had there not been a pro-wind lobby, the technology

---

[223] Howlett and Ramesh, Studying, 145.

[224] Ibid., 144-5.

would not have had the necessary profile to be noticed by decision-makers. Windpower entrepreneurs, working alone, never could have succeeded in getting their technology grid-connected. The status given to wind energy in Development Plan 1993, indicates how successful such efforts would have been. Nor did the derailment of Great Whale automatically lead to the decision favouring wind energy. Other energy sources were available. It was the combination of these unrelated and unpredictable factors which created the unexpected scenario that thrust windpower into a prominent position on Hydro Quebec's decision-making agenda. Wind energy met the political, economic, environmental and social value requirements present within the three streams.

From this it can be concluded that the garbage can model endeavours to explain why an idea has been acted upon rather than which idea will be acted upon next.[225] This appears to be the more fruitful approach since,

> (a)t a minimum, analytical approaches exist to classify a phenomenon into manageable chunks of reality and to generate or suggest hypothesized relationships we might not otherwise see. At a more rarefied level, they help generate theories that will both explain behaviour and allow us to predict. It is doubtful that any of the approaches to public policy allow us to do the latter.[226]

---

[225] Kingdon, Agendas, 2.

[226] Doern and Phidd, Canadian, 4.

Therefore, despite Howlett and Ramesh's contention that the garbage can model suffers from not enough "order", the case study examined presents the opportunity to offer a pithy rebuttal: In this particular instance not enough order was more appropriate than too much.

Time as a Test

According to Kingdon, policy changes...

> ...generally occur gradually, incrementally, in small and nearly invisible steps. But there are times, with the passage of landmark legislation or the adoption of a precedent-setting...decision, when a new principle is established.[227]

What causes the latter, paradigmatic type of policy change? Why is the normal routine of evolutionary policy expansion sundered? The case study provides the answer. Hydro Quebec's development strategy was undermined by a set of political, economic and social forces. The old guard which supported the status quo was defeated. The utility's windpower decision set a precedent and in so doing represented a fundamental break from past policies. In this way a new principle was established. This...

> ...does not necessarily imply that a policy actually has taken a dramatic new turn, at least in the short run. The step might or might not be quite small; the

---

[227] Kingdon, Agendas, 200.

> importance of such events lies in their precedent-setting nature.[228]

The establishment of a principle over the long-term has far reaching effects. While its initial achievements may be modest, Hydro's windpower decision, for example, nonetheless provides a blueprint for similar future policy change. The initial success encourages entrepreneurs to seek out other issues; energizes entrepreneurs in other policy sectors; and provides all entrepreneurs with a foundation for arguments based on analogy.[229] In other words, the effects of the windpower decision could potentially spillover to other alternative energy resources and even into other policy areas. On the political front, the...

> ...old coalition that was blocking change is defeated...[it] may fight a rear-guard action for years but is henceforth unable to argue that [it is] invincible.[230]

Does Hydro Quebec's 1994 decision with respect to wind energy symbolize paradigmatic policy change? Or was it simply a minor setback? Were the defenders of the status quo defeated or did they simply conceed a minor skirmish? Time will tell, and therein lies a test as to the validity of the garbage can model.

---

[228] Ibid.

[229] Ibid., 203.

[230] Ibid., 201.

A P P E N D I X A

A Detailed Explanation of Windpower

The ABC's of Wind Energy

How reliable can any power source be if it is wholly dependent on the volatile nature of the wind? Its speed and direction are anything but certain and may vary according to season, geographical area and local topography. Technology has been applied to wind energy to compensate for these inconsistencies.

To generate electricity for a utility's grid, the output of the generating source must be within certain parameters. The greater the percentage of the grid supplied by that one source, the narrower those parameters. If a large supplier's output exceeds those parameters it would cause serious grid disruptions.[231] To reduce the vulnerability of wind energy to the vagrancies of its fuel source, aerodynamic technologies were developed to moderate the variability of wind speed. Without these technologies, wind power would be unsuited to grid production.

The first aerodynamic technique involves designing the rotor blades to become inefficient once they have reached the optimum rotation speed.[232] Thus, if the wind increases in speed, it blows by the rotor. "Feathering the blades" is

---

[231] Wind power does not yet comprise a large enough percentage of the grid for this to be a concern.

[232] M. Chappell, Program Report: Wind Energy Research and Development at the National Reserach Council of Canada 1975-85, (Ottawa: National Reserach Council, 1987), 51.

another way to perform this function.[233] It is a process in which the end of the blades are computer controlled to turn their edges into the wind if wind speed increases. This ensures that constant rotator speed is maintained. The opposite is performed if the wind speed decreases. Another, non-aerodynamic means to guarantee constant output are induction generators equipped with capacitors.[234]

If the wind happens to change direction, wind turbines are have the ability to "yaw".[235] Simply put, the machine is equipped with mechanical devices that constantly keep the rotor faced directly into the wind. This assures constant power production despite changing wind direction.

Wind turbines operate only within specific wind speeds. The minimum is 5 meters/second (m/s).[236] This is the **cut-in**

---

[233] Schefter, Capturing, 53.

[234] Capacitors maintain a steady output of 60 cycles by filtering the peaks and valleys of output production which result from changes in wind speed. For a more detailed explanation, see, Paul Gittewitt, Conceptual Physics, 2d ed., (New York: Addison-Wesley Publishing Company, 1992), 530.

[235] Only **Horizontal Axis Wind Turbines (HAWTS)** require the ability to yaw into the wind. This is because the rotor axis is parallel to the ground. Thus, if the wind blows from the sides of the turbine, the rotor does not intercept it and consequently no power is produced. Yawing can be performed in several different ways: (1) a **tailfin**; (2) **fan tail rotors**; or (3) a **computer** controlled system. For further elaboration see, John Twidell, A Guide to Small Wind Energy Conversion Systems, (Cambridge: Cambridge University Press, 1987), 33. **Vertical Axis Wind Turbines (VAWTS)** resemble giant eggbeaters. The axis of a **VAWT** is perpendicular to the ground and therefore omnidirectional. It does not require a yaw system. For more information see, Chappell, Program, 34.

[236] Ibid., 8.

speed. While the rotor may turn in lesser wind speeds, it is not generating electricity. The **cut-out** speed occurs when continued operation would damage either the generator, the grid or the structural integrity of the turbine itself. The actual cut-out speed depends on the rated capacity of the machine's generator. In such situations, the rotor is turned out of the wind, and in larger sophisticated models, a brake is automatically applied to lock the blades in a stationary position.

Utility customers expect the constant availability of power. How then could wind power be a significant contributor to a utility's grid? Michael Brower contends that while wind speed and direction may fluctuate widely, there are general "...daily and seasonal patterns that are surprisingly predictable".[237] By using wind data from the past several years, an astonishingly accurate calculation can be made with regards to the monthly mean speed, and daily peaks of the wind at specific sites. From these figures one can determine the amount of power a site can be expected to deliver.[238]

Site selection then, is a very important preliminary step. In A Guide to Small Wind Energy Conversion Systems, John Twidell defines the ideal site as being a hilltop, with a long flat uninterrupted exposure in the direction of prevailing wind. Near the top " ...of such a hill the wind

---

[237] Brower, Cool, 81.

[238] Ibid., 79.

speeds will be increased by perhaps 50% over speeds at the same height above ground before the hill."[239] Hilltops with steep slopes, cliffs or sharp ridges should be avoided because they will create turbulence. This will have detrimental effects on power output and the structural integrity of the WECS, resulting in a shorter life expectancy.[240] Another type of site well suited to wind turbines not addressed by Twidell, are mountain passes. The advantage here is that the walls of the pass act as a funnel and thus increase the speed and force of the wind. Altamont Pass and Gorgonio Pass in California are home to thousands of wind turbines.[241] These two sites benefit from being located between the Pacific Ocean on one side and a desert on the other. The result is strong winds made even stronger by the channelling effect of the mountain pass.[242]

Once the potential output of a site has been calculated, the next step is to choose a generator for the wind machine. As a rule of thumb, the rated capacity of the generator selected is two-thirds larger than the potential power of the site. The reasoning for this is based on the cognizance that

---

[239] Twidell, A Guide, 19.

[240] Wind Energy Conversion System or WECS is the formal name for wind turbine or wind machine. The term *windmill* is used to describe only historic examples.

[241] AWEA, 1992 WIND TECHNOLOGY, 1.

[242] The measure of the strength of the wind in an area is known as its **wind regime.**

calculating the expected power of a site does not preclude uncharacteristically strong gusts of wind. Thus, the generator installed is larger to protect it from being overloaded.[243]

Despite the benefits it bestows, technology cannot guarantee the availability of wind. If wind energy is ever to play a significant role in power production, wind turbines will have to be grouped into wind farms (two or more turbines on the same site), and wind arrays (a cluster of wind farms, often geographically distant, whose power production is fed into the same grid).[244] The power rating of a wind farm is referred to as the installed capacity. However, a wind farm's actual capacity is approximately 48%-51% less than the installed capacity.[245] Therefore, a wind farm with an installed capacity rating of 40MW would be expected to generated roughly 20MW.

The ideal situation from the point of view of a utility is that electricity demand and wind speeds peak at the same time.[246] For the rest of the day there may be no wind at the site but demand can be met with other sources of power production. These may well include other wind farms. For

---

[243] Twidell, A Guide, 46.

[244] Wind Energy Technical Information Guide, 11.

[245] Quebec, Debat sur l'energie au Quebec: Cahier d'information, 64.

[246] Brower, Cool, 79.

example, the utility Pacific Gas & Electric (Ca), has a wind array connected to its grid. Two of its wind farms are located in Altamont Pass and Solano County respectively. The winds at Altamont Pass correlate well with the utilities seasonal load (strong winds in the summer months when air conditioners are on) but offer poor correlation with daily loads. PG & E's peak power needs occur late in the afternoon, whereas the winds at Altamont Pass are not at their strongest until 9-10 pm. Yet in Solano County the winds peak in the late afternoon, and thereby present an excellent match to PG & E's load.[247]

It is estimated that the amount of potential energy in the wind is 10^{11} GW.[248] There are two factors which thwart the ability of the wind industry to harness all of this potential energy. Firstly, there is the question of urban development. Many sites with good wind regimes already host developments which effectively prevents them from being used. Buildings disrupt wind flow and cause turbulence, the damaging effects of which have already been discussed. Wind energy is more suited to areas where there is little urban construction, such as farm lands or mountain passes.

The second obstacle to extracting the maximum amount of potential energy from the wind has to with aerodynamics. In 1927, Carl Betz calculated that an ideal rotor could, at best,

---

[247] Brower, Cool, 82.

[248] Cheremisinoff, Fundamentals, 5.

extract 59.3% of the potential power.[249] Modern technology has not yet been able to design the ideal rotor. Hence, Betz's Limit, as it has become known, remains elusive. At best, modern high speed rotors approach or slightly surpass a 40% extraction efficiency.[250] This figure should not be dismissed out of hand. When compared to the extraction efficiencies of fossil fuel contemporaries, it is quite satisfactory. Car engines convert 15%-20% of the chemical potential of gasoline into usable horsepower and the latest diesel generators convert fuel to energy at about 35% efficiency.[251] If one were to consider the externalities of each, the overall advantages of wind power (economic and environmental) are further illustrated.

The complete dependence of wind energy on the wind mitigates against it being proclaimed the "be all and end all" solution to our energy needs. Nonetheless, it can satisfy some of those needs and in so doing, perform the dual function of conserving finite non-renewable resources and consequently reducing the quantity of pollution produced by the generation of electricity.

---

[249] Schefter, Capturing, 18.

[250] Twidell, A Guide, 32.

[251] Centre for Mineral and Energy Technology's Wind Energy Conversion Systems: A Buyers's Guide, 2nd draft, Natural Resources Canada, Ottawa, 32.

A P P E N D I X B

Canadian Wind Energy Conference Program

SUNDAY OCTOBER 6, 1996

A day in the Canadian Rockies

A variety of activities are available to conference participants and their families. A golf tournament at the world class Kananaskis Country Golf Course has been organized. There are a limited number of tee times available. Please call Dave Baker (CanWEA Secretary) at (403) 248-9663 for details and to book your time. The conference location is also ideal for a number of outdoor activities in the mountains. Organized hiking, biking and whitewater rafting trips are available but must be booked before August 31, 1996. Call Jean at Mirage Adventure Tours (1-800-312-7238) to arrange - let me to let her know that you are attending the conference. For the adventurous, there is riding, hiking and kayaking to do on your own. Finish your day with cocktails in the Trade Show.

7:00 pm **Early Registration and Trade Show opens**
7:30 pm **Opening Reception in the Trade Show**
Host: York WindPower Corp.

8:15 pm **CanWEA Board of Directors Meeting**

MONDAY OCTOBER 7, 1996

SEMINAR

Sponsored by Natural Resources Canada

7:30 am **BUS DEPARTS for Pincher Creek Area Tour**
Tour highlights: Cowley Ridge Windfarm, CWT Windfarm, Alberta Renewable Energy Test Site

12:30 pm **LUNCH at Cowley Hall, Pincher Creek,** *Menu to be announced*
Host: Canadian Niagara Power

1:45 pm **WIND PUMPING & WATER QUALITY FOR STOCK AND AGRICULTURAL USE**
Location: Cowley Hall

Improving Water Quality, Dave Baker, Phoenix Engineering
Market Opportunities, Isaac Crusoe, Dutch Industries
Water Quality and Cattle Production
Keith Evans, Alberta Cattle Commission
Additional speakers from Prairie Farm Rehabilitation Administration, Alberta Agriculture

3:45 pm **BUS RETURNS TO KANANASKIS**

7:00 pm **RECEPTION/COCKTAILS in the Trade Show**

TUESDAY OCTOBER 8, 1996

CONFERENCE

7:30 am **Registration/Trade Show Open**
DAYBREAK COFFEE
Host: Edmonton Power

8:55 am **Welcome/Opening Remarks**
Jeff Passmore, President, CanWEA

9:15 am **IS THERE LIFE AFTER RESTRUCTURING?: WIND IN THE NEW POWER MARKET**

Larry Wilson, CEO, Power Pool of Alberta
Fred Gallagher, Managing Director, Canadian Enhanced Energy Development Ltd.
Guido Bachmann, President, IPPSA
Bill Marcus, Principal, JBS Energy Inc.

10:20 am **REFRESHMENT BREAK in the Trade Show**

10:45 am **CLIMATE CHANGE, SUSTAINABILITY AND COMPETITION**

The Impact Of Climate Change On W. Canada - What the Scientists Are Saying, Kevin Jardin, GreenPeace Canada
The Political Context for GHG Emission Reduction
Robert Hornung, Pembina Institute
Sustainable Energy Systems - Opportunities and Constraints within Competitive Electricity Markets
Andrew Pape, Simon Fraser University
The Role of Renewables in an Environmental Policy Portfolio.
Jay Barclay, Environment Canada

12:00 pm **SMALL WIND TURBINES**

Remote Power Systems for the NWT
Alexandra Hampson, Midnight Sun Energy
The Smaller Windmill
Peter Sanguinetti, Trillium Windmills Inc.
Machines Under 10 kW: Buyer Beware, Carl Brothers, AWTS

12:45 pm **BUFFET LUNCH in the Trade Show**

2:00 pm **SUMMARY TECHNICAL PRESENTATIONS**

The Predicted Performance of Cleave-Rotor Wind Turbines,
John Kentfield, University of Calgary

Accuracy of Wind Speed Data: A Key-Factor in the Economic Analysis of Wind Energy Projects, Peter Enders, EKOPOWER
Time-Series Modelling of Remote Community Wind & Hybrid Energy Systems
Patrick Quinlan, University of Wisconsin-Madison
Uncertainty in Wind Speed Measurements
Jim Salmon, Zephyr North

3:00 pm **REFRESHMENT BREAK in the Trade Show**

3:20 pm **WIND OPPORTUNITIES IN REMOTE & NORTHERN COMMUNITIES**

A Renewable Energy Policy for the NWT
Joe Ahmad, Government of NWT
Community Energy Planning
Dennis Bevington, Mayor, Fort Smith, NWT
Adaptation of a Wind Turbine for Sub-Arctic Conditions with Severe Rime Icing, John Maissan, Yukon Energy
Wind Energy in Polar Regions: Casey Station Antarctica, Christopher Brown, Inst. of Antarctic and Southern Ocean Studies
A New NRCan Program: Renewable Energy for Remote Communities, Greg Long, Natural Resources Canada

4:45 pm **RESTRUCTURING, CLIMATE CHANGE AND THE ROLE FOR RENEWABLES - TOWN HALL MEETING**
Rick Hyndman, Deputy Minister, Alberta Energy

A 20 minute presentation followed by questions and discussion

6:15 pm **COCKTAILS IN THE TRADE SHOW**
Host: TransAlta Utilities

7:00 pm **BANQUET DINNER**
Host: TransAlta Utilities

Keynote Speaker: *to be confirmed*

Twelve Months Later - A Report Card on the Implementation of CanWEA's Strategy Document
Mike Bourne - Chair, Priorities & Planning Committee

R.J. Templin Award Presentation

WEDNESDAY OCTOBER 9, 1996

CONFERENCE and AGM

7:15 am **ANNUAL GENERAL MEETING**
Continental Breakfast

DAYBREAK COFFEE
Host: CWT Power

9:00 am **SELECTED MARKETS AND STRATEGIES FOR WIND ENERGY INITIATIVES**

The Quebec Debate on Energy - Implications for Wind,
Bernard Saulnier, Public Consultation Committee
A Strategy for 3000 New Jobs in Alberta
Roy Davidson, Economic Development Board, Town of Pincher Creek

Placing Economics First: For Long Term Growth
Paul Luddy, Suncurrent Industries Inc.

10:00 am **FEDERAL GREEN POWER PROCUREMENT & RECENT TAX INITIATIVES**

Dan Whelan, Dir. General, Energy Supply Branch, NRCan
John Keeping, President, Canadian Hydro Developers, Inc
Jason Edwardy, President, Northwood Energy Systems

10:45 am **REFRESHMENT BREAK**
Host: Turbo Windpower Inc.

- see over for rest of Wednesday's program -

WEDNESDAY OCTOBER 9, 1996 (cont.)

CONFERENCE

11:00 am **OPERATIONAL PERFORMANCE AND TECHNOLOGY DEVELOPMENT**

One Year Later: The Tacke Machine
Philipp Andres, Tacke Windpower
The CWT Turbine, Michael Carten, CWT Power
A Summary Report on Wind Diesel
Malcolm Lodge, Island Technologies
Perspectives on Worldwide Development Activities
Al Davies, Zond Corporation

12:15 pm **UTILITY INTEREST IN WIND AND OTHER RENEWABLES**

Rick Blennerhossett, Vice President Operations
Northwest Territories Power Corporation
Gordon Lambert, Director Sustainable Development,
TransAlta Utilities
David Morrow, Manager Business Development,
Edmonton Power
Speaker to be confirmed, Ontario Hydro
Bevan Laing, Manager Power Resources Planning,
Alberta Power

1:30 pm **CLOSING REMARKS**

INVITED MINISTERS

The following ministers have been invited to participate in this year's conference.

Hon. Anne McLellan
Hon. Dr. Stephen West
Hon. Pat Black
Hon. Stephen Kakfwi

Trade Show

In conjunction with this year's conference, a trade show will be held adjacent to the plenary sessions. Receptions and lunches are planned to be held in the trade show area. This is an excellent opportunity for industry members to feature their products and services and for potential customers, as well as policy and decision makers, to see the industry's capabilities for themselves. Some space is still available. To reserve space call the CanWEA office. Exhibitors to date include: Dutch Industries, Nor'wester Energy Systems, NRCan, Rosemount Aerospace, Micon Wind Turbines, Tacke Windpower, Trillium Windmills, Wind Power Inc. and Zond Corporation.

Sponsors

The Association would like to extend its gratitude to the conference and seminar sponsors who are vital in making this event a success. To date these sponsors include: Alberta Power; Canadian Niagara Power; CWT Power; Edmonton Power; Energy, Mines and Petroleum Resources, GNWT; Environment Canada; Hydro Québec, Ontario Hydro; Natural Resources Canada; Tacke Windpower Inc.; TransAlta Utilities; and York WindPower Corp.

Annual General Meeting

The Canadian Wind Energy Association's annual general meeting will be held on Wed., October 9, 1996 at 7:15 am at The Lodge at Kananaskis, Kananaskis Village, Alberta. The meeting is open to all, but in order to vote you must be a fully paid member of the Association by September 27, 1996. Individual and Associate members are entitled to one vote, Corporate and Sustaining members have two votes. Student memberships do not include voting privileges. Morning refreshments will be served during the meeting.

Hotel Information

This year's conference is being held at *The Lodge at Kananaskis* in Kananaskis Country in Alberta's Rocky Mountains. Incredible scenery, excellent facilities and activities ranging from golf to horseback riding to whitewater rafting provide an outstanding venue for this years event.

The special conference rate is $118 per night, single or double. You must book before Labour Day (Sept. 2) to take advantage of this rate and you must advise the hotel that you are attending the Canadian Wind Energy Conference. Call 1-800-441-1414 (403-591-7711) to make your booking or fax (403) 591-7770.

To get to the hotel from the Calgary Airport, take the Trans Canada Highway #1 west from Calgary to the Kananaskis Trail/Kananaskis Country/Hwy #40 turnoff (75 km from airport). Follow this south for approx. 25 km and turn at Kananaskis Village entrance. Follow signs to the Lodge. Bus service from airport also available.

Additional Information

Pour information en français: Jeff Passmore, Coordinateur de la conférence, tél: (613) 566-7005, fax: (613) 233-9527

For additional information, contact either the CanWEA office at 1-800-9-CANWEA (outside Canada, call (403) 289-7713) or Jeff Passmore (conference coordinator) at (613) 566-7005

FREE MEMBERSHIP WITH NON-MEMBER REGISTRATION

If you are not a CanWEA member and are registering as a non-member for the conference, you will receive a one year complimentary membership, which includes a subscription to *WindSight*, the Association's quarterly newsletter.

Primary Sources

Castel, Daphna. Member of Mouvement Au Courant. Interview, 18 January 1996.

Davis, Earl. Manager Windpower Integration at Electic Research Institute. Interview, 9 Febraury 1996.

Edwards, Gordon. President Canadian Coalition for Nuclear Responsibility. Interview, 15 September 1995.

-----. Interview, 8 November 1995.

-----. Interview, 26 January 1996.

Elverez, Michael. President Kenetech Energy Systems, Inc. Global Development and Finanace Company for Kenetech Corporation. Interview, 26 February 1996.

Hamilton, Graeme. Journalist, The Montreal Gazette. Interview, 24 January 1996.

Hardie, Yvon. Engineer (retired) Hydro Quebec. Interview, 26 January 1996.

Heinrich, Jeff. Journalist, The Montreal Gazette. Interivew, 25 January 1996.

McIntosh, Andrew. Journalist, The Montreal Gazette. Interview, 20 March 1996.

Paquet, Paul. Conseils d'economies et fiancieres, Hydro Quebec. Interview, January 25, 1996.

Passmore, Jeff. President of the Canadian Wind Energy Association and President of Passmore Associates International. Interview, 1 February 1996.

-----. Interivew, 28 February 1996.

----. Interview, 24 July 1996.

Pinchaud, Guy. Kenetech Canada. Interview, 15 September 1995.

-----. Interview, 25 January 1996.

Rangi, Raj. Wind Division, Natural Resources Canada. Interview, 10 November 1993.

-----. Interview, 12 February 1996.

------. Interview, 21 June 1996.

Saulnier, Bernard. Research scientist (IREQ), Hydro Quebec. Interview, 25 January 1996.

------. Interview, 5 February 1996.

Sirros, Christos. Member of the National Assembly and former Quebec Energy Minister. Interview, 23 April 1996.

Tanguay, Francois. Member of Greenpeace Canada. Interview, 23 January 1996.

Secondary Sources

Abley, Mark. "Act of God or man?" The Montreal Gazette, 27 July 1996: B1-2.

Alberta. Alberta Energy. Southwest Alberta Renewable Energy Initiative Annual Report 1992-93. Edmonton: Government of Alberta, 1993.

American Wind Energy Association Newsletter. 1992 WIND TECHNOLOGY STATUS REPORT. Washington, D.C., 1992.

Authier, Philip. "Johnson hopes to clean up environmental image." The Gazette, 16 June 1994: B4.

Block, Irwin. "New York City puts power talks with Hydro Quebec on hold for 18 months." The Gazette, 2 April 1994: A5.

Bourassa, Robert. Power from the North. Scarborough: Prentice- Hall, 1985.

Branswell, Jack. "Sirros proposes integrated energy plan for Quebec, eastern Canada, and U.S." The Montreal Gazette, 7 April 1994: A6.

Bright, David and Stephen Salaff. "The Role for Wind Will Grow." WindPower Monthly. November 1993: 20-21.

Brooks, Stephen. Public Policy in Canada: An Introduction. Toronto: McClelland & Stewart, 1989.

Brower, Michael. Cool Energy: Renewable Solutions to Environmental Problems. Cambridge, Massacheusetts: MIT Press, 1992.

Canada. Centre for Mineral and Energy Technology, Efficiency and Alternative Energy Technology Branch. Canadian Wind Energy Technical and Market Potential. Ottawa: Energy, Mines and Resources Canada, 1992.

Canada. Natural Resources Canada. Electric Power in Canada 1993. Ottawa: Ministry of Supply and Services, 1994.

Canada. National Research Council Canada. Program Report: Wind Energy Research and Development at the National Research Council of Canada 1975-85. Ottawa: National Research Council, 1987.

Canadian Wind Energy Association's (CanWEA). Status of Wind Energy Technology: October, 1991.

-----. Bulletin. Vol. XI, No. 3, July 1993.

-----. Bulletin. Vol. 8, No. 4, December 1995.

-----. WindSight. Vol. 9, No. 1, March 1996.

Centre for Mineral and Energy Technology, Wind Energy Conversion Systems: A Buyer's Guide, 2nd draft. Natural Resources Canada, Ottawa.

Cheremisinoff, Nicholas. Fundamentals of Wind Energy. Ann Arbor: Ann Arbor Publishers, 1978.

Coleman, William D. The Independence Movement in Quebec: 1945-1980. Toronto: University of Toronto Press, 1984.

Davidson, John. "Hydro Quebec unplugs contract for New York power." The Gazette, 26 May 1994: A6.

Doern, Bruce and Robert Phidd. Canadian Public Policy: Ideas, Structure, Process. Toronto: Methuen, 1992.

Dror, Yehezkel. "Muddling Through - 'Science' or Inertia". Public Administration Review. 24, 3 (September 1964): 153-57.

Edwards, Frank. "Amory Lovins, Energy Pathfinder." Harrowsmith, December 1978, 32-38.

Edwards, Gordon. "Canada's Nuclear Industry and the Myth of the Peaceful Atom." In Canada and the Nuclear Arms Race, edited by Ernie Regehr and Simon Rosenblum. Toronto: James Lorimer & Company, 1983.

Gagnon, Alain-G. and Mary Beth Montcalm, Quebec: Beyond the Quiet Revolution. Scarborough: Nelson Canada, 1990.

Gantenbein, Douglas. "Energy: Something in the Wind." The Atlantic, October 1993, 36-42.

Gazette, The. "Massachusetts considers review of Great Whale." 8 April 1994: A5.

Gittewitt, Paul. Conceptual Physics. 2nd ed. New York: Addison-Wesley Publishing Company, 1992.

Ham, Christopher, Michael Hall. The Policy Process in the Modern Capitalist State. 2nd ed. New York: Harvester Wheatsheaf, 1993.

Hamilton, Graeme. "Sirros, it is time to rethink approach to energy planning." The Montreal Gazette, 1 February 1994: A1-2.

-----. "Hydro Quebec must turn to windpower, Sirros says." The Montreal Gazette, 21 March 1994: A3.

-----. "Hydro paid its won consultants to assess Great Whale study." The Montreal Gazette, 4 August 1994: A5.

Heinrich, Jeff. "Hydro aims for direct sale to New York." The Montreal Gazette, 3 March 1994: A1-2.

-----. "Hydro mauled at power hearings in New York." The Montreal Gazette, 5 March 1994: D1-2.

Howlett, Michael and M. Ramesh. Studying Public Policy: Policy Cycles and Policy Subsystems. Toronto: Oxford University Press, 1995.

Hydro Quebec. Development Plan 1993. Montreal, 1992.

International Energy Association. Wind Energy Newsletter. No. 3. Smith Falls: Performance Printing Ltd., 1993.

Keller-Herzog, Angela. A Dynamic Economic Model of Global Warming: Fossil Fuel Depletion and Co_2 Accumulation. Carleton: M.A. Thesis, 1994.

Kenetech. "Prospectus". San Francisco: Kenetech, September 1993.

Kingdon, John W. Agendas, Alternatives and Public Policies. Boston: Little Brown & Co., 1984.

Mckenzie, J. J. "Energy and Environment in the 21st Century: The Challenge of Change." In Energy and Environment, edited by J. Byrne and D. Rich. London: Transaction Publishers, 1992.

McRoberts, Kenneth. Quebec: Social Change and Political Crisis. 3rd ed. Toronto: McClelland & Stewart, 1989.

Pal, Les. Public Policy Analysis: An Introduction. Toronto: Methuen. 1992.

Pross, Paul. Group Politics and Public Policy. Toronto: University of Toronto Press, 1986.

Pershagen, B., ed. IEA Wind Energy Annual Report 1992. Selected and Introduced by B. Pershagen. Stockholm: NUTEK, 1993.

Quebec. Ministere des Ressources naturelles. Debat public sur l'energie au Quebec: La production d'electricite. Quebec City: Government of Quebec, 1995.

Schefter, J.L. Capturing Energy from the Wind. Washington, DC: National Aeronautics and Space Administration, 1982.

Thayer, Robert L. and Heather A. Hansen, Wind Farm Siting Conflicts in California: Implications for Energy Policy, Davis, California: University of California Press, 1991.

Toner, Glen. "Environment Canada's Continuing Roller Coaster Ride". In How Ottawa Spends 1996-97: Life Under the Knife, edited by Gene Swimmer. Ottawa: Carleton University Press, 1996.

Twidell, John, ed. A Guide to Small Energy Conversion Systems. Selected and Introduced by John Twidell. Cambridge: Cambridge University Press, 1987.

United States of America. Solar Energy Research Institute, Solar Technical Information Program. Wind Energy Technical Information Guide. Washington, DC: U.S. Government Printing Office, 1985.

United States of America. U.S. Department of Energy, Energy Technology, Division of Solar Technology. Third Wind Energy Workshop. vol. 1. Washington DC: U.S. Government Printing Office, 1978.

Van Loon, Richard and Michael Whittington. The Canadian Political System: Environment, Structure and Process. 4th ed. Toronto: McGraw-Hill Ryerson Limited, 1987.

van Wijk, A.J.M., J.P. Coelingh and W.C. Turkenburg. Wind Energy: Status, Constraints and Opportunities. December 1991, 4th draft of an unpublished study. Natural Resources Canada, Wind Energy Chapter, 580 Booth Street Complex, Room 973.

Wells, Paul. "Hydro's Great Whale study called inadequate." The Montreal Gazette, 27 July 1994: A3.

END

17-06-97

FIN