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***MEGAPROJECT DECISION MAKING
Lessons and Strategies***

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INTRODUCTION

This bulletin is about the management of megaproject decision processes—the strategies that enhance their potential for success and the lessons learned in making those decisions. There are two kinds of megaproject successes: i) built megaprojects that stand the tests of viability over time; and ii) unbuilt megaprojects that would not have been viable. Similarly, there are two kinds of megaproject failures: i) built megaprojects that were not viable over time (i.e., white elephants); and ii) unbuilt megaprojects that never came to fruition for reasons other than objective analysis and timely decision-making. To maximize the odds for success and minimize those for failure, a sound and systematic megaproject decision-making process is essential.

Megaprojects have been very important in Canada's economic and social evolution. Typically, Canadian megaprojects have been built with direct and/or indirect government support; frequently, Crown corporations have been formed as operating organizations for megaprojects and several have been possible only by risk-pooling through government participation.

A megaproject usually is defined by absolute size, and the size criterion here is set at \$1 billion. Elsewhere, the author argues for a relative rather than absolute size definition (Warrack, 1985). In some contexts, a

\$100 million size could constitute a megaproject.

There are three basic components of

megaproject decision-making processes: the sponsor, the government, and the interface between them. The intention here is to address levels, structures, and approaches in which the myriad of individual micro decisions can be made. Where government has a sponsorship role, that role is included here rather than subsumed into the government's public policy role.

The lessons to be learned from megaproject experiences in Western Canada relate to their analysis, organization, and strategies. Five such lessons and strategies are identified and briefly commented on.

Most writing about megaprojects is retrospective rather than analytical and prescriptive. The academic literature is scant although governments have commissioned reports from time to time. Much of this paper summarizes longer and more generic work sponsored by the Institute for Research on Public Policy (Warrack, December 1985). The Canada West Foundation has also done research to identify major projects and assess sector/regional/national implications (Beck and Dungan, 1983). Doern (CPA, 1983) has argued that Canadian "episodic" policy toward megaprojects, oscillating between "savior" status and unwarranted inattention, has been harmful.

Ten characteristics of megaprojects are identified in the Appendix. Five conditions for success are enumerated, and eight requirements are listed to meet the five conditions. Finally, four decision options are set out for each stage of the decision-making process.

LESSONS AND STRATEGIES

From experience with megaprojects, it seems clear that strategic considerations can enhance the chances of success and

reduce the odds of failure (Warrack, 1992).

Lesson One

Objective evaluation of project viability, from both micro (sponsor) and macro (society) perspectives, is vital.

Successful megaprojects can embody large *potential* economic benefits, and megaproject should not be built for its own sake—nor should one be precluded summarily.

A stronger economy makes social improvements more affordable. The economic development strategy of any jurisdiction is stronger if it facilitates megaproject possibilities. A dimension of this economic strategy must be to "capture the multiplier" of megaproject economic benefits. An orderly sequence of megaprojects would induce competitive supplier and market investment decision-making in the project location. Examples of this in Alberta are the forestry and oil sands resources projects.

Lesson Two

Government is a decision-making *partner*. Regardless of megaproject sponsorship, government at any involved level must make major and often final decisions in the megaproject approval process. Where impact are very large and highly diverse; it is reasonable for the public to expect public policy decision-making. Megaproject sponsors make a strategic error in failing to recognize the legitimacy of government responsibility for decision-making on behalf of the broader public interest. At times governments do not accept to recognize their necessary role, and thus fall short in organizing and managing the needed public policy decision process. (Some specific suggestions for facilitating this will follow.) The strong strategic position for a megaproject sponsor is early and graceful acceptance of government policy involvement, and initiation of an open consultation process based on

understanding and trust. The strong strategic position for government is exactly the same. The result should be more rational, reliable, and expeditious megaproject decision-making.

Lesson Three

Projects should *only* be built as megas if there is no real choice.

Many resources and utility projects can only be megaprojects due to physical circumstances. From a risk perspective, megaprojects are more than the simple "ballooning" of the size of conventional projects. With increased size come exponentially larger risks. Complex specific factors underlie this reality, including new facility designs, sizes beyond operating experience, capital access, markets (output and input) distortion, environmental impact, government monetary policy, and so on. It is in the public interest that megaproject success be *possible*.

Lesson Four

Risks can be abated by early and continuous sponsor/government consultations attendant iterative decision-making.

Decision-making *linkage* is the vital point here. Megaprojects are unlike conventional projects where an existing and reliable regulatory framework likely will be in place; thus, a conventional project can be developed fully and then (i.e., sequentially) put forward to government for probable, perhaps modified, approval. Government staff will be familiar with such projects and applicable regulations that enact public policy and legislation. None of this applies to megaprojects. Government will need to learn about the complexities and uncertainties of a megaproject. A sponsor will need to learn about government policies, regulations and administrative intricacies. Needless

risks can be added when misunderstandings are magnified by accompanying frustrations.

Lesson Five

Government must be *capable of positive* decisions regarding megaprojects.

Negative decisions are easier to make (and justify politically) than positive ones. Easier still are delays in decision-making, sometimes by an artful series of studies, meetings, hearings, and so forth. A tentative government may wishfully assume that a negative or delayed decision can be reconsidered in the future, but this is much less likely for megaprojects than for conventional projects. Economic globalization, in

capital and markets, alters the odds further and worsens the risks embodied in decision-making paralysis.

The strategic lesson for a potential megaproject sponsor is evaluation of capacity to government capacity to reach decisions within the relevant, often crucial, time frame. Such a capacity is effectively a "resource base", similar to physical, financial, or management resources. Few governments are in a position to make expeditious decisions just before or after their respective elections, nor can re-election be taken for granted. Government decision-making is far more reliable in the middle half of an electoral term.

WESTERN CANADIAN CONTEXT

Roles

Many associate with the development of megaprojects natural resources while many of these projects have powerful economic, social, and symbolic roles in the society. A concert hall, a national arts centre, Expo 67 and Expo 86 and the 1976 and 1988 Olympics are examples of megaprojects that have had symbolic roles for Canada. Powerful political leverage may be conferred by symbolic megaprojects. As a source of economic activity, they generate incomes and create employment opportunities. Many associate with the development of natural resources. Expanded and improved economic infrastructure enhances the capacity for other productive economic activities that generate income and create jobs.

Some megaprojects such as cross-Canada railway construction, the St. Lawrence Seaway, Trans-Canada pipelines, the Trans-Canada railway construction, the St. Lawrence Seaway, Trans-Canada pipelines, the Trans-Canada highway, and the Lion's Gate Bridge have had very large social

impacts. Their infrastructure components, both large and small, have had very positive socioeconomic effects.

Economic Development

The terms "economic growth" and "economic development" are not synonymous. There is a difference in meaning and its nature varies with economic circumstances. With serious and widespread unemployment, economic activity of almost any kind should be embraced; only in these dire circumstances is economic growth necessarily economic development. Economic growth is an expansion of output increasing employment and incomes, regardless of output characteristics. An economy could be more unstable (i.e., vulnerable) after economic growth. Project construction can gear up far more rapidly than the expansion of local infrastructure and people-oriented services. Given the size and pace of construction, megaprojects can mismatch and disrupt their social environments.

Economic development relates to economic priority at a given time. For example, high unemployment is indicative of a weak economy; a prosperous but precarious economy is also a weak economy. Most analysts will recognize that reliability of any mean (average—e.g., economic prosperity level) is conditioned by its attendant variation (variance—e.g., economic instability). A recent study of the Alberta economy provides hard analysis of these problems (Mansell and Percy, 1990). In an economy where the one of the biggest problems is vulnerability, economic activity that reduces vulnerability constitutes economic development. Hence, economic strategy needs to emphasize "balancing" economic structure by both geographic and sector diversification (Alberta Government, 1984).

There is a great difference between a megaproject during construction and its post-construction operation. This is evident in numbers of direct and indirect workers, resulting population growth, and the range of demands placed on communities. Megaproject construction can take four to eight years with a work force from a few hundred to several thousand people. The permanent work force will be far smaller.

If a local community reacts fully to the construction level of needs, it can be left with a costly and excessive excess infrastructure on project completion. The new activity, as well as overwhelming the existing economic base, may not be compatible with it. An associated result, although intangible, is that the community "character" and lifestyle may be forced to change. The human impact in the community can be highly disruptive with great stress from forced and rapid change (Warrack and Dale, 1982).

Megaprojects have not been uncommon

in Western Canadian economic development. Careful policy formulation and implementation is essential if megaprojects are to foster economic development and yield social improvement through enhanced affordability.

Community Context

The public benefits of megaprojects tend to be longer-ranging and regional/national in scope; the negative impacts tend to be immediate and local.

The location of a megaproject is usually dictated by a set of physical attributes. Many can only be built in (or through) rural areas, often remote from any metropolitan urban centre. Difficulties with megaprojects are magnified when viewed in a community or other sub-regional context. Even the sheer size of a megaproject understates the impact on an existing social environment; once a "go" decision is made, megaproject sponsors will need to build it expeditiously, but the sudden surge of economic impact can easily overwhelm the host's historic economic base.

At the community level, it is easy to overestimate the benefits, especially in the construction phase "multiplier," and to underestimate the costs. The economic multipliers, ie; the recycling of injected income into an economy, are much higher in project-operating phases (2.0-4.0) than in construction phases (1.0-2.0). Typically, the local business is unable to compete effectively for new business to the extent that was anticipated. Moreover, local labour skills are likely to mismatch project requirements. Most employment opportunities may be filled by workers from outside the area. The result is tragic if the indigenous population is disadvantaged by ethnic or other circumstances. Manpower preplanning and training is imperative to avert this scenario.

Even when a megaproject is successful, communities and their local governments will need help in the early phases of project development. A megaproject failure is a disaster for any but the largest and wealthiest of communities. A financial base for coping is needed. For resource megaprojects, the logical funding base is economic rents (royalties, stumpage). In Western Canada, where most natural resources are Crown-owned, the method of allocation to community social needs can cycle through governments or be applied directly pursuant to an agreed fiscal regime. Where the resources are

privately owned, direct allocation to the social environment by the megaproject sponsor is more likely.

As important as are economic considerations, it is imperative to recognize the social environment that cradles the megaproject. Project sponsors ignore the social environment at their peril. Too often the priority is that of public relations rather than substantive managerial functions. There is always much skepticism about the virtues of rapid growth and change inherent with megaprojects. Unless sponsor and public management is effective, such misgivings may be valid.

MEGAPROJECT DECISION PROCESSES

Megaproject decision processes involve the sponsor, the government and the sponsor/ government partnership. Pursuant to size, complexity, and characteristics, *concurrent* decision-making is vital, if a megaproject is to proceed

construction, established project management techniques and decision-making processes will have to supplant the preconstruction ones. Significant continuity of expertise is essential but the need for and balance of expertise will evolve.

In the following discussion emphasis is on enhancing potentially successful megaprojects.

Entry

Sponsor

A potential sponsor must decide whether entry under the stipulated terms are acceptable, must have a willingness to adapt to megaproject requirements, and be able to withstand potential related losses. For the entrant the question is whether other entrants have the necessary organizational and financial strength. Bringing technical, marketing, or other special attributes to the consortium is a bonus. The one factor that cannot be emphasized too much is that every dollar expended prior to a construction commitment is subject to the risk of total loss. An entrant must be able to digest this potential loss.

Sponsor decision-making is a "ray" that penetrates through the characteristics, conditions, and requirements of megaprojects. Sponsor owners, managers, analysts, and decision makers need to become familiar with these elements early in the process.

Experience with megaproject successes, especially at top management levels, is invaluable. The wide array of decisions applicable to conventional projects are necessary but insufficient for megaprojects. Special attention needs to be paid to risk issues.

Too small a consortium share may result in insufficient commitment and produce a cumbersome number of sponsor participants. Too large a share can unbalance the strength brought to the

If after preconstruction megaproject phases, a commitment is made to

megaproject consortium. Strength must be evaluated on an aggregate basis and for each potential sponsor participant individually. Moreover, each sponsor should have some standby strength in case pessimistic circumstances become reality.

Each potential entrant must judge the compatibility of other entrants. How similar are interests and styles? For example, the management of public utilities could differ from what it takes to succeed with resources-oriented oil patch entrepreneurship.

Personnel

Good ideas require effective implementation. Once mutually determined partners for a megaproject are in place, the next level of decision-making is hiring personnel with the right analytical skills and leadership capabilities. Personnel decisions can "make or break" megaproject prospects regardless, even if the conditions for success are favourable.

All personnel must be loyal to the fundamental "truth" of the megaproject. *A priori* commitment to construction is a non-affordable luxury, as are divided loyalties, a special danger among people seconded from sponsor companies. Employment and contractual agreements must enable people to recommend against a project even though it may seem contrary to their personal and professional interest. Unless negative recommendations are possible, investigatory team recommendations and decisions will lack objectivity.

Personnel can be drawn from various sources. One is secondment from sponsor companies in the megaproject consortium. If this occurs sponsors must be alert to protect against ulterior motives in seconded personnel. More bluntly, people must not be "fobbed off." Another is staff hired specifically for the

megaproject investigation. External consultants, including those with multidisciplinary skills, can strengthen particular areas of analysis; flexible arrangements can bring expertise to bear where project interests are served. People will come to the project from varied sources, with differing experiences, which at the best, will include some experience with successful megaprojects.

The team of people should, if a megaproject proceeds beyond preliminary phases, be organized into an independent separate entity. Their responsibilities will be large and carried on in a complex and uncertain environment. In the circumstances, team-building will be an essential and continuous management challenge to which a separate entity is well adapted. Moreover, a separate entity will make it easier to cancel a megaproject.

Decisiveness

A megaproject consortium needs the authority and capacity to act decisively. Project review must be a continuous and simultaneous process in which all interests, whether favourable or unfavourable, are taken into account. Continuity assures that changing circumstances are diagnosed and evaluated. Simultaneous review assures that the vital implications of interrelated changes are not overlooked. With megaproject review of sufficient scope actions to mitigate concerns about the project and protect everyone's investment are possible.

It is important to identify early any critical time limits that will affect the decisions of a megaproject. For example, a hydroelectric power project will also evaluate fossil fuel energy alternatives in meeting future electricity demand. For resource megaprojects, market growth and timing of competing additions to world supply are critical to

prospects for success. Endless studies and deferrals are out but there will always be some residual of risk that sponsors must weight and judge.

Partitioning the overall megaproject into separable stages aids decision-making. Sufficiently favourable results from objective study, means work should proceed to the next stage. If the favourable threshold is not met, reconsideration through additional same-stage analysis is preferable to commitment to a further stage of investigatory expenditure. Another option is to put the megaproject on hold pending resolution of one or more crucial conditions, such as a pre-agreed fiscal regime applicable to a resource megaproject (i.e., taxation). Finally, the correct option could be to halt work and expenditure.

Accurate data, correct analysis, and effective consultation are keys to objective megaproject decisions. A well-structured and compatible consortium is more likely to be decisive.

Public Affairs

Production, finance, and marketing considerations underlie traditional business decision-making. The relationship to the public-at-large often has been a one-way public relations function; whose purpose was to "put the best public face" on corporate decisions. Most large and successful corporations have upgraded public affairs to decision-making status (Gillies, 1990). Indeed, many senior executives spend much of their time on public affairs and government matters.

A megaproject is vulnerable if the sensible and moderate majority of the public hold poor perceptions of the project. Perceptions based on understanding and positive attitudes minimize the political risks. The pressures of democracy force

governments to a bifocal vision: they have the best of intentions for the long run, but put priority on short run survival. It behooves megaproject sponsors to understand and incorporate this reality into its decision-making.

Government

Given the breadth and magnitude of their impact, megaprojects by their nature attract government involvement. Government cannot escape its responsibility for reviews and decisions. One thing about megaprojects, is that government can stop them. With this responsibility, it is in the government interest, regardless of political party, that investigations be objective.

Recommendations for Government Management

There follows a set of recommendations and approaches to government management of the decision-making process. These are useful guidelines to dealings with government sector(s).

Attitude

Most governments do not possess an articulated policy about megaprojects. A government's underlying attitudes and actions can gauge and predict its reaction to a megaproject proposal. Is a government's behaviour bold or risk-averse? Is it progressive or complacent? Is it preoccupied with unrelated matters? How high is economic development in its priorities? Where does the government stand on international trade and foreign capital flows? Is there already a queue of megaprojects?

It is likely that government, while favouring economic development, will express support in general terms. But actions and decisions are what counts. The foregoing questions reveal attitudes

that will condition responses to megaprojects. A government may favour megaprojects generally but oppose a particular one, and early assessment of its actual position may save a great deal of frustration and expense.

Government statements and actions should allow consideration of a megaproject on its objective merits. If government attitudes appear positive full megaproject investigation may be worthwhile. The following specific suggestions are made about government handling of megaprojects which megaproject sponsors may request be put in place.

Economic Strategy

Economic development strategy is related to a jurisdiction's economic circumstances (Alberta White Paper, 1984). Infrastructure megaprojects are a feature of the economic history of any region. Resource megaprojects depend on physical factors such as ore bodies, fossil fuel deposits or pools, rivers, etc. Resource economies are cyclical; typically there is heavy reliance on international markets and infusions of foreign capital. Usually resource economies are positively correlated with sparse populations and limited national political clout. A result can be policy risk (e.g., NEP) from another order of government responding to political pressure from elsewhere.

Governments in resource economy regions should actively favour megaprojects as a potential source of economic development. Support should be a consistent rather than episodic dimension of economic development strategy (Doern, 1983).

A resource-region government should (a) welcome megaprojects as one factor in its economic strategy; (b) strive to have one or more megaprojects underway at any given point in time; and (c) optimize

megaproject benefits with specific measures. Always having at least one megaproject underway (whether resource-based or not) hones and maintains government capacity to manage related responsibilities. Effective and steady-state government handling of a megaproject (e.g., Syncrude) enhances its credibility with prospective developers and financial markets. In a recessionary period, government could take special measures to enhance the prospects and pace of one or more additional megaprojects. Steady state employment on (a sequence of) megaprojects is possible. The optimal timing for a megaproject is for it to be built during an economic downturn and enter the market as rapid economic growth characterizes macroeconomic recovery.

Finally, there is special expertise allied to megaproject analysis and decision-making. This expertise can be a significant export in terms of engineering, environment, financing, and other consulting work.

The goal of economic progress is social progress. While more is nearly always better, public services and infrastructure are cash-starved in the current era. Beyond good intentions and philosophies, *affordability* is the key to improvements desired by most citizens. Economic strength underlies affordability; for many jurisdictions a major dimension of economic strength are successful megaprojects.

Preliminary Disclosure Review

Enormous time, effort, and cost may be expended and wasted on a proposed megaproject if it is inconsistent with government principles. For example, if a government opposes nuclear power there is no point in bringing forward a detailed proposal. There is not only a loss in direct outlays, but also of the imputed costs of deferring time and effort from

alternative investment opportunities.

This problem can be lessened by a "preliminary disclosure" step in a government decision-making process. The concept is to encourage megaproject sponsors to bring their plans forward to government early in the feasibility analysis. The ideal timing is when project principles are reasonably clear, limited time and expense have been deployed, and sponsors believe detailed investigatory analysis will show the megaproject to be viable and in the public interest.

The preliminary government review will not approve or accept, but can result in rejection. A megaproject "not approved" in principle is unlikely to be approved after detailed investigation. Projects not rejected may merit detailed analysis; this is a business judgment to be made by the sponsors. Frequent outcomes of the preliminary disclosure review are comments and concerns provided by government that sponsors would be wise to evaluate. Examples might be pending resource royalties policy review or changes to wilderness areas legislation. The prudent sponsor response is to put the megaproject on hold pending resolution of one or more crucial conditions. If they can be resolved, detailed investigatory work can proceed. If not, the project is abandoned with limited loss of time, money, and morale.

Optimization of Benefits

Macroeconomic optimization by megaproject timing was referred to earlier. Once a commitment to construct is made, internal project optimization is an ongoing focus of project management. Megaproject benefits are stronger when a project relates to comparative economic advantage in a host jurisdiction (Mansell and Percy, 1990).

The thrust here is to address government decision-making geared to enhance

public net benefits from megaproject construction and operation. Immensely detailed government planning, management, and decision-making may be needed. To a substantial extent, the optimization components vary from project to project. Space limitations preclude detailed treatment here; however, a basic checklist is suggested. The optimization checklist is largely contained in four categories: (a) finance, (b) participation, (c) manpower, and (d) the economic multiplier.

Financial considerations include return on resource assets, financing infrastructure, environmental costs, and taxation. The detailed arrangements to be negotiated have come to be known as "fiscal regimes." Particular attention must be paid to the community and local government impact; the property tax base cannot possibly cope with the large and immediate infrastructure requirements that accompany a megaproject.

Participation involves business sector suppliers and contractors, manpower supply and training, and, for some governments, project equity opportunities (e.g., Alberta Energy Company as a vehicle for citizen equity participation in new projects developed with Crown-owned resources). In the 1970s when a timber block was developed in the Whitecourt region of Alberta, a participation requirement¹ was that: (i) a 20 percent equity position was taken by the Government of Alberta; and (ii) a further 20 percent equity option was taken. The forestry project was developed with these equity participation provisions.

Manpower participation, skilled and unskilled, is exceedingly important.

¹ The author negotiated these requirements for the Government of Alberta as Minister of Lands and Forests, 1971-5.

Manpower planning and training are necessary for human resources participation to come about on a competitive basis.

Economic benefits from a megaproject can be enhanced by a "capture the multiplier" economic strategy. The multiplier is the recycling of project expenditures throughout the economy. An advantage of a steady-state megaproject sequence is that investors and suppliers can plan and invest to compete effectively for megaproject business. Skilled manpower can look ahead to more assured demand for their services. Unskilled persons can expect greater stability in utilization of training efforts and programs. Megaprojects require extensive engineering, materials, and supplier economic activities. When needs cannot be met competitively in local and regional economies, economic benefits flow to other regions. Studies in Canada show that western resource megaprojects have substantial economic impact across the country (Beck and Dungan, CWF, 1983).

One-Window Access

The one-window concept should be implemented if the megaproject sponsor proceeds beyond the preliminary disclosure review step. Among both sponsors and governments there is limited megaproject expertise and experience. Moreover, government staff are hired for public service functions and are generally fully occupied. It is not likely that effective megaproject handling can be added to the workloads of busy people. Decisiveness and timing can be critical to a megaproject but may be only one of many difficult priorities for a public sector manager. Devoid of personal and staff expertise, a megaproject bursting onto the agenda is hardly a welcome event. The sheer size and complexity of a megaproject touches a wide array of governmental

responsibilities. Also, communicating with government can be a frustrating experience, despite good intentions on both sides, for megaproject sponsors and analysts. Finally, mirroring government difficulties dealing with megaprojects, megaproject sponsors likely know little about (and have limited patience for) government perspectives and decision-making.

Conventional government structure is ineffective for handling megaprojects. Beyond the preliminary disclosure stage of a megaproject, a type of "one-window" structural entity is needed if the megaproject sponsor proceeds beyond the preliminary disclosure review step. The point is not to "bring government onside" but to facilitate thorough and objective analysis of megaproject viability. It is important that the objective determination be expeditious and limited to sensible and necessary costs. The definition of megaproject success means avoiding the building of "white elephants"; it also means proceeding with those megaprojects that are viable and in the broad public interest. Megaprojects should not tail through the ineptitude of the government decision-making process.

The one-window entity needs excellent leadership, a small "crack" staff, the capacity for short-term secondment from government, and a budget for consulting assistance. An experienced and independent sounding-board panel can be a useful adjunct to the leader of a one-window organization. The entity should dissolve when the megaproject is either aborted or becomes operational. Once operational, the megaproject should relate to mainstream government in the usual ways. A different one-window entity could be established for each new megaproject that ensues.

There has been some success with the one-window approach. Some examples are Syncrude (i.e., North East

Commission in Alberta), Federal Economic Development Coordinator offices in provinces (i.e., originally in Alberta with special responsibilities for the Alsands megaproject), and the Northern Pipeline Agency. In these cases, the one-window entity was established at a salvage stage. British Columbia established its Northeast Coal Development Agency at the outset of the megaproject.

Public hearings that are thorough and fair are essential to government decision-making. Several departments and agencies may have an interest in hearings; often more than one level of government will be involved.

Consolidation into a single hearing makes sense (Macdonald Commission, 1985); such as "one-window" hearing should be extensive in both content and time. It is important that the hearing observe due process and the legal basis for consolidated public hearings to be assured.

Total agreement with a government decision is most unlikely. That is inevitable. More serious is when outcomes result from nondecision and when the process is cloaked in inertia. Megaprojects are particularly vulnerable to government indecision. The "one-window" approach can help with this.

CONCLUSIONS

There are three major conclusions for the megaproject sponsor/government decision process. The first stems from the five lessons and strategies set out earlier. Each of these is important on a stand-alone basis, but it is essential to view the lessons/strategies as an *integrated set*. Hence, the decision-making management challenge encompasses *all* five elements simultaneously.

A second conclusion is that governments have difficulty managing their megaproject decision-making *process*. The process is fragile and vulnerable even in the best of times; at worst, non-decision is tempting. Government leadership and openness is the "royal jelly" that is needed. While most megaproject ideas should be rejected as non-viable, society benefits from those megaprojects that can pass viability criteria. Megaprojects sponsors should seek to facilitate reliable, robust government decision-making processes. The acid-test is whether the will, policies, and implementation capabilities exist for positive decisions on potentially viable megaprojects.

The third conclusion is that there is much

room for *improvements* in megaproject decision-making by both sponsors and governments. Sponsors tend to underestimate the necessary role of government in megaproject decision-making, often due to their limited experience in dealing with government. False assumptions about substance and timing can result. Too often megaproject sponsors do not seek needed assistance and advice until severe damage has been done. Negative public perceptions are very difficult to reverse. Strained relationships with government and indecision by the latter can compound the difficulties.

Any government is likely to profess favour towards economic development and express the desire to cooperate with potential developers. But more than passive "openness" is needed. Conventional government policies and administrative structures fit poorly with megaproject decision-making realities. Active and positive government attitudes, policies, and decision-making processes are crucial to realizing viable megaproject opportunities. Leadership at the highest levels of government facilitates objective and timely

megaproject decision-making.

APPENDIX:

MEGAPROJECT CHARACTERISTICS AND DECISION-MAKING

A. Ten characteristics:

1. Joint sponsors
2. Public policy
3. Uniqueness
4. Indivisibility
5. Time lags
6. Remoteness
7. Social-environmental impact
8. Market impact
9. Risk
10. Financing difficulty

B. Five conditions for success:

1. Genuine and robust viability
2. Resources for objective and exhaustive investigation
3. Experienced and capable analyst team
4. First choice of the key participants
5. Achievable despite opposition

C. Eight requirements for meeting the conditions:

1. Sponsorship strength
2. Project directorate
3. Directorate management
4. Timing
5. Risk analysis
6. Financing
7. Unanimity
8. Political climate

D. Decision options:

1. Proceed
2. Delay for reconsideration
3. Postpone, subject to critical problem(s)
4. Stop

Note: Each element of the foregoing lists is discussed elsewhere in detail by the author (Warrack, 1985).

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