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From Isolation to Integration: Organizational Alternatives to Airport Environmental Planning

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1. Environmental Knowledge and Economic Capacity in Civil Aviation

In the last two decades, we have become more aware of the ways in which airport operations impact the environment. But during the same period, deregulation, privatization, and globalization in the air transport sector have transformed the economic context in which environmental impacts are assessed. The airlines of the 1970s and early 80s operated in a highly regulated and subsidized commercial context, where the cost of environmental initiatives (like quieter aircraft engines) could be passed along to consumers through regulated prices. But today's carriers face increasingly open and highly competitive markets. In the 1990s, few, air carriers can afford to look beyond the daily battle in the skies to retain (or increase) their market share. As a result, airport environmental planning has been caught between two opposing trends.

On the one hand, environmental assessment practices can yield a growing precision of information about the damages arising from civil aviation. This information can mobilize opposition to existing airport operations, and expansion plans. Neighbouring communities, environmental interest groups, and even environmental protection agencies from other levels of government are placing more demands on airport operators to address their environmental impact. On the other hand, airline competition has made carriers more demanding airport tenants. Airlines will strongly resist measures which would raise their costs or constrain productivity, since these burdens could make the difference between profit and bankruptcy. Ironically, when the economic climate was more receptive to optimizing civil aviation's net social benefits, through a combination of including environmental externalities in ticket prices and then investing these revenues in remediation measures, the technical information needed to specify objectives was largely lacking. Now that such technical information is at hand, the competitive economic exigencies facing civil aviation sharply constrain the adoption of environmentally sustainable policies.

While airlines have acquired an increasing freedom to expand their business, airports are constrained in addressing the environmental effects of airline competition. The negative environmental externalities of civil aviation have intensified due to competition in at least three ways. The hub and spoke operating pattern of major airlines, discussed below, has increased congestion both on the ground and in the air. Price competition has stimulated the aggregate demand for air travel, leading to higher growth rates than would have occurred under a more regulated regime. And the progressive

opening of markets has meant that older aircraft, which might have otherwise been retired, continue flying for new carriers. More air travel, greater congestion, and the longer life of old aircraft each increase the negative environmental impact of civil aviation in ways that are measurable.

This tension between environmental and economic trends forms one of the major challenges to successful airport management. As in other industries, the gap between environmental knowledge and the willingness or capacity to act upon it will bring increasing controversy and opposition to existing practices. With mounting evidence that air, noise, and water pollution from air transport poses significant local and global environmental impacts, when and how will airport environmental planning take this information into account?

In order to reconcile growth with sustainability, the relevant policy actors (i.e., airline companies, airport operators, and government officials) need to focus on a common set of economic and environmental objectives. Where these objectives recognize environmental protection as a shared responsibility, airport planning practices stand a far greater chance of yielding outcomes that are both environmentally sustainable and politically acceptable. By contrast, where airlines, airports, and governments pursue their transportation planning and development functions independently, environmental policy, if it is taken seriously at all, will be constrained by fragmentation and inertia. In such circumstances, political differences over the appropriate scope of airport operation will be far more difficult to reconcile and more likely to precipitate adversarial opposition.

This investigation compares three organizational approaches to planning for airport growth and development that can highlight the capacity of aviation policy makers to address environmental issues. The data is drawn from a policy document review and interviews with key informants conducted in Canada, France and Switzerland. The policy documents consulted are referenced below and cited where appropriate. Their information on the nature of environmental planning was complimented by interviews with key informants - airport and airline managers with planning and research responsibilities. To ensure candor, these interviewees were were guaranteed confidentiality.

The most immediate analytical objective is to determine the structure and content of the "policy network" in place for airport planning, and how environmental issues fit into that network. The policy network concept, as elaborated by Atkinson and Coleman (1989), suggests that the key to understanding what has happened, and then predicting what will happen, on a given policy issue is to identify the *relationship* between policy actors who take part in the economic transactions and political deliberations concerning that issue. These "rules of the game" govern the access to both material resources (what type of environmental analysis is funded) and non-material legitimacy (to what degree are environmental findings taken seriously). The rules at work in a policy network differ across issues (surface versus air transport sectors), over time (concerns over air emissions in the 1970s versus the 1990s), and between jurisdictions (tolerance for aircraft noise in Zurich versus Toronto). By contrasting the airport planning policy networks that now exist in Canada, France, and Switzerland, one can observe how their rules of the game can work to either constrain or to facilitate environmental management.

2. Three Approaches to Relating an Airport's Commercial and Environmental Goals: Convergence, Divergence, and Transition

In order to appreciate the ways in which a shared problem definition can enhance environmentally effective planning and policy development, we must first establish the context, the external economic and political environment in which our three case study airports are situated. Paris (CDG), Toronto (YYZ), and Zurich (ZRH) are already the principal ports of entry into their respective countries. They increasingly serve as transfer hubs, a phenomenon in which one or more airlines concentrate their flight schedules to create waves of arrivals followed by departures. This permits a route network with much more extensive market coverage through connections at the hub (Doganis and Dennis, 1989). But in operational terms, hubs mean that airports alternate between peak hour congestion and relative emptiness several times per day. This hubbing pattern usually requires infrastructure expansion (i.e., new runways and terminal space) just to meet existing traffic levels, since both flight and passenger movements through the airport have become concentrated (Transportation Research Board, 1991, chap. 6). When long term traffic growth, induced by greater price competition, is combined with the pattern of concentration encouraged by deregulation, the negative environmental impact of airport operation can increase. Either existing facilities will become congested, leading to higher pollution from planes idling in takeoff queues (or flying in overhead holding patterns) or new runways and terminals will handle the traffic increases more smoothly. A comparative analysis of growth scenarios at Toronto's Pearson airport demonstrates how increased atmospheric emissions will result (Patterson and Woodmansey, 1993).

At each airport, perceptions differ on the environmental significance of traffic growth and concentration. These differences arise from the way in which policy actors define their interests and view alternative options. Three patterns of relationships between air carriers, airport managers, and societal interests can be observed that demonstrate alternative policy networks in action. At ZRH, a combination of collaborative planning by the dominant air carrier and the airport authority, linked to democratic participation, has yielded a **convergence** of environmental and economic objectives. At YYZ, contested airport privatization plans and aggressive competition between the two principal air carriers have combined with a jurisdictional divorce of public input from planning efforts to yield a **divergence** of environmental and economic objectives. And at CDG, the decentralization of political power has made airport development dependent upon approval from local public officials. Facing this new necessity for acceptance in the surrounding communities, airport managers are now leading a **transition** toward reconciling environmental and economic objectives in their planning activities.

3. Zurich: Convergence of Economic and Environmental Objectives

In Zurich, both the airport authority and Swissair, whose route network is centred at ZRH, have been working on environmental planning in partnership. For Swissair, environmental responsibility is seen as a means to more efficient operation (Swissair, 1993). Swissair executives anticipate that the growth of air transport will eventually trigger stricter regulatory limits and/or externality pricing schemes in their core market of European operations, with a subsequent spread to North America. Swissair is positioning itself to develop a long run competitive advantage by implementing leading

edge environmental practices ahead of its rivals. This strategy begins at the airline's home base in Zurich.

Since the Swiss public exhibits an extremely high environmental consciousness (Inglehart, 1995), a proactive environmental policy has immediate economic benefits. In the short term, Swissair can only expand its operations at ZRH (essential if it is to survive the competition that other major European carriers provide from their hubs) with public approval. Switzerland's highly decentralized federal system and direct democracy make it effectively impossible to expand ZRH without putting the question before the public in a referendum. Such a vote was taken on June 25, 1995, when voters of the Canton of Zurich approved financing a major expansion of ZRH.

By committing itself to work with government and the airport operator to minimize the air, noise, and water pollution arising from increased operations, Swissair was able to campaign effectively in the ZRH expansion referendum. It was also able to have significant input in defining terms by which all other carriers using ZRH will have to abide. As a result, Swissair's environmental precocity will yield a long run advantage in its principal hub, as other airlines will either be taxed for various forms of pollution that they create or restricted from using ZRH. Swissair and the Zurich airport authority have a very close working relationship, and jointly pursue environmental research. The remediation measures that have been developed thus reflect a common set of priorities for both Swissair and the Zurich airport authority.

With the high degree of public input into its operations, the ZRH operating authority has been among the world's most environmentally protective airports. From noise restrictions and night time flight curfews, to a ban on the extended use of aircraft auxiliary power units, to the use of electric vehicles for ground handling functions, ZRH has pioneered innovations designed to reduce environmental impacts. The airport conducted its first comprehensive emissions inventory in 1989, and integrated these findings into its master planning process (Staffelbach, 1991). Expansion plans focused upon building a third passenger terminal and a major cargo handling facility. These new facilities were designed to minimize the net impacts of the additional traffic projected to pass through ZRH.

A key element of Zurich's environmental remediation strategy was to expand the already successful intermodal connection between air and rail transport at ZRH by siting the new passenger terminal's land side interface atop the existing intercity train station, an underground facility currently located adjacent to the airport's second terminal. All the airlines serving ZRH would use check-in facilities for passengers arriving by train in this new terminal. Additional gates in a mid-field boarding pavillion would be linked by a people mover. With no planned expansion of airport access roads, this project anticipated a significant increase in airport passengers arriving and departing by train.

In the process of ratifying ZRH's expansion, Swiss elected representatives had a relatively easy role to play, compared to their French and Canadian counterparts. Details of the plan were developed by a cooperative partnership between the airport and the major airline. Ongoing public consultation broadened input into the reconciliation of environmental and economic priorities, and has led to adaptation of the final proposal. And the project's financing has secured public approval in a referendum. All that remains is to implement the new infrastructure. An integrated and collaborative relationship between the airport authority, the carrier whose route network is centred at ZRH, and the region's citizens has worked to facilitate the integration of economic and environmental objectives into the aviation planning process.

4. Toronto: Divergence of Economic and Environmental Objectives

At YYZ, environmental management has been constrained by divergent interests and contested definitions of responsibility among airlines and the airport's operators. Economic rivalry has been exacerbated by a lack of democratic input into airport planning, compared to both the Swiss referendum mechanism and the growing authority of French local officials. As a result, Canada has an adversarial and competitive policy network which has been largely incapable of reconciling economic and environmental priorities, to the detriment of both objectives. Economic rivalry between airlines and prospective private developers has constrained the airport's physical development, while the isolation of environmental impact assessment analysis from infrastructure planning activities has left neighbouring residents and environmental advocates distrustful of airport expansion proposals. Elected officials are thus caught in the midst of polarized economic and environmental positions.

Increasingly intense and bitter competition between Canada's two principle air carriers is the second difficulty that YYZ planners face. Instead of being home base to a single dominant carrier like Swissair at Zurich, YYZ, Canada's largest air gateway to the U.S. and the rest of the world, is the shared hub of archrivals Air Canada and Canadian Airlines International. These companies have been locked in combat since deregulation, fighting for a traffic base that has yet to support both firms profitably. As well, Canada's principal carriers find themselves in increasing competition with U.S. carriers that have lower operating costs. Under such competitive pressures, each company perceives that committing to costly environmental initiatives would be a high risk strategy. Any initiative that might give an edge to either of YYZ's two principal tenants can be expected to draw fire from its rival. Such a volatile and competitive operating environment places extra demands on airport planners. But over the past decade, YYZ's future has been in the hands of an increasingly diverse and adversarial group of public and private managers.

YYZ's operations have become fragmented since the mid 1980s, with a mounting degree of uncertainty over just who is guiding the airport's long range future. Two of three terminals, as well as all airside facilities, are publicly owned and managed directly by the federal Ministry of Transport. The third, and newest, terminal is privately managed on a long term lease from the federal government. No other industrialized nation's principal airport infrastructure is simultaneously under the control of both private and public management. To Canada's Auditor General, this exceptional division of responsibilities was the product of a policy vacuum within the federal government about where and how to develop major airport infrastructure (Canada, 1990). Since that assessment, YYZ's planning efforts have been characterized by long impasses punctuated by periods of intense conflict.

In part because Canada's federal government has jurisdiction over airports but not urban and regional transportation, YYZ's planning efforts have not looked beyond the airport perimeter. Although intercity passenger trains fall under federal jurisdiction, and are managed by a federal Crown Corporation, Transport Canada has seriously discounted any possibility for integrating these two transport modes. According to a Transport Canada study (Transport Canada, 1993) intercity rail's potential to divert traffic from planes or cars has dwindled to the point of irrelevance. Assuming virtually no chance for modal substitution, Transport Canada has pursued the only development option left open in the face of air traffic growth.

In a 1990, the federal government announced a plan to expand YYZ to its maximum physical capacity (Transport Canada, 1992). The proposal called for adding three new runways and expanding terminal facilities. These plans triggered an arm's length consideration of the impacts of the proposed expansion. In Canadian practice, environmental assessment reviews are an *ex post* exercise, meaning that public input and expert analysis are expected to modify already existing development plans. Unlike the continuous collaboration pursued at ZRH, where government, industry, and public interest groups consult and negotiate over airport development from the pre-planning stage through post-project follow-up and oversight, at YYZ, environmental review represents a discrete stage of project development. Public input and expert analysis are weighed by a judicial-like panel which renders a verdict on the project as a whole. The panel's decision endorsed modifying the expansion to reduce environmental impacts, but its recommendations were quickly overshadowed by intense disputes over who should manage YYZ's future operations (Federal Environmental Assessment Review Panel, 1992).

Even before the environmental review was complete, Ottawa launched a "Request for Proposals" from private firms interested in redeveloping and operating YYZ's two publicly managed terminals. This privatization initiative came to fruition at the end of the Progressive Conservative party's electoral mandate, with a 57 year lease being executed three weeks before a federal election. Despite constitutional conventions that limit governments from taking major policy initiatives after a writ of election has been issued, the Rt. Hon. Kim Campbell pushed ahead with privatizing Canada's largest airport during the election campaign.

When the Liberals took office, they canceled the privatization contract, plunging Canada's largest airport into a state of administrative and commercial limbo. The government has been alternately praised and pilloried for pulling out of the privatization scheme, directly along partisan lines (Senate of Canada, 1995). An alternative "National Airports Policy" has proposed devolving airport management to non-profit authorities that would operate at arm's length from all levels of government (Transport Canada, 1994), but this transfer has yet to be completed at YYZ. In the meantime, YYZ's management remains divided and uncertain, and the physical expansion proposed in 1990 remains to be implemented.

Being partly private, partly public, and in the midst of ongoing debate and controversy over its future, YYZ management has taken a low profile on environmental issues. Thus, despite the Greater Toronto Area's serious air quality problems, and the Federal Environmental Assessment Review Office's warning that remediation efforts are needed to offset the impact of traffic growth and infrastructure expansion, no comprehensive environmental strategy has been adopted for YYZ. The "one off" review conducted by Federal Environmental Assessment Review Panel offers little opportunity for ongoing analysis and modification of plans in light of changing administrative and economic circumstances. Adjusting expansion plans drafted in the early 1990s might be necessary given the many changes that have occurred since the government proposed expanding YYZ. The precipitous move toward privatization followed by an even more abrupt repudiation, along with the falling off of record air traffic levels in the early 1990s have each suggested modifications to the initial master plan, opportunities to adjust the balance of economic and environmental goals, and to fine tune the means of achieving them.

Given the gap between YYZ's all-out expansion scenario and present administrative and economic realities, Canada's elected officials face a far more difficult

task in presiding over YYZ's redesign compared to their counterparts in Switzerland and France. The formal opportunity to bridge economic and environmental priorities at YYZ was passed by before the project's management and timetable had been resolved. Today's airport managers continue to await the results of YYZ's devolution to a non-profit authority. In the meantime, economically oriented policy actors, like private developers and airline companies, have grown frustrated with the commercial limitations of mixed management, while environmentally oriented actors, including community organizations and public interest groups, have lost faith in the planning process.

5. Paris: Building Environmental Priorities Into Airport Planning

The case of CDG illustrates an important middle ground between ZRH's convergence on the need to address environmental objectives along with commercial priorities and YYZ's divergent approach in dealing isolating these two domains. In Paris, airport environmental priorities have steadily risen in importance over the last decade, under the deliberate encouragement of the airport operator, Aéroports de Paris (ADP). ADP is a public agency which owns and operates all airports in the Paris region. Since France began to decentralize decision-making power to regional and municipal councils in 1982, through the famed "Loi Deferre" passed by the Socialists, local community concerns about airport growth could no longer be over-ridden. Environmental protection, symbolized by the creation of a "Maison de l'Environnement," and intermodal connections with France's network of high speed trains (TGVs) have become evidence of ADP's changing priorities (Aéroports de Paris, 1995).

CDG serves as the base of operations for Air France, the state owned carrier that works closely with ADP. Air France's recent economic difficulties have limited its ability to pioneer environmental initiatives, but there has been no discord with ADP's new environmental agenda. In this transition toward more active remediation measures, ADP is serving as a catalyst - promoting the advantages of new environmental practices among airlines, and serving as a go-between for airlines and the French National Railways, the operator of the TGV (Perl, 1995). ADP's goal is to embrace sustainable growth, the only kind that will convince recently empowered local officials that air traffic will not impose greater burdens on their constituents. As with most transitions, the results of this new strategy are not yet clear. It will take several more years to assess the impact of new intermodal links, as well as the noise and air emissions abatement policies being implemented at present. If future traffic growth occurs at CDG without increased emissons, noise, and water pollution, then ADP's acquisition of new environmental planning capacities can be said to have paid off.

6. Conclusions

In airport operations, environmental assessment techniques have generally outpaced the administrative and political capacity to remedy identified negative impacts. This lag challenges policy makers to adapt their practices to close the gap between environmental awareness and sustainable mobility. This analysis of airport planning at ZRH, YYZ, and CDG demonstrates that reconciling growth with sustainability requires airline companies, airport operators, and government officials to share a common agenda that includes both economic and environmental objectives.

Making the commitment to reconcile environmental costs with economic benefits gave policy makers at ZRH the public credibility needed to gain democratic approval for infrastructure expansion. CDG's environmental policies are pointed in the same general direction and appear likely to facilitate expansion in coming years. Yet at YYZ, sporadic attention to environmental impacts coupled with bitter disputes over the role of public and private policy actors have done little to close the gap between awareness of impacts and the capacity to remedy them. Sooner or later, such capacity will become necessary for sustainable air transportation in Canada.

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