

Working papers series (Canada. Environment Canada. Science Polic
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Environment Canada University Research Partnership Expansion Strategy: A Discussion Document

Working Paper No. 12

Science Policy Branch
Environment Canada

Document de travail n° 12

Direction de la politique scientifique
Environnement Canada

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Environment Canada
University Research Partnership Expansion Strategy:
A Discussion Paper

Science Policy Branch Working Paper # 12



June 2000

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1.0 Introduction

This report was commissioned by Environment Canada in support of the department's efforts to expand science and technology working relations with the higher education sector. The department sees enhanced partnerships with the university sector in particular, as a vital ingredient in forging a strong national system of environmental research, and in addressing its own S&T mandate.

In the past 3 years substantial federal resources have been made available to improve research infrastructure and increase research support in the university sector. Over time, increasing capabilities in the higher education sector will lead to the generation of more environmental knowledge. By developing effective working relations with universities, Environment Canada can draw on this knowledge to support public policy development, and its other mandates. The department recognizes that there are important advantages to be gained from a closer working relationship with universities and colleges. In principle, these advantages include:

- Improving planning and coordination to create a balanced national program of environmental research;
- Facilitating the allocation of public sector S&T resources to address short, medium and long-term environmental issues;
- Applying funds from different partners and sources to put in place new research infrastructure - facilities and equipment - which is capable of supporting the national environmental research agenda;
- Improving the utilization of federally-funded research facilities;
- Improving flows of S&T knowledge among knowledge producers and users;
- Facilitating Canadian participation in international environmental research projects and programs; and,
- Training and recruiting the next generation of government and university researchers.

Though university and government research differ in important ways (see Appendix 1), each makes an important contribution to the national system of (environmental) innovation. Many research groups within Environment Canada have long-standing and productive working relationships with universities and university researchers. These range from individual inter- researcher collaborations, to EC scientist cross-

appointments to university departments and faculties, to a variety of grants, contracts, contributions, scholarships, fellowships, etc. that support research of mutual interest to university researchers and the department. In the course of developing these relationships the department has pioneered novel partnership models - for example the Climate Research Network and ACWERN - that could serve as examples for future relations. Thus, the department is launching this expanded partnership initiative from a substantial base of experience.

Individual EC researchers and labs have already achieved a great deal in forging the kind of relationships with the university research community that serve the needs of each. To date, relationships have been established from the ground-up, without the necessity of a department-wide strategy or plan. As Environment Canada moves forward, it becomes apparent that in many instances it would be helpful to establish institutional arrangements with partner organizations as a means of facilitating expanded working relations among researchers and research groups. The goal is to establish framework arrangements with other federal agencies whose mission is to support university research. Environment Canada labs and researchers can then use these arrangements to facilitate specific opportunities.

Similarly, an increased emphasis on partnerships as a formal strategy for EC, means that the department will need to adopt internal procedures for forming, approving and supporting partnerships.

In particular, this report discusses the partnership possibilities with seven of the key federal (or federally-sponsored) organizations/programs that deal with the higher education sector:

- Canada Foundation for Innovation
- Canadian Institutes for Health Research
- Networks of Centres of Excellence
- Canada Research Chairs
- NSERC Research Partnership Programs
- Genome Canada
- Canadian Foundation for Climate and Atmospheric Sciences

It also makes some suggestions about steps that Environment Canada should explore in order to facilitate partnership development within the department.

2.0 Goal and Objectives of the Partnership Expansion Strategy

Environment Canada's S&T Management Framework states that:

Partnerships are an important component of the S&T conducted by Environment Canada. Through S&T partnerships, Environment Canada builds synergy with other organizations, levers resources, enhances human resource development, and draws on S&T expertise in other sectors.

The Department's guideline on Science and Technology Partnering: Principles and Practices¹ explains that partnering is growing in importance: *Such partnerships are more critical now than ever, because environmental issues are no longer local or even regional in nature.* It goes on to propose a set of principles for partnering. S&T partnering will:—

- be undertaken in the public interest
- support departmental and government-wide science priorities
- enhance EC's capability
- foster capacity-building in other organizations ...
- help build consensus among different organizations
- be conducted to minimize competition (with the private sector)

Partnering with the higher education sector offers Environment Canada a number of specific benefits. It can:

1. Improve communication, networking, alliances and linkages with the higher education component of the national system of environmental research.
2. Facilitate timely access to current research and expertise that is relevant to EC policy requirements.
3. Communicate EC research needs to the higher education sector.
4. Enhance the sharing of research facilities and resources.
5. Invest in higher education research and research infrastructure that support EC's mission.
6. Support universities' and researchers' requests to funding agencies for research and infrastructure support.
7. Establish productive ongoing relations with the higher education sector.

The purpose of this report is to provide a road map that will help Environment Canada build on current relationships by expanding institutional linkages to the higher education sector.

¹Science and Technology Management Committee. Report No. 3. February 2000

3.0 Partnership Principles

In addition to the general partnering principles adopted by the department (see section 2.0 above) we believe it would be helpful for EC to adopt a set of principles that will guide its relations with potential partners and the university community. The purpose of the principles is to indicate to potential partners and EC staff the general philosophy which will guide the development of specific arrangements. Following are a number of suggested principles that we believe will help to prepare the ground for successful partnerships with the university sector.

EC Partnering Principles With the Higher Education Sector

1. Partnership arrangements should provide benefit both to EC and its partners.
2. A principal EC objective of university partnerships is to improve access to new environmental knowledge that will support the department's monitoring, regulatory, service and policy development mandates. EC will concentrate its efforts on establishing partnerships which support these mandates.
3. In general, the extent of support will vary with how directly the partnership activities support the EC mandate. Partnerships which are directly aligned with its mandate will receive greater support than those which are less directly aligned with the mandate.
4. EC may contribute to the capital and operating cost of university research infrastructure (facilities and equipment) that allows for the shared use of those facilities by EC and university researchers and collaboration between them. The department's financial contribution will correspond to the degree to which it utilizes the research infrastructure.
5. EC will support training of individuals in fields of environmental studies that are linked to its mandate. Training support will be targeted to those individuals whose experience, interests and activities are aligned with departmental research priorities. Training support will be linked to EC's human resource strategy and plans.
6. EC will establish ongoing mechanisms for communication with partners and with the university research community. The purpose of these mechanisms is to provide a mechanism for dialogue on matters of mutual interest, such as research priorities and plans.
7. EC will apply the CSTA BEST criteria to assessing partnership opportunities: Alignment, Linkages, and Excellence.

These principles may be amended and others added, as EC gains experience with partnerships.

4.0 Environment Canada Partnering Assessment

This section of our report is based on informal discussions with a limited number of EC research organizations². Our purpose was to assess the current state of partnerships within the department, and most importantly, to identify barriers and opportunities that a department-wide partnership expansion strategy should address.

By all appearances partnerships are alive and well in Environment Canada. Discussions reveal there is an impressive level of partnering activity under way within the department, and more being planned. Especially notable is the high level of co-authorship of scientific papers with university researchers, which grew through most of the 1990s³. Likewise, the EC "shadow workforce" (individuals from other organizations working in EC labs - i.e. visiting professors, volunteers) and the number of EC researchers who are cross-appointed to teaching positions in university faculties. This is significant because after budget cuts in the mid-1990s, many EC operations were forced to scale back their interaction with the university and college sector⁴. This led to a period of retrenchment during which established relationships eroded and there were insufficient resources to pursue new opportunities.

At the present time we perceive strongly renewed interest throughout the organization, in building (and re-building) partnerships with universities and colleges. The following chapter of our report (4.0) discusses a number of prominent opportunities for developing partnerships. However, in order to pursue such opportunities, EC will need to implement changes both at the corporate level and in operating research organizations. Among EC researchers there is a strong belief that effective partnering takes place at the working level, among government and university scientists and researchers who share common interests. At the same time, there is an acknowledgement of the need for corporate support to facilitate institution-to-institution relations and support individual efforts.

In our discussions with EC personnel they raised a number of issues they feel an effective department-wide partnering strategy needs to address. These are:

- Personnel time and responsibilities
- Partnership development and implementation resources
- Adding value to partnerships
- Senior management support

²The discussions were by no means comprehensive; not all parts of EC took part.

³Environment Canada's Scientific Research Publications 1980-1997, Science Policy Branch Working Paper no.6., Environment Canada. March 2000

⁴Notably, not all did so. MSC, for example, made a special effort to preserve its university partnership activities.

4.1 Personnel Time and Responsibilities

It is apparent that much the success of current partnership activity is due to the efforts of champions within the different EC services; individuals who are committed to building bridges to universities and colleges. A great deal of the partnering activity within the department has resulted from the well-intentioned efforts of individuals working in different EC research organizations, with the support of their managers. (Often it has been the managers themselves who acted as champions for partnering.) Likewise, the future success of EC's partnering strategies and plans will rest on the efforts of individual champions.

Many people within Environment Canada referred to the amount of time needed to develop and follow through on effective partnerships. They emphasized that there is often a lack of staff time available for partnership activities. It appears that a great deal of current activity takes place "on the side", by people devoting un-budgeted time to pursuing opportunities that have value to their research group and the department. The people who are most involved in partnering also have their normal day-to-day responsibilities to carry out. Often, they take on partnering responsibilities as an add-on to their normal work load.

Practically speaking, many believe that EC should be prepared to provide dedicated personnel resources for its partnering activities. In our opinion, it would be a small price to pay to allocate a number of PYs to creating full-time partnership development positions⁵. The cost of establishing a number of positions would be small, especially considering the significant potential of partnerships to leverage research and knowledge of value to the department. Furthermore, by allocating new resources, senior management would also be sending a powerful signal inside and outside the department about the priority that EC assigns to partnerships.

4.2 Partnership Development and Implementation Resources

Apart from staff time, many people in EC who are involved with partnerships believe that recognition needs to be given to the financial cost of partnership development and maintenance. Travelling to meetings, organizing workshops and conferences⁶, helping to finance proposals and business plans often require money. In many instances, partnership opportunities are difficult to forecast in advance, and it is hard for organizations to budget for them. When they do arise, they can place considerable pressure on the already-strained budgets of research organizations, especially smaller organizations that find it more difficult to absorb development costs from their correspondingly-smaller budgets.

⁵In smaller organizations these might be part-time positions combined with other responsibilities.

⁶And other "innovation-related networking activities".

The same can be said for supporting partnerships once they are established. Attending review meetings, sitting on board of directors or management committees, establishing liaisons between EC scientists and external partners, evaluating projects and undertaking other day-to-day management functions, often require overhead funds that are additional to the budgets of EC research organizations. Thus, developing beneficial partnerships is one thing, supporting them is another. Many people within the department believe that reasonable financial resources are needed to manage effective partnerships.

In addition, EC needs to develop its position regarding ownership and exploitation of intellectual property arising from partnership arrangements. In some instances in the past, EC researchers have been met with firm policies from potential partners with respect to intellectual property, including full ownership for the partner. As the Department does not have a stated position of its own, they have not been in a strong position to counter or negotiate.⁷

4.3 Adding Value to Partnerships

The essence of successful partnerships is that each partner must bring something of value to the table. If one partner cannot add value to the partnership, then the relationship will not last long. The usual "currency" of science consists of expertise and facilities. To create and sustain a research relationship, partnering organizations must be able to offer one or other of these⁸.

A study undertaken for the Canadian Research Management Association in the early 1990s⁹, demonstrated that industry placed high value on the unique facilities (i.e. national facilities) offered by federal labs, and secondarily, the expertise associated with the use of those facilities. With respect to universities, industry primarily valued the expertise offered by university researchers, and only secondarily, unique university facilities. This was consistent with a federal research system that then saw one of its chief roles as providing national facilities that individual universities or companies could not afford on their own. (A typical example frequently cited was wind tunnels.)

In the 1990s, the advent of federal and provincial university infrastructure support programs (e.g. Canada Foundation for Innovation, Ontario Innovation Trust), together

⁷ Currently EC Commercialization and Management Practices Branch is developing Policy on Revenue and Equivalent Activities. The document lays out guiding principles and a management framework for user charges, collaborative arrangement and intellectual property licensing.

⁸Frequently, they go hand-in-hand. Excellent research requires excellent facilities.

⁹The Impact Group. Effectiveness of University and Government Research Funded by Industrial Corporations. CRMA 1991.

with a significant drop in government research capital spending, began to alter this longstanding complementarity. Suddenly, new research infrastructure was being situated in universities and government infrastructure began to "rust"; in many instances it was no longer leading edge.

To the extent that expertise is best acquired by practising science (conducting research) at a high level¹⁰, and thus having access to modern facilities and equipment, there is a risk that without new investment in federal science capacity - facilities, equipment and expertise - that in future federal departments and agencies will become less sought-after partners. Thus, the point we frequently heard in discussion with EC researchers, is that the department must have something of value to bring to the table in research partnerships, and that this would require a re-investment in federal science capacity that would be complementary to the new investment in university capacity.

If that investment is not made, then it seems to us that federal labs need to implement a cost-sharing strategy with universities to have access to leading edge facilities and equipment which are located at universities, but available to external partners as well. In any event there is merit in this approach because it would allow EC to save on capital and operating costs, and instead focus its resources on facility use.

4.4 Senior Management Support

There is a sense at the working level within Environment Canada, that senior management is a late convert to the importance of partnerships. That being said, the challenge for the department is to move quickly to capitalize on the current partnership momentum and incorporate partnerships as a core element of the department's research strategy. A related challenge is to provide the necessary backing to turn potential or emerging partnerships into actual ones.

Middle level managers would like to be able to call on executive support, especially in the early stages of partnership development, to help open doors to relationships with university and college institutions and with federal (and provincial) research funding organizations. Because specific partnerships usually arise from the initiative of working researchers and their managers, there often comes a period when concrete expressions of high-level support from within the department are needed to move emerging partnerships forward.

For example, the proposed Atlantic Environmental Research Network (AERN)

¹⁰The CSTA BEST (Building Excellence in Science and Technology) report advises that federal labs must conduct world-competitive research in their respective field, or none at all.

proposal¹¹ is attracting strong support among universities in the region. However, there is no clear route within EC for gaining approval for the initiative, not to mention resources to finance EC participation. How exactly do proponents gain approval for such major initiatives, which have implications that extend beyond a specific research group? How do they indicate to external partners that the initiative is authorized by the Department? Likewise, once EC has made a commitment to a major partnership, executive involvement is often needed to negotiate for new resources from central agencies, reallocate resources within the department, or secure the participation of other federal departments and agencies.

What is called for, in our opinion, is a more structured (but non-bureaucratic) mechanism for approving partnership proposals within the department. This is necessary so that good proposals are not left high and dry after considerable work has been done to move them forward. Part and parcel of this should be a mechanism that would allow middle managers to call on senior executives to help move partnerships forward, at the appropriate time¹². One useful element could be a high-level partnership development committee which would oversee major partnership activities, leaving middle managers responsible for other initiatives that do not have department-wide implications.

5.0 Opportunity Analysis

Following is a description and analysis of several specific research partnership opportunities that Environment Canada may wish to pursue in the near term.

5.1 Canada Foundation for Innovation

5.1.1 Introduction

CFI was established in 1997 as an independent corporation at arms-length from government¹³. The Foundation's aim is to invest in research infrastructure in universities, colleges, hospitals and other not-for-profit institutions. Only these institutions are eligible to apply for CFI funds. CFI provides infrastructure funding for R&D that will support economic growth and job creation, lead to improvements in

¹¹ The Atlantic Environmental Research Network (AERN) - A concept paper for consideration by interested parties. George H. Finney, Alex T. Bielak and Richard D. Elliot. Environment Canada, Atlantic Region. Atlantic Region. April 2000.

¹²For example when institutional doors need to be opened or when negotiations become stalled .

¹³CFI operates under the terms of a funding agreement with Industry Canada and the Department of Finance.

health, environment and quality of life, etc. CFI also promotes networks and collaboration among researchers and ensures the optimal use of research infrastructure by promoting sharing within and among institutions.

CFI has 4 funding programs, of which the Innovation Fund is most relevant to Environment Canada's interests. The other 3 programs fund new researchers (New Opportunities), small universities (University Research Development Fund), and community or technical colleges (College Research Development Fund). However, for the moment it is recommended that EC be proactive about developing partnerships with universities which are eligible to submit projects to the Innovation Fund. The department should be prepared to respond to partnership proposals from other universities.

5.1.2 Financing

CFI was originally granted \$800 million in funds. This was later increased by a supplementary grant \$200 million. The 2000-2001 budget provided CFI with a further \$900 million, raising the total direct federal contribution to \$1.9 billion. In addition, it is expected that funds invested by CFI will produce another approximately \$200 million of income for the organization.

Following successful review by a Multidisciplinary Assessment Committee, CFI will provide up to 40% of the cost of an approved project. External partners must provide an additional 60%. Normally, provincial governments contribute 40% and universities are responsible for securing an additional 20%. Experience to date is that about 7% (of the 20%) is cash contributions, while the remainder is usually in the form of supplier discounts and in-kind donations (e.g. equipment). In the Atlantic Provinces, in first round of CFI awards, ACOA played the role of provincial funder and contributed 40% to CFI projects in the region. With leveraging, CFI expects to have a total financial impact of in excess of \$5 billion by the time the program winds up.

The capital costs of acquiring, developing, modernizing or leasing research infrastructure, including capital facilities and major equipment valued over \$100,000¹⁴, are eligible for CFI support. Ongoing operating costs of research are not. Other eligible costs include those related to facility and equipment acquisition and maintenance.

University presidents must certify that projects proposed to CFI are aligned with the strategic plan of the institution¹⁵. They must also certify that the university will be able to provide sufficient operating funds to support the facility, once it is constructed.

¹⁴NSERC typically funds equipment costing less than \$100,000.

¹⁵In fact, in many cases CFI has played a significant role in encouraging institutions to develop strategic plans.

5.1.3 Eligible Partners

CFI's guidelines clearly indicate that **departments and agencies of the federal government** are eligible to provide matching funds for CFI projects. It is not clear whether any special terms or conditions apply to SBDAs - for example whether they can occupy space and conduct research in the facilities which they co-fund. To date, largely owing to their own tight budgets, SBDAs have not tested the CFI partnership model¹⁶. It is important to bear in mind that under CFI's guidelines any partnerships must be formed directly with universities and not with CFI itself.

5.1.4 Key Programs

From Environment Canada's standpoint CFI's key program is the **Innovation Fund**, which finances large-scale projects at large universities¹⁷. Starting with the current round of CFI funding (FY2000), the Innovation Fund will combine two former programs - Institutional Innovation (large universities/projects) and Regional/National Facilities. To date, CFI has funded only two regional/national facility projects, the Canadian Light Source synchrotron (University of Saskatchewan) and a Digital Libraries project (many universities). However, the synchrotron project had been developed before CFI was established, and the digital libraries project came about because CFI forced competing local projects to join together and (re-)submit a national-scope project. The important point is that to date universities have apparently not seen it in their interest to develop regional or national projects¹⁸. This circumstance could change in the current round of funding.

5.1.5 Potential Benefit to EC

From EC's standpoint, the chief benefit of CFI is that a partnership between EC and one or more universities could lead to the establishment of new national or regional environmental research facilities¹⁹ whose work would support EC objectives. Two partnership possibilities present themselves: capital contribution and operating contribution.

In principle, it should be possible for EC to forge a partnership with one or more

¹⁶NRC is considering such support for two projects in the second CFI competition (2000)

¹⁷Universities receiving more than 1% of Granting Council research grants.

¹⁸Probably because these projects compete for available funds with local projects.

¹⁹This presumes, of course, that EC sees a need for such facilities.

universities, under which it would make a capital contribution (nominally up to 40%) for the establishment of a regional or national environmental research facility that would be eligible for CFI funding²⁰. Under CFI guidelines proposals must come to it from the university(ies), and must have external funding (nominally 20%) in addition to CFI funding (nominally up to 40%).

Presumably, such an arrangement would appeal to EC if its researchers could utilize a portion of the facility commensurate with the department's capital contribution (i.e. up to 40%), for research directly related to the department's mission. There would be two chief benefits of such an arrangement. The first is that there would be cost savings due to the sharing of building costs (e.g. land, common areas, building infrastructure) with the university partner and other tenants. The second, and in our view more exciting benefit, is the research and recruitment synergies that would develop from EC staff working in close proximity with university professors and graduate students.

In a different scenario, where EC researchers did not carry on research in the new facility, it could still be argued that the department would have an interest in contributing to the capital cost - albeit at a reduced level. This would be the case if the department deemed that the research that would be carried out there: (a) had high priority; (b) was in the national interest; (c) had mechanisms in place to facilitate the flow of knowledge to EC; and, (d) was beyond EC's ability to fund by itself. In this case a capital contribution could help ensure that a needed research institution was established.

Another approach worth considering focuses on support to the operating cost of a facility. Assured availability of operating cost is another prerequisite of CFI funding, so some certainty of ongoing research support by EC would lend weight to a university proposal. EC might elect to defray some of the ongoing operating costs of a CFI-supported university facility through grants, contracts, contributions, fellowships, scholarships or Research Chairs²¹. A likely prerequisite for EC support is that means would be established whereby EC would participate in setting the work plan of the new facility, and would gain access to the knowledge produced there.

Thus, for example, if a university were to propose a "National Centre for Environmental Toxins Research", and environmental toxins were an EC research priority, then it might make sense for the department to back such a proposal - either with capital or operating funds or both. If EC researchers were to work in the facility alongside their university colleagues, or if the university-based research centre obviated the need for EC to invest in a comparable in-house facility, then a capital contribution might be in order. If not, and assuming the research was a priority for EC, then a research funding agreement that would provide ongoing operating support might be in order, to increase the chance that the proposal would succeed in a CFI competition.

²⁰In effect, EC would assume the role of a provincial funding partner.

²¹Some of these could also be cost-shared with NSERC, CIHR or SSHRC.

In either scenario, a close ongoing working relationship between EC and university researchers needs to be established to help EC gain access to the flow of knowledge from a new research centre, and so that EC researchers can keep their university colleagues in touch with national priorities.

5.1.6 CFI Partnership Prerequisites

CFI's guidelines specify that only universities (and hospitals, etc.) can submit proposals. CFI does not regard third-parties (such as provinces or federal departments) as CFI's partners, but rather as the university's partners. Therefore, where specific projects are concerned, direct dealings with CFI are neither required nor encouraged. That said, direct dealings with CFI at an early stage - likely in consort with other SBDAs - would be helpful to explore the general parameters for federal lab participation in CFI programs. A CFI-SBDA MOU might be an objective of these discussions.

EC should note that with regard to specific university-generated projects that fall under CFI's aegis, successful proposals must meet CFI's main assessment criteria:

- Quality of the research
- Need for the infrastructure
- Contribution to strengthening the capacity for innovation
- Potential benefits to Canada

Such proposals must also address Environment Canada's own priorities. (Please see section 5 for further details.)

5.2 Canadian Institutes for Health Research

5.2.1 Introduction

In the February 1999 budget, the Government announced its intention to create the Canadian Institutes for Health Research (CIHR), which will become the successor to the Medical Research Council. Legislation to create CIHR was passed in April 2000.

CIHR will link health researchers to work toward improving the health of Canadians. CIHR will do more than support existing research excellence. It is designed to foster new synergies among researchers to solve complex, difficult health challenges, based on integrated, collaborative and multi-disciplinary approaches. It will build on the research base in Canadian universities, health and research centres, teaching hospitals, federal and provincial governments, voluntary and private sectors.

CIHR will integrate current loosely linked health research efforts into a network of "virtual institutes". One of CIHR's objectives is to promote networking and collaboration among researchers, and ensure the optimal use of Canadian research infrastructure by promoting sharing within and among institutions. Institutes will address important health issues using the resources from four cross-cutting approaches to health research (biomedical, applied clinical, health system/services and culture and the health of populations). A list of candidate institutes was approved by the CIHR Governing Council in early June. Two institutes with an obvious environmental orientation are approved:

- **Social, Environmental and Genetic Influences on Health Institute**
- **Population Health, Social and Environmental Determinants Institute**

In addition, other Institutes may include an environmental research aspect: Cell Function and Cancer; Immunity and Infection, and Nutrition, Hormones and Metabolic Health.

CIHR is intended to help forge an integrated health research agenda to accelerate discovery and treatments where emerging health threats can be identified. CIHR will build on the rapidly growing body of evidence demonstrating some of the most important determinants of health lie outside the scope of clinical, biomedical interventions (i.e. social determinants of health). CIHR will serve as a base to transfer knowledge to local communities and monitor and report on the quality of the social environment and health of Canadians. CIHR has adopted four health research perspectives or themes:

- Basic biomedical research. Basic research conducted by scientists in, for example, the discovery of a new gene; building the knowledge base.
- Applied clinical research. Applying knowledge, possibly to find a cure for diseases and disabilities; testing and applications of basic research in a clinical setting such as labs, research centres, communities, etc.
- Research on health care systems and services. Advances related to the health care system and health services such as identifying the most effective delivery mechanism or system for rehabilitation services, etc.
- Society, culture and the health of populations. Dealing with factors outside the health care system that affect the health of communities and populations; research on social, cultural, **environmental** and behavioural determinants and dimensions of health; factors outside the health care system that directly impinge on health.

The objectives of the CIHR are to excel, by international standards, in the creation of

new knowledge, and its translation into improved health for Canadians, more effective health services and products, and a strengthened Canadian health care system, by:

- Creating a robust health research environment in Canada;
- Building the capacity of the Canadian health research community;
- Forging an integrated health research agenda across disciplines, sectors and regions; and.
- Encouraging interdisciplinary, integrative health research through the creation of thematic institutes that pertain to all aspects of health.

5.2.2 Financing

Under CIHR the former MRC budget will rise from \$271 (1998) to \$484 million (2001), an increase of nearly 80%. Fourteen institute Scientific Directors will oversee 4 different budget "pots", only one of which will be largely discretionary. The first budget pot has a small amount of money to cover the expenses of the Institute Governing Council. The second is a discretionary institute Development Fund, to seed new initiatives. The third fund is the Investigator Fund, which is allocated based on individual investigator success in (formerly MRC) peer review. The Investigator Fund will be allocated a funding "floor" - a base funding amount. Finally, there is a Targeted/Strategic fund which will be allocated to each Institute to finance oriented research projects; this fund will be equivalent to the current MRC fund for targeted/strategic research.

5.2.3 Eligible Partners

Federal government departments and agencies are eligible to partner with CIHR (corporate) and with individual Institutes. CIHR's planning documents²² indicate a desire to:

- Link government science into the broader health research network and peer review process;
- Expand access for researchers to government infrastructure, resources and partners; and,
- Encourage networks between researchers, policy makers and program providers.

Apparently, CIHR is considering "accept(ing) invitations to undertake specific tasks commissioned by Health Canada ... aimed at specific challenges". Presumably, it will

²²Working Paper on Partnerships and Commercialization. September 1999.

be open to similar arrangements with Environment Canada and other SBDAs.

CIHR will specifically "...encourage its potential (university) recipients to seek collaborative partnerships with the laboratories of federal government departments and agencies ... Environment Canada could be a useful partner in the areas of the environmental aspects of health and toxicology."

Notably, the CIHR planning document urges CIHR to **"establish an expertise in government liaison within the secretariat to facilitate and oversee on a continuing basis, the relationships between CIHR and other federal laboratories and agencies and their programs"**.

As with MRC and the other Granting Councils, in all likelihood CIHR will not fund directly fund federal government researchers. SBDAs will need to fund their own portion of partnered activities.

5.2.4 Key Programs

CIHR programming is still in a state of flux, and partnership mechanisms do not appear to have been established. According to the CIHR Working Paper on Partnerships and Commercialization, CIHR will invite partnership activities in the following areas:

1. Agenda-Setting

CIHR is proposing to work with partners to determine common positions on the priorities for health research in Canada. (Presumably, EC would be invited to contribute to discussions on agenda-setting for environmental health research. However, EC should make known its desire to be involved.)

2. Research Programs

Another proposal is for CIHR and individual Institutes to encourage and support collaborative research partnerships which unite researchers from different sectors and disciplines. Emphasis would be on cross-disciplinary research collaboration (e.g. bio-sciences, applied clinical sciences, health services, societal and cultural determinants) and cross-sectoral collaboration (e.g. university, government laboratory, voluntary associations, NGOs, companies, etc.).

3. Co-Funding Research

CIHR desires to develop partnerships with other organizations to share the costs of funding health research and create synergy and leverage to increase funding, knowledge, level of effort and influence.

4. Capacity Building

Capacity building partnerships will concentrate on personnel development, research resources, equipment, and databases.

5. Communication/Dissemination

The emphasis here is on establishing partnerships to disseminate knowledge and know-how generated by CIHR research projects.

Of considerable interest to EC is the proposed CIHR **Health Research Partnership Fund** (a continuation of the former MRC program). The objective of this program is to improve the coordination and planning of health research capacity by co-funding training and salary awards for new and established investigators. Under the terms of the program CIHR will provide matching funding for Ph.D. and Postdoctoral Fellowships, New Investigators (5 years), and Investigator and Senior Investigator salary awards (5 years). In addition, CIHR will organize an expert review of proposals and manage the awards competition.

Under HRPF, preference is given to health research areas where research gaps have been identified, to maintain a platform of research excellence across the country. Organizations (i.e. EC) may specify the location of the research award(s)

5.2.5 *Potential Benefit to EC*

CIHR Institutes and funding programs offer a significant number of potential benefits to EC, especially with regard to the department's medium and long term research requirements. First, in principle, they allow EC to work with CIHR and individual Institutes to help determine national research priorities related to environment and health. This becomes relevant both in the initial definition of CIHR institutes, and thereafter, in setting the agenda and conducting specific research related to EC's mandate.

Secondly, CIHR partnerships allow EC to seed research addressed to specific areas of interest to the department, by providing long-term salary support for students and full-time investigators. And thirdly, CIHR will match EC's contribution to the investigators' salaries. A related benefit is that the CIHR or the investigators' employer (university, hospital, NGO, etc.) will cover the indirect cost of employing the researcher and provide him or her with facilities and equipment needed to undertake the work.

In our opinion, developing partnerships with CIHR both at the corporate level and with individual Institutes, should be an immediate priority for EC. As CIHR is now being set up, this is an especially important time for establishing long term relationships with the

organization.

It is not clear whether or not EC was able to respond effectively to MRC's 18 January 2000 offer to participate in the Health Research Partnership Fund. The deadline for applications to this program was 7 April.

5.2.6 CIHR Partnership Prerequisites

The next few months are a critical period in CIHR's development. The new President, Dr. Alan Bernstein, was appointed in June 2000 and the Institute Directors the following month. Institute directors will move quickly to establish their priorities and plans. **If EC wants to be at the table when priorities and plans are being established it needs to move fast to develop a relationship with CIHR at the corporate and institute levels.** Unlike in the case of CFI, partnerships can be formed directly with CIHR and its various institutes. The first opportunity was associated with the formal call for partnerships which went out in January 2000; however, it is not clear whether or not EC was prepared to respond to it. This highlights the top-down/bottom-up nature of partnership development. Complex line departments like Environment Canada require the ability both to organize top-down (corporate-level) and bottom up (peer-to-peer) partnerships. In many instances both are required.

The chief prerequisite for a sustained partnership program with CIHR (and for that matter with other agencies) is that EC must designate an official point of contact for such arrangements. That individual must be able to devote all - or at least a large part - of his or her job to developing corporate linkages and simultaneously, to work with EC researchers and labs to develop specific partnership projects under the umbrella of the corporate arrangements.

5.3 NSERC

5.3.1 Introduction

NSERC's role is "to make investments in people, discovery and innovation for the benefit of all Canadians". The crown corporation invests in people by supporting more than 9,000 students in their advanced studies. It promotes discovery by funding more than 8,700 researchers every year, and encourages more than 1,000 Canadian companies to invest in university research.

5.3.2 Financing

NSERC's total budget expenditure is approximately \$500 million per year. NSERC's main program which supports university-government research collaboration is Research Partnership Agreements With Government Departments (RPA). For the current fiscal year NSERC has set aside \$8 million for university-government collaborative programs

under RPA. However, their expectation is that the budget will not be fully expended, because federal departments will not provide sufficient matching funds²³. In addition, NSERC spends approximately \$11 million per year to support Research Networks.

5.3.3 Eligible Partners

Several federal departments have already taken advantage of Research Partnership Agreements. These include: NRC, DND, NRCan (CFS, ESS), AAFC, and CSA. One example - the joint program among NSERC, SSHRC and the Canadian Forest Service, described below - is typical of the NSERC/SBDA RPA arrangements.

To date, EC has not taken advantage of the RPA opportunity.

Canadian Forest Service (CFS)/NSERC/SSHRC Forest Research Partnerships Program

The broad objectives of this joint program are to promote the sustainable development of forests, the forest industry, and the communities that depend on the forests. It is intended that the research will help integrate environmental, social and economic values, while allowing stakeholders to better understand the complexity of the ecosystem and the importance of this valuable natural resource. CFS, NSERC, and SSHRC will together provide funding for university-based research that involves collaboration with Canadian-based non-academic users of research results in both the public and private sectors. CFS/NSERC/SSHRC may contribute a maximum of two dollars for each dollar invested by the sponsor(s) of which at least 50 percent must come from Canadian-based profit-making organizations. Proposals for research should fall within CFS's defined priority areas. Projects are funded for up to three years.

5.3.4 Key Programs

NSERC has two programs of interest to Environment Canada. The NSERC Research Partnerships Agreement program (RPA) is analogous to CIHR's Health Research Partnership Fund (see section 4.2.2). The purpose of RPA is to promote closer collaboration between the university research community, government departments, the private sector, and other organizations capable of putting knowledge to work. RPAs typically involve a 3-way partnership among NSERC²⁴, a federal department, and the private sector. Some RPAs involve an additional partnership with SSHRC²⁵. The

²³In 1996-97 NSERC spent around \$1.3 million to support university-government projects through RPAs. This sum was significantly reduced from 1994-95 levels, reflecting the effect of Program Review on the ability of departments to provide matching funds.)

²⁴Sometimes with the involvement of SSHRC or MRC/CIHR

²⁵This is particularly valuable when research projects have a social or behavioural component, e.g. NIMBY.

program is designed to:

- Capitalize on the complementary R&D capacity existing in the universities and in federal labs to generate new knowledge in selected areas required to meet identified economic, industrial, social and environmental needs and opportunities;
- Build strong three-way linkages and create synergy between the private sector and researchers in federal labs and universities;
- Achieve the efficient and effective transfer of research results and technology to receptors in the public or private sectors; and,
- Train and develop highly qualified personnel in priority areas consistent with the future human resource requirements in the public and private sectors.

RPA is particularly well suited to research projects where there is an expectation that knowledge will result that can be commercialized by the private sector and support public sector objectives as well.

The program is open to academic staff members of Canadian universities. Applicants must satisfy normal NSERC eligibility criteria as outlined in NSERC's Researcher's Guide. To be eligible for support, a proposal typically must involve a collaborative effort with at least one federal lab. Normally, at least one Canadian-based company, incorporated and operating in Canada, will be involved and will contribute cash and in-kind to the project.

A thrust of the program is to develop interactions with small- and medium-sized Canadian enterprises (companies with fewer than 500 employees); therefore, their participation in the research project is particularly encouraged.

One of the attractive features of this program is that departments can tailor the financial and programmatic guidelines to their specific needs. In the case of the NRC/NSERC program, funding provided by NRC/NSERC will usually be in the range of up to \$400,000 per year but may exceed this amount for very special opportunities. Other SBDAs have different financial guidelines for their projects. For example, CSA projects are in the \$50,000 range.

In exceptional cases²⁶, the requirement for industrial collaboration may be waived. In such cases, applicants must indicate, in the application, why the proposed research represents an exceptional opportunity and how the research results will be exploited to the benefit of Canada.

Approved activities may be supported for terms of up to five (5) years with funding beyond the first year contingent upon evidence of satisfactory progress and, where

²⁶For example, when the research serves an exclusive public good requirement and there is no expectation of commercial gain.

applicable, evidence of continuing support from the industrial partner(s).

A second program of interest to EC is NSERC's **Research Networks** program. The Research Networks program funds large-scale, complex research proposals that involve multi-sectorial collaborations on a common research theme and that demonstrate the added advantages of a networking approach. A management structure is required to direct, manage, and integrate the activities of the network. Research Networks normally require in excess of \$500,000 annually from NSERC. They involve at least five researchers from three organizations that are not formally affiliated. There is no pre-determined funding requirement; both private and public sector partner contributions will be assessed in determining an appropriate cost-sharing ratio. Networks are normally funded for five years. This program encourages the interaction and exchanges of personnel between universities and other sectors as part of the training of highly qualified personnel, e.g., reciprocal laboratory visits, joint workshops, and seminars. Many of the currently-funded research networks are relevant to Environment Canada's research agenda.

| 1998-99 NSERC Research Networks | |
|--|--------------|
| Metals in the environment (MITE) Research Network | \$ 620,845 |
| Lithoprobe Phase V Proposal: The Evolution of a continent revealed | \$ 4,540,000 |
| GLOBEC CANADA | \$ 1,066,581 |
| GLOBEC - Shiptime for YEAR 3 | \$ 240,000 |
| NOW Research Network (International Norther Water Polynya Study) | \$ 1,174,983 |
| Climate System History and Dynamics-Phase 2 | \$ 1,130,532 |
| The MacKenzie GEWEX Study: Support for University Participation | \$ 792,633 |
| Canadian participation in the ocean drilling program | \$ 660,000 |
| Ocean Drilling Program Secretariat | \$ 115,000 |
| Network for computing and mathematical modelling | \$ 851,788 |

Research networks are typically developed through multi-stakeholder consultations, and federal labs are welcome to work with university proponents to help develop and fund networks.

5.3.5 *Potential Benefit to EC*

As in the case of the CIHR partnership program, NSERC RPAs can help EC to achieve its medium and long-term research objectives by developing a research capacity within

the university sector, and by supporting the work of researchers and graduate students. NSERC partnerships allow federal departments to stretch their own resources through matching funds. Universities also make a significant contribution to the indirect costs of the research. RPAs allow funds to be targeted to departmental priorities. EC should find RPAs to be particularly useful for addressing precautionary research issues, where long term research is required that might not be appropriate to the mission of its own labs. RPAs will also produce a recruitment benefit to EC, as students are trained in fields of research of interest to the department. Federal organizations such as NRC have strengthened the recruitment link by requiring that students supported under its RPA conduct some or all of their work in their own labs.

Research Networks are another useful mechanism to address environmental issues. Research Networks function much like Networks of Centres of Excellence. They have the potential to concentrate expertise from different institutions on common themes or problems. In working with university researchers, EC has the opportunity to define new networks and become actively involved with them.

5.3.6 NSERC Partnership Prerequisites

The initial requirement for an EC-NSERC RPA is an MOU between the two organizations that specifies the terms of the agreement and commits funds from each of the partners. Once the RPA is in place EC labs can work with their university and industry counterparts to develop specific project proposals. Most RPA projects are submitted following lengthy consultation between researchers in a government department and their prospective collaborators in a university or company. This implies that individual (EC) labs need to have established contacts and ongoing working relations with their university and industry counterparts so that they can jointly develop project proposals in typically short time frames.

As with other granting council programs universities must take the lead in submitting RPA applications. Normally, university researchers can submit RPAs at any time of the year (no fixed deadline). Cash and in-kind contributions from industry are recognized by the Program as eligible contributions and valid commitments if they are used to defray the direct costs of the proposed activity. Applicants must indicate in the budget section of their proposals the portion of the industry funding that will flow to the university.

Cash contributions from industry on projects funded through this partnership program cannot be used for payments towards university overheads, licensing fees, faculty honoraria and consulting fees. The industrial partner may make an in-kind contribution (at fair market value and standard labour rates) in addition to its cash contribution to the joint research project.

The recognized company(ies) contribution is the total of cash or cash and in-kind, and

this contribution is the basis for defining the upper limit of the Program contribution. The Program may contribute up to two dollars for every dollar invested by the company(ies).

To initiate Research Network projects, Environment Canada scientists and managers need to collaborate with university colleagues to develop Network of Centres of Excellence-type projects, which typically involve researchers at multiple universities and in government. Close collaboration with NSERC in developing project proposals is recommended.

5.4 Canada Research Chairs

5.4.1 Background

The goal of the Canada Research Chairs program is to build a critical mass of world-class researchers who will help Canadian universities achieve research excellence and encourage leading researchers to remain in Canada. In the 2000-2001 budget the government set aside \$900 million to establish 2000 Canada Research Chairs in universities by 2004-05. The program is being managed by a steering committee composed of the president of the Canada Foundation for Innovation, the DM of Industry Canada, and the presidents of the three research granting agencies: SSHRC, CIHR, NSERC. The program secretariat is located within SSHRC.

Under the new program 35% of chairs allocated to the fields currently funded by the Medical Research Council/CIHR, 45% to the fields funded by NSERC, and 20% to fields funded by SSHRC. The number of chairs allocated to each university each year will be proportional to the funding researchers at the university receive from the Councils. Ninety-four percent (94%) of the 2,000 Chairs (1,880 chairs) will be allocated in this manner; the remaining 120 chairs (6%) will be reserved for a special allocation to smaller institutions receiving less than 1% of total of a council's research granting funds. This special allocation often provides three extra chairs to small universities, which means that for most of them their research chair allocation will, at least, double.

There will be two types of chairs. Seven-year renewable Tier I chairs will attract current research stars, acknowledged by their peers as world leaders in their research fields. Five-year Tier II chairs, renewable once, will attract future research stars, acknowledged as having the potential to lead their research fields.

For each Tier I chair, the university will receive \$200,000 per year in financial support for seven years. For each Tier II chair, the university will receive \$100,000 per year in financial support for five years. The university will have flexibility in the use of the funds, as between salaries and other associated research costs.

Universities that have received between \$100,000 and \$200,000 per year, on average, from the three granting councils combined will receive a special allocation of one Tier I

chair or equivalent (\$200,000). This will be made available in the first year. Universities that have received at least \$200,000 in total per year, on average, but less than one per cent of the funding from the three granting councils combined will receive a special allocation of one Tier I chair and two Tier II chairs or equivalent (\$400,000). Eligible expenditures include:

- Salary and benefits of the incumbent;
- Salary and benefits of members of his/her team (students at all levels, postdoctoral fellows, research associates, technicians, research assistants, etc.);
- Recruitment costs and relocation expenses;
- Costs associated with fitting research and office space for the incumbent and his/her team;
- Administrative costs related to the research program (proposal writing, secretarial assistance, publication costs, administration, technology transfer costs, etc.);
- Acquisition, maintenance, operation of research equipment and other research resources; and
- Other costs of research (travel, workshops, computing, consumables, publication costs, material and supplies, etc.).

5.4.2 Analysis

To strengthen the national system of environmental research, it would be beneficial if universities allocated a substantial portion of research chairs to fields that are important to Environment Canada. However, more than the other programs described in this report, Research Chairs - once allocated to universities - are within the sole discretion of individual universities to distribute. Universities are expected to have strategic (research) priorities and plans in place as a precondition of their receiving their chair allocation. Thus, the real issue is how universities will establish those priorities and plans. Some universities may decide to emphasize a particular branch of excellence - say Information and Communication Technology - while others might concentrate on environmental science.

There is little doubt that university presidents will take a wide array of internal and external factors into account in determining their priorities. Not least is that each Dean will argue that his or her field, faculty, or discipline deserves special attention. Those that can muster the best argument will likely fare better in the competition. One determining factor might be the amount of ongoing support the chair-holder is likely to receive from external sources, such as a federal government department. Deans who can point to a high level of ongoing support may be better positioned within the university to receive Chairs. EC might consider establishing a small matching fund program to enrich environmental studies/sciences research at universities, and thereby give a boost to environmental chairs.

EC's challenge is to work with Deans of Environmental Studies/Science to lend support to their internal efforts to gain support for their particular cause. In order to do that, the department needs a **forum for discussion**. At such a late date, it may not be appropriate to convene such a forum exclusively to discuss this matter. In retrospect, it would have been helpful if such a forum had already been in place, in which case the matter of the research chairs could have been referred to it for advice. However, that not being the case, it might be worthwhile to have informal discussions with a small number of Deans to see if EC can be of help to them in making their case within the university.

5.5 Networks of Centres of Excellence

5.5.1 Background

The federal government's Networks of Centres of Excellence (NCE) program was established in 1988 and made permanent in 1997. The program is managed by a Tri-Council committee of presidents. NCE's are "research institutes without walls", inspired by the Canadian Institute for Advanced Research. The NCE program has 2 streams; non-targeted & targeted networks. Most networks are non-targeted, whereas the latest competition has concentrated on targeted networks.

The aim of an NCE is to link the best researchers in a field together. NCEs are generally targeted to national priorities. NCEs are linked to investors, manufacturers, exporters and others, although there is no quota for external financial support. Industry financial involvement is desirable, but not required. NCEs are designed to develop the economy and improve quality of life. They compete for seven years of NCE funding. There is a maximum of two seven-year funding cycles available to a network. At the end of the first seven-year funding cycle, existing networks compete with applications for new networks. The current networks are:

Non-targeted networks:

- Aquaculture
- Arthritis Network
- Bacterial Diseases
- Genetic Diseases
- Photonics
- Telecommunications
- Vaccines & Immunotherapy
- Stroke
- Geomatics
- Health Evidence
- Robotics & Intelligent Systems
- Sensors and Structures

- Mathematics of IT
- Mechanical Wood Pulps
- Microelectronics
- Protein Engineering
- Sustainable Forest Management
- Tele-learning

Targeted networks:

- Automobile of the 21st Century
- Genomic Technologies and Society
- **Environmental Challenges for Clean Water**
- Early Child Development

The goal of the program is to mobilize Canada's research talent in the academic, private and public sectors and apply it to the task of developing the economy and improving the

quality of life of Canadians. This goal is consistent with, and reinforces, the three pillars of the Federal Science and Technology strategy: sustainable job creation and economic growth, improved quality of life, and advancement of knowledge. Networks are meant to:

- Stimulate internationally competitive, leading-edge fundamental and applied research in areas critical to Canadian economic and social development;
- Develop and retain world-class researchers in areas essential to Canada's productivity and economic growth;
- Create nation-wide multi-disciplinary and multi-sectorial research partnerships that integrate the research and development priorities of all participants; and,
- Accelerate the exchange of research results within the network and the use of this knowledge within Canada by organizations that can harness it for Canadian economic and social development.

The annual NCE budget is \$47.4 million. The budget for targeted programs budget is \$13m per year.

NCEs can pay for the direct costs of research, as normally allowed by granting councils, i.e.:

- Salaries and benefits of full-time university-based researchers working full-time on network-funded research
- Partial teaching release/clinical release for Program Leader only, up to \$25K per year
- Salaries and benefits for staff
- Equipment
- Materials and supplies related to the direct costs of research
- Communication activities
- Costs to obtain liability insurance
- Legal fees and incorporation costs
- Intellectual property: on an annual basis up to 50% of the total cost of protection for intellectual property
- Market studies for Network IP
- Contracting of services only where necessary to provide services and expertise not available within the network
- Costs relating to networking: travel and accommodation for personnel, researchers and members of network boards and committees
- Networks may use contracts to acquire access to **specialized facilities and services provided by government laboratories**

In addition, Specified Purpose Accounts may be used to support joint projects with

federal labs. Money can come only from non-federal funds raised by the networks and not from the federal funds for the NCE program. In 1997-1998, a total of 463 companies, more than 100 provincial and **federal government departments and agencies**, 44 hospitals, 61 universities, and more than 200 other organizations from Canada and abroad were involved in the NCE program. Current federal SBDA partnerships with NCEs include:

- AEC(Concrete, IRIS, ISIS)
- CFIA (HEALNet)
- CMHC (Concrete)
- Correctional Services Canada: (TeleLearning)
- CRC (CITR, TeleLearning)
- CSA (IRIS)
- DFO (CBDN)
- DND (CBDN, PENCE, IRIS)
- Health Canada: (CBDN, HEALNet, Inspiraplex)
- HRDC (TeleLearning)
- Industry Canada (TeleLearning)
- MRC (CBDN Inspiraplex)
- **Environment Canada NWRI (SFM)**
- NRCan (IRIS, Concrete, SFM)
- NRC (CBDN, IRIS, CITR, Micronet, Wood-Pulps, TeleLearning, Inspiraplex, ISIS, Concrete)
- PWGC (Concrete, Inspiraplex, ISIS)

5.5.2 Analysis

For the first decade of the NCE program, it funded so-called non-targeted networks; networks from any discipline that could demonstrate scientific excellence and meet the program criteria. The luck of the draw dictated that there was little direct link between the research of the non-targeted networks, and the mission of Environment Canada. This accounts for the fact that EC researchers (NWRI) are involved with only one network (Sustainable Forest Management).

In the last two years a decision was taken to target new networks to areas of national need, and proposals for specific networks were solicited (Automobile of the 21st Century, Genomic Technologies and Society, Environmental Challenges for Clean Water, Early Child Development). This may well set the pattern for future NCEs.

Many SBDAs are involved with the NCE program, but the extent of their involvement is limited. Federal researchers are not currently eligible to receive funds from NCEs, however, they are free to tie in to the research of NCEs.

In future, we see two opportunities for Environment Canada. The first is to liaise with the federal Granting Councils and the NCE program office to alert them to any national environmental research priorities and issues which might lend themselves to the establishment of future targeted networks. If the NCE program were to call for proposals for new environmental research networks, the department should work through its university partners to help develop winning proposals.

There is a second opportunity for EC, which it should probably pursue in concert with other SBDAs (the 5NR grouping is a logical vehicle here). Our discussions with senior granting council officials indicate they might be open in future to federal researchers participating directly in NCEs and being eligible to receive NCE funds. A requirement would be that federal scientists would need to compete on level ground with their university colleagues in peer-reviewed competitions. Details are still vague, but we feel that the door is now open to discussions about how federal labs and scientists can work more closely with the NCE program.

This is a delicate area and we suggest that discussions be held at an informal level to begin, before any formal overtures are made.

5.6 Genome Canada

5.6.1 Background

The government announced \$160 million of funding for Genome Canada (GC) in the 2000-2001 budget. There is no set period of time in which the funds needs to be spent.

GC is a not-for-profit corporation. The GC Board of Directors is being chaired by Dr. Henry Friesen, former President of the Medical Research Council. Other members are Kevin Keough (Memorial U.), Heather Munroe-Blum (U of Toronto), Murray McLaughlin (Foragen Technology Ventures Inc.), Susan Smith (Royal Bank Ventures), Lorne Babiuk (VIDO), plus a Mr. Brunet (GC lawyer). Note that there are no longer any federal government members of the Board. The 4 Presidents of the Granting Councils are ex-officio members. Announcement of the new Board and of Genome Canada's program is awaiting agreement on a suitable date by Mr. Manley's office.

GC plans to establish 5 regional genome centres²⁷ (Atlantic, Quebec, Ontario, Prairie, B.C.) which will act as shared service facilities for the research community. Each of the 5 centres will be independently incorporated as a not-for-profit corporation. GC will issue an "RFP" for the 5 centres after the end of June. Each centre's research focus (e.g. agriculture, environment, sequencing, proteomics, etc.) will be established by the centre, not by Genome Canada.

To secure funding approval centres must demonstrate they have tried to involve industry and government in their organization and program, as well as the university community. Centres will be judged on the quality of their research program, administration and partnerships. In approving regional genome centre proposals - for example, a program to sequence the genome of a bacterium important to agriculture or environment - priority will be given to the quality and breadth of large-scale projects. In

²⁷In fields of gene sequencing, proteomics and functional genomics.

other words, genome centres will be project-driven rather than technology- or process-driven.

Genome Canada will pay for all costs at genome centres - equipment, staff, supplies, etc. This means that federal government departments (and other public sector participants) will not need to pay for the costs of the research.

Intellectual property will be held by participating researchers' home institutions, under those institutions' IP policies.

Only one of the five centres is as yet incorporated - Génome Québec. The contact is Dr. Chantal Brunet (418 528-9774). Other centres will be incorporated in response to the forthcoming RFP.

5.6.2 Analysis

The Genome Canada program will evolve in 2 phases; genome centre development and implementation. To build effective partnerships, EC research managers and researchers will need to work with the emerging centres in both phases. In the development phase, which is presently under way, there is an opportunity for EC staff to help genome centre proponents to shape the scientific focus and research program of the centres. Within EC there is already significant progress in this direction. This Spring, EPS staff brought together 14 universities from across Canada to explore environmental research priorities and opportunities through Genome Canada. The intent was to convey EC's national-level priorities and develop complementary visions for the future.

The hope is that the new centres will incorporate national priorities in their work plans; hopefully, many of these will cover fields of interest to the department. Once major research programs are defined, they will probably last for 3-5 years, so early intervention and collaboration is key. EC can help shape different proposals by holding out the prospect of giving its support to centres that are aligned with national priorities, when proposals are submitted to Genome Canada. (Presumably, in the remote event that EC would withhold support for a proposal, that would weigh heavily against the proposal.)

The next opportunity for EC is in the genome centres' implementation phase. Once genome centres are up and running, EC research organizations will need to have their own in-house genomic strategies if they are going to capture benefit from the department's relationships with the different centres. In other words, there must be an in-house receptor capacity for genomics research; a plan for using genomic technology to fulfil different EC missions. Otherwise, relations with regional genome centres will be a non-starter.

Once the 5 genome centres are up and running, it will be important for EC researchers to participate in major projects and programs that are relevant to the department. It appears that federal departments will not be asked to finance the ongoing operations of the genome centres, as the cost of Genome Canada is being paid by the federal government. However, there will be a need for EC to develop a receptor capacity (knowledge transfer capacity) within its different services, to utilize the research and knowledge that arise.

The Budget did provide \$1 million for three years for EC to create an in-house genome capacity. An internal competition surfaced 80 genomic-related proposals from within the department. This process also revealed that there were gaps in in-house capacity that could be filled by the university sector. Some of these gaps could be filled by the department's relationships with the genome centres.

Working effectively with the new genome centres will also place human resource demands on EC research organizations. Maintaining effective working relations with 5 genome centres (plus the Genome Canada central office) will require staff time. This highlights an theme of this report, which is that partnership development and maintenance is an important activity for which dedicated resources need to be found. The benefits of partnership will be proportionate to the investment made.

5.7 The Canadian Foundation for Climate and Atmospheric Sciences (CFCAS)

5.7.1 Introduction

The Canadian Meteorological and Oceanographic Society has received a one-time grant of \$60,000,000 for the establishment of the Canadian Foundation for Climate and Atmospheric Sciences. This Foundation operates as a not-for-profit corporation at arm's length from Government. The prime purpose of the CFCAS is to fund research in Canadian universities in the areas of: (i) climate system science, (ii) climate change, (iii) extreme weather, (iv) air quality, and (v) marine environmental prediction. The objectives within these areas are to strengthen Canada's scientific capacity, improve scientific understanding of processes and prediction capabilities, provide relevant science to policy makers, improve understanding of the implications of these sciences for human health and for the natural environment, foster collaboration and interdisciplinary approaches, and encourage participation and support of others.

The CFCAS will be directed by a twelve member Board of Trustees, and will be supported by a Grants Review Committee to review all grant applications. The CFCAS will disburse the \$60 million Fund over a six year period.

Eligible projects must address one or more of the following areas:

- (a) understanding key Climate System processes, including greenhouse gas sources and sinks;
- (b) understanding key meteorological and atmospheric chemistry processes that impact air quality
- (c) understanding the probability of occurrence and/or improving the prediction of extreme and hazardous weather;
- (d) developing and improving weather, air quality and Climate System models adapted to Canada's regional context leading to better predictions and to studying anticipated impacts;
- (e) improving knowledge of ocean and atmospheric processes leading to better marine environmental predictions;

The Canadian Meteorological and Oceanographic Society will disperse the grant over a six year period.

The CFCAS will attempt to use application procedures and forms familiar to the Canadian academic community where possible. The NSERC application process is currently in use. A CFCAS requirement is that applicants must demonstrate in the description of their research proposal how they address the CFCAS eligible funding areas. For all applications, complementary or differences with existing funded efforts (CRN, NSERC grants, etc.) must be covered in the application.

For the first round, which began July 25, 2000, letters of intent for networks and large research proposals are due to CFCAS by September 29, 2000. Research proposals (up to \$200K/year) are also due to CFCAS by September 29, 2000. The first grant awards are to be made by December 2000. Awards will be made for one, two or three year periods.

The Foundation is intended to be complementary to existing funding programs for specific research areas, and to lever funds in a way that makes a real incremental increase to research in these areas. CFCAS was seen to fill a niche between the NSERC research grants and the CFI funding.

5.7.2 Eligible Partners

Individual researchers and/or collaborative networks of researchers affiliated with Canadian universities or other degree-granting institutions or not-for-profit organizations federated or associated with universities who have demonstrated their capabilities to support and conduct eligible projects are eligible for the grants.

While a CFCAS project would not be considered an 'official partner' by NSERC, it could be a co-funder of collaborative or synergistic work. For example, while CFCAS funds cannot be used to lever Industrial Research Chairs or Canada Research Chairs from NSERC, they can be used to provide research support to a position/chair that NSERC funds.

5.7.3 Analysis

CFCAS is considering a plan for regionalized expertise, rather than just regional distribution of projects for its own sake. There is a need to build similar kinds of "nodes" for the key research areas identified by CFCAS. In terms of a regional distribution of funds, a strengthening of the existing capacity was endorsed at the July 2000 planning session. At present, funds tend to be distributed around regional areas of interest:

- Air quality science - Toronto
- Climate system science - West coast
- Marine prediction - East coast
- Severe weather - Montreal and Southern Ontario

To strengthen the national system of climate and atmospheric research, it would be beneficial if universities accessed a substantial portion of the funds available in fields that are important to Environment Canada. The use of CFCAS project funds in a complementary way to the Millennium Chairs program would be very beneficial to achieving targeted research goals while at the same time enhancing scientific capacity in Canada in climate and atmospheric sciences.

6.0 EC Partnership Requirements

6.1 Departmental Considerations

in order to effectively pursue the opportunities described in this report, Environment Canada needs to know what its partnership requirements are so that it can develop the appropriate corporate relations and support specific projects. In particular, this means that the department - and especially each business line - **must identify its infrastructure (capital) and knowledge requirements in advance**. It must then determine which knowledge and infrastructure it can and should supply in-house, which should be developed through active partnerships, and which can be entirely provided by accessing third party information. At the same time, the department needs to retain a degree of flexibility so that it can capture good opportunities as they arise.

Another departmental prerequisite, we believe, is that there be **high-level champions within Environment Canada** for partnerships. In our opinion, an individual on EMB needs to be assigned executive responsibility for overseeing partnership development

and reporting progress to EMB. A high level champion is needed to help open doors and coordinate initiatives within the department and with external partner organizations. He or she should chair a departmental Partnerships Committee whose job would be to coordinate and facilitate major departmental initiatives. This individual should be supported by an entrepreneurial manager - a deal maker - who will have day-to-day responsibility for strategic partnership development and liaison with external organizations such as CFI, CIHR, Granting Councils, advisory committees, universities, etc. This individual will work closely with different EC services and labs to coordinate specific opportunities.

In most instances, however, it will be individual lab directors and research managers who will identify and pursue specific partnership opportunities on behalf of the department. The role of the corporate partnership manager is to foster high level relations with partner organizations and develop framework agreements under which particular partnerships will be developed. In our opinion, it would be helpful if each EC service, region and lab were to designate its own point of contact for university partnerships to work with the corporate manager and with external partners.

In all cases where EC develops partnerships with external organizations, the central issue is **knowledge transfer** - building in mechanisms that will allow knowledge to flow to EC so that it can be used to support the department's public good mandate. Developing partnerships may be a necessary condition for progress, but establishing mechanisms for knowledge flow is a sufficient one. We know that person-to-person contact is the most powerful form of knowledge transfer. Therefore partnerships should maximize contact between EC researchers and external partners. This happens best when EC and external researchers are working together on common issues - whether in a university lab or in an EC facility.

In many respects, from a corporate standpoint (not a lab standpoint) EC is making a "cold start" with respect to university partnerships. There are many fruitful relations at the working level in the department, but few if any at a corporate level. Partnerships and (in particular) relationships with the university sector will take time to develop; they cannot be put in place overnight.

Finally, EC officials should be aware that there is a degree of scepticism within the university community and federal agencies supporting university research, about the motives of SBDAs in working with universities. Many outside of government believe that departments' new-found interest in partnerships conceals a desire to appropriate university research funds. Environment Canada will have to work hard to dispel this myth. In general, the more directly-related a partnership or research project is to the department's immediate mandate, the greater proportion of the costs it should be willing to bear.

6.2 Service, Region and Business Line Considerations

At heart, partnership development is a bottom-up exercise. We expect that the initiative to participate in specific infrastructure project proposals will originate with individual researchers and research groups in the different EC services and regions. These people and organizations are best placed to assess and develop specific partnerships with the university sector; in particular with senior researchers and deans in individual universities, faculties and departments. To guide its partnership activities, each EC Business Line should:

1. Identify an individual who will be responsible for partnership development on behalf of the Business Line.
2. Identify its short, medium and long-term knowledge requirements, assess its research priorities, and develop a long term research agenda. (This should be updated annually.)
3. Determine which knowledge and research priorities, if any, will require new research infrastructure.
4. Assess what infrastructure elements, if any
 - (a) need to be government-owned and operated, or
 - (b) could be jointly operated with an external (university) partner, or
 - (c) could be operated exclusively by an external partner.
5. Where EC's research needs can be appropriately met facilities operated by universities or jointly operated by EC an universities, identify potential partners and determine:
 - (a) a partnership strategy specific to each opportunity; and
 - (b) a knowledge-transfer strategy
6. Use a mix of capital and operating support to initiate the specific opportunity.
7. Include partnership development as a key performance indicator for all research organizations.

In conclusion, it will require a joint effort between officials at a corporate level and managers and researchers at an operational level to implement a successful partnership strategy.

7.0 Recommendations

We offer the following suggested recommendations for your consideration.

1. Designate a senior departmental official - a champion - to be responsible for reporting on the department's partnership strategy and plans at EMB. Partnership development should be a regular agenda item at EMB meetings.
2. Recruit a senior partnership "ambassador" from the university community to work with the senior departmental official and different EC services, to help establish high level relationships with the university sector.
3. Ensure the department has a capacity to follow up on high level discussions. Support the designated EMB champion with the services of a senior full-time partnership manager/coordinator. This individual will do the day-to-day work of partnership development.
4. Adopt a proactive partnership stance and make this known to EC staff, potential partners, and central agencies. Develop a communication strategy to support partnership development. It is important to let partners know that EC is serious about developing partnerships, where specific opportunities lie, and that EC's partnership commitment has high level backing within the department.
5. Initiate high level discussions at the DM or ADM level with CFI, CIHR and NSERC. Establish contact at the management level within each organization prior to the high level discussions. Come to meetings equipped with some examples of possible partnerships. Aim to develop MOUs and other framework agreements that will open doors for specific project development down the road. Focus initially on the key partnership programs which are described in this report: Institutional Innovation (CFI), Health Research Partnership Fund (CIHR), Research Partnership Agreements (NSERC).
6. EC executives (DM or ADMs) should meet with the soon-to-be-announced President of CIHR to open the door to partnerships with EC, and in particular, to explore partnerships through the Health Research Partnership Fund. Go to the meeting equipped with a few examples, which should be developed in association with EC labs. Explore the option of an MOU to establish a framework and mechanisms for ongoing cooperation.
7. Encourage EC business lines to formally identify their short, medium and long term environmental infrastructure and knowledge requirements, so they can determine which of these can best be served through partnerships with the higher education sector. This could be done in the context of the department's science capacity work.

8. Establish an approval mechanism and facilitation capacity within Environment Canada for major partnerships that require a high degree of commitment by the department. One element could be a Partnership Development Committee that would coordinate and facilitate major new partnership initiatives.
9. Ensure that business lines, regions and labs designate individuals who will act as points of contact for partnership development. Unless one or more individuals have partnership development as a specific component of their job description, opportunities are likely to be missed. Once a group of individuals with partnership responsibility has been designated, the department should establish an internal partnership development network, which should be coordinated by the corporate partnership manager.
10. EC senior management should quickly make contact level with the soon-to-be-announced Directors of the two CIHR institutes whose activities are directly relevant to the department: *Social, Environmental and Genetic Influences on Health Institute*, and *Population Health, Social and Environmental Determinants Institute*. Offer to work with him or her in identifying national research priorities.
11. Recruit an Academic Advisory Committee to the department. (The Department's S&T Advisory Board may serve this function) The university "ambassador" could help with this. Invite a number of Deans of Environmental Studies/Science from different universities (and possibly colleges as well) to sit on this committee. The committee should meet twice a year to provide advice on higher education partnership strategies and plans, as well as upcoming partnership opportunities. The department should also keep the committee abreast of its own knowledge needs and strategies, so environmental studies faculties can take these into account in their own plans.
12. Consider creating an internal EC university/college partnership development fund that would provide small grants (seed funding) to university researchers to develop larger partnership proposals that would utilize funding from multiple sources. Consider creating a larger fund to finance ongoing partnership operations. This fund would kick in when partnerships are sufficiently large, or affect a number of different EC research groups.
13. Together with a number of other SBDAs (possibly the 5NR group) start informal discussions to explore with NSERC, SSHRC and CIHR the possibility of amending current Network of Centres of Excellence guidelines to allow federal government researchers to actively participate in NCE research and possibly compete for funds in peer-reviewed competitions.
14. Ensure that in all partnership situations that EC research groups develop an explicit knowledge management plan so that they can effectively access and utilize the

knowledge produced through the partnership. One aspect of partnering that need to be dealt with early on is intellectual property.

Appendix 1 -Complementary Roles of National Innovation System Partners

| Characteristic | Federal Lab | University |
|--|---|---|
| Wealth Creation Objectives | <ul style="list-style-type: none"> Principal value: Explicit and direct wealth creation Seeks public benefits | <ul style="list-style-type: none"> Principal value: Basic research as an enabling condition for wealth creation Seeks mixed private, public benefit |
| Quality of Life Objectives | <ul style="list-style-type: none"> Principal value: Explicit and direct improvement of quality of life for all citizens Seeks public benefits | <ul style="list-style-type: none"> Principal value: Basic research as an enabling condition for quality of life Seeks mixed private, public benefits |
| Advancement of Knowledge Objectives | <ul style="list-style-type: none"> Principal value: Advancement of knowledge in support of missions | <ul style="list-style-type: none"> Principal value: Advancement of knowledge as an end in itself (basic research) Advancement of knowledge in support of missions (targeted research) |
| Purpose of S&T Activities | <ul style="list-style-type: none"> Mission-oriented Targeted basic and applied research and technology development To achieve public benefit Conforms to government and public policies and priorities (public goods) | <ul style="list-style-type: none"> Majority: Non-oriented, "curiosity driven" Minority: Strategic, industrially-oriented Advancement of knowledge Conforms to individual prof./student priorities |
| Project selection | <ul style="list-style-type: none"> Projects selected by team, departmental and interdepartmental managers, with input from external advisory committees Projects funded based on impact on public good | <ul style="list-style-type: none"> Projects selected by individual researchers Projects funded on recommendation of peers based on research quality |
| Level of effort | <ul style="list-style-type: none"> Full-time research effort 5+ personnel | <ul style="list-style-type: none"> Part-time research effort 2-5 personnel (typical) |
| Management | <ul style="list-style-type: none"> Research plan with milestones, deliverables, key performance indicators | <ul style="list-style-type: none"> Research plan optional |
| Clients | <ul style="list-style-type: none"> Elected officials Public at large | <ul style="list-style-type: none"> Self Peers Granting Councils |
| Time frame for research and application (typical) | <ul style="list-style-type: none"> 6 months - 5 years | <ul style="list-style-type: none"> 36 months - 7 years |
| Evaluation | <ul style="list-style-type: none"> Semi-annual internal reviews Regular external reviews Oversight by Treasury Board, Auditor General Political oversight | <ul style="list-style-type: none"> No direct evaluation; indirect evaluation through peer review of publications No oversight |
| Accountability | <ul style="list-style-type: none"> Direct accountability; moderate-high level Accountable to Ministers, Parliament, Auditor General, Senior government officials, Senior scientists. | <ul style="list-style-type: none"> Indirect accountability; low-moderate level Accountable to: Granting Councils, Peers |

Appendix 2 - Institutional Partnership Analysis

| Partnership Factor | Organization/Program | | | | |
|-----------------------|---|--|--|--|---|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| A. Descriptive | | | | | |
| Description | <ul style="list-style-type: none"> Independent corporation est. in 1997 to strengthen Canadian capability for research. Invests in research infrastructure Mandate to increase the capability of universities, colleges, hospitals, and other not-for-profit institutions to carry out scientific research and technology development ...in co-operation with funding partners Provides infrastructure for R&D that will: support economic growth and job creation; lead to improvements in health, the environment, and quality of life; build capacity for innovation; strengthen training for research careers for young Canadians; attract and retain capable researchers in Canada; promote networks and collaboration among researchers; and ensure the optimal use of Canadian research infrastructure by promoting sharing within and among institutions Targets investment at key needs in the areas of health, | <ul style="list-style-type: none"> Will have a Governing Council Governing Council will establish Institutes and will have responsibility for the allocation of resources and CIHR operations Council will establish broad policy direction and set goals and priorities Institutes' Scientific Directors and Advisory Boards will advise on these matters Institutes are "virtual". Majority of their budgets are also "virtual" in that monies flow through the Institutes to the PIs within the Institute to support science that has been judged excellent by peer review CIHR budget is not initially divided into arbitrary fixed Institute or theme allocations | <ul style="list-style-type: none"> Made permanent by the federal government in 1997 2 streams: non-targeted & targeted Research networks - no buildings Links the best researchers in a field Targeted to national priorities An economic development vehicle for smaller communities Linked to investors, manufacturers, exporters and others Partnerships among industry, universities and government Industry financial involvement not required Designed to develop the economy and improve quality of life Networks compete for seven years of NCE funding. There is a maximum of two seven-year funding cycles available to a network. At the end of the first seven-year funding cycle, existing networks compete with applications for new networks | <ul style="list-style-type: none"> \$900 million to establish 2000 Canada Research Chairs in universities by 2004-05 Managed by a steering committee composed of the President of the Canada Foundation for Innovation, the DM of Industry Canada, and the presidents of the three research granting agencies: SSHRC, CIHR, NSERC Secretariat located within SSHRC 35% of chairs allocated to the fields currently funded by the Medical Research Council/CIHR 45% to the fields funded by NSERC 20% to fields funded by SSHRC Number of chairs allocated to each university each year proportional to the funding researchers at the university receive from the Councils 94% of the 2,000 Chairs (1,880 chairs) will be allocated in this manner; the remaining 120 chairs will be reserved for a special allocation to smaller institutions A special allocation (6% of 2,000) set aside for universities with less than 1% of total of a council's research | <ul style="list-style-type: none"> The Research Partnerships Program (RPP) comprises a number of grant types that have a common purpose in promoting closer collaboration between the university research community and other sectors, including government Partners must have the capacity to apply the research results so as to benefit the Canadian economy RPP Programs of interest include: <ul style="list-style-type: none"> Strategic Projects Research Networks Research Partnership Agreements With Canadian Government Departments and Agencies |

| Partnership Factor | Organization/Program | | | | |
|--------------------|---|--|---|--|---|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| | environment, science, and engineering | | | granting funds. | |
| Objective | <ul style="list-style-type: none"> • Increase the capability of Canadian universities, colleges, hospitals, and other eligible institutions to carry out world-class scientific research and technology development ... by investing in research infrastructure, jointly with funding partners. • Policies and programs have been designed to: <ul style="list-style-type: none"> • build capacity for innovation; • strengthen research training of Canadians for research and other careers; • attract and retain able research workers in Canada; • promote networking and collaboration among researchers; • ensure optimal use of Canadian research infrastructure by promoting sharing within and among institutions. | <ul style="list-style-type: none"> • Establish national research priorities - from basic science to clinical research to population health - linked with Canadian health policies and complementary to provincial investments ... • Combine resources with other organizations to achieve mutually agreed objectives and/or to co-fund research projects • Encourage sharing of major research facilities and equipment and encourage joint planning for new facilities • Encourage individual Institutes to conduct unique programs - from capacity-building, to third party partnerships • Collaborate with all organizations that have demonstrated a capacity to support or conduct health research; incl. voluntary health organizations, provincial granting bodies and individual research centres. • Recognize and support the central role that universities and associated health science centres play in education, training and in creating interdisciplinary opportunities. | <ul style="list-style-type: none"> • The goal of the program is to mobilize Canada's research talent in the academic, private and public sectors and apply it to the task of developing the economy and improving the quality of life of Canadians. This goal is consistent with, and reinforces, the three pillars of the Federal Science and Technology strategy: sustainable job creation and economic growth, improved quality of life, and advancement of knowledge. • Stimulate internationally competitive, leading-edge fundamental and applied research in areas critical to Canadian economic and social development; • Develop and retain world-class researchers in areas essential to Canada's productivity and economic growth; • Create nation-wide multi-disciplinary and multi-sectorial research partnerships that integrate the research and development priorities of all participants; • Accelerate the exchange of research results within the network and the use of this knowledge within Canada by organizations that can harness it for Canadian | <ul style="list-style-type: none"> • The goal of this program is to build a critical mass of world-class researchers who will help Canadian universities achieve research excellence and encourage leading researchers to remain in Canada. | <ul style="list-style-type: none"> • Objectives vary according to the particular program • Typical objectives include: training, economic/social impact, inter-sectoral collaboration |

| Partnership Factor | Organization/Program | | | | |
|------------------------|--|---|--|--|--|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| | | | economic and social development. | | |
| Main Program(s) | <p>CFI has four funds to support strategic development in Canadian research institutions:</p> <ul style="list-style-type: none"> • Innovation Fund (large projects) • New Opportunities Fund (new researchers) • University Research Development Fund (small universities) • College Research Development Fund (community/technical colleges) | <p>Partner participation in CIHR still in flux. Most likely route is through RPF and via links to individual institutes.</p> <ul style="list-style-type: none"> • MRC Health Research Partnership Fund (RPF) - Partnerships with the Public Sector <ul style="list-style-type: none"> • <u>Training Programs</u> - Industry Partnered Studentships, MD/PhD Studentships, Fellowships, Operating Fellowships, Clinician-Scientists • <u>Salary Support Programs</u> - Industry Partnered Scholarships, Scientists, Senior Scientists, Distinguished Scientists, University-Industry Research Chairs • <u>Research Grants</u> - Industry Partnered Operating Grants, Equipment Grants, Multi-User Equipment Grants, Maintenance Grants, Maintenance Grants for Multi-User Equipment | <ul style="list-style-type: none"> • Non-targeted networks: <ul style="list-style-type: none"> • Aquaculture • Arthritis Network • Bacterial Diseases • Genetic Diseases • Photonics • Telecommunications • Vaccines & Immunotherapy • Stroke • Geomatics • Health Evidence • Robotics & Intelligent Systems • Sensors and Structures • Mathematics of IT • Mechanical Wood Pulps • Microelectronics • Protein Engineering • Sustainable Forest Management • Targeted networks: <ul style="list-style-type: none"> • Automobile of the 21st Century • Genomic Technologies and Society • Environmental Challenges for Clean Water • Early Child Development | <ul style="list-style-type: none"> • There will be two types of chairs: Seven-year renewable Tier I chairs will attract current research stars, acknowledged by their peers as world leaders in their research fields. Five-year Tier II chairs, renewable once, will attract future research stars, acknowledged as having the potential to lead their research fields. • For each Tier I chair, the university will receive \$200,000 per year in financial support for seven years. For each Tier II chair, the university will receive \$100,000 per year in financial support for five years. • A special allocation of 120 research chairs is being made exclusively to small universities. This special allocation often provides three extra chairs to small universities, which means that for most of them their research chair allocation will, at least, double. • Universities that have received between \$100,000 and \$200,000 per year, on average, from the three granting councils combined will receive a special allocation of one Tier I chair or equivalent (\$200,000). This will be made available in | <ul style="list-style-type: none"> • Research Partnership Agreements With Canadian Government Departments and Agencies <ul style="list-style-type: none"> • Supports projects within the mandates and priorities of the government partner; and often involving collaboration with government researchers. • Research Networks Grants Program <ul style="list-style-type: none"> • large-scale multidisciplinary networked research projects; collaboration with other sectors; transfer of knowledge and expertise; training of HQP; socioeconomic benefits to Canada • funds large-scale, complex research proposals that involve multi-sectorial collaborations on a common research theme • \$500,000+ |

| Partnership Factor | Organization/Program | | | | |
|--------------------|---|---|---|--|--|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| | | | | <p>the first year</p> <ul style="list-style-type: none"> Universities that have received at least \$200,000 in total per year, on average, but less than one per cent of the funding from the three granting councils combined will receive a special allocation of one Tier I chair and two Tier II chairs or equivalent (\$400,000). | <p>annually researchers from three organizations that are not formally affiliated. Both private and public sector partner contributions will be assessed in the determination of an appropriate cost-sharing ratio. Networks are normally funded for five years.</p> <ul style="list-style-type: none"> Encourages the interaction and exchanges of personnel as part of the training of HQP e.g., reciprocal laboratory visits, joint workshops, and seminars. benefit(s) to Canada |
| Funding | <ul style="list-style-type: none"> Federal: \$1.9 billion: Phase 1 (1997) - \$800m; Phase 2 (1999) - \$200m; Phase 3 (2000) - \$900m Investments: ~\$200m Partner funding (@60%) - \$2.85m Total: ~\$4.95b Committed to date: \$.465 Remaining: \$1.5 billion+ | <p>Institute budgets will be based on:</p> <ul style="list-style-type: none"> the sum of the grants awarded to affiliated researchers, in CIHR peer-reviewed competitions. (Researchers elect to affiliate themselves with an individual institute, and their grant(s) are transferred to the institute.) annual allocations to the institutes for strategic initiatives. | <ul style="list-style-type: none"> Annual budget of \$47.4 million. Non-targeted program budget increased by \$30 million per year in 1999-2000. Targeted program budget \$13m per year No preset minimum contribution expected in terms of cash or in kind support from either industry, government or other sources | <ul style="list-style-type: none"> \$900 million to 2004-05 Tier I chair: university receives \$200,000 per year for seven years Tier II chair: university receives \$100,000 per year for five years. The university will have flexibility in the use of the funds Eligible expenditures include: <ul style="list-style-type: none"> salary and benefits of the incumbent salary and benefits of members of his/her team | <ul style="list-style-type: none"> Funding parameters vary depending on the specific program in question Typically, NSERC provides funds to match partner contributions on a 1:1 basis |

| Partnership Factor | Organization/Program | | | | |
|-----------------------|---|--|---|--|-------------------------------------|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| | | <ul style="list-style-type: none"> a small discretionary fund available to Directors Total in 2001-02 ~\$500 m (\$250m MRC + \$225m additional CIHR + external partner funding - e.g. Rx&D) | | <p>(students at all levels, postdoctoral fellows, research associates, technicians, research assistants, etc.);</p> <ul style="list-style-type: none"> recruitment costs and relocation expenses; costs associated with fitting research and office space for the incumbent and his/her team; administrative costs related to the research program (proposal writing, secretarial assistance, publication costs, administration, technology transfer costs, etc.) acquisition, maintenance, operation of research equipment and other research resources; and other costs of research (travel, workshops, computing, consumables, publication costs, material and supplies, etc.) | |
| Eligible Costs | <ul style="list-style-type: none"> capital costs of acquiring, developing, modernizing or leasing research infrastructure are eligible Ongoing operating costs are not eligible. Other eligible costs may include the cost to: Retain professional and technical personnel, consultants, and contractors directly involved in the design, engineering, manufacturing, or | <ul style="list-style-type: none"> Vary with program | <ul style="list-style-type: none"> Direct research costs as normally allowed by granting councils Salaries and benefits of full-time university-based researchers working full-time on network-funded research Partial teaching release/clinical release for Program Leader only, up to \$25K per year Salaries and benefits for staff Equipment Materials and supplies | <ul style="list-style-type: none"> Universities have flexibility to allocate funds | |

| Partnership Factor | Organization/Program | | | | |
|----------------------------|---|---|---|--|--|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| | <p>construction of the infrastructure project;</p> <ul style="list-style-type: none"> • Travel to a manufacturer, dealer, or supplier; • Ship or transport the research infrastructure, including brokerage fees, excise taxes, and duties; • Purchase an extended warranty, service contract (max. 3yr. period) • Modernize or construct research space essential for using the infrastructure effectively. • Train the institution's staff to operate and use the research infrastructure. • For infrastructure that is used for research and other purposes the total amounts must be prorated to include only the research portion of the infrastructure project and exclude, for example, the non-eligible components of an infrastructure project for teaching and clinical care. | | <p>related to the direct costs of research</p> <ul style="list-style-type: none"> • Communication activities • Costs to obtain liability insurance • Legal fees and incorporation costs • Intellectual property: on an annual basis up to 50% of the total cost of protection for intellectual property • Market studies for Network IP • Contracting of services only where necessary to provide services and expertise not available within the network • Costs relating to networking: travel and accommodation for personnel, researchers and members of network boards and committees • Networks may use contracts to acquire access to specialized facilities and services provided by government laboratories. • Specified Purpose Accounts may be used to support joint projects. Money can come only from non-federal funds raised by the networks and not from the federal funds for the NCE program. | | |
| Eligible Recipients | <ul style="list-style-type: none"> • Universities, colleges, and hospitals that have demonstrated their capability to support and conduct research may be eligible for CFI funding. | <ul style="list-style-type: none"> • Universities, hospitals, NGOs | | <ul style="list-style-type: none"> • Universities and related teaching and research organizations (e.g. teaching hospitals) | <ul style="list-style-type: none"> • Universities and related teaching and research organizations (e.g. teaching hospitals) |
| Eligible | ... any of the following possible | Organizations from the following | In 1997-1998, a total of 463 | | <ul style="list-style-type: none"> • Federal SBDAs |

| Partnership Factor | Organization/Program | | | | |
|--------------------|--|--|---|------------------------|---|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| Partners | <p>sources (Canadian or foreign):</p> <ul style="list-style-type: none"> institutional funds, trust funds or foundations; departments and agencies of the federal government, excluding MRC, NSERC, SSHRC, and the Networks of Centres of Excellence; departments and agencies of provincial and municipal governments; corporations; voluntary organizations; individuals. <p>Note: Partnerships must be formed directly with CFI-sponsored institutions, and not with CFI itself.</p> | <p>sectors are invited to participate in the Health Research Partnership Fund:</p> <ul style="list-style-type: none"> Federal laboratories, agencies and departments National, local or community based voluntary or not-for-profit organizations Provincial, municipal, and local government(s) and provincial government agencies International not-for-profit health research agencies | <p>companies, more than 100 provincial and federal government departments and agencies, 44 hospitals, 61 universities, and more than 200 other organizations from Canada and abroad were involved in the NCE program. Current federal partnerships:</p> <ul style="list-style-type: none"> AEC(Concrete, IRIS, ISIS) CFIA (HEALNet) CMHC (Concrete) Correctional Services Canada: (TeleLearning) CRC (CITR, TeleLearning) CSA (IRIS) DFO (CBDN) DND (CBDN, PENCE, IRIS) Health Canada: (CBDN, HEALNet, Inspiraplex) HRDC (TeleLearning) Industry Canada - (TeleLearning) MRC (CBDN Inspiraplex) Environment Canada NWRI (SFM) NRCan (IRIS, Concrete, SFM) NRC (CBDN, IRIS, CITR, Micronet, Wood-Pulps, TeleLearning, Inspiraplex, ISIS, Concrete) PWGC (Concrete, Inspiraplex, ISIS) | | <ul style="list-style-type: none"> NRC, DND, NRCan (CFS, ESS), AAFC, and CSA |

B. Most Likely EC Partnership Opportunities

| Program/Activity | Innovation Fund | Health Research Partnership Fund | A. Current and Forthcoming Networks | | |
|------------------|---|---|---|--|---|
| | <ul style="list-style-type: none"> CFI's main program Explicitly allows federal labs to participate Enables institutions, <u>alone or in groups</u>, to strengthen | <ul style="list-style-type: none"> co-funds training and salary awards for established and new investigators (Profs., Post-docs, Grad. students, | <ul style="list-style-type: none"> Sustainable Forest Management (NWRI currently involved) Environmental Challenges for | <ul style="list-style-type: none"> N.A. | <ul style="list-style-type: none"> NSERC-EC Research Partnership Agreement Research Network Competition |

| Partnership Factor | Organization/Program | | | | |
|--------------------------------|--|---|--|---|---|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| | <p>their research infrastructure in priority areas.</p> <ul style="list-style-type: none"> Now combines the former Institutional Innovation and Regional/national Facilities Funds. Maximum CFI funding budgeted for the 2000 competition is \$350m "Intent to Apply" by 10 Dec. 1999 Submission Deadline 1 Feb. 2000 CFI Board Decisions 25 July 2000 Total project cost \$100k or more; Individual item costs \$8,000+ Applies to all disciplines Strategic/beyond current means Shared/integrated Innovative/transformational Floor of \$100,000 for proposals | <p>etc.)</p> <ul style="list-style-type: none"> Partners (e.g. EC) identify areas of research relevant to their mission Fields may include biomedical, applied clinical, health services/ systems, social/cultural determinants of health MOU development June/July 2000 \$5m annual budget (\$10m with partners' contribution) | <p>Clean Water (forthcoming network)</p> <p>B. Possible New Networks</p> <ul style="list-style-type: none"> TBD | | |
| Partnership Arrangement | <ul style="list-style-type: none"> EC (40%) matches CFI (40%) and university (20%) capital funds to establish national/regional research facility in field(s) of shared interest Possible additional contribution from provincial government (up to 40%) could lower EC & CFI costs | <ul style="list-style-type: none"> EC matches CIHR funds 1:1 for university-based research personnel | <ul style="list-style-type: none"> In flux. Possible consideration of direct involvement of federal researchers | <ul style="list-style-type: none"> No direct partnership Possible partnership with universities (e.g. to supply ongoing research support) | <ul style="list-style-type: none"> Matching funds with NSERC (RPA) TBD (Research Networks) |
| Potential Benefit to EC | <ul style="list-style-type: none"> Access to leading-edge knowledge Closer interaction with university researchers Cost-sharing to support new infrastructure | <ul style="list-style-type: none"> Closer interaction with university researchers Cost-sharing to support new infrastructure Offset of operating costs Closer interaction with | <ul style="list-style-type: none"> Possible role in identifying new targeted NCEs Possible participation in NCE research Possible access to NCE research funds on a | <ul style="list-style-type: none"> Increase research capacity of national system of environmental research Access to knowledge generated by holders of environment-related research | <ul style="list-style-type: none"> Access to leading-edge knowledge Closer interaction with university researchers Access to new |

| Partnership Factor | Organization/Program | | | | |
|--------------------|--|--|--|---|---|
| | Canada Foundation for Innovation | Canadian Institutes for Health Research | Networks of Centres of Excellence | Canada Research Chairs | NSERC Research Partnership Programs |
| | <ul style="list-style-type: none"> Offset of operating costs | <ul style="list-style-type: none"> university researchers Cost-sharing to support new infrastructure Offset of operating costs | <ul style="list-style-type: none"> competitive basis Access to NCE-generated knowledge | <ul style="list-style-type: none"> chairs | <ul style="list-style-type: none"> university-based research infrastructure Offset of operating costs Support of EC recruitment strategies |
| Mechanism | <ul style="list-style-type: none"> Projects must be initiated by university or college partner Informal discussions with CFI executives, leading to possible MOU-Pursue with 5NR | <ul style="list-style-type: none"> Framework Partnership Program initiated via MOU between EC & CIHR Individual Research Programs initiated via MOU(s) between EC labs/branches and CIHR Institutes EC participation in CIHR research networks EC participation in CIHR Community Alliances in Health Research | <ul style="list-style-type: none"> Start with informal discussions with NCE program managers Follow up with discussions with Granting Council presidents | <ul style="list-style-type: none"> Informal discussions with Environmental Studies/Science Deans | <ul style="list-style-type: none"> MOU with NSERC |

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