

# Discussion Paper on Renewable Energies in Canada

re-draft April 20, 2003  
for Climate Action Network - Canada

This re-draft is for consideration by CANet in development of a policy position on renewables; it incorporates feedback received from the recent Board meeting.

## OBJECTIVE

The actions suggested in this document are designed to encourage development of renewables for electricity generation (green power) and space conditioning / water heating (green heat) applications. It does not address green fuels (ethanol) or cogen, and suggests that CANet strongly support the basic principle of energy efficiency / conservation ('negawatts') as the least-cost and most environmentally benign option (reduce demand as much as possible, before supplying with green).

The actions suggested in the first draft were intended to promote 'core' renewables technologies (wind, PV, solar thermal water, ST air, earth energy, tidal, geothermal). If CANet is opposed to high-impact renewables, a separate policy calling for renewables to be defined 'only as low-impact' would be appropriate, but I recommend against combining your definition and your goals in a single document because it could confuse and weaken both. For example, large hydro is accepted by Ottawa as a renewable energy in the absence of a formal definition from EC; for CANet to argue against a consensus position (regardless of flaws in the TerraChoice definition) would be politically unwise. There is controversy and lack of consensus (domestically and abroad) over inclusion of certain biomass and EFW technologies, as well as criticism of windfarms (avian mortality and NIMBY), arsenic in PV panels, emissions from geothermal, silting from tidal, aquatic problems with wave, etc.

A CANet policy is not the forum to engage in technology-bashing; a preferred option would be for CANet to encourage support for 'any renewable' over a five-year period (recognizing that large hydro capacity could not be installed within that period) with a caveat that support be restricted to defined low-impact renewables after that time. This would provide a phase-in / transition period and avoid arbitrary re-definition; it would be analogous to supporting a transition off coal to natural gas as a fuel source due to the latter's lower GHG content (ie: get the momentum rolling and worry about the details later).

## PROBLEMS

Among OECD nations, Canada is one of the least advanced in adopting renewables for two reasons: there is no perception of an energy crisis (although the benefits of current high-GHG sources are increasingly questioned) and little public concern; and constitutional jurisdiction vests with the provinces, leaving Ottawa averse to any 'national energy program.' Canada shares a number of barriers to development of renewables which exist elsewhere in the world:

1. there is low awareness of the benefits (or existence) of renewables, and low understanding of the role that renewables can play in energy supply options;
2. there is competition from conventional fuel suppliers that do not want their market share to be eroded;
3. the infrastructure for production and distribution / transmission is biased in favour of conventional fuels;
4. the true cost to develop the existing infrastructure has never been determined, so current retail prices do not reflect the true cost of current production;
5. there is low support for (or understanding of) energy lifecycle costing;
6. energy planners favour centralized facilities;
7. deregulation in the power sector creates uncertainty, which impedes a transition to renewables;
8. consumption patterns are biased in favour of conventional fuels (eg: there is no encouragement of off-peak consumption);
9. renewables often have a high first cost compared with conventional fuels;
10. some renewables suffer from dispatch constraints or storage issues;
11. society continues to consume high-quality energy for low-grade applications (eg: use of electricity for space conditioning and water heating);
12. there is little opposition to high-GHG energy (this is changing under Kyoto);
13. there is limited training of practitioners in renewables, which impedes promotion and installation of renewable energy technology.

Canada obtains significant economic benefit from the development and sale of conventional fuels, so measures to encourage renewables must be as 'political' as they are 'pragmatic.' A number of supportive measures exist at the federal level, including the \$260 million Wind Power Production Incentive, Renewable Energy Deployment Initiative and the green power marketing incentive. There is little R&D and credits are limited to CCA Class 43.1. At the provincial level, some jurisdictions have set goals or are committed to green power procurement, with some incentives for development and installation of renewables. Some utilities have committed to green power, but there is lack of consistency on how renewables for base versus peak load are handled. The GeoExchange coalition will involve five utilities in the first national green heat initiative.

## PHILOSOPHY

This draft does not favour rebates or other monetary incentives, but it assumes that CANet will ask for subsidies. Asking for fiscal assistance can be dangerous: consumers equate the credibility of a technology with the level of its incentive; funding programs can be prone to abuse; the expiration of any incentive frequently results in marketplace disruption (eg: the earth energy industry was seriously

harmed by the end of a utility rebate in 1993 and unanimously asked NOT to receive rebates under the federal REDI program); there is no guarantee that incentives will continue until such time as a critical mass is achieved; political opposition can endanger incentives (eg: uncertainty about Congressional support for wind energy was the #1 reason for reduced installations in the U.S. last year); the cost to administer funding programs often equals the fund value; incentives often do not reduce costs in a competitive market (eg: installed retail costs under CHIP, COSP and GSHP rebates increased with rebates); and incentives imply a premium cost for the option, whereas the focus should be on lifecycle benefits and the damage from consumption of conventional fossil fuels. The benefit of incentives is the immediate and quantifiable kick-start and the profile accorded the rebate program, which will induce many consumers to purchase.

The first draft included more than 40 scattergun ideas to allow CANet to identify and prioritize measures with match your philosophy, prior to elaboration on selected ideas. This redraft presents a smaller range of preferred options, for both 'most-needed' and 'most-likely' options. It is recommended that CANet be as creative and as visionary as possible in its proposals, rather than just replicating suggestions from other groups.

## PARAMETERS

This paper assumes that energy demand in Canada will rise, absent a domestic recession. The last NEB demand forecast to 2025 (released 1999) shows that 8,482 PJ of secondary demand (1997) will rise to 10,953 PJ (2025) under a slow-growth scenario and 12,588 PJ under high growth. The national energy mix will shift to lower-GHG fuels and there will be conservation, but forecasts do not predict actual drops in overall demand. CANet could argue that demand 'should / must' drop, as per the goal of Kyoto, but you should couch all recommendations in the context of growing demand (in the power sector, at minimum). If demand were to not grow, renewables would be in the position of supplying 10% of no new capacity.

The federal Climate Change Plan is designed to reduce GHG emissions by 240 MT by the end of the first Kyoto period, and includes three specific measures to promote renewables (both low- and high-impact). Of cuts in the first and second tranches, 2.8 MT will come from 1,000 MW of wind turbines via the \$260 million WPPI, 0.2 MT from federal green power procurement and 3.9 MT from targeting 10% of new generating capacity from emerging renewables. The balance of reductions in the 'clean energy' category will come from improving grid issues, carbon sequestration and clean coal. To specifically target only 0.03% of total reductions from renewables (7 MT of 240) is unacceptably low, and the two non-WPPI measures may include high-impact green power (depending on interpretations of the final definition), reducing the effective level from renewables even more. Two semantic points on CCAP need clarification: what constitutes 'new' versus 'retrofit' capacity? (eg: is a gas retrofit of a coal-fired plant exempt from the 10%?); and what is eligible as an 'emerging renewable' source (rumours suggest this could include methanol-stacked fuel cells and similar technologies in the absence of a definition).

CANet may wish to endorse the recommendations of the Clean Air Renewable Energy Coalition for the establishment of a national low-impact renewables target; an increase in WPPI to 2.7¢/kWh; extension of similar incentive programs to other renewables technologies; co-operation with provincial governments to implement a Renewable Portfolio Standard or System Benefits Charge (possibly matching federal WPPI and MIP commitments); and expansion of funding and extension of the Market Incentive Program to \$30 million per year until 2012.

CANet should insist that any legislative, regulatory, fiscal or monetary measures from government include clear objectives and measurable timeframes, with sunset clauses to force a review based on well-defined parameters. Any subsidies should have appropriate phase-out periods to avoid market disruption, and full cost accounting and cost transparency. Accounting must provide 'real costs' of all options, including GHG emissions, and all programs or subsidies should involve minimal accounting complexity and anti-abuse measures. If incentives are requested, they should support the overall goal / target / strategy of governments.

This draft omits all actions related to emission trading credits and offsets, since this process is criticized by some as accounting trickery that fails to encourage real green facilities. Although the potential for renewables under CDM / JI is significant, rules are not yet finalized and it may be premature to endorse a system or process that likely will change. Again, CANet may wish to propose certain rules to define only low-impact core renewables as eligible for trading credits or similar approach in future.

Government places undue emphasis on green power to the detriment of green heat options. Electricity is an important energy commodity and, in many regions of Canada, is generated from high-GHG fuels. NRCAN's National Energy Use Database says that all residential buildings in Canada (2000) emitted 45 MT (excluding electricity) with Ontario as the largest single emitter at 19 MT for space and water heating, and Quebec in second place with 6.3 MT. In the commercial sector (including electricity), all buildings emitted 60 MT, of which 33 MT comes from fossil fuels and 27 MT from electricity. Of fossil fuels, 31 MT was from heating space & water, with 4 MT from electrical heating of space & water. Across Canada, 89% of commercial space heating is from fossil fuels and 11% from electricity (including fossil-generated); 95% of water heating is from fossils and 5% from electricity; and 15% of cooling from fossils with 85% from electricity. Measures to increase green heat in buildings would be broadly based across Canada (ie: less perception of punitive measures in Alberta) and would be more cost-effective than green power in many situations.

## POSSIBILITIES

A range of options to implement renewable energies have been implemented around the world, of which the generic choices include:

14. Renewable Portfolio Standard where legislation demands that x% of power (and sometimes heat) be obtained from eligible renewable sources by x year. (In Australia, it is called a Mandatory Renewable Energy Target of 9,500 GWh from green power by 2010.) The selection of source technology is left to the discretion of the supplier, who must achieve the goal in whatever means best suits the situation; there is no cost to government (other than minor administration and enforcement costs);
15. Subsidies for production or consumption of renewables, such as incentives for wind power. This is designed to levelize the retail cost of green with conventional sources; it involves cost to government but it can be limited or focused;
16. Feed-in laws where retail power rates include a tax that is earmarked to support development of renewables. This is viewed by some as a form of regressive taxation and Germany has experienced opposition from high energy users for the cost penalty it imposes;
17. A Systems Benefit Charge, where a tax on all consumers is collected to develop new green facilities. There is no cost to government;
18. Green power procurement where government commits to obtain x% of its energy from

renewables regardless of cost premium. Depending on technology chosen, there could be significant cost to government and cannot be controlled if there is market manipulation or unless the set level is amended;

19. Green certificates which can be purchased voluntarily by consumers, with proceeds designated to support development of new green facilities. This measure appeals to personal action and involves no cost to government;
20. R&D incentives or tax credits to expedite technology development, in the expectation of lowering costs in future from an improved product. This is a cost or foregone revenue to government, but it can be controlled.

The German government expects renewables to compensate for the closure of nuclear reactors, and says wind turbines can replace 60% of nuclear output by 2030. More than half of the world's new wind capacity last year was installed in Germany (3,247 MW), making it the world leader with 12,001 MW of capacity. Wind now provides 4.7% of the nation's power and the goal for 2010 is 12.5%. Total energy consumption will grow at an annual rate of 0.9% until 2020, while renewables will increase by 4.9% pa. Environment protection is the goal for both Kohl's Electricity Feed Law and Schroeder's eco-taxes (the latter were demanded by the SPD-Green coalition and comprise 70% of the price for gasoline. The tax is levied on most energy sources, and channeled to a Market Incentive Program for renewables (critics say the program never received the full DM 900 million derived from renewables in 2000 and, consequently, the government receives more money from taxing renewables than it spends supporting them). The German program could be replicated in Canada, but would require consent of all provinces to impose a power tax with proceeds earmarked for renewables.

The commitment towards renewable energies in most other countries is that those nations lack sources of clean energy and / or there is a political imperative for energy security. Germany has virtually no hydroelectric potential and wants to eliminate nuclear; wind was identified as the best option. EU countries are subject to targets of 22% from non-fossil energies by 2010 (includes large hydro, EFW, biomass, etc).

## THE TOP TEN RECOMMENDED ACTIONS

21. Obtain 'top-down commitment' to renewables from the prime ministers of federal AND provincial governments; they should provide unqualified support for all feasible applications of renewable energies, with fiscal support provided in the context of 'leveling the playing field' with subsidies to conventional fuels. The ratification of Kyoto includes philosophical support for 'clean energy,' but the allocation for renewables is only 0.03% of national targets. There is no clear commitment from government for renewables as a solution to GHG emissions.
22. Government must define the term 'renewable energy.' Environment Canada has been unable to do so for three years and rumours suggest that the latest version will eliminate the environmental attributes of green power. Without a definition, it will be impossible to obtain consensus on what is and is NOT included for possible support, and the term 'renewables' is perceived by some to include fuel cells stacked with high-GHG fuels, large hydro or sequestration. A parallel definition must be formulated for non-electrical applications and to qualify the four green heat technologies identified by NRCan for space conditioning, in order to provide clarity to those technologies. A definition would ensure that only eligible technologies

are provided with support in whatever format is determined.

23. The greatest current deficiency is the lack of data on the capacity of renewables (with the exception of grid-connected wind and PV). c.a.r.e. has researched the official prediction that non-hydro green power in Canada will decline by two-thirds by 2010, and the lack of benchmark or predictive data, targets or estimation of GHG reductions has been confirmed via ATIP requests and documented on c.a.r.e.'s site. The last NEB supply scenario and latest draft suggest that adoption of renewables will depend on supportive government policies but, without data, it is difficult to design such policies. Data collection should include off-grid applications (wood stoves, solar water heaters, PV panels, water pumps, earth energy systems, etc). When EIA was asked to aggregate those uses, the share of renewables in the U.S. doubled with no additional cost. As distributed generation becomes more accepted, off-grid applications will account for an increasing share of renewables, and the format for aggregating such data should be made now for consistency. There is a possibility that policies / programs will not be optimized without accepted benchmark data and predictions.
24. The domestic wind industry credits a 47% growth to the 2001 federal commitment to procure 20% of its power from renewables. Government should increase that level each year, and expand the policy to provincial and regional governments (Alberta wants 90% of its power to come from green) and para-public agencies and Crown corporations. A target of 20% for space conditioning in federal and provincial buildings should be set for green heat options to capture the GHG reductions possible ([www.GreenHeat.org](http://www.GreenHeat.org)).
25. A joint federal-provincial strategy on renewables must be developed, which would be implemented by a new joint agency with a mandate to report to Parliament and to all legislatures. Similar calls for an Apollo program in the U.S. have been advanced; this would allow transfer of renewables-related activities from NRCan in order to assuage provincial concerns and to provide support and focus to renewables without 'ghetto-izing' the technologies. Initiatives would be regionally responsive (similar to HRDC) with national consistency (similar to Health) and funded on a shared basis, and could include development of complementary and consistent RPS or SBC levels; development of application 'roadmaps' for each technology; encouragement of exports (to meet energy needs in developing nations, improve Canada's balance of trade, increase the profile and economic credibility of the sector, etc); training to accommodate anticipated demand (including certification or inspection services); provincial approval for net metering; creation of buyers groups for residential or ICI systems (such as IEA Task 24 and NRCan's subsidy of residential DHW systems by 40%); and more.
26. Governments should issue an 'executive order' to PWGSC, DND and other building management agencies, to require infrastructure decisions to be based on long-range planning and lifecycle factors, and not short-term capital costs. This policy should require all government buildings to undergo a pre-feasibility assessment (using RETScreen?) to assess capital and lifecycle costs, as well as GHG benefits, of implementing renewables. Evaluations should be made public to increase awareness and understanding, and to promote the concept of lifecycle costing.
27. Government could develop a revolving fund to finance installation of systems, similar to the

FCM green funds, by providing low-cost financing options to interested parties to offset any premium. It could also encourage banks and lending institutions to offer green mortgages which provide lower (subsidized?) interest rates based on the level of renewables incorporated into a building. It could provide support or regulatory guarantees to lending institutions that offer low-cost / no-cost financing to offset any first cost premium of renewables, similar in concept to student loans.

28. Government could develop a warranty re-insurance program that would provide consumer protection on the installation of certified / inspected systems. The program would have clear conditions for involvement and well-defined coverages, and the insurance premium would be absorbed by government but the liability would rest with participating industry practitioners.
29. Replicate the U.S. brownfield redevelopment strategy that involves installation of solar facilities on redeveloped properties, and adapt the concept to the 30,000 brownfield sites in Canada that are being promoted for clean-up by the 2001 budget and groups such as NRTEE. Another idea to mimic would be an industrial 'jobs for renewables' initiative, similar to 'Jobs for Power' in New York, where companies receive subsidized power if they create jobs.
30. Government could offer incentives for the development of green hydrogen options (eg: using renewable energy for electrolysis). Infrastructure changes for fuel cells will require significant disruption in the energy market, and changes should facilitate the entry of renewables.
31. (if agreement among the provinces is possible) Introduce a feed-in law to tax all purchases of electricity, and allocate the revenue to development of defined renewables facilities.

Public understanding of energy-environmental issues is growing in Canada and is beginning to overcome the inertia explained earlier in this paper. Awareness in that area will leave the political tension between the levels of government as the major barrier to support for renewables, and almost all measures proposed by CANet will involve the strong involvement of provinces and their ability to co-operate with Ottawa on measures. It is recommended that recommendation #5 be a key element of CANet's position for a number of reasons: it overcomes constitutional concerns; it encourages consensus among different levels of government; it focuses attention on the need for co-operation by all stakeholders; and it centralizes synergies in a single agency with a clear mandate to promote renewables. If adopted, it would address many / all of the impediments to provincial support and would allow regional and national initiatives to co-exist.