Submission to
BC's Green Energy Advisory Task Force

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1. Introduction (All Groups)

The BC Sustainable Energy Association is a non-profit society of citizens, professionals, practitioners and businesses dedicated to the development of climate solutions, sustainable energy and energy efficiency in British Columbia.

We are motivated by three main considerations:

(1) We are deeply concerned about climate change. According to the most recent climate science, our world is heading toward a 6°C temperature rise by the end of the century, with catastrophic consequences. This calls for a rapid organized transition from fossil fuels to renewable electricity, transport and heat, and significant changes in the way BC manages its farms, forests, wastes, industries, and consumer behaviour.

(2) We are very mindful of the looming peak oil crisis, which according to the International Energy Agency will occur by 2020 - not 2030, as the IEA had previously stated, and quite possibly much sooner. This gives us very little time to prepare, and calls for the same accelerated drive towards electric cars, buses and trains, electrically powered heat pumps and sustainable sourced bioenergy that is needed to address climate change.

(3) Turning these concerns around, we are strongly motivated by the global emergence of clean, renewable technologies, and the civilizational transformation of the world's energy system that is underway. During our lifetimes, we will live through the third great energy revolution - the first being the discovery and use of fire; the second being the discovery and use of fossil fuels; the third being the development and use of renewable energy technologies.

To minimize the extent of the harm of climate change, we believe it is necessary for all countries and jurisdictions to do their fair share to reduce greenhouse gas emissions. As a large jurisdiction, blessed with rich natural resources and a prosperous well-educated citizenry, and with high (by world standards) per capita greenhouse gas emissions, BC should be a leader in this new energy revolution alongside Sweden, Germany, Denmark, and California, pioneering new technologies and policies and enjoying the multiple economic benefits that spring from this leadership.

BC has shown admirable leadership on climate change, and our province's goal (33% below 2007 = 19% below 1990) is at least in range of what was being asked for at Copenhagen (25-40% below 1990), but BC is not yet among the leaders when it comes to implementing solutions on the ground. This is our great opportunity, and the formation of the Green Energy Advisory Task Force provides us with a chance to analyze the various obstacles and barriers that are impeding growth, and to lay a new foundation that can facilitate the rapid acceleration of the new energy revolution.

We need to make ambitious plans and commitments as we prepare for the new energy revolution that will power the 21st century. BCSEA believes it will be necessary for society to make a fundamental shift from its extensive reliance on fossil fuels to renewably produced electricity, and to other energy sources such as sustainably produced biofuels and solar heating. We must radically reduce our use of fossil-fuelled internal combustion engines and the stationary use of fossil fuels for heating and industrial processes.

We need to think big as we prepare for the new energy revolution that will power the 21st century- a future that will be fundamentally *electric*, combined with sustainable sourced bioenergy.

Our research leads us to share the widely held conclusion that the future world energy economy will:

- Be powered almost entirely by renewable electricity, distributed through a smart interactive grid, using multiple power firming technologies and policies;
- Be transported by many more bicycles and electric bicycles; by far greater use of transit, light rail transit, and rail; by electric and plug-in hybrid electric cars and light trucks; and probably by algae-biofueled and hybrid heavy trucks, ships, and airplanes;

- Be heated by heat pumps, stored solar thermal energy, passive solar design, sustainably harvested biofuels, and maybe hydrogen for high-intensity industrial heat (e.g. replacing metallurgical coal for steel-making);
- Be far more efficient in its use and non-use of energy (such as teleworking and teleconferencing).

Once accomplished, this global energy transition will create a world that will:

- use much less total energy, benefiting from the three-fold efficiency gain that results from substituting electricity for fossil fuels;
- eliminate the air pollution and associated cancers and other diseases that come from burning fossil fuels;
- eliminate the tensions and wars that arise from competition for scarce fossil fuel resources;
- reduce energy and transport costs due to greatly increased efficiency, and the long-term falling price of solar PV, solar thermal, and wind energy.

BC needs to become a leader both in the development of the new energy economy, and in the manner of the development, demonstrating the best means of public engagement and transparency.

The BCSEA strongly supports all practical means that increase BC's ability to produce more low-impact green electricity, both for domestic use and for export, and to produce sustainable sourced bioenergy.

To obtain public support for the profound transition that we advocate, it is vital that the changes be:

(a) well-planned,
(b) ecologically responsible,
(c) publicly transparent, and
(d) affordable.

If any one of these conditions is not in place, the response from the public will likely be one of political anger, organized resistance, and a defensive desire to hang onto cheap power and fossil-fuelled cars and trucks.

We would like the government to adopt the following principles for developing green energy:

- Ensure that energy conservation and efficiency remain the first choice energy resource, and that renewable energy development does not downplay energy conservation;
- Maximize the development of renewable energy for both domestic and export needs, linked with proactive policies to reduce fossil fuel use both in BC and abroad;
- Improve the standards of environmental protection, and use land-use planning to identify areas unsuitable for development and to address cumulative environmental impacts;
- Improve the transparency of the renewable energy planning and approvals process.

The BCSEA's Recommendation

#1. Public Availability

In the light of the importance of public trust and transparency, we recommend that the Final Report of the Green Energy Advisory Task Force be made fully available to the public. In keeping with this, we will be posting our submission on the BCSEA's website, and we hope that if they wish, others may be given the option to post their submissions on the Task Force website at www.greenenergyadvisorytaskforce.ca.

2. Renewable Energy Land-Use Planning (Groups 1 & 4)

There is widespread concern that BC has no long-term planning process designed to produce a strategic assessment of BC's renewable energy resources, and that in the resulting vacuum, there is an unplanned "gold rush" to develop every creek, river and wind site without any contextual framing of BC's unique wilderness values and environmental sensitivities. Energy resources were omitted from the successful Land-Use Planning processes of the 1990s, and the resultant Land and Resource Management Plans (LRMPs) and Sustainable Resource Management Plans (SRMPs).

A government-led renewable energy land-use planning process would build public trust by screening out projects from environmentally inappropriate areas early in the process, reducing the fear that hundreds of BC's creeks and rivers will be subject to development, and that many of BC's treasured parks will have their boundaries challenged. At the *Building a Vision for Green Energy in British Columbia* conference in Vancouver on 3 & 4 November 2009, we observed considerable support from a wide range of well-informed interests for such an approach.

The BCSEA's Recommendations

#2. WREZ Environmental Sensitivities Work
We would like the government to complete the work on environmental sensitivities in BC that was started for the Western Renewable Energy Zone (WREZ) initiative, and use this work in the period before a proper land-use planning exercise is completed to pre-screen projects at the water license application and electricity purchase agreement level (see Recommendation #6, below).

We believe that the screening criteria should include exclusion from intact old growth forests and watersheds; the cumulative impacts of multiple developments (to the extent that this is possible); and life-cycle greenhouse gas analysis (see Recommendation #12, below). Projects that fail the screen should be rejected.

#3. Renewable Energy Land-Use Planning
The BC government should lead a participatory renewable energy land use planning exercise, based on the existing LRMPs, to develop a robust land-use based screen to assess and effectively zone energy projects.

#4. WREZ mapping and the BCUC
To aid in public transparency and participation, and First Nations engagement, the government should complete the WREZ environmental sensitivities mapping and file it in a timely manner in the Utilities Commission's current review of BC's long-term transmission needs.

The Commission provides a unique forum in which interested stakeholders can discuss energy-related issues in detail and express their interests. As such it can assume a vital role in educating the public and stakeholders on energy issues, and in resolving differences.

The transmission inquiry, in particular, has attracted an unusually large number of participants. To the extent that the inquiry meets the parties' expectations for fairness, thoroughness and transparency, it can make a strong contribution toward building public support for renewable energy development in BC.

3. Water Licensing (Groups 1 & 4)

There is widespread public mistrust about the number of water licenses being issued, the quality of the projects being approved, potential damage to impacted watersheds, and what will happen to a project at the expiry of a water license. There is also concern that developers may be motivated to acquire licenses speculatively, even if they do not seriously intend to develop a site.

The BCSEA's Recommendations

#5. Two-Stage Water Licensing
For any new water license applications, create a new category of *Exploratory Water License* similar to the Investigative Use Permit for wind energy that can be issued on an unlicensed body of water, and limited to a certain time period, implying no tacit consent to proceed with a project. The development stage of a water license would entitle the proponent to the use of the water resource, but it should be subject to revocation after a reasonable period of time if significant progress is not being made toward developing a project.

#6. Environmental Screen
Apply an environmental screen to prospective projects before a water license is issued. In the interim, the screen should be based on the criteria described in Recommendation #2, until a more robust planning exercise has been completed (see Recommendation #3, above). For projects with existing licenses that fail the screening that have not yet been developed, the licenses should be revoked, with appropriate compensation.

#7. Land Lease Expiry
Government should clarify what happens with regard to the ownership and future use of project facilities at the expiry of a Crown Land lease.

4. Electricity Purchase Agreements (Group 1)

The BCSEA supports the existing procurement method by which BC Hydro produces a plan for BC's requirements and submits it to the BCUC for approval, with new resources being acquired from the private sector. However, we support retaining both BC Hydro and the transmission grid in public hands, and large hydro projects such as Site C, if developed, should be publicly owned.

We also support the use of the BCUC as an effective forum to examine the issues transparently and thoroughly, and allow for optimum stakeholder involvement, especially now that the BCUC is required to serve the public interest by reflecting BC's Energy Plan and the government's commitment to reduce greenhouse gas emissions in its findings.

We urge the government to maintain the Commission as a strong, autonomous body regulating energy in BC. The Commission's ability to convene all interested parties and to conduct a thorough, independent and transparent examination of the evidence and arguments gives it a unique credibility that may help to support the social license for the development of renewable energy, as well as optimizing the assessment of the risks and opportunities of development.

Energy conservation and efficiency should always be reliably established as the first resource to be deployed to meet demand, and government should ensure that new supply-side resources do not compete with demand-side resources when meeting BC's electricity needs.

There is a concern, however, that BC Hydro is awarding EPAs to projects that are not suitable for development, due to environmental concerns that appear at the point of the environmental assessment. This problem causes undue concern for the public and needless waste of time and energy for the public, developers and regulators alike. It also adds to BC Hydro's costs and uncertainties by increasing the rate of attrition of projects that have been granted EPAs. This issue must be resolved.

The BCSEA supports the mechanism whereby BC Hydro pays less for non-firm power (e.g. during the freshet period of a run-of-river power), in order to maintain the financial viability of a contract. We do not share the fear that long-term power contracts will lead to BC Hydro's future bankruptcy, since long-term

contracts of this nature are used by almost all power utilities around the world, with the financing being built into the future rate-base.

The BCSEA's Recommendations

#8. Future BC Hydro EPAs
We suggest that BC Hydro award EPAs only to projects that have passed the new environmental screen proposed above (Recommendation #6, above), and for projects over 50 MW, only to those that have entered the EA process.

#9. Transparency of EPAs
To address the concern that awarded EPAs are not publicly accessible, we suggest that BCUC should require BC Hydro to make its EPA contracts publicly available, with confidential information redacted.

5. Environmental Assessment (Groups 1 & 4)

There are several serious public concerns around the transparency, quality, and process of environmental assessment, including -

- that the cumulative impacts associated with run-of-river and other green energy projects are not being properly addressed;
- that there is sometimes not sufficient enforcement of environmental standards during construction;
- that the post-construction monitoring of some green energy projects is not being adequately done due to budget shortages at the Ministry of Environment;
- that some projects may cause large amounts of carbon to be released through the construction of associated roads and transmission lines;
- that some public meetings are not being run in a manner that generates trust, including sometimes being held far from major population centres, making it hard for people to participate.
- that some projects under 50 MW which do not go through provincial Environmental Assessment are not being properly managed or monitored for their environmental impacts, and that it is hard to find completed studies.

The BCSEA's Recommendations

#10. Cumulative Environmental Effects
Cumulative environmental effects should be addressed both through land-use screening (see Recommendation #2, above) and through the Environmental Assessment process.

#11. No Net Ecological Loss
We support the existing policy of "no net ecological loss", requiring habitat restoration, tree planting, and forest protection, and we support it being applied to all development projects, including construction and mining. We also support site-specific long-term data collection and adaptive management practices being legally required.

#12. Net Carbon Benefit
We propose that a full life-cycle carbon balance analysis be undertaken for all projects. The carbon analysis should apply a forest-ecosystem carbon formula to the land involved, and include land clearing for site and transmission lines; construction emissions; and upstream emissions from equipment manufacture and transport to the site. Any project that shows a net reduction of greenhouse gas emissions relative to an appropriately low benchmark should pass the screen.

Sample Calculation of Net Carbon Benefit
(not definitive)

In the Pacific Northwest, trees managed on a 40-year cycle store 400 tons (362 tonnes) of carbon per hectare (see reference below). If a transmission line right of way is 50 metres wide, a 1 km length will cover 50,000 square metres, or 5 hectares, and cause a presumed carbon loss of 1,810 tonnes and the equivalent production of 6,637 tonnes of CO_2 per linear kilometre. 50 km of transmission line would release 90,500 tonnes of carbon (331,850 tonnes of CO_2).

A 50 MW run-of-river plant will generate around 200 GWh of electricity a year, and 1 kWh will offset 600 grams of CO_2 from regular North American grid power a year. 1 MWh will offset 600 kg, and 1 GWh will offset 600 tonnes of CO_2 a year. 200 GWh of green power will therefore offset 120,000 tonnes a year. If the plant has 50 km of transmission line, the carbon loss will be repaid in 2.76 years, and the net carbon benefit over a 40 year operating period will be 120,000 tonnes a year for 37.24 years, or 4.47 million tonnes, with a 40-year Net Carbon Benefit of 93%.

The proposed 1,027 MW Bute Inlet project has a proposed 443 km of transmission lines. If 100% of the line requires forest loss (which is unlikely), this would generate 2,940,191 tonnes of CO_2. The project is to produce 2,905 GWh a year x 600 tonnes of CO_2 = 1,743,000 tonnes of CO_2 benefit a year, providing a 1.69 years carbon payback, and a 40 year Net Carbon Benefit of 95.77%.

If the forest is old growth, it will store 650 tons (590 tonnes) of carbon per hectare, x 5 = 2,950 tonnes of carbon = 10,818 tonnes of CO_2 per linear kilometre.

Forest carbon reference: Modeling historical patterns of tree utilization in the Pacific Northwest, by Mark Harmon et al. Ecological Applications Vol. 6, No. 2, pp. 641-652

#13. Monitoring and Research Fees
We propose that every project proponent be required to pay to the Ministry of Environment a Monitoring and Research Fee sufficient to meet the cost of long-term monitoring, equivalent to a Development Cost Charge paid by a developer in a land-use rezoning. [GD1]

#14. MoE Powers
In the event of continuing breaches of legal agreements (e.g. disregarding minimum instream water flow), we support the MoE having power to impose a fine, or if need be to revoke a water license.

#15. Collaborative Consultations Protocol (CCP)
We recommend that the government create a Collaborative Consultations Protocol (see below) that will define a preferred way to run public information meetings and hearings in order to achieve greater transparency, more constructive questioning of a proposal, and greater public participation. All project proponents should be invited to sign onto it.

Proposed Collaborative Consultations Protocol (CCP)

Step One:
Three people ("the Parties"), representing the proponent, local government, and one organized group of concerned citizens meet together to agree to use the CCP, and the services of a mutually trusted facilitator.

Step Two:

Working with the facilitator, the Parties create an agreed list of all Matters of Concern (MoC), such as water flow, impact on fish, monitoring, road building, etc. They also agree to adopt a Progress Protocol, enabling progress on each MoC to be tracked.

Step Three:
At the Public Meeting or Hearing, the Parties agree that the chosen facilitator will run the meeting in an organized manner, working through the list of MoCs in a systematic way, seeking a conclusion on each MoC as to whether:
(a) steps are needed to gather further information,
(b) the MoC can be dismissed as resulting from erroneous understandings, or
(c) the MoC is solid enough that it should be addressed

If time for public input is limited, and there are (eg) 10 MoCs to cover, the Parties may agree to spend 10 minutes on each MoC before returning to the top of the list for more discussion as time allows.

Step Four:
The Parties continue to track progress on all MoCs until all outstanding concerns have been addressed in a satisfactory manner, or until the project is withdrawn because certain MoCs cannot be thus addressed.

#16. Location of Public Meetings
To address the concern that public meetings are often held only in small rural communities, a clause in the CCP should state that the Parties agree that public meetings should also be held in the nearest large community within X km of the project. There should be clear criteria by which a certain threshold of public interest in a project should trigger a requirement for such a meeting.

#17. Projects under 50 MW
Regarding projects under 50 MW, there is concern about lack of transparency, and a belief that such projects do not receive proper scrutiny and environmental assessment. It is our understanding that such projects do in fact conduct similar studies as 50+ MW projects, but that these studies are scattered around the different regulatory agencies, making them hard to locate, and engendering distrust.

We recommend that projects rated 49 MW or less be required to post all studies, reports and approvals on a single Front Counter BC website, following a standard format where everyone can track the progress of the different studies and regulatory processes, and submit comments.

6. Renewable Energy and Climate Action (Groups 1, 2, 3)

To gain social license for the development of BC's renewable energy resources, we believe that the government should consistently pursue a clear, credible, open policy, including:

- A public roadmap for developing renewable resources, strongly linked to meaningful reductions in fossil fuel use and greenhouse gas emissions in BC and the western region;
- Effective measures to shift energy use from fossil fuels to renewably generated electricity;
- A clear export plan that addresses both the economics and GHG reduction linkage;
- Non-arbitrary targets for BC Hydro to acquire renewable energy, rather than the current "self-sufficiency plus insurance" requirement.
- Safeguards to ensure that supply-side development does not reduce the development of energy efficiency and conservation;

When it comes to transportation, the first mass-market, plug-in hybrid and all-electric vehicles will be available in 2011. Due to its green hydroelectricity, BC is in a unique position of being able to realize large reductions in its GHG emissions within a relatively short time by a rapid conversion to green-powered electrical vehicles.

According to the Pacific Institute for Climate Solutions, BC's existing grid is capable of charging two million EVs, equal to all the cars on the road. The use of EVs will grow wherever drivers can enjoy their advantages and overcome shortcomings such as "range anxiety". While the early EVs will probably be more expensive, they are inherently simpler and easier to build, fuel and maintain, and there is a vigorous race to produce EVs and PHEVs among the major manufacturers.

BC's vehicle recharging electricity could be sold at a premium price at rapid charge and battery swap facilities, supplementing business at existing gas stations. If BC Hydro's profits from the sale of EV electricity at a premium were used to improve the efficiency of BC's slow-changing building stock, the process of saving gasoline could become a key funding source for reducing GHGs emissions in homes, offering a unique opportunity to boot-strap the province into a low-carbon economy.

The BCSEA's Recommendations

#18. Roadmap for BC's Renewable Energy Resources
Using inputs from the Green Energy Advisory Task Force, the WREZ and the Utilities Commission transmission inquiry, publish a roadmap by the end of 2010 for the development of BC's renewable energy resources, while maximizing energy conservation and linking energy development to greenhouse gas reductions in BC and elsewhere.

#19. Reducing Fossil Fuel Use in BC
Continue to implement the Climate Action Plan, with increased emphasis on shifting energy use from fossil fuels to renewable energy for electricity, transportation, and stationary uses of fossil fuels for heating and industry.

Specifically, we would like to see:

- A legislated commitment that carbon pricing beyond 2012 will rise consistently with the need to provide a strong price signal.
- A commitment to end the HST exemption on heating and transportation fuels, which until 2012 will entirely neutralize the effectiveness of the carbon tax. The $550 million annual income that BC is forgoing, due to the HST exemption, could be used to implement a world class program to encourage building upgrades and low/zero-carbon transport alternatives.
- The restoration of the PST exemption within HST to bicycles, energy efficiency investments and renewable energy equipment, including whole systems.
- Policy direction to BC Hydro and the BCUC to discourage fuel switching from electricity to natural gas for heating.
- A serious consideration of road pricing as an effective way to reduce traffic, using the income to finance a major expansion of transit and cycling.

#20. Electricity Demand Forecasting
To address the need for a rapid shift toward electric transportation and the use of electrically powered heat pumps to substitute for oil and gas fired heating, we recommend that government formally adopt as a policy the concerted promotion of a shift in energy use from fossil fuels to renewable alternatives, including electricity in particular.

We would like to see the government attach numeric targets to the expansion of electrical power to meet future EV and heat-pump needs, which will effectively require BC Hydro to include them in its energy planning.

#21. A Green Vehicles Task Force
Convene a Green Vehicles Task Force early in 2010 to help the Province speed the rapid deployment of EVs. Consider allowing BC Hydro to charge a differential rate to customers who resell electricity for transportation at EV charging stations.

We would like to see the government prioritize the rapid development of EV infrastructure standards for battery charging and replacement. The government could also consider revising the tariff structure under which BC Hydro sells power to battery charging stations for EVs, to allow Hydro to capture some of the gap between the cost of gasoline and the much lower cost of electrical power for transportation, which could be used to fund efficiency improvements elsewhere.

#22. Energy Exports and Climate Action Abroad
Create a firm link between BC's green electricity exports and greenhouse gas emissions abroad (including reductions in coal-fired electricity) by pursuing long-term power sale agreements only with jurisdictions which have strong programs to support energy conservation and renewable energies, such as California. This may be obviated by the successful conclusion of a regional or international cap-and-trade agreement.

#23. Mutual Regional Support and The Heritage Contact
Because all greenhouse gas emissions affect BC, effective action must also consider other jurisdictions. BC's ability to generate GHG-free energy could contribute to the regional reduction of emissions if the government planned the BC energy system to contribute to GHG reductions in the western US states, Alberta and Saskatchewan, as well as to domestic energy security.

BC Hydro's reservoirs have great potential to support renewable energy generation through firming services, and thereby to reduce GHG emissions by displacing baseload fossil-fuel-based generation in the US northwest and western Canada. The reservoir management benefits are currently assigned to the Heritage Contract and reducing electricity rates. Government should strike a task force to consider whether this is the best use of this resource, or whether it could be better deployed to support renewable energy development.

#24. "Renewable to Renewable" Firming Services
If the linkage of a wind farm in BC with a wind farm in Washington state allows both projects to increase their firm power potential, due to different wind regimes at each location, this would be to the benefit of both projects, and should encouraged.

#25. Green Energy Attributes
Green energy attributes, also known as renewable energy certificates (RECs), are evidence that the power in question meets a defined green power standard, granting assurance to a purchaser that the power is what it claims to be. Some US states require green power to carry defined RECs for inclusion in their Renewable Portfolio Standards (RPS).

The BCSEA recommends that in order to develop trust and market fungibility, BC should develop a clear definition of its green energy attributes, modeled on the highest standards, while seeking definitional consistency with states and provinces requiring RECs for their RPS; and that BC should develop a publicly transparent web-based tracking system for all such certificates. (See *The Treatment of Renewable Energy Certificates, Emissions Allowances, and Green Power Programs in State Renewables Portfolio Standards*, Holt and Wiser, 2007, http://eetd.lbl.gov/ea/EMP/reports/62574-ppt.pdf).

#26. Carbon Offsets
The BCSEA opposes the sale of green energy attributes as carbon offsets, since the associated greenhouse gas reductions would not meet the "additionality" requirement - i.e. they would have occurred anyway. The thought that the purchase of a green power producer's offsets might enable an oil sands developer to claim carbon neutrality would be distasteful to many supporters of green energy. We recognize that if and when a North American Cap and Trade system comes into play, the carbon offsets scene will change accordingly.

7. Energy Pricing (Groups 1, 3, 4)

To ensure a vibrant renewable energy industry, the government must address the thorny issue of energy prices. The current policy of low energy prices – the "BC Advantage" – benefits some parties, but it also encourages the wasteful use of energy and discourages the development of renewable energy. Jurisdictions that have high electricity prices, such as Germany, do not necessarily have higher overall electricity bills than lower-priced jurisdictions that lack a strong incentive to conserve.

> Average household energy bills in Germany, where electricity costs 32 cents kWh, are *lower* than they are in Ontario, where electricity costs 6-7 cents kWh. Ontarians pay $111 a month; Germans pay $98.
> See http://bit.ly/7hLKjh

The pressure to act on climate change will also impose a strong upward pressure on prices elsewhere, when the harm caused by their carbon emissions is factored in.

In arguing for a higher electricity price, the BCSEA is very conscious of the need to protect those who live on lower incomes. When it comes to sustainability, "If it's not affordable, it's not sustainable."

This means that specific programs must simultaneously be put in place to assist people on low incomes and their landlords to invest in greater energy efficiency, so that (eg) a 15% increase in the cost of electricity can be offset by a 30% increase in conservation and efficiency.

The BCSEA's Recommendations

#27. Change Power Pricing in BC
The government should consider changing BC's electricity pricing from a cost-recovery to a market-price or cost-of-new-supply model. The cost-recovery model makes sense in a business-as-usual scenario, when reliability and affordability are the chief goals, but it is counterproductive in a new energy scenario where the driving goals are the rapid reduction of BC's carbon emissions and the development of a zero-carbon economy and zero-carbon transport.

Charging market rates or cost-of-new-supply rates for electricity would send a strong price signal that would support conservation and renewable energy. To avoid rate shock, the change could be phased in over time. Over-collected income could be used in a variety of ways to benefit the public and/or ratepayers and support policy objectives such as economic development; protecting low-income people; supporting energy efficiency improvements to buildings; and/or giving a flat rebate to ratepayers.

#28. Targetted Programs for Low-Income Households
The government should carefully monitor the progress and effectiveness of BC Hydro's and other utilities' energy efficiency programs for low-income households and rental accommodation, with a view to bringing forward additional regulations as needed.

To protect those on lower incomes from the impact of rising electricity prices, it may be necessary to augment the currently mandated programs, e.g. to set quantified standards for energy poverty and remedial measures to address energy-users suffering from it. We would also like to see investments in energy efficiency upgrades being encouraged with zero-interest loans attached to the meter or the building title. The BCSEA's Green Landlords report contains nine specific recommendations to this end. (See www.bcsea.org/greenlandlords)

#29. Incentives for Community Ownership
In order to encourage greater community participation and ownership in the new energy revolution, create a favourable price incentive for projects that include community ownership, e.g. mandate a $5/MWh

adder to these projects in BC Hydro's procurement process to reflect the benefits that would flow to a local region from community ownership. This might entail a small amendment to the Utilities Commission Act, defining community ownership as being in the public interest.

#30. A Voluntary Feed-in Tariff
Around the world, five main policy approaches are being used to drive the development of renewable energy - free market; renewable portfolio standards or obligations; feed-in tariffs; green power pricing programs; and direct subsidies. Of these, the feed-in tariff is generally by far the most successful. These are described in the Appendix to this paper.

There is no reason to doubt that if BC was to adopt a Feed-in Tariff it would realize success similar to that being experienced in Germany and Ontario, enabling the solar PV, geothermal, tidal, wave, wind, and bioenergy sectors to become firmly established in BC. This would in turn generate many new green jobs, and run a healthy pulse of innovation through BC's economy. Any project bidding into BC Hydro's Clean Power Calls such as large wind energy or run-of-river power would be excluded from the tariff.

With BC being close to 100% green energy, however, we need to acknowledge that most of the new green energy that resulted from such a feed-in tariff would be for export.

From a global warming perspective, this would assist other jurisdictions to phase out their coal-fired power. From a BC ratepayers' perspective, however, the new green power for which they will have paid an additional (eg) $3 a month would be exported for a market or a green energy premium price. Either way, the price would not compensate the ratepayer for the additional dollars paid out. Such a policy, therefore, may find it hard to gain support from ratepayers or the BCUC.

Without such a Feed-in Tariff or equivalent policy instrument, however, there is a very strong argument to be made that BC will fail to establish a mature solar industry, fail to take advantage of its ocean-power potential; fail to develop a bioenergy industry; fail to exploit its geothermal potential; and fail to develop the jobs associated with this success.

The BCSEA would love to see a Feed-In Tariff adopted in BC, regardless of the difficulties. If this is truly not possible, as a weaker alternative solution, we propose that BC Hydro and other utilities offer a Voluntary Feed-in Tariff for solar, geothermal, tidal, wave, small wind, and bioenergy companies that are currently shut out of BC Hydro's Calls for Clean Power, equivalent to the Green Power Purchase Programs that are widely offered elsewhere in North America.

#31. A Biogas Voluntary Feed-in Tariff
We propose that Terasen and other gas utilities also offer a Voluntary Feed-in Tariff for companies producing biogas from food wastes, farm wastes and sewage. In Britain, a recent study found that biogas from such sources could supply 50% of Britain's gas demand from residential homes, with the biogas/biomethane being added directly to the gas distribution grid.

8. Remote Communities & First Nations

Many of BC's first nations live off the grid, their power and heat being provided by diesel that is trucked or flown in over long distances. The diesel is then used to heat some of BC's least efficient buildings, equipped with the cheapest baseboard heaters, paid for by Indian and Northern Affairs Canada (INAC).

There is a huge untapped opportunity for BC's first nations to retrofit their communities with far greater efficiency, heat pumps, solar hot water, and solar, wind and run-of-river hydro power, with the diesel serving only as back-up. The savings from the reduced diesel-use would be able to finance the green investments. In practice, however, it is our understanding that INAC pays for the diesel, and if less is

used, they pay less. If this is the case, there is no structured financial relationship which would enable the green investments to be offset by the efficiency savings, creating a classic split incentive.

The BCSEA's Recommendation

#32. Request Ottawa to Change INAC's Diesel Funding Formula
The Premier of BC should write to the Prime Minister of Canada, asking for a change to INAC's diesel funding formula so that Canada's first nations could use reduced diesel costs to finance green energy investments. Ottawa's annual bill for diesel could be reduced by 90% over ten years, and BC's first nations could become working models for the use of integrated sustainable energy in remote communities. The letter might benefit from being co-signed by Sean Atleo, National Chief of the Assembly of First Nations.

#33. Remote Communities Initiative
The government and BC Hydro should include the Remote Communities Initiative in their planning for renewable energy development; and the Remote Communities Initiative criteria should include the use of renewable energy and GHG abatement as key criteria when planning electrification projects.

We would recommend that all work on remote diesel power plants be halted, allowing for a complete overhaul of the remote power program, which lacks renewable energy expertise. The program could provide remote electrification at a minimally higher cost, instead of projects such as Toad River being premised on old-fashioned diesel plants.

9. Solar PV Energy (Group 4)

BC has good solar resources - better than Germany, which gets less average solar exposure than we do. BC's Climate Action Plan describes the government's commitment to 100,000 solar roofs across BC by 2020, and MEMPR's *Energy Efficient Buildings Strategy* supports this target through its support for SolarBC, for which BCSEA is the delivery agent. The 100,000 roofs target is a joint target for solar PV and solar hot water, without separate breakout targets.

Around the world, various policies are being used to support solar PV, grounded in the knowledge that solar PV prices are continuing to fall due to the efficiencies of mass production, and that any policy that accelerates the price-fall will hasten the day when solar achieves price parity with regular electricity.

At an electricity price of 15 cents US kWh, price parity is expected to arrive by 2015. In BC, with lower electricity prices, it will arrive later. Because of our low electricity prices, unless BC adopts specific policies to support the solar industry we run the danger that BC will be among the last jurisdictions in the developed world to build a strong solar industry, instead of the first.

The BCSEA's Recommendations

#34. A Solar-Ready Building Code
In Austin, Texas, the city's building code requires all new buildings to be pre-wired for solar PV. We believe that the BC Building Code should do likewise, enabling building owners to take advantage of the fall in price more easily when it arrives.

These barriers are causing significant prejudice to small and innovative renewable energy projects that are often really challenged to keep within budget, and are significantly reducing the number of such projects that are economic.

#35. Electrical Code, Tax and Certification Barriers
We believe that BC should aim to become a jurisdiction in which there are no regulatory factors that prejudice a consumer's choice against the use of renewable energy.

There are a number of frustrating technical barriers to solar PV and other renewables that result from the old paradigm of energy use which really need to be resolved.

Our recommendation is that a Small-scale Renewable Energy Technical Barriers Working Group be established consisting of individuals from established businesses, to look into these matters and make detailed recommendations to eliminate them, enabling renewable energy to grow rapidly without being hamstrung by attitudes and regulations that result from the past.

Here are seven that we know of - and we are sure there are more.

(a) **Electrical code permit**. This is set as a % of the net installed cost. Renewables have a big upfront cost, however (and then the energy is free), so this approach makes permits much more expensive for renewables. A flat rate approach would give more incentive for customers to have systems installed in code-compliant manner by approved installers.

(b) **BC Safety Authority Inspectors** are seemingly not trained in solar energy, and different inspectors give contradictory rulings, or turn down an installation previously approved by another inspector. A formal training program is needed.

(c) **CSA and acceptable certification**. There are many different international safety standards for electrical apparatus, of which BC only recognizes certain types. This causes many renewable energy products such as small microhydro turbines and wind generators to be unapproved for use in BC. We need a streamlined approach to make it easy for manufacturers to sell in BC. CSA approval is very expensive, and in a very limited Canadian market, manufacturers are often unwilling to spend the money required for yet another certification. For the 24VDC SunFrost fridge - the most energy efficient fridge in the world - the compressor and the controller have a CSA sticker, but the unit as a whole does not, so its use is not being allowed in Canada. BC companies are being denied the ability to sell these products and as a result, customers are shopping directly with US-based companies.

(d) **Service Size in alternative energy sites**. The size of an electrical service (i.e. 200, 400 amps) is based on the square footage of a home. In a grid-connected, normal home world, the increased cost of a larger service is negligible. Alternative projects such as Net Zero homes or other modern green building techniques use less energy, so it would be logical to also allow smaller electrical services. At remote sites that intend using diesel generators for primary power, a very high standard of energy efficiency should be mandated and modifications permitted to sizing to allow power plants sized to the actual load, not the code.

(e) **Electrical engineers and electricians**. As a result of their unfamiliarity with renewable energy systems, many engineers and electricians design and install systems that don't work well. Designing a renewable energy system requires a completely different mind-set, calling for consideration of the site characteristics in terms of solar, wind or other potentials. An integrated design process would allow for higher performance buildings that used much lower input energy. Engineers need to demonstrate advanced training or experience with renewable energy before being permitted to work on such projects.

(f) **PST/HST.** PST exemptions apply to solar panels, wind generators, microhydro turbines, etc, but not to batteries, which are essential for most off-grid systems. If someone is upgrading by adding a new inverter it is taxable, unless they also buy an additional solar panel - which causes people to buy inexpensive solar panels just to get the PST exemption. With HST, all these incentives will disappear. We recommend that all components of a renewable energy system should receive a point-of-sale HST exemption, rather than the exemptions going to fossil fuels for heating and transport, creating a tax regime that encourages the very thing that BC needs to reduce the use of to meet our climate action targets.

(g) **BC Hydro.** UL1741 criteria for grid-tie inverters require that they automatically disconnect should the grid go down, to protect the electrical worker. BC Hydro also requires a manual disconnect so that hydro workers can de-energize, which is not needed since most inverters have this built-in to save money. Cost: $160. BC Hydro is now also requiring a manual disconnect with a visible window so that someone can verify that the circuit is open. Cost: $420. When you add in the special location and routing needed for the visible window, the cost could run into $1000s, and add significantly to the cost of an already expensive solar grid-tie system.

#36. A Voluntary Solar Feed-In Tariff
If a voluntary Solar Feed-in Tariff could be created, linked to a contractual requirement that the recipient property be upgraded to a very high level of efficiency, this would drive the market for solar PV, while also supporting BC's conservation agenda (see Recommendation #30, above).

10. Solar Thermal Energy (Group 4)

Solar thermal energy around the world delivers far more energy than solar PV, and yet its contribution is consistently under-valued and underappreciated compared to its attractive cousin, solar PV. In 2006, globally, solar thermal energy produced 77 TWh of heat energy, compared to 7.7 TWh of solar PV.

In China, over 45 million households use solar hot water systems. Proportionally, that would be the equivalent of 120,000 households in BC, in contract to the current total of perhaps 500. In Europe, solar thermal technology is expanding from hot water to space heating, using heat storage systems for the winter months. This is possible as the industry matures, since the installations require experienced and sophisticated engineering skills that grow with consistent market development. To put Europe's leadership in perspective, the goal of the European Solar Thermal Industry Association is that by 2030, 50% of all low temperature space heating will come from solar thermal technologies.

The BCSEA holds a special position with regard to the development of the solar thermal market in BC, having been entrusted with delivery of the SolarBC program, which has been supporting the delivery of solar thermal systems to residences, communities, schools, First Nations, municipalities and social housing projects.

This gives us a close insight into the nature of the market barriers, and the measures needed to overcome them. Lessons from the solar thermal leaders in Austria, Germany and Hawaii tell us that consistent solar thermal market development requires key supportive policies that are referenced below.

The BCSEA's Recommendations

#37. Long-term Commitment, Clear Targets
There is a growing market uncertainty regarding the future of solar hot water in BC beyond March 31 2011, when the current SolarBC program ends (funded by the Province of BC and NRCan). A long-term commitment for BC would set reliable, stable, long-term policies to match the 100,000 solar roofs target.

BC's utilities also need encouragement to include solar hot water in their demand-side management programs, and as a DSM tool in their procurement plans.

#38. Supportive Regulations
Germany's Renewable Energy Heat Law requires 14% of the heat in any new building to come from renewable energy (passive solar, solar hot water, heat pumps, stored solar thermal, bioenergy, etc). In 2003, the new Spanish Technical Buildings Code set an obligation that 30% to 70% of the domestic hot water demand be met by solar thermal energy for new buildings, or those undergoing major renovations.

This was initiated by the first solar ordinance in Barcelona in 1999. Spain also included an obligation for PV in its Technical Buildings Code.

We would like the BC Building Code to require new buildings to be pre-plumbed for solar hot water, enabling future building owners to have a system installed with ease, and within three years, to require the full installation of a solar hot water system.

#39. Regulatory Barriers
Solar thermal industry support from NRCan and LiveSmart BC is being held back by two regulatory barriers:

- Differing interpretations of the requirements for solar hot water by building and plumbing officials who lack experience of solar hot water systems has led to a defensive requirement for a double-walled system that increases cost and reduces efficiency, to protect consumers from a hypothetical failure has never been known to happen in Europe, where single-walled systems are the rule.

- The Canadian Standards Association (a private industry body) has only certified a small number of manufactured solar hot water systems in 30 years, resulting in delays and additional costs to obtain an engineer's sign-off on a new system. New systems seeking CSA certification, soon to be a mandatory requirement for NRCan grants, cost up to $90,000.

We recommend that MEMPR work with BC's plumbing and building inspectors and with the CSA to remove these administrative barriers as rapidly as possible.

#40. Financial Incentives
Experience in Europe shows that long-term, predictable, financial incentives are needed to help the industry become established. The incentives need to be matched to the size of the potential market, the performance of the installed systems, and quality assurance measures. The BCSEA recommends that the BC government work with NRCan to ensure continued funding for the market growth of the solar hot water sector, including increased support for high-demand commercial users such as laundries, hospitals, restaurants, hotels, motels and carwashes. These incentives would decline with time as the new building code regulations were enforced.

We would also like BC's solar support for schools to be extended to colleges and universities.

#41. PACE Bonds for Financial Loans
Equally important is access to zero or low interest loans which can in turn be attached either to the meter or the title of a building, removing the concern that a homeowner may want to move before a loan is repaid. This new system of lending is being adopted in Britain as part of the UK's Act on CO2 Action Plan, and in California and New York State, where the approach is known as Property Assessed Clean Energy (PACE) Bonds.

The BCSEA recommends that BC move to adopt PACE Bonds legislation, and that a government loan guarantee be established to reduce PACE interest rates for solar hot water and other building efficiency upgrade loans.

PACE BONDS (Property Assessed Clean Energy Bonds)

PACE bonds incentivize private property owners with a more desirable return on investment. PACE enabling legislation has been passed in 15 states across the country with California having the most expansive program. The estimated potential for PACE bonds could exceed $500 billion in the US.

PACE bonds can be issued by municipal financing districts or finance companies. A PACE bond's proceeds are lent to commercial and residential property owners on a voluntary basis to finance efficiency measures and small renewable energy systems (such as solar hot water). Repayment of the loan is over up to 20 years via an annual assessment on the owner's property tax bill. Lien is attached to and transfers with the property, not the property owner.

PACE Bonds dramatically improve the economics of efficiency measures and micro renewable energy, permitting 20-year repayment and tax-deductibility. The US DoE has authorized more than $450 million in Recovery Act funding for PACE pilot projects nationwide, to develop best practices for PACE.

DoE loan guarantees for PACE will bring down PACE interest rates and costs for property owners. A NY State pilot project is being designed to offer lower interest rates and reduce upfront costs to demonstrate return on investment for property owners and position NY State on the forefront of energy retrofitting.

#42. Solar Skills Development
BC needs to create an integrated professional network of qualified, certified installers, electricians, roofers, plumbers, building inspectors, plumbing inspectors, utility professionals and college instructors, with the associated professionally run qualification and certification courses and business development courses for installers, delivered by colleges, trade associations (CanSIA) and non-governmental organizations.

The BCSEA has been working hard to achieve this through SolarBC, but progress is being held up:
- by a lack of certified solar installers in many BC communities;
- by delays in installers completing the CanSIA training programs;
- by delays in trained installers being certified by CanSIA; and
- by a shortage of professional Home Energy Assessment advisors for the ecoEnergy program.

Continuation of the SolarBC initiative after the expiry of the current program in March 2011 would allow for the continuity of these efforts.

The development of a LiveSmart 2.0 building upgrade program would restore the market for professional Home Energy Assessment advisors for the ecoEnergy program.

11. Ocean Energy (Groups 1 & 4)

Over the millennia, nature has blessed BC with a rugged, ragged coastline that funnels the tides into constrained places, creating optimal conditions for the harvesting of tidal energy. This is not the case on clean flat coastlines where the tidal flow is not accentuated. Our coastline also has excellent wave conditions, creating another energy resource that can be exploited. Tidal energy provides consistent, reliable power, and wave energy power comes mostly during the winter, when BC's power needs are greatest. Year round hydrokinetic energy can also be harvested in-situ from BC's large rivers, using an in-flow turbine.

These forms of power would help to increase the diversity of BC's power mix, providing greater resilience, and protecting us against the impacts of future climate instability.

British Columbia has 37 GW (MEMPR) to 60 GW (OREG) of potential wave energy along its coasts, and 4 GW (OREG) of potential tidal energy. BC should be among the global leaders in the development of ocean energy, but the cheapness of our electricity has frustrated BC's ocean energy developers, causing BC's ocean energy potential to remain unharvested with every week that passes.

The BCSEA's Recommendations

#43. An Ocean Energy Road Map
Develop a clear Ocean Energy Roadmap to facilitate ocean energy planning.

#44. An Ocean Energy Pricing System
As a strategy to encourage procurement, adopt either a Voluntary Feed-in Tariff, and/or an Ocean Energy Obligation as part of a future BC Hydro Clean Power Call (e.g. 50 GWh out of 5,000 GWh).

#45. An Ocean Energy Centre
Develop an Ocean Energy Centre, similar to Europe's Marine Energy Centre in the Orkney Islands, where the multi-berth, subsea cabled ocean test site hosts 55 tidal and 95 wave energy developers. A project of this kind in BC could serve much of North America, and speed the maturing of the industry.

#46. Ocean Energy Pilot Projects
Targeted support should be given to ocean energy pilot projects in BC, to build knowledge and experience.

12. Geothermal Energy (Groups 1 & 4)

BC's geothermal potential, similarly, languishes undeveloped underground. With every month that passes this is a potential that could be meeting BC's power needs and contributing to the phase-out of coal-fired power elsewhere, while contributing rewarding jobs to BC's economy.

The BCSEA's Recommendations

#47. A Geothermal Energy Pricing System
As a strategy to encourage procurement, a similar geothermal energy pricing system is needed, using either a Voluntary Feed-in Tariff and/or a geothermal energy obligation as part of a future BC Hydro Clean Power Call.

13. Bioenergy (Groups 1 & 4)

The term "bioenergy" covers a large family of players (see box), ranging from bioenergy from sewage that can be used to heat buildings, as in the SE False Creek Olympic Village, to bioenergy from forest wastes that can be converted into liquid fuel, wood pellets or electricity.

Biosource →	Method →	Result
Algae	Anaerobic digestion	Biobutanol
Animal wastes	Biogas collection	Biochar
Crops	Combustion	Biocrude
Crop wastes	Crush, pulp, and purify	Biodiesel
Food wastes	Enzymatic digestion	Biodimethyl ether
Garbage	Fermentation	Bio-electricity
Landfill gas	Photobioreaction	Bioethanol
Sawdust	Liquid pyrolysis	Biogas
Seaweed	Depolymerization	Bioheat
Sewage sludge	Thermal gasification	Biohydrogen
Switchgrass	Transesterification	Bioplastics
Waste oils		
Wood wastes		
Woody plants		

Source: The Climate Challenge: 101 Solutions to Global Warming, by Guy Dauncey

Many environmental factors must be considered when bioenergy is being developed, since several types of bioenergy source their material from working ecosystems that have their own sustainability needs. For this reason, and because of significant problems that have arisen with first generation biofuels, *Principals for Sustainable Biofuels* has been written by the Roundtable on Sustainable Biofuels. (See bioenergywiki.net)

The BCSEA's Recommendations

#48. A Sustainable Bioenergy Development Roadmap
Create a BC sustainable bioenergy development roadmap designed to meet 100% of BC's fuel, heat, and gas needs by 2030 in partnership with sustainable transportation and heating strategies. Emphasize local and regional planning, and adopt the *Principals for Sustainable Biofuels.*

#49. Full GHG Life-Cycle Analysis
We support all bioenergy and biofuel GHG calculations using full lifecycle analysis, including land-use changes, and recommend the development only of projects that achieve a large net GHG reduction. We believe that biofuel that does not achieve a large net carbon reduction should be prohibited.

#50. Second-Generation Biofuels
We support the development of second-generation biofuels from cellulosic wastes, algae, seaweed, sewage, and crops grown sustainably on non-agricultural land, and of carbon-negative biofuels that store their carbon as biochar.

#51. Bioplastics Task Force
Establish a Bioplastics Task Force to find ways to encourage the import and sale of plastics made from 20% bioplastic by 2020, 50% by 2030, and 100% by 2040.

#52. Sustainable Sewage Task Force
Establish a Sustainable Sewage Task Force to find ways to maximize the opportunity for BC's sewage treatment plants to produce bioenergy from our wastes.

#53. Flex-fuelled Vehicles
Require all new non-electric vehicles to be flex-fuelled by 2012, so that they can run on sustainably sourced biofuel. The additional cost at the manufacturing stage is just $100 per vehicle.

14. Public Engagement

In a democracy, it is important for a government to win public backing for its policies. On BC's climate action file, excellent though its many initiatives have been, there has been an almost total absence of public engagement. The vacuum has left the government vulnerable to attack from those who are skeptical of the science of climate change, and those who are skeptical of initiatives which they believe might harm BC's economy.

This lack of public engagement around climate change is one of the causes of the province-wide wave of discontent about independent power production and run-of-river power. Many people who say they are sincerely concerned about climate change still fail to understand the all-encompassing danger that it presents, or the reasons why measures to introduce renewable energy and a zero-carbon economy are so urgently needed.

Good public engagement needs to come in five forms:

(i) As a clear, confident and decisive top-down message from the government, spelling out *why* climate change is such a danger to BC and the world as a whole, and why an investment in

the solutions will benefit BC's economy and job creation. The use of sports, music and arts celebrities helps people identify with such heroes.

(ii) Through enhanced collaboration with local and regional governments to engage and educate citizens on legislation, policies, programs and incentives related to energy, emissions reduction and adaptation.

(iii) Through collaboration and engagement with businesses and other large organizations;

(iv) Through funding for a host of community-based projects that can pioneer the best ways to get people engaged in initiatives to reduce their emissions in their homes, schools, businesses and other organizations.

(v) Through public engagement and consultation processes for initiatives such as new green power projects that are seen to be open, trustworthy and transparent.

The BCSEA's Recommendations

#54. Funding for Public Engagement over Climate Change
Set up a fund that non-profit societies can apply to for public engagement initiatives, and allow the results to determine which approaches are the most effective, and worthy of further funding.

#55. Matching Funds for Local and Regional Governments
Set up a fund that local and regional governments can apply to public education and engagement initiatives related to climate and energy strategies.

#56. Climate Change in the Schools Curriculum
Accelerate the initiative to advance experiential environmental education in BC's schools to ensure that all students are able to take modules in climate science and climate solutions, starting in September 2010.

#57. Green Energy Public Engagement
Ensure that the approaches recommended above for Renewable Energy Land-Use Planning and for a Collaborative Consultations Protocol - or something closely resembling them - are put into action.

15. Preparing for the Impacts of Climate Change and Peak Oil

BC has experienced first hand how the results of climate change can impact a community - we have only to look at the devastation that the mountain pine beetle has caused to our forests, thanks to a lack of cold winters.

On the current path, which is projected to see the global temperature rise by up to 6°C by 2100, there could be a global sea-level rise of 1-2 metres by 2100, which would have an enormous impact on the Lower Mainland, the Cowichan Valley, and other areas.

The most effective tool that we know of to combine climate preparedness with the public engagement necessary to make people aware of the threat is an economic analysis of the future costs.

At the same time, we need to begin emergency planning for the fast approaching day when peak oil will arrive, and for the rapid and permanent rise in gas prices that will follow. Some believe this may happen as soon as the world economy recovers; others, including the IEA, believe that it will happen by 2020. Either way, we need to begin emergency planning immediately.

The Threat of Peak Oil

"Reliance on IEA reports has been used to justify claims that oil and gas supplies will not peak before 2030. It is clear now that this will not be the case and the IEA figures cannot be relied on."
- John Hemming, British MP who chairs the all-party parliamentary committee on peak oil and gas

A senior International Energy Agency (IEA) official (identity hidden) claims that the IEA has been "deliberately underplaying a looming shortage for fear of triggering panic buying". A second senior IEA source said that "A key rule at the IEA is "not to anger the Americans."

Colin Campbell (former geologist and executive at Total France): "If the real oil reserve figures were to come out there would be panic on the stock markets… in the end that would suit no-one."

- Key oil figures were distorted by US pressure, says whistleblower
- Guardian (UK) November 9, 2009. www.bit.ly/28IZZH

The BCSEA's Recommendations

#58. An Economic Study of the Costs of BC's Climate Impacts
Commission a study to examine the value of the assets at risk and the economic costs of coping with and adapting to climate change by 2100, if the world continues on its business-as-usual path. Include a Sea Level Rise Assessment Report to consider a range of scenarios for 2050 and 2100 and advise on the cost of planning for future sea level rise, as California is doing. Publicize the results widely.

#59. Regional Climate Adaptation Planning
Require and support each of BC's regional governments to prepare a regional version of the same report, with a financial update every three years. Support them by providing a common planning framework, and grants.

#60. Emergency Peak Oil Planning
Commission a study to examine BC's vulnerability to a rapid rise in oil prices, and to prepare emergency plans (eg) for low-income household heating and travel, and vulnerable businesses in the BC economy.

#61. Oil-Free by 2025
Form a Task Force to recommend how BC could be free of dependency on oil by 2025, following Sweden's example, which has set an ambitious goal to eliminate its dependency on oil by 2020/2030.

Sweden's Commission on Oil Independence

To make recommendations on how dependency on oil should be broken, the government created a Commission on Oil Independence, headed by then Prime Minister Göran Persson, which reported in June 2006, proposing the following targets for 2020:

* Consumption of oil in road transport to be reduced by 40-50 per cent;
* Consumption of oil in industry to be cut by 25-40 per cent;
* Heating buildings with oil, a practice already cut by 70% since the 1973 oil crisis, should be phased out;
* Overall, energy should be used 20% more efficiently.

Appendix: Comparative Review of Renewable Energy Pricing Policies

Five main policy approaches are being used to direct power acquisition around the world:

1. Free market, price-based only
2. Renewable Portfolio Standards
3. Feed-in Tariffs
4. Green Power Purchase Programs
5. Grants and subsidies.

1. Free market, price-based only
Used in jurisdictions that seek to deliver cheap reliable power, without any regulatory assessment of social or environmental considerations. The BCSEA is pleased that the government of BC no longer approves the awarding of electricity purchase agreements on this simple basis.

2. Renewable Portfolio Standards
In North America, the policy used most widely to "green up" the power supply has been the Renewable Portfolio Standard, which requires utilities to produce a percentage of their electricity from renewables by a certain date. Combined with the use of tax credits, loans, production incentives, and net metering (allowing consumers who generate excess power to run their meters backwards), these have sometimes achieved good results, but they are, generally speaking, nowhere near as effective as Europe's Feed-in Tariffs.

BC has a Renewable Portfolio Standard that requires BC Hydro to purchase all new power from green, clean sources. Compared to almost every other jurisdiction in the world, BC is in a unique position, in that thanks to its large heritage dams it generates 90% of its energy from renewable energy, and in that the BC Energy Plan requires all new electricity generation projects to have zero-net greenhouse gas emissions - the equivalent of a 100% Renewable Portfolio Standard.

BC is also in a unique position in that when BC Hydro put out its recent Clean Power Call for 5,000 GWh of green power, it was offered 17,000 GWh. This surplus of potential green power enables BC Hydro to give contracts to those projects which best combine reliable affordable power delivery and high environmental standards with low cost.

This strength also exposes BC to a troublesome weakness, however, since the abundance of relatively cheap green power, combined with BC's cheap base-load power from the heritage dams, inhibits more expensive renewable energy technologies from getting a commercial foothold, including solar PV, geothermal, tidal, wave, wind, and bioenergy.

Elsewhere in the world, in jurisdictions that are nowhere near to generating 100% green energy, the response to this dilemma has been the Feed-in Tariff.

3. Feed-in Tariffs
Feed-in Tariffs are the world's most successful policy for the rapid development of significant amounts of renewable energy.

Developed in Denmark in the early 1980s, adopted by Germany in 1991, and now adopted in 31 nations and states or provinces around the world, they address the core problem of renewable energy, which is that solar, wind, and biogas and other renewables are usually more expensive up front, because of capital costs. The Feed Laws eliminate this hurdle by giving every farmer, cooperative, or private producer of renewable energy guaranteed priority access to the grid, and a fixed 20-year contract at the price needed for investors to make a decent return, enabling everyone - including homeowners, farmers, cooperatives and businesses large and small - to profit from renewable energy. In so doing, they have created hundreds of thousands of new jobs in Europe. There are no intrinsic limits on using them in BC.

The price paid is based on the cost of the electricity produced plus a reasonable profit for the producer. This is much like the way electricity from conventional power plants has been regulated in North America for many decades, and utility regulators are familiar with the concept. The price is set by the cost to install, operate, and maintain the plant, varying by the type of technology, size of installation, and application. In Germany, a Bavarian farmer earns more for solar on a barn roof (75 cents/kWh) than on the ground (57 cents/kWh). The members of a wind cooperative earn less for a very windy (8 cents/kWh) than for a less windy site (13 cents/kWh).

The results have been very persuasive. In 2007 alone, Germany installed more solar PV systems than the USA installed in its entire history, with four times more people and 26 times more land. The renewable energy revolution has propelled Germany to rapid economic growth, generating 240,000 jobs and 4-5% of Germany's GDP in 2007. Germany has made equally impressive gains in biogas and solar hot water. When investors are local, community economic development is amplified, and resistance minimized.

The tariffs are paid by a small surcharge on everyone's electricity bill, averaging 1 cent/kWh, or $17 to $27 a year for an average household. For this small an investment, Germany is unleashing a new energy revolution. By 2008, Feed Laws had been adopted by France, Italy, Spain, China, and 36 other nations, states and provinces. In North America, they have been adopted in Ontario's Green Energy Act, and in a limited form in Washington State, Hawaii, and Minnesota, and things look hopeful in Illinois, Michigan, California, and Wisconsin.

In 2008, the accounting firm Ernst & Young concluded that Germany's Feed Laws had delivered five times more renewable energy for 20% lower cost that Britain's market-friendly policies, which include tendering and certificate trading systems.

Feed-in tariffs can be implemented alongside and existing renewable energy programs, such as net metering and renewable energy standards. (Text adapted from Paul Gipe, www.wind-works.org/FeedLaws/PrimersonFeed-inTariffsandAdvancedRenewableTariffs.html)

4. Green Power Pricing Programs

Green power pricing programs enable ratepayers to choose to buy renewable energy power over coal or gas-fired power, and to pay more for the choice. It is an optional service or tariff offered by utilities to customers in regulated electricity markets, enabling customers to voluntarily choose to pay more to purchase 100% green energy.

North America's program leader is Austin Energy, which has a **GreenChoice Program** through which, by 2008, 10,000 households and 500 businesses had signed up to buy 100% green power (mostly wind) at a fixed price for 10-15 years, instead of the variable fuel charge that rises or falls with the price of natural gas. Because Austin Energy has marketed its program so successfully to businesses, GreenChoice has been America's top-performing green power program since it started in 2001, selling 578 GWh of green energy in 2007.

13 US states have policies requiring utilities to offer green power pricing programs. Colorado, for instance, requires municipal utilities to offer an optional pricing program that allows retail customers to support emerging renewable energy technologies through utility rates.

Minnesota requires the state's electric utilities to offer customers voluntary options to purchase power generated from renewable sources or "high-efficiency, low-emission distributed generation, such as fuel cells or microturbines fueled by a renewable fuel." Rates charged for the offerings must be based on the difference between the cost of the renewable energy and the same amount of nonrenewable energy.

Oregon requires investor-owned utilities to offer a portfolio of service options to residential and commercial customers:

- *New Wind Energy* - Customers can buy fixed blocks of new wind generation each month, paying

an additional $2.95 - $3.50 monthly for each 100 kWh block purchased. (0.29 - 0.35¢ kWh)

- *Renewable Energy Blend* - Customers can buy 100% of their actual electricity usage from wind and geothermal sources, paying 0.78¢ to 0.80¢ kWh more for this option.
- *Renewable Energy and Habitat Restoration* - Customers can buy 100% of their electricity from renewable sources and also help restore native fish habitat, paying 0.78¢ - 0.99¢ kWh extra, plus a fixed $2.50 per month that is applied to salmon restoration projects.

For details of US Green Power Pricing policies, see
http://apps3.eere.energy.gov/greenpower/markets/state_policies.shtml

5. Direct subsidies

In California, the state pays 50% of the cost of a solar installation. In Texas, Austin Energy offers a $4.50 per watt rebate and a solar loan with a credit union, which led to 2 MW of solar being installed by 550 homes and businesses by 2008, in pursuit of the goal of 100 MW by 2020. Japan's current subsidy is $700 per kilowatt (70 cents per watt), which is around 10% of the installed cost.

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