

CAC Manitoba: Exhibit CAC# 57
NFAT Review

Document

Kyrke Gaudreau and Robert Gibson, *Framework for Sustainability-based Assessment for the Public Utility Board's Needs for and Alternatives To (NFAT) Assessment of Manitoba Hydro's Preferred Development Plan and Alternatives*, February 2014

Sustainability Criteria Set: Table 6 – p. 28-32

4.2 The sustainability criteria set

Table 6 – A proposed set of evaluation and decision criteria for the NFAT analysis of Manitoba Hydro’s preferred power system plan

<p>Socio-ecological system integrity Build human-ecological relations to establish and maintain the long-term integrity of socio-ecological systems and protect the life support functions upon which human as well as ecological wellbeing depends.</p>
<p><i>Maintaining the integrity of our social-ecological systems</i></p>
<ul style="list-style-type: none"> • protect and enhance ecological integrity, including attention to direct, indirect and induced effects (e.g. ecological connectivity, biodiversity)
<ul style="list-style-type: none"> • maintain our ecological life-support systems, including those that deliver ecological services (e.g. water purification), keystone species and culturally important species and ecotypes (e.g. forest cover, wetlands, caribou)
<ul style="list-style-type: none"> • support traditional livelihoods that depend on habitats and ecological services (e.g. hunting and trapping, medicinal plants) and the regeneration of traditional knowledge
<ul style="list-style-type: none"> • ensure the power system helps Manitoba to reduce its appropriation of global biocapacity (e.g. by discouraging highly consumptive lifestyle behaviour)
<p><i>Anticipating and adapting to system dynamics</i></p>
<ul style="list-style-type: none"> • anticipate and prepare for social-ecological systems change (e.g. climate induced species migration) through a variety of mechanisms (e.g., a robust monitoring program and response capacity built in the spirit of adaptive management)
<ul style="list-style-type: none"> • allow ecosystems to move through necessary cycles, including growth, development, collapse and renewal (e.g. fire regimes)
<p><i>Living within the capacity of our planet</i></p>
<ul style="list-style-type: none"> • favour system options that minimize rate of energy and resource extraction such that it stays within local and regional ecological carrying capacity (in all areas where the electricity is consumed)
<ul style="list-style-type: none"> • ensure the power system contributes to substantial reduction of net greenhouse gas emissions (including upfront emissions) in Manitoba and export markets
<ul style="list-style-type: none"> • minimize waste generation and manage wastes to avoid adverse social-ecological impacts (e.g. discharge of air and water pollutants, and mercury contamination of water)
<ul style="list-style-type: none"> • ensure that the net effects of new generation, CDM and substitution of new components for existing ones (e.g. in export markets) reduce overall stresses on biophysical systems and communities
<p>Livelihood sufficiency and opportunity Seek to expand the range and availability of desirable and durable livelihood opportunities while helping to ensure sufficiency for all.</p>
<p><i>Providing reliable and economical electricity services</i></p>
<ul style="list-style-type: none"> • ensure system capacity for reliable provision of affordable energy to meet current and emerging needs and opportunities for lasting benefits without impairing future opportunities or undermining larger socio-ecological system integrity
<ul style="list-style-type: none"> • design for maximum net benefits over the long term, recognizing both conventionally accounted factors and important benefits and costs that are not included in conventional pricing
<p><i>Promoting meaningful employment opportunities</i></p>
<ul style="list-style-type: none"> • promote respectful and fulfilling employment that respects workers’ rights and interests (e.g. fair wages, opportunity for skill development and promotion)
<ul style="list-style-type: none"> • promote sufficient and desirable livelihood opportunities (number, diversity, quality, accessibility, permanence)
<ul style="list-style-type: none"> • ensure the anticipated opportunities are directed to and likely to be practically accessible by those now most in need of livelihood improvement (e.g. rural regions, First Nation and Métis communities, youth)

<ul style="list-style-type: none"> • avoid or smooth boom-bust employment and economic effects; enhance capabilities and opportunities for lasting employment and associated benefits
<p><i>Maintaining community and economic resilience</i></p>
<ul style="list-style-type: none"> • maintain and improve the resilience of the Manitoban economy (e.g. lasting employment opportunities, strong ecological foundations, enhanced social capital, flexible energy system) • control the pace and scale of energy production and consumption such that it remains within local capacity for management, including capturing opportunities, and reversing adverse effects
<p><i>Promoting energy transition</i></p>
<ul style="list-style-type: none"> • ensure broad exploration and fair comparison of system component alternatives (e.g. renewable energy technologies, CDM, flexible packages of small components) • favour livelihood and employment opportunities centred on innovative and flexible options (e.g. CDM and diverse renewable technologies) that emphasize continuous learning and lasting potential • foster positive social and technical innovations (e.g. through funding, research, grid access) • help Manitobans make a transition to greater efficiencies and reliance on renewable energy sources (e.g. heritage funds, employment retraining, and other bridging provisions) in all sectors of society and the economy • plan for transition to renewable energy and resources for communities and sectors currently relying on fossil-based electricity
<p><i>Enhancing First Nations, Métis, and rural community wellbeing and self-determination</i></p>
<ul style="list-style-type: none"> • foster First Nations and Métis employment opportunities that allow for and foster traditional ways of living • promote expansion of lasting economic foundations for rural and remote communities, First Nations and Métis communities (e.g. through partnership in energy and resource development) • promote First Nations and Métis communities self-governance and self-determination
<p>Ensuring fairness</p> <p>Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor, both now and in the future.</p>
<p><i>Fostering equity</i></p>
<ul style="list-style-type: none"> • promote energy pricing that discourages excessive consumption (e.g. tiered pricing), with adjustments to respect the barriers facing low income consumers and those with no practical access to alternatives • promote fair distribution of wealth, income generating opportunities, and influence within and between communities, regions and nations, with particular attention to currently disadvantaged people and places, both now and in the future • promote equity through initiatives to retain energy and resource consumption within ecological limits
<p><i>Promoting fair distribution of benefits and risks</i></p>
<ul style="list-style-type: none"> • promote fair distribution of risks within local communities and by age, gender and ethnicity, respecting that some groups have less capacity than others to accommodate current as well as prospective risks • avoid risks likely to fall disproportionately on already stressed ecosystems and/or disadvantaged and otherwise vulnerable communities • promote equitable distribution of resources and opportunities among and within urban and rural regions, while addressing different urban and rural needs • promote full cost accounting while meeting the needs of those who are most vulnerable to price increases
<p><i>Ensuring fairness for the future</i></p>
<ul style="list-style-type: none"> • avoid trading off long-term needs and opportunities for short-term gains (e.g. underpricing the cost of energy, discounting future costs) • plan to leave the local communities, regions and province with resources and opportunities at least

as great and desirable as those available today
<ul style="list-style-type: none"> • ensure that sufficient resources are reserved for and available to the future generations that will need to address maintenance, decommissioning and rehabilitation needs of power system components
<i>Accounting for past wrongs</i>
<ul style="list-style-type: none"> • ensure mechanisms are in place to redress past wrongs done to vulnerable groups (e.g. First Nations) including and beyond initiation of resource development partnerships
<i>Promoting equity beyond provincial borders</i>
<ul style="list-style-type: none"> • ensure that effects of project components and sales outside Manitoba reduce stresses on vulnerable ecosystems and communities there and avoid displacing problems from Manitoba to other jurisdictions. • promote responsible and equitable practices by the international community (e.g. ISO 14001 and 26000, Global Reporting Initiative)
<i>Avoiding trade-offs</i>
<ul style="list-style-type: none"> • treat potential trade-offs as a regrettable last resort while seeking mutually reinforcing and lasting cumulative contributions for the most positive overall result and avoiding significant adverse effects • ensure that no decisions displace adverse effects from the present to the future, unless all alternatives would to displace even more adverse effects to the future • identify all evidently proposed trade-offs explicitly, facilitate public discussion, and provide public rationales based on evidence that all alternatives involve more regrettable trade-offs • where adverse effects are anticipated, favour mitigation over compensation • where trade-offs of some sort are inevitable, avoid options that would add stresses to already vulnerable communities and ecosystems
<p>Resource maintenance and efficiency</p> <p>Provide a larger base for ensuring sustainable livelihoods and energy security for all while reducing threats to the long term integrity of socio-ecological systems by reducing extractive damage, avoiding waste and cutting overall energy and resource use per unit of benefit. Seek equitable and cost-effective supply and CDM technologies and power systems measured in terms of full resource cost (rather than the narrower levelized unit energy cost (LUEC)).</p>
<i>Promoting responsible use of energy and resources</i>
<ul style="list-style-type: none"> • reduce lifecycle material and energy use, resource depletion (including agricultural lands), extractive damage, demand on carrying capacity and waste generation (including GHG emissions) • foster more efficient use of energy by large industrial users (e.g. through adjustment to the rate structure, revolving loans, increased load management) • favour conservation measures that reduce the overall demand for and consequent footprint of energy generation
<i>Promoting end-use matching</i>
<ul style="list-style-type: none"> • match the quality of the energy supplied to the quality required for the end-use (e.g. promotion of biomass or passive solar for heating purposes)
<i>Developing resilient energy supplies</i>
<ul style="list-style-type: none"> • build resiliency in energy supply systems through emphasis on sufficient diversity, modularity and redundancy of energy pathways (e.g. biomass heating) • promote research and development of innovative renewable energy and energy efficient technologies and practices
<i>Managing at the whole electrical power system level</i>
<ul style="list-style-type: none"> • promote positive synergy between different supply side technologies (e.g. hydro storage for wind variability where storage activities do not introduce river ecology problems) that may overcome seasonality and intermittency concerns • minimize losses along the entire energy supply system (production, transmission, conversion, final consumption)

<ul style="list-style-type: none"> • seek opportunities for multiple uses of energy inputs (e.g. cogeneration), particularly with industrial and commercial users
<ul style="list-style-type: none"> • seek flexible means (e.g. ecologically benign storage opportunities) of allowing for the large-scale integration of intermittent renewable resources (e.g. wind, solar)
<ul style="list-style-type: none"> • ensure that supply-side investments do not reduce the opportunity for expansion of CDM, low-impact renewables, or substitution of benign non-electric energy supply options (e.g. electric heating infrastructure may discourage passive solar biomass heating) in Manitoba and export regions
<ul style="list-style-type: none"> • discourage rebound and other effects (e.g. increased frivolous or wasteful electricity consumption due to increased supply)
<p><i>Developing renewable and adaptable energy systems</i></p>
<ul style="list-style-type: none"> • promote energy systems that promise increasingly positive Energy Returns On Investment
<ul style="list-style-type: none"> • minimize the use of non-renewable resources along the entire lifecycle
<ul style="list-style-type: none"> • favour options that are minimally vulnerable to possible and unexpected future changes and able to take advantage of emerging opportunities (e.g. economic cycles and technological advances)
<ul style="list-style-type: none"> • plan for the system integration of alternative energy technologies
<p><i>Avoiding and addressing waste and contaminant production</i></p>
<ul style="list-style-type: none"> • aim to reduce the amount of waste generated and where feasible and desirable, seek productive uses for wastes (e.g. anaerobic digestion of organic wastes)
<ul style="list-style-type: none"> • avoid generation of hazardous wastes and release of significant contaminants (e.g. mercury)
<p>Ensuring due process and an informed and engaged citizenry</p> <p>Build the capacity, motivation and habitual inclination of individuals, communities and other collective decision making bodies to apply sustainability requirements through more open and better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary and personal decision making practices.</p>
<p><i>Promoting good governance</i></p>
<ul style="list-style-type: none"> • promote and build capacities for local decision making and more broadly participative and decentralized local multi-stakeholder governance
<ul style="list-style-type: none"> • enhance collaborative and transparent governance, accountability and trustworthiness
<ul style="list-style-type: none"> • ensure participation early in decision cycles
<ul style="list-style-type: none"> • seek free, prior and informed consent for potentially disruptive activities and facilities
<ul style="list-style-type: none"> • promote traditional ways of knowing and include them meaningfully in the decision-making process
<p><i>Fostering responsible and virtuous individuals and societies</i></p>
<ul style="list-style-type: none"> • promote respect for marginal members of society
<ul style="list-style-type: none"> • promote basic human rights (liberty rights, security rights, gender equity)
<ul style="list-style-type: none"> • promote respect for Constitutional rights, and social and environmental laws, regulations and principles both domestically and internationally
<p><i>Developing an awareness of needs, ends and means</i></p>
<ul style="list-style-type: none"> • promote responsible consumption with consumption understood as an ecologically and socially shared privilege as opposed to an intrinsic right and seek to delink wellbeing from energy and resource consumption
<ul style="list-style-type: none"> • increase awareness of the services being met by energy supply and CDM and promote constructive dialogue on how to meet those ends in the most effective, elegant and ethical manner
<p><i>Fostering social capital and learning</i></p>
<ul style="list-style-type: none"> • favour supply and CDM options and implementation approaches that enhance social capital and social as well as individual learning (e.g. traditions of shared knowledge and mutual assistance)
<ul style="list-style-type: none"> • design energy system components and linkages with capacity for catalyzing broader constructive social change (e.g. public transport and urban agriculture)
<p><i>Developing fair and responsible pricing</i></p>

<ul style="list-style-type: none"> • promote fair and full cost resource pricing (including shadow pricing, e.g. of carbon) both in the immediate and long term while respecting that some citizens are more vulnerable to changes in price
<ul style="list-style-type: none"> • apply full-cost accounting principles, including appropriate valuing of natural and social capital
<p>Prudence, precaution and adaptation</p> <p>Favour the selection, design and implementation of the undertaking (including provisions for monitoring and adjustment), in ways that reflect the application of precautionary approaches, including through respecting uncertainty, avoiding both well and poorly understood risks of serious or irreversible damage to the foundations of sustainability, and acting on incomplete but suggestive information where there may be risks to social and/or ecological systems that are crucial for sustainability.</p>
<p><i>Fostering resilience, reliability and adaptive capacity</i></p>
<ul style="list-style-type: none"> • favour system options designed with adaptive capacity for response to potential and unexpected changes (accidents, technological advances, changes in demand, etc.),
<ul style="list-style-type: none"> • promote monitoring (using both western science and traditional knowledge) that encourages learning and informs adaptive response
<ul style="list-style-type: none"> • maintain sufficient resources (financial, material, human, knowledge, social capacity) to respond to minimally predictable and unanticipated future events
<p><i>Reducing geopolitical risks</i></p>
<ul style="list-style-type: none"> • favour options with low vulnerability to geopolitical risks (terrorism, weapons proliferation, other contributions to insecurity)
<p><i>Managing for climate change and extreme events</i></p>
<ul style="list-style-type: none"> • avoid system vulnerability to predicted and potential regional climate change impacts that could impair the power system's viability and performance, and add to adverse economic, social and environmental impacts and risks.
<ul style="list-style-type: none"> • plan for and anticipate changes in magnitude and probability of extreme weather events (e.g. 1/20 year flooding, droughts, heat waves, cold snaps, ice storms)
<p><i>Minimizing power system risks</i></p>
<ul style="list-style-type: none"> • favour technological systems that are minimally sensitive to human error, and with low cost of technological failure and accidents
<ul style="list-style-type: none"> • select and design system components to minimize exposure to potential resource shortage (fuel, wind or water flow or other power resource) or programme failure (e.g. poor public or industry response to conservation/demand management initiatives)
<ul style="list-style-type: none"> • ensure availability of response options, including spare capacity (e.g. storage, back-up generation, additional temporary and longer term CDM), adjustable scale, etc.
<p><i>Avoidance of economic risks</i></p>
<ul style="list-style-type: none"> • minimize risk of component or system failure or higher than expected costs due to technological or management failure, climate change, lack of social licence, or political factors (e.g. by ensuring appropriate and early consultation, well-accepted partnerships, public awareness and engagement)
<ul style="list-style-type: none"> • minimize vulnerability to system level upsets due to individual project difficulties or technological failures through avoidance of over dependence on individual projects
<ul style="list-style-type: none"> • minimize exposure to risks related to financial system perturbations
<p><i>Planning for technological development</i></p>
<ul style="list-style-type: none"> • Anticipate and plan for technological advances that may lower the cost of alternative generation technologies (e.g. wind, solar PV) with implications for desirable system components and export market viability
<ul style="list-style-type: none"> • Anticipate and plan for the development of storage technologies and/or residential (and other) demand response technologies that may allow dispatchable and interruptible loads to play a more active role in power system operations