



**Alternative Energy, Demand Side Management
and Energy Efficiency**

Biannual Report, June 2009

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1 **1.0 INTRODUCTION**

2 In Decision 13-2007 with respect to the Northwest Territories Power Corporation’s
3 (“NTPC”) 2006/07 and 2007/08 Phase I General Rate Application, the Public Utilities
4 Board (“PUB”) issued Directive 51 which stated:

5
6 The Board directs NTPC to provide the Board with biannual reports that discuss the
7 following:

- 8
- 9 1. The efforts and progress of NTPC and its affiliates in pursuing alternative
10 energy, demand side management and energy efficiency projects;
 - 11 2. Justification for any projects being pursued by NTPC’s affiliates rather than
12 NTPC;
 - 13 3. Funding programs that are, or will be, available and any efforts and progress
14 by NTPC and its affiliates in obtaining funding.

15
16 This report has been prepared to comply with Directive 51 from Decision 13-2007. This
17 report covers the period up to June 30, 2009. Subsequent reports will be prepared to
18 update this information and provide new information for future periods.

19 **1.1 OVERVIEW**

20 The Corporation undertakes numerous activities related to alternative energy, demand
21 side management and energy efficiency projects each year. In order to provide a
22 comprehensive response to the Board’s directive, this report is organized according to
23 the following headings:

24

- 1 • **Alternative Energy Projects:** This section reviews all projects investigated or
2 undertaken by NTPC or its affiliates related to alternative methods of
3 generation.

- 4 • **Demand Side Management/Energy Efficiency Projects:** This section
5 reviews all projects investigated by NTPC or its affiliates related to demand
6 side management (DSM) or improving energy efficiency.

7

8 The alternative energy, DSM or energy efficiency projects outlined within this report are
9 initiatives undertaken either solely by NTPC or its affiliates, or in partnership with other
10 organizations. The factors that are taken into consideration when determining which
11 business entity undertakes these projects include:

- 12
- 13 • If project risk is high and the potential for downside to regulated customers is
14 significant, then the project may be undertaken by an affiliate so as not to
15 expose the regulated customer to a liability or cost should the project be
16 unsuccessful.
- 17 • Where a project will likely converge with operations that serve regulated
18 customers, then that project may be undertaken by NTPC.
- 19 • Where a project diverges from or is unrelated to the current service to
20 regulated customers, then such projects may be undertaken by an affiliate.
- 21 • Where NTPC does not have access to a particular business opportunity but
22 an affiliate does, then that project may be undertaken by the affiliate. An
23 example of this would be Federal Government funding for alternative energy
24 projects where a Crown corporation is not eligible to participate.
- 25 • Where a project requires extensive third party equity, joint venture partners,
26 or other forms of financing such that NTPC is not in a majority position, then
27 the project may be undertaken by an affiliate.
- 28 • Legislative changes or executive order from the GNWT may also dictate
29 which entity undertakes the project.

1
2 NTPC frequently liaises with the GNWT who has staff dedicated to developing funding
3 programs targeted at alternative energy, DSM or energy efficiency projects. In addition
4 to these efforts, the GNWT is also aware of other funding programs that may be
5 available through other government agencies. In most cases, NTPC is not eligible for
6 government funding or the tax credits offered through these programs because it is a
7 Crown corporation. Regardless, this report identifies on a project-by-project basis
8 where NTPC or its affiliates have applied for funding, received funding or assisted a
9 third party in obtaining funding in support of an alternative energy, DSM or energy
10 efficiency project.

11 **2.0 ALTERNATIVE ENERGY PROJECTS**

12 The Corporation's primary goal in pursuing alternative energy projects is to continue
13 providing safe and reliable service at the least cost to regulated customers over the
14 long-term. Many alternative energy applications are largely untested in the extreme
15 operating environment faced by NTPC. As a result, NTPC often pursues small scale
16 demonstration projects in order to test new technologies prior to implementing them on
17 a larger scale. This practice ensures these technologies can be adequately serviced
18 and operated in our environment without adverse effects to the Corporation's
19 customers. NTPC's commitment to alternative energy includes the following activities:

- 20
- 21 • The Corporation will stay knowledgeable of new technologies that may benefit
22 its core business. The Corporation will study these new technologies as they
23 emerge and analyze their suitability to the North including technical feasibility,
24 "green benefits", and economic costs and benefits.
 - 25 • The Corporation will not act as a pure researcher of emerging technologies
26 that are not already on the market with proven technological and economic
27 performance. Rather, it will invest in demonstration projects to test how
28 proven technologies work in the northern environment.

- 1 • The Corporation will not undertake alternative energy projects that do not
2 lower its costs in the long term (as compared to the costs of diesel), unless it
3 has guarantees of operational subsidies that make up the cost differential or
4 PUB approval to recover these costs.
- 5 • The Corporation will seek external funding (from all levels of government) for
6 testing, developing, implementing and maintaining ongoing operations for all
7 alternative energy projects.
- 8 • The Corporation's preference is to encourage private developers,
9 manufacturers or local interests to undertake and fund the projects and take
10 the construction, technological and operational risk. In cases where the
11 Corporation undertakes any projects directly it will seek approval from the
12 PUB (i.e. a General Rate Application or a Major Project Permit Application).
- 13 • In order to maintain a safe, reliable source of generation, the Corporation will
14 maintain existing or modified diesel plants as the main source of generation
15 or as back up to new technologies.

16
17 The following sections outline the alternative energy projects currently being
18 investigated or pursued by NTPC or its affiliates. It is important to note that not every
19 alternative energy project investigated by the Corporation will proceed to a capital
20 investment. Where capital projects are developed, these will be reviewed during future
21 General Rate Applications or Major Capital Project Permit Applications as appropriate.

22 **2.1 NWT Hydro Strategy**

23 ***Efforts and Progress***

24 The initial efforts of the NWT Hydro Strategy are to conduct ongoing baseline
25 environmental, engineering and economic work related to future development of the
26 NWT hydroelectric resources. It will also provide general information on hydro
27 development to communities. The strategy will quantify the resources available, identify

1 opportunities and challenges of development, and create a long-term vision for
2 sustainable hydroelectric development in the NWT.

3

4 ***Justification for Affiliates vs. NTPC Pursuing This Project***

5 This is a GNWT initiative that involves the participation of NT Hydro. NTPC will, as will
6 other companies, benefit from the information obtained.

7

8 ***Funding***

9 The GNWT's Energy Priorities Investment Plan has identified \$1.5 million a year for the
10 next three years, subject to Legislative Assembly approval, to fund the implementation
11 of the hydro strategy developed by NT Hydro for the GNWT.

12 **2.2 Snare Hydro Development**

13 ***Efforts and Progress***

14 The Snare/Yellowknife Hydro system comprises a series of four hydroelectric projects
15 on the Snare River system. The hydro facilities provide energy to the communities of
16 Yellowknife, Behchoko and Dettah. NTPC began studies into developing another
17 potential hydroelectric project, Site 7, in the mid-1990s. Since that time NTPC has
18 continued to update the business case for Site 7 and other sites as system loads,
19 energy markets and construction costs have changed over time.

20

21 At present, NTPC is forecasting the need for new generation resources on the
22 Snare/Yellowknife system by approximately 2020. Potential industrial development or
23 new electric heat load in the region may improve the business case for new hydro such
24 that it could be advanced prior to the 2020 in-service date when new generation
25 resources are expected to be required. Considering the requirements for aboriginal
26 involvement, regulatory approvals, financial and other requirements, development of
27 new hydro is expected to require a minimum of eight to ten years. Any development of
28 new hydro on the Snare system, which is in the Tli Cho land claims area, will require

1 their participation and, as such, NTPC continues to work with the Tli Cho Investment
2 Corporation (TIC) on identifying potential future hydro sites. TIC has completed some
3 preliminary studies on Site 7 and the Lac La Martre River (refer to Section 2.13) and
4 preliminary talks have been held regarding which party will undertake this project.

5

6 ***Justification for Affiliates vs. NTPC Pursuing This Project***

7 At this time, NTPC is pursuing this project as it converges with operations that serve its
8 regulated customers. Depending on developments with the TIC, this may become a
9 100% aboriginal development with NTPC participating as a customer or a joint venture
10 with an affiliate.

11

12 ***Funding***

13 Funding for the original Site 7 feasibility studies was provided by NTPC. Further
14 funding for regulatory approval or development of this project has not yet been secured
15 as it is unknown who will undertake this development. Once this is determined, the
16 proponent responsible for the development of new hydro will be responsible for securing
17 funding either from government or on its own merit.

18

19 TIC has funded its preliminary studies on Site 7 and the La Martre River with GNWT
20 assistance. With NTPC support, TIC is seeking additional government funding for
21 further feasibility studies on the Lac La Martre River site.

22 **2.3 In-stream Hydro Generation**

23 ***Efforts and Progress***

24 An in-stream hydrokinetic power generation system is comprised of a turbine attached
25 to a floating pontoon boat that is anchored to the riverbed. It is similar to a vertical wind
26 turbine except that instead of wind, water flowing in the river turns the turbine. Currently
27 the units come in sizes ranging from 5 kW to 25 kW but they can also be connected in

1 series. For example, four 25 kW turbines can be stacked one after another to achieve a
2 total output of 100 kW.

3

4 In October 2008, NTPC in conjunction with New Energy Corporation from Calgary, AB
5 conducted a hydrological assessment in Fort Simpson to determine the potential power
6 generation for a hydrokinetic project. This assessment proved favourable and is now
7 the basis for a demonstration project in Fort Simpson that involves the purchase and
8 installation of a 25 kW hydrokinetic turbine.

9

10 Fort Simpson was chosen for this demonstration project because the Corporation has
11 been studying the potential for an in-stream hydro unit at this location for several years.
12 As a result, more technical information exists for this location. Also, the Corporation has
13 technical staff in Fort Simpson which will reduce costs and help ensure the success of
14 the project as it can be monitored and maintained more easily from this location.
15 Finally, the community strongly supports this technology.

16

17 To date, after negotiating a streamlined approach, regulatory approval has been
18 received from the Mackenzie Valley Land and Water Board and the Department of
19 Fisheries and Oceans. The Corporation is still awaiting approval from Navigable
20 Waters Protection Program (Transport Canada). The regulatory delays are outside the
21 control of NTPC and have put the project at risk for the 2009/10 season. Once
22 regulatory approval is granted, NTPC will undertake the demonstration project, working
23 with the turbine manufacturer in order to keep costs as low as possible and to ensure
24 support.

25

26 ***Justification for Affiliates vs. NTPC Pursuing This Project***

27 NTPC is pursuing this project. It converges with operations that serve its regulated
28 customers.

29

30 ***Funding***

1 The assessment was funded by the GNWT and NTPC. For 2008/09, NTPC has
2 received a GNWT contribution of \$175,000 of an estimated \$250,000 from the GNWT's
3 Energy Priorities Investment Plan to fund the installation of the 25 kW turbine to be
4 tested as a demonstration project in Fort Simpson. Additional funding is being
5 discussed. Funding obtained in 2010/11 will be used for hydrological assessments at
6 other sites and to evaluate the demonstration project in Fort Simpson. If the
7 demonstration project proves successful, funding for 2011/12 will be used to install an
8 additional turbine at another appropriate site, based on the results of the hydrological
9 assessments.

10 **2.4 Wind Energy Request for Proposal**

11 ***Efforts and Progress***

12 In February 2008 NTPC issued a request for proposals (RFP) for the purchase of power
13 from wind generation. This RFP closed in January 2009. No proposals responsive to
14 the RFP were received. The Corporation will no longer pursue this RFP and will,
15 instead, redirect its efforts in the area of wind energy to offering its support to the GNWT
16 demonstration project in Tuktoyaktuk (Refer to Section 2.5).

17

18 ***Justification for Affiliates vs. NTPC Pursuing This Project***

19 NTPC pursued this project. It converges with operations that serve its regulated
20 customers, and it also protects them from the potential associated risk of a large
21 investment in an alternative energy technology. The purchase price of the wind power
22 would have been at or below NTPC's costs.

23

24 ***Funding***

25 Although NTPC is not eligible for available Federal government funding for wind
26 generation, it was committed to working with the proponents to obtain this funding.

1 **2.5 Wind Energy Deployment**

2 ***Efforts and Progress***

3 The GNWT demonstration project in Tuktoyaktuk, in partnership with the Tuktoyaktuk
4 Development Corporation (TDC), will provide operational and maintenance experience
5 with wind-diesel systems. NTPC is supporting this project and TDC will negotiate a
6 Power Purchase Agreement with NTPC in December 2009.

7

8 ***Justification for Affiliates vs. NTPC Pursuing This Project***

9 NTPC is involved in this project because it converges with operations that serve its
10 regulated customers. NTPC's role in this initiative will be to purchase the electricity
11 from the wind generators (which will partially displace current thermal generation), to
12 provide technical assistance and to perform the necessary interconnection to the
13 Corporation's distribution system.

14

15 ***Funding***

16 TDC and the GNWT are funding this project. NTPC's costs (to construct the distribution
17 line and the control systems in the plant) will be borne by the project proponents.

18 **2.6 Residual Heat Recovery**

19 ***Efforts and Progress***

20 The GNWT's Department of Public Works designed and installed a residual heat
21 recovery system in Wha Ti for its school. All costs were borne by the GNWT. The
22 school received the heat from NTPC at no charge. The customer's facilities related to
23 this project have been inoperable in recent years but Public Works and Services intends
24 to repair them during the course of the summer 2009 season. Upon completion of the
25 repairs, an NTPC representative will revisit the system and possibly have it online by
26 autumn.

27

1 In 1994 the community of Ulukhaktok, with assistance from GNWT, built a system to
2 provide heat from the NTPC power plant to three community buildings adjacent to the
3 plant. The customer's facilities related to this project are now at the end of their useful
4 life and are inoperable. NTPC will undertake a study of its plant in Ulukhaktok and
5 potential customers to estimate the cost of providing residual heat and the related
6 revenues in doing so.

7

8 The Corporation completed an analysis of existing power generating infrastructure and
9 potential heat loads that could be served by a residual heating system in the
10 communities of Inuvik, Fort Liard and Fort Simpson. In 2009/10, the power plant in Fort
11 Liard will be upgraded and a distribution system constructed to provide heat to the
12 Hamlet office, fire hall, garage, and school. Contingent upon securing GNWT financing,
13 NTPC will proceed with Inuvik in 2010/11 and Fort Simpson or Ulukhaktok in 2011/12.

14

15 ***Justification for Affiliates vs. NTPC Pursuing This Project***

16 NTPC is pursuing this project. These projects converge with the existing business of
17 NTPC and the regulated customer is protected from risk through the government
18 contribution of project funding.

19

20 ***Funding***

21 NTPC received three Eco Trust Fund contributions for the proposed residual heat
22 studies in Inuvik, Fort Liard, and Fort Simpson (up to \$190,000 over two years). Funding
23 was split equally between the sites for study purposes and \$55,000 was spent in 08/09
24 with the remainder to be spent in early 2009/10.

25

26 In addition, the Corporation has received a capital contribution for 2009/10 from the
27 GNWT of \$1.35 million that, coupled with a \$100,000 corporate contribution, will fund
28 the development of the residual heat system in Fort Liard and will fund a study of the
29 NTPC plant in Ulukhaktok and potential customers to estimate the cost of providing
30 residual heat in that community.

1 **2.7 Converting Residual Heat to Electricity**

2 ***Efforts and Progress***

3 Nothing new to report.

4

5 ***Justification for Affiliates vs. NTPC Pursuing This Project***

6 NTPC is pursuing this project.

7

8 ***Funding***

9 None.

10 **2.8 Wha Ti Transmission Line**

11 ***Efforts and Progress***

12 This project would involve the construction of a 65 km transmission line from the
13 existing Snare hydro facility to provide hydro power to the community of Wha Ti. In
14 concert with this, the community of Wha Ti is also investigating the option of a mini-
15 hydro plant on the La Martre River (known as the Nailii project) and, more recently, a
16 larger hydro facility with the potential of 6-15 MW. Community support currently favours
17 hydro development; therefore support for the transmission line is limited. Regardless of
18 which option is pursued, community support is required in order to receive the
19 appropriate regulatory approvals. NTPC is in negotiations with the GNWT for a capital
20 contribution for this project.

21

22 ***Justification for Affiliates vs. NTPC Pursuing This Project***

23 NTPC is pursuing the transmission line option as it converges with its existing business
24 and power would be supplied from Snare hydro.

25

26 ***Funding***

1 The GNWT has agreed to provide funding to assist with field assessments and
2 feasibility work for the transmission line.

3 **2.9 Lutsel K'e Mini Hydro**

4 ***Efforts and Progress***

5 NTEC(03) is assisting the community of Lutsel K'e to investigate the feasibility of a mini-
6 hydro facility. The hydro facility would be located on the Snowdrift River approximately
7 14 km from the community. Water would be diverted via a 270 metre penstock to the
8 powerhouse. The transmission line would follow the road to Lutsel K'e. The initial
9 turbine size would be 500 kW however the facility would be designed for expansion to 1
10 MW. If the mini-hydro project proceeded, a stand-by diesel plant would be constructed
11 in a new location at an estimated cost of \$3 million. This would represent a cost savings
12 of \$4 million compared to the construction of a new diesel plant for the community
13 (estimated at \$7 million).

14
15 It is anticipated that it would take approximately four years to complete the
16 investigations needed to obtain regulatory approvals for the project. Construction of the
17 project is expected to take three years following regulatory approvals.

18
19 Considerable preliminary design and field assessments such as geotechnical,
20 geophysical and bathymetric investigations were undertaken in 2008/09 that is sufficient
21 to proceed to more advanced design studies. Tasks for 2009/10 will examine the
22 design of the power canal and water intakes in order to resolve bank erosion and frazil
23 ice concerns identified last year. A scope of work for the baseline environmental data
24 needed to achieve regulatory approval is also under development and will be guided by
25 the knowledge gained from the Taltson Hydro Expansion project and the Wha Ti mini-
26 hydro experience. The resulting environmental work will be sufficient to examine the
27 business case for the project and make a decision on whether to develop a project
28 description and submit a regulatory application early in the first quarter of 2010.

1

2 ***Justification for Affiliates vs. NTPC Pursuing This Project***

3 This project is currently being led by NTEC (03) because it involves partnership control
4 that has an established relationship with NTEC(03) and NTEC (03) had the resources to
5 undertake the work. NTPC will be involved if the project proceeds either by way of a
6 purchase power agreement, as a partner, or as the proponent.

7

8 ***Funding***

9 NTEC (03) received \$350,000 from the GNWT and Federal Government towards the
10 studies. NTEC (03) has undertaken this work as they, with their partners, the Métis
11 Energy Company Ltd. and Akaitcho Energy Corporation are in ongoing discussions with
12 Lutsel K'e with respect to hydro. The GNWT has agreed to provide additional funding in
13 2009/10 for continued scope work, field study, community information sessions,
14 economic analysis, and engineering design and study.

15 **2.10 Natural Gas Conversion**

16 ***Efforts and Progress***

17 Construction of the Mackenzie Gas Project would potentially result in access to natural
18 gas for communities and industries throughout the Mackenzie Delta and Valley. This
19 offers the NWT an opportunity to convert the power generation in some of these
20 communities to this clean and potentially less costly fuel supply.

21

22 The overall objective of this initiative is to fully explore the potential for natural gas
23 conversion in the NWT and provide the technical basis for a policy decision by the
24 GNWT on the appropriate next steps in the initiative. The GNWT continues to collect
25 data on community energy load.

26

27 ***Justification for Affiliates vs. NTPC Pursuing This Project***

28 This is a GNWT initiative in which NTPC is playing a supporting role.

1

2 ***Funding***

3 This is a self-funded GNWT initiative.

4

5 **2.11 Deep Geothermal Electricity Generation**

6 ***Efforts and Progress***

7 The GNWT is proposing to investigate the potential for geothermal electricity generation
8 in the Liard Valley. Deep geothermal energy is extracted from the earth from depths of 5
9 to 7 kilometres as super-heated water at temperatures of over 150°C. The Liard Valley
10 is well suited for this technology because earlier gas well exploration has confirmed that
11 high grade heat can be accessed at shallower depths.

12

13 NTPC continues to monitor this technology and support the GNWT in its efforts to study
14 this potential; as such, it participated in the June 2009 information session organized by
15 the GNWT Department of Environment and Natural Resources and led by the Executive
16 Director of the Canadian Geothermal Energy Association.

17

18 ***Justification for Affiliates vs. NTPC Pursuing This Project***

19 This is a GNWT initiative in which NTPC is playing a supporting role.

20

21 ***Funding***

22 This is a self-funded GNWT initiative.

23 **2.12 Micro-Turbines in Inuvik**

24 ***Efforts and Progress***

25 NTPC has worked with the Town of Inuvik since 2002 on the installation and operation
26 of two natural gas fired micro-turbine units to supply combined electricity and residual

1 heat to the Town's recreation complex. This technology is only available for
2 communities with natural gas and is NTPC's first venture involving micro-turbines.
3 NTPC is monitoring the development of this technology in a diesel format but it is
4 currently not available.

5
6 To date, the performance of these units has not met the manufacturer's specifications.
7 Based on information shared by other utilities employing this or similar technology,
8 reliable operation is an issue and many have terminated trial projects. NTPC, however,
9 has had greater success with this endeavour than have the other utilities. Operational
10 staff has been impressed with the units' potential and the Town of Inuvik is a strong
11 supporter of this NTPC project. Thus, the Corporation will continue to monitor the
12 performance of the micro turbines and work to improve their performance.

13
14 ***Justification for Affiliates vs. NTPC Pursuing This Project***

15 NTPC is pursuing this initiative as it converges with operations that serve its regulated
16 customers.

17
18 ***Funding***

19 This initiative is being funded by NTPC.

20 **2.13 Taltson Hydro Expansion Project**

21 ***Efforts and Progress***

22 The proposed Taltson Hydro Expansion Project is a new 36 MW hydro plant located at
23 Twin Gorges on the Taltson River. This project is being pursued by Dezé Energy
24 Corporation, which is comprised of the NWT Energy Corporation (03) (NTEC(03)), the
25 Akaitcho Energy Corporation, and the Métis Energy Company Limited.

26
27 The expanded capacity would provide hydroelectric power to the diamond mines
28 located northeast of Great Slave Lake: Snap Lake, Ekati Diamond Mine, Diavik

1 Diamond Mine, and Gahcho Kué Mine (currently in Environmental Assessment). NTPC
2 and NTEC (03) have been working with Aboriginal organizations since 2002 to expand
3 the Taltson site to supply hydro to the diamond mines. The length of the development
4 period, coupled with the technical nature of the predevelopment work, means that
5 significant expenditures must be incurred before the viability of the Taltson Hydro
6 Expansion can be assessed to an acceptable degree of confidence. To date,
7 approximately \$10 million (provided by the Federal government, Territorial government,
8 and the project proponents) has been expended to bring the project to this relatively
9 advanced stage of development. All work completed thus far points to the project being
10 viable and having the potential for long-term positive economic impacts for the NWT.

11
12 The project is currently in the environmental assessment process, which should be
13 complete by late 2009. The Developer's Assessment Report was filed with the
14 Mackenzie Valley Environmental Impact Review Board on March 2, 2009 and received
15 conformity approval on March 25, 2009. Other concurrent steps include the finalization
16 of Project Development Agreements between the project partners and Power Purchase
17 Agreements with the diamond mines.

18
19 ***Justification for Affiliates vs. NTPC Pursuing This Project***
20 This project is being pursued by Dezé Energy Corporation (DEC), which is comprised of
21 the NWT Energy Corporation (03) (NTEC(03)), the Akaitcho Energy Corporation, and
22 the Métis Energy Company Limited.

23
24 The DEC is pursuing this project due to the significant upfront speculative investment
25 required, NTPC's lack of internal resources and DEC's ability to access government
26 funding. Also, the proposed customers of the Taltson expansion (the diamond mines)
27 are not regulated customers and are not seeking to be served by a regulated utility.

28
29 DEC's pursuit of the Taltson expansion ensures that regulated customers remain
30 protected from the business risks associated with this large scale development.

1 However, the regulated customer will still benefit from the substantial upgrades to the
2 Taltson facility at considerable savings. NTPC's role will be through an operating
3 agreement for the new hydro site, potential sale of surplus power, and capital upgrades
4 funded by DEC.

5

6 ***Funding***

7 To date, approximately \$10 million (provided by the Federal government, Territorial
8 government, and the project proponents) has been expended to bring the project to this
9 relatively advanced stage of development. The GNWT has allocated to Dezé Energy
10 Corporation \$2.5 million in funding for 2009/10 as part of its Energy Priorities
11 Investments Plan.

12 **2.14 Wha Ti Mini Hydro and Larger-Scale Hydro**

13 ***Efforts and Progress***

14 The Community of Wha Ti is investigating the construction of a mini hydro project
15 (known as the Nailii Project) on the La Martre River. This project consists of installing a
16 1.2 MW hydro unit to serve the community load and heating requirements. The project
17 would also have environmental benefits related to reduced GHG emissions from
18 thermal generation. The existing diesel plant would continue to be maintained as back-
19 up generation for the community. The Nailii mini hydro project has completed
20 considerable field assessments related to wildlife, vegetation and aquatics as well as
21 engineering and capital cost estimates in 2008/09 that are sufficient to proceed to more
22 advanced design.

23

24 This initiative is being studied in conjunction with two other options: a larger-scale hydro
25 development on the same site and a transmission line to the Corporation's existing
26 Snare Hydro facility (see Section 2.7). A recent study commissioned by the Tli Cho
27 Investment Corporation (TIC) has identified considerable hydro potential in the range of
28 6-15 MW on the same river site. Although the smaller plant still remains viable,

1 preliminary indications are that the larger site is a more favourable economic project
2 with comparable environmental impact.

3
4 For this reason, work that will be complementary to any hydro development sized
5 between 1 and 15 MW will be undertaken in 2009/10. Bathymetric studies of the head
6 pond area and topographical and geotechnical analysis at both shores of the La Martre
7 Falls will be completed in 2009/10 as will a baseline environmental analysis of air
8 quality, climate, soil, and water. As well, community consultation, traditional knowledge
9 investigations, and a regional discussion on opportunities and objectives of the
10 community of Wha Ti and Tli Cho government are planned.

11

12 ***Justification for Affiliates vs. NTPC Pursuing This Project***

13 This project is being pursued by NT Hydro (assisted by its subsidiary NTEC(03)). As
14 the controlling partner, the community of Wha Ti identified NT Hydro as their preferred
15 partner. The GNWT agreed, and has allocated funding to NT Hydro. It is possible that
16 TIC may decide to pursue this as an independent project. Under any of these scenarios
17 NTPC would still have a role through a purchase power agreement.

18

19 ***Funding***

20 NTEC (03) received \$350,000 from the GNWT and Federal Government's Eco Trust
21 Fund Program to fund the studies. The GNWT has committed further funding in
22 2009/10 for the work scheduled this year.

23 **2.15 Bear River Feasibility Study/Sahtu Regional Hydro Assessment**

24 ***Efforts and Progress***

25 This is a proposed study undertaken by Sahdae Energy Limited to examine the
26 feasibility of hydro generation on the Bear River to provide power to the communities of
27 Deline and Tulita. The possible construction of a natural gas pipeline down the
28 Mackenzie Valley has given rise to the opportunity of generating and supplying

1 hydroelectricity to the pipeline operators. The Bear River has hydro generation potential
2 given the location of the St. Charles rapids and the proximity of Deline and Tulita to that
3 generation site.

4

5 The Bear River Feasibility Study has now been put forward as the Sahtu Regional
6 Hydro Assessment. This is an initiative that falls under the umbrella of the NWT Hydro
7 Strategy to undertake a regional hydro electric assessment of the Sahtu region. It will
8 be guided by community input and may include the examination of all viable energy
9 options for communities and potential industrial customers in the region. This initiative
10 will re-engage the Sahtu communities to discuss their interests and help identify energy
11 resource potential as well as to identify viable options for supplying renewable energy to
12 the region in the future.

13

14 ***Justification for Affiliates vs. NTPC Pursuing This Project***

15 This project is being pursued by Sahdae Energy Limited. It is a project where partners
16 will be required and the risk is considerable.

17

18 ***Funding***

19 The GNWT has contributed \$100,000 in 2009/10 as part of its Energy Priorities
20 Investments Plan.

21 **2.16 Net Metering**

22 ***Efforts and Progress***

23 Net metering involves system-connecting customers that have acceptable renewable
24 energy generation in excess of their own needs and are interested in selling the excess
25 energy into the grid. On April 23, 2009, NTPC and Northland Utilities (NUL) submitted a
26 proposal to the PUB outlining possible parameters for a net metering project. This
27 submission was in response to interrogatories received from the PUB during recent rate

1 applications and discussions with the PUB that ensued after the rate applications were
2 completed.

3
4 The PUB sent the proposal to a distribution list and called for interrogatories. On the
5 basis of the interrogatories received, NTPC and NUL determined that the scope of a net
6 metering project is beyond a business arrangement between a generator and a utility
7 and would be better driven by a government-led group with the utilities and other
8 stakeholders participating and providing technical expertise. In consideration of this,
9 NTPC and NUL withdrew their proposal on May 27, 2009, offering to provide their
10 cooperation to a group assembled by the GNWT to address the full spectrum of issues
11 surrounding net metering.

12
13 The Department of Environmental and Natural Resources (ENR) from the GNWT is now
14 leading this initiative, with the cooperation of NTPC and NUL. The three parties met in
15 June 2009 to discuss continued progress on net metering and will continue to
16 collaborate on this endeavour.

17
18 ***Justification for Affiliates vs. NTPC Pursuing This Project***

19 This is a GNWT initiative in which NTPC is playing a supporting role.

20
21 ***Funding***

22 This is a self-funded GNWT initiative.

23 **2.17 Biomass Strategy Implementation**

24 ***Efforts and Progress***

25 The GNWT has identified the implementation of biomass energy as one of its energy
26 investment priorities. As such, the Department of Environment and Natural Resources
27 has formed a committee to further investigate this energy option and NTPC participates
28 on this committee.

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Justification for Affiliates vs. NTPC Pursuing This Project

This is a GNWT initiative in which NTPC is playing a supporting role.

Funding

This is a self-funded GNWT initiative.

3.0 DEMAND SIDE MANAGEMENT AND ENERGY EFFICIENCY PROJECTS

In addition to alternative energy projects, the Corporation investigates and pursues DSM and energy efficiency projects where these projects provide economic or other benefits to the Corporation and its customers. This section reviews those projects related to energy efficiency and DSM currently being investigated or implemented by the Corporation.

3.1 Streetlight Conversion

Efforts and Progress

Nothing new to report.

Justification for Affiliates vs. NTPC Pursuing This Project

This project was initiated and completed by NTPC. It was an energy-efficiency initiative that converged with its operations to serve regulated customers.

Funding

Funding to help offset the change-out costs is available to communities through the NWT Energy Conservation Program from the GNWT's Department of Environment and Natural Resources. NTPC played a key role in helping communities secure this funding including: informing communities of the existence of the program; assisting with the completion of the required documentation; and acting as liaison between the community and the GNWT.

1 **3.2 Light Emitting Diode (LED) Streetlights**

2 ***Efforts and Progress***

3 LED streetlights use less than half the power of high pressure sodium lights of the same
4 output and, although they cost about double the price, these lights may last up to 1
5 million hours versus the typical 30,000 hours of high pressure sodium lights. The
6 Corporation purchased six LED streetlights and installed them in March 2009 at its
7 plants in three trial locations: Yellowknife (Jackfish plant), Inuvik, and Fort Simpson.
8 After installation, performance was monitored from an operational and economic
9 standpoint. To date, the trial has been favourable and the Corporation will continue to
10 add more LED streetlights to the Jackfish plant and monitor the cost/benefit of their
11 installation.

12

13 ***Justification for Affiliates vs. NTPC Pursuing This Project***

14 This project was initiated and is being completed by NTPC. It is an energy-efficiency
15 initiative that converges with its operations to serve regulated customers.

16

17 ***Funding***

18 NTPC is funding this project.

19 **3.3 Longer Life Batteries**

20 ***Efforts and Progress***

21 Nothing new to report.

22

23 ***Justification for Affiliates vs. NTPC Pursuing This Project***

24 This project was initiated and is being completed by NTPC. It is an energy-efficiency
25 initiative that converges with its operations to serve regulated customers.

26

27 ***Funding***

1 NTPC is funding this project.

2 **3.4 Diesel Fuel Catalysts and Fuel-Saving Devices**

3 ***Efforts and Progress***

4 A diesel fuel catalyst is a substance that, when mixed with low sulphur diesel fuel
5 makes a physical change to the way the diesel fuel is burned. As a result, fuel
6 consumption, engine wear, and emissions are reduced in older model engines currently
7 in service. However, it is not expected to materially improve engine efficiency for new
8 engines equipped for the new California emission standards. NTPC is investigating and
9 speaking with other Canadian companies that use these products.

10

11 Fuel-saving devices are installed on the engine's fuel line and are meant to reduce fuel
12 consumption and emissions. NTPC is in the process of testing one of these devices on
13 the market – "Etorus FE". In June 2009, baseline studies are being conducted on two
14 engines for a 1-month period, following which the fuel-savings device will be rented and
15 installed on the engines for a subsequent 2 to 3-month period and fuel savings
16 measured.

17

18 ***Justification for Affiliates vs. NTPC Pursuing This Project***

19 This project was initiated and is being completed by NTPC. It is an energy-efficiency
20 initiative that converges with its operations to serve regulated customers and, if
21 successful, will lower fuel expense.

22

23 ***Funding***

24 NTPC is funding this project.

25 **3.5 Fort Smith Electric Heat**

26 ***Efforts and Progress***

1 The GNWT has converted the heating system in several of its buildings in Fort Smith to
2 one that uses electric boilers. This heating system avoids the use of heating oil and
3 therefore reduces GHG emissions. All costs associated with this conversion including
4 all upgrades to the Corporation's distribution system were funded by the GNWT. To
5 support these efforts, NTPC is selling the electricity used for heating purposes to the
6 GNWT at an interruptible rate in accordance with PUB Decision 19-2005.

7

8 ***Justification for Affiliates vs. NTPC Pursuing This Project***

9 NTPC partnered with the GNWT on this project.

10

11 ***Funding***

12 All costs associated with this conversion including all upgrades to the Corporation's
13 distribution system were funded by the GNWT.

14 **3.6 Station Service Initiatives**

15 ***Efforts and Progress***

16 The Corporation has undertaken a number of measures to reduce its reliance on diesel
17 fuel and to assist customers to conserve energy, thereby reducing diesel generation.
18 These measures were identified and described in the December 2008 Report. The
19 Corporation continues to implement those measures.

20

21 In the spring of 2009, an Energy Conservation Challenge was issued by NTPC Senior
22 Management to all employees, requesting their ideas on how the Corporation could
23 further reduce its energy usage. To date, 113 responses have been received. Senior
24 Management has committed to review these suggestions on a regular basis. During the
25 first of these reviews, a Top 10 list was chosen (based on a cost/benefit analysis) and
26 the suggestions on this list will be implemented in a timely manner.

27

28 ***Justification for Affiliates vs. NTPC Pursuing This Project***

1 NTPC is pursuing this project. It is an energy-efficiency initiative that converges with its
2 operations to serve regulated customers.

3

4 ***Funding***

5 NTPC has funded and continues to fund this project.

6 **3.7 Energy Audits**

7 ***Efforts and Progress***

8 Since the last report, eight commercial customer energy audits have been completed.
9 NTPC commissioned these reports to assist General Service customers to identify cost-
10 effective opportunities to decrease electric energy costs. The scope of the work
11 involved reviewing and analyzing three years of historical usage to set pre-audit
12 baselines and identify anomalies, completing site visits to confirm details of installed
13 equipment, and identifying opportunities to reduce energy usage and save costs. Three
14 of these audits were completed in Inuvik and five were completed for customers in Fort
15 Simpson.

16

17 ***Justification for Affiliates vs. NTPC Pursuing This Project***

18 NTPC pursued this project. It is an energy-efficiency initiative that converges with its
19 operations to serve regulated customers.

20

21 ***Funding***

22 NTPC funded this program at a total cost \$78,000. Unless another funding source can
23 be identified, the program will not continue. As well, inability to secure qualified
24 personnel to conduct these audits may threaten the program's future. NTPC is in
25 discussion with the GNWT for funding for this program.

1 **3.8 Energy Conservation Education**

2 ***Efforts and Progress***

3 NTPC is committed to both employee and customer education regarding energy
4 awareness. In addition to the measures described in the December 2008 Report,
5 NTPC's Health and Safety Department delivers a "School Safety Program" to Grade 5
6 students throughout the Northwest Territories. The program, spanning the course of 3-
7 4 individual sessions, explains to students how electricity is made in their respective
8 communities, how it gets to their homes, how to use it wisely and how to be safe around
9 it. There is a 16-page safety booklet that the department representative works through
10 with the children and several electrical safety videos are presented. In 2008/09, this
11 program was delivered in 23 communities.

12

13 ***Justification for Affiliates vs. NTPC Pursuing This Project***

14 This project is an NTPC initiative.

15

16 ***Funding***

17 NTPC funds this project.

18 **4.0 CONCLUSION**

19 This report has been prepared in compliance with Directive 51 from Decision 13-2007
20 and covers the period up to June 30, 2009. Subsequent reports will be prepared to
21 update this information and provide new information to be filed with the PUB on a
22 biannual basis.