PROJECT NEWS
Eastmain-1-A/Sarcelle/Rupert

Bulletin No. 1 May 2011

THE PROJECT

Construction of the Eastmain-1-A/Sarcelle/Rupert project in the Baie-James region got under way in January 2007. The project calls for building a 768-MW powerhouse, Eastmain-1-A, near the existing Eastmain-1 powerhouse, and a 150-MW powerhouse, Sarcelle, at the outlet of Opinaca reservoir, as well as the partial diversion of the Rivière Rupert.

The project reached a major milestone in November 2009, when the Rupert diversion went into operation: a portion of the river's water now flows to Eastmain-1, Eastmain-1-A and Sarcelle powerhouses, and on to three existing generating stations in the La Grande complex (Robert-Bourassa, La Grande-2-A and La Grande-1). Once it is completed in 2012, this project will allow Hydro-Québec to add 8.7 TWh to its annual output.

Bringing the power generated by the new facilities onto the grid required the construction of a short 315-kV line between Eastmain-1 and Eastmain-1-A substations, and an approximately 100-km line, also at 315 kV, between Sarcelle and Eastmain-1 substations. In addition, 160 km of permanent roads had to be built.

Partnering for success

The ***Boumhounan Agreement***, which followed the signing of the Paix des Braves in February 2002, sets out the framework for the Eastmain-1-A/Sarcelle/Rupert project. It was signed by Hydro-Québec, Société d'énergie de la Baie James, the Cree Regional Authority, the Grand Council of the Crees (Eeyou Istchee) and the Cree communities concerned. During the draft design phase, the Crees contributed their traditional lore and knowledge of the land to the environmental and technical studies. They are taking part in building some of the structures and will be involved in the environmental follow-up activities as well.

Interior of Eastmain-1-A powerhouse during construction.

AT A GLANCE

Proponent: Hydro-Québec Production

Work involved: construction of two powerhouses, two substations and two lines, as well as various retaining and diversion structures; relocation of three 735-kV transmission line sections

Project agent: Société d'énergie de la Baie James

Region: Nord-du-Québec

Duration of work: 2007-2012

Workforce: 4,000 at the peak of construction (summer 2009)

Project cost: $5 billion

Economic spinoffs in Québec: $2,883 million

Jobs created and sustained: 33,000 person-years

Technical innovations

DAM WITH AN ASPHALT CONCRETE CORE

Nemiscau-1 dam has an asphalt concrete core—a Canadian first. Well known in Europe, this technique ensures that a structure is watertight. Hydro-Québec has mastered the technique for use in future projects in northern regions where till, the material generally employed in Québec, is hard to find.

PREFABRICATED COMPONENTS ASSEMBLED ON-SITE

Eastmain-1-A powerhouse is partly built from prefabricated components assembled on- site. This made work on the powerhouse go faster.

BULB-TYPE TURBINES

This is the first time Hydro-Québec has installed bulb-type turbines in one of its generating stations. This type of equipment is ideal for sites where there is low hydraulic head and heavy flow. Sarcelle powerhouse is equipped with three of these units.

EASTMAIN-1-A POWERHOUSE

Installed capacity	768 MW
Annual output	2.3 TWh
Type of powerhouse	Surface
Number of generating units	3
Type of turbine	Vertical Francis
Head	63 m
Design flow	1,344 m^3/s
Commissioning	2011

Eastmain-1-A powerhouse (left, background) and Eastmain-1 powerhouse (right).

SARCELLE POWERHOUSE

Installed capacity	150 MW
Annual output	1.1 TWh
Type of powerhouse	Surface
Number of generating units	3
Type of unit	Horizontal bulb
Rated net head	11.7 m
Design flow	1,380 m^3/s
Commissioning	2011–2012

Water intake at Sarcelle powerhouse.

AVERAGE ANNUAL OUTPUT (TWH)

Eastmain-1-A powerhouse (including additional output from Eastmain-1 powerhouse)	2.3
Sarcelle powerhouse	1.1
Robert-Bourassa, La Grande-2-A and La Grande-1 (additional output)	5.3
Total	**8.7**

Rupert diversion

Sustainable development

- ENVIRONMENTAL COMPONENT: Integration of important environmental criteria right from the project design phase
- SOCIAL COMPONENT: Participation by host communities during development and at all other stages in the project
- ECONOMIC COMPONENT: Increased economic efficiency through maximization of generating capacity of existing facilities in the La Grande complex

Main environmental criteria

- Minimal flooding of land
- Implementation of an ecological instream flow regime at the Rupert's closure point to preserve fish habitat and use of the river
- Maintaining of Cree hunting, fishing and trapping activities

Weir at KP 290 of the Rupert and channel allowing the free movement of fish.

Weir at KP 223 of the Rupert. Downstream, Hydro-Québec developed spawning grounds for walleye, suckers and whitefish.

Michel Shecapio from the Cree community of Mistissini conducting a land survey.

The Rupert has been partially diverted by means of a dam and a control structure (spillway) built 314 km from the river mouth. At this point, 29% of the water in the Rupert continues along its previous course, while 71% is diverted north. With inflows from the river's tributaries, the flow at the mouth of the Rupert, near Waskaganish, is equivalent to 48% of the mean annual flow measured before the diversion.

On the Rupert, downstream of the dam

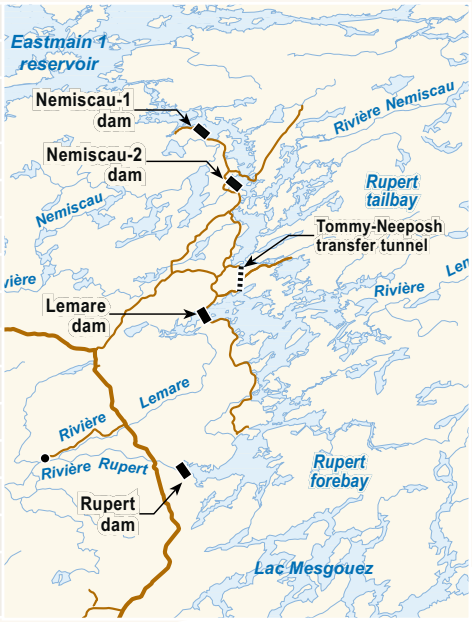
To protect fish communities and habitat, and preserve navigation and fishing, an ecological instream flow regime has been implemented at Rupert dam. The instream flow and hydraulic structures (weirs, spur dikes, rock blanket) maintain mean summer water levels over nearly half of the river, which remains navigable throughout its length. These measures help maintain land users' activities.

Rupert diversion bays, upstream of the dam

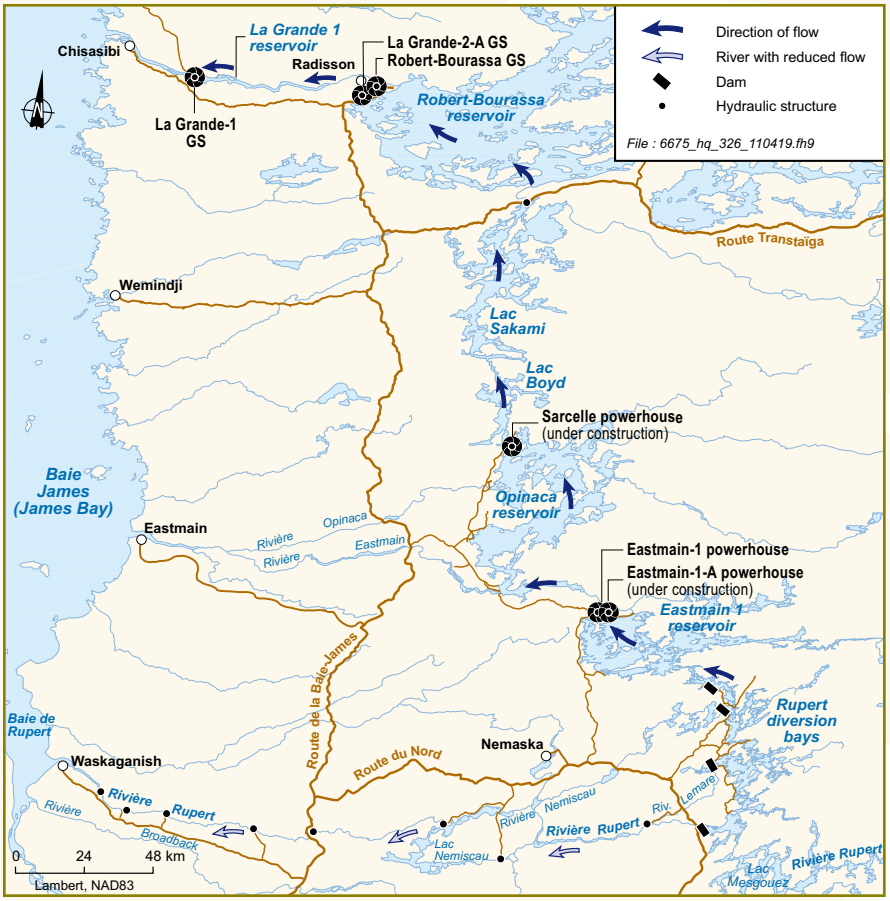
A hundred or so structures (dams, instream flow release structures, spillway, dikes, canals) have been built to create two diversion bays that, since November 2009, have received the flow diverted from the Rupert. The diversion bays, which are connected by the Tommy-Neeposh transfer tunnel, channel the flow toward Eastmain 1 reservoir.

RUPERT DIVERSION

Number of dams	4
Height and length of main dam (Rupert)	29 m and 470 m
Location of main dam and spillway	314 km from the mouth of the Rupert
Spillway capacity	3,470 m^3/s
Mean annual instream flow at main dam	181 m^3/s
Number of dikes	73
Length of dikes	28 km
Number of instream flow release structures	5
Number of canals	10
Length of canals	7 km
Length and area of forebay	42 km and 229 km^2
Length and area of tailbay	44 km and 117 km^2
Length and capacity of transfer tunnel	2.9 km et 800 m^3/s
Area of flooded land	188 km^2
Impoundment of diversion bays and diversion of river	2009



Unlike reservoirs, which are designed to store water, diversion bays direct the flow of water without storing it.



For more information:

Société d'énergie de la Baie James
Direction – Projets de l'Eastmain
888, boul. de Maisonneuve Est
6e étage
Montréal (Québec) H2L 5B2
CANADA
E-mail: SEBJ_Eastmain_1A@hydro.qc.ca

www.hydroquebec.com/sebj/en

Prepared by Direction – Services de communication
for Direction – Projets de l'Eastmain
Société d'énergie de la Baie James

2011G067A

Hydro Québec