

## **1. Description of point of delivery/receipt LAW**

The Québec transmission system is linked to the Ontario grid by lines B31L and B5D, operated at 230 kV. Line B31L links Beauharnois substation, belonging to Hydro-Québec TransÉnergie (the Transmission Provider), to St. Lawrence substation, owned by Hydro One. Line B5D links Beauharnois substation to St. Isidore substation, also owned by Hydro One.

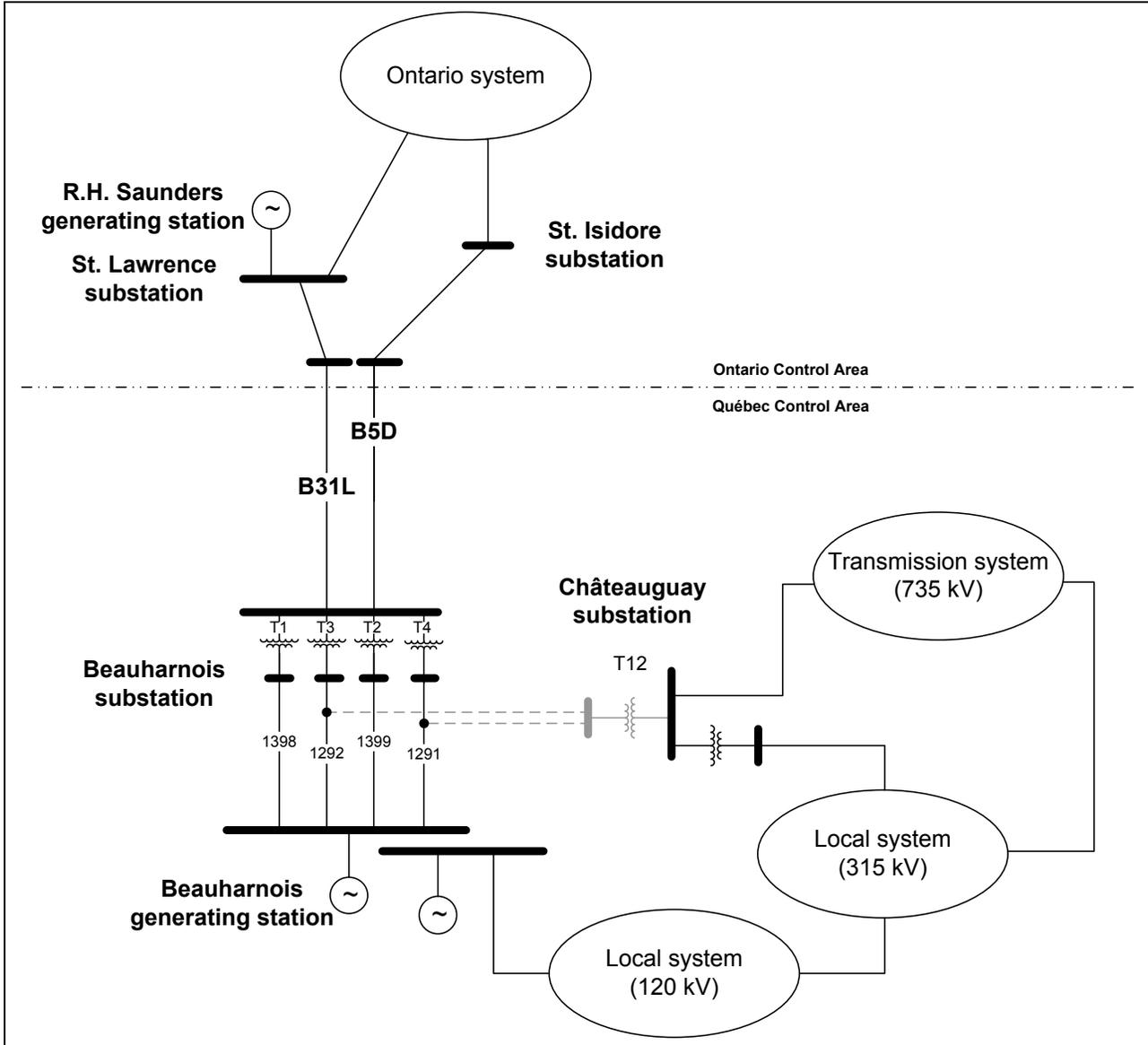
For power flows to be made, either generators at Beauharnois generating station, belonging to Hydro-Québec Production (HQP), are synchronized to the neighboring system or generators at R.H. Saunders generating station, belonging to Ontario Power Generation (OPG), are synchronized to the Transmission Provider's system.

There are three operating modes possible for point LAW: delivery, receipt and bidirectional. The three are not necessarily possible at all times but depend on capacities subject to firm transmission service reservations or to day-ahead transmission schedules.

**1.1. Configuration as point of delivery**

Power flows at point of delivery LAW are achieved by isolating Beauharnois generating units from the Transmission Provider’s system and synchronizing them to the neighboring system over line B5D and/or B31L (see Figure 1).

**Figure 1: Point of delivery LAW**

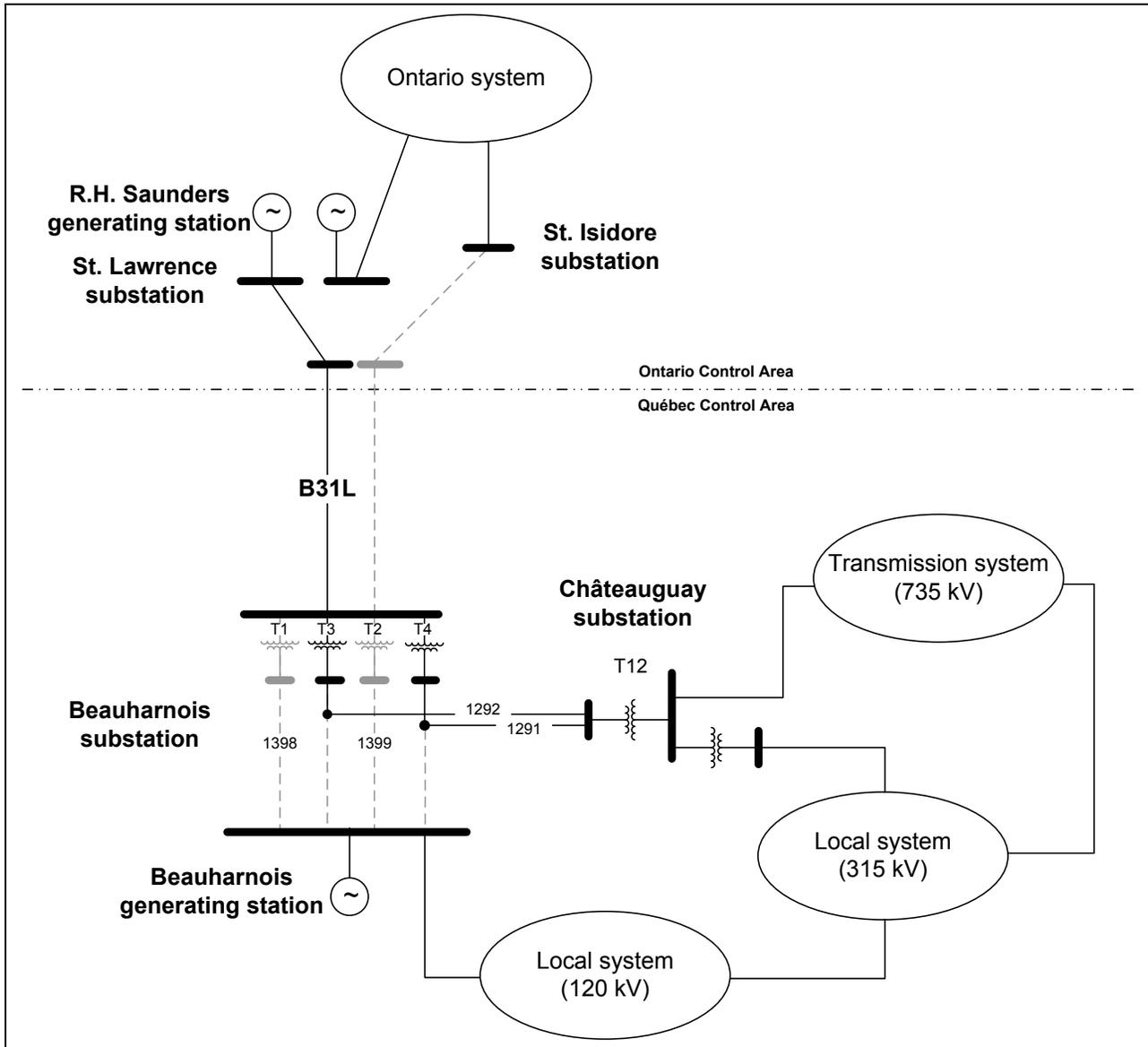


**1.2. Configuration as point of receipt**

Power flows at point of receipt LAW are achieved by isolating R.H. Saunders generating units from the neighboring system and synchronizing them to the Transmission Provider’s system over line B31L (see Figure 2). The link to the 735-kV transmission system is then made over

120-kV circuits 1291 and 1292 connecting Beauharnois substation to Châteauguay substation transformer T12. Flows can be rerouted over 120-kV lines in the local system in the event of a transformer T12 outage.

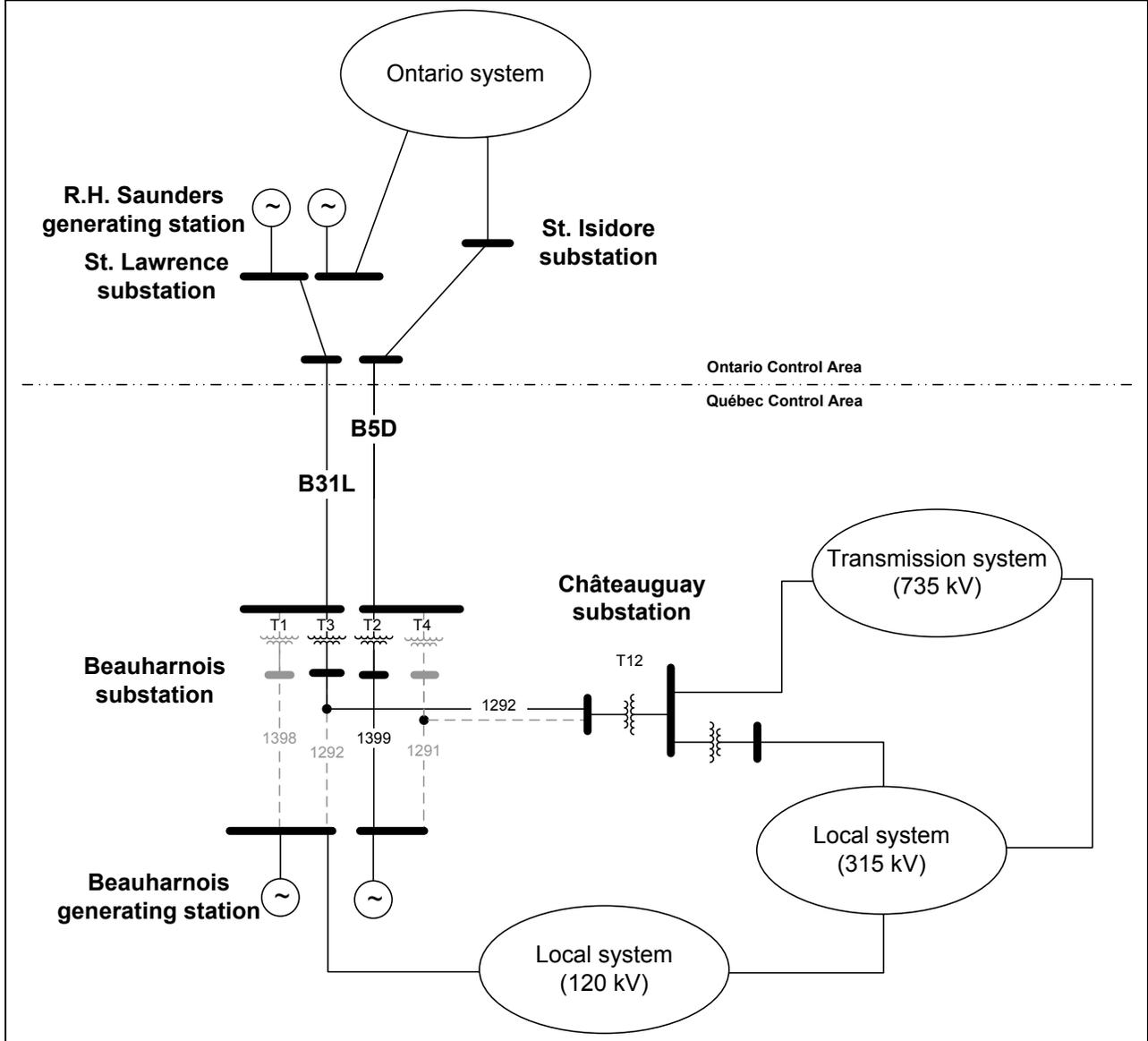
**Figure 2: Point of receipt LAW**



**1.3. Configuration as a bidirectional point**

Bidirectional power flows at point LAW are achieved by synchronizing R.H Saunders generating units to the Transmission Provider's system over line B31L, and Beauharnois generating units to the neighboring system over line B5D (see Figure 3).

**Figure 3: Point Law in bidirectional mode**



## 2. Transfer capability

### 2.1. Total transfer capability

The total transfer capability (TTC) of point of delivery LAW is 800 MW, limited by stability requirements.

The TTC of point of receipt LAW is 470 MW, also limited by stability requirements.

In bidirectional mode, the TTC of the point of receipt ranges from 240 to 340 MW, depending on the ambient temperature, while the TTC of the point of delivery is 400 MW, regardless of the ambient temperature.

#### 2.1.1. Capacity under normal conditions (all facilities available)

With all system facilities available and no confirmed firm reservations or accepted schedules, the TTC of the point of delivery is 800 MW and that of the point of receipt 470 MW. Every time a firm service request is confirmed or a non-firm day-ahead transmission schedule is accepted, the Transmission Provider checks which operating modes are still possible and, if necessary, adjusts TTCs accordingly (see Table 1).

**Table 1: Transfer capabilities and reliability margins under normal conditions**

Confirmed firm reservations and accepted schedules	Modes possibles	Delivery		Receipt	
		TTC	TRM	TTC	TRM
None	Delivery, receipt and bidirectional	800	400	470	130–230
Delivery only: Total power < TTC (bidirectional)	Delivery and bidirectional	800	400	240–340	0
Delivery only: Total power > TTC (bidirectional)	Delivery	800	400	0	0
Receipt only: Total power < TTC (bidirectional)	Receipt and bidirectional	400	0	470	130–230
Receipt only: Total power > TTC (bidirectional)	Receipt	0	0	470	130–230
Delivery and receipt	Bidirectional	400	0	240–340	0

### 2.1.2. Capacity under degraded conditions (one or more equipment outages)

Planned outages for lines B5D and B31L are scheduled so they do not coincide. The circuit in service is then operated so as to prioritize the use of line B5D for delivery and of line B31L for receipt.<sup>1</sup> Transfer capabilities are reduced accordingly (see Table 2).

**Table 2: Transfer capabilities and reliability margins under degraded conditions**

Outage of line:	Confirmed firm reservations and accepted schedules	Modes possibles	Delivery		Receipt	
			TTC	TRM	TTC	TRM
B31L	N/A	Delivery	400	0	0	0
B5D	None	Delivery or receipt	400	400	470	130–230
	Receipt reservations and schedules	Receipt	0	0	470	130–230
	Delivery schedules	Delivery	400	400	0	0

The transfer capability of the point of delivery also depends on the availability and capacity of 120-kV circuits 1398, 1399, 1291 and 1292 from 120/230-kV Beauharnois substation and of transformers T1, T2, T3 and T4 at that substation. Those facilities make it possible to carry Beauharnois generating unit output to the neighboring system.

The transfer capability of the point of receipt also depends on the availability and capacity of 120-kV circuits 1291 and 1292 from 120/230-kV Beauharnois substation and of transformers T3 and T4 at that substation. Those facilities make it possible to carry R.H. Saunders generating station output to the Transmission Provider’s system.

### 2.2. Transmission reliability margin

The transmission reliability margin (TRM) quantifies the Transmission Provider’s uncertainty regarding the possibility of offering the anticipated transfer capability. For point LAW, the TRM factors in the lower delivery and receipt capacities in bidirectional mode.

### 2.3. Neighboring system constraints

Transfer capabilities posted by the Transmission Provider do not account for operating conditions on the neighboring system.

## 3. Commercial aspects

Since any transmission service requested entails synchronizing generating units on the Transmission Provider’s system to the neighboring system, or vice versa, the customer must have an agreement to that effect in place with the generating unit owner, either HQP or OPG.

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<sup>1</sup> The Transmission Provider can accept non-firm transmission reservations using line B31L for delivery provided there are no firm reservations using it for receipt.

Transmission capacities posted by the Transmission Provider do not take into account anticipated operating conditions at Beauharnois generating station. Due to those conditions, less capacity may be available for delivery to the neighboring system than the posted transfer capability.

Because of the configuration of lines B5D and B31L, of measures available at Beauharnois (HQP) and R.H. Saunders (OPG) generating stations, and of rules by the manager of the neighboring transmission system,<sup>2</sup> the Transmission Provider does not take into account schedules over the reverse path in calculating the capacity of point LAW. Available transfer capability (ATC) values for point of delivery LAW and point of receipt LAW are thus calculated independently.

Capabilities offered on OASIS are 800 MW for delivery and 470 MW for receipt, until such values are no longer achievable. As firm service requests are confirmed, TTC and TRM values are adjusted promptly so that they reflect, for each hour of the day, the operating mode(s) that remain possible. The final operating mode is determined in real time. Real-time management rules are designed to avoid curtailing approved day-ahead schedules.

There is no minimum time between successive changes in mode, which can only be rejected on the grounds of technical or operating constraints. The deadline for receiving firm reservations and associated schedules is about 40 minutes before the hour in order to allow operators sufficient time to change modes.

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<sup>2</sup> The Independent Electricity System Operator, better known by its acronym “IESO”.