



Renewable Generation Supply to London Hydro: Progress Report & Outlook

Wind, Sun & Energy Storage

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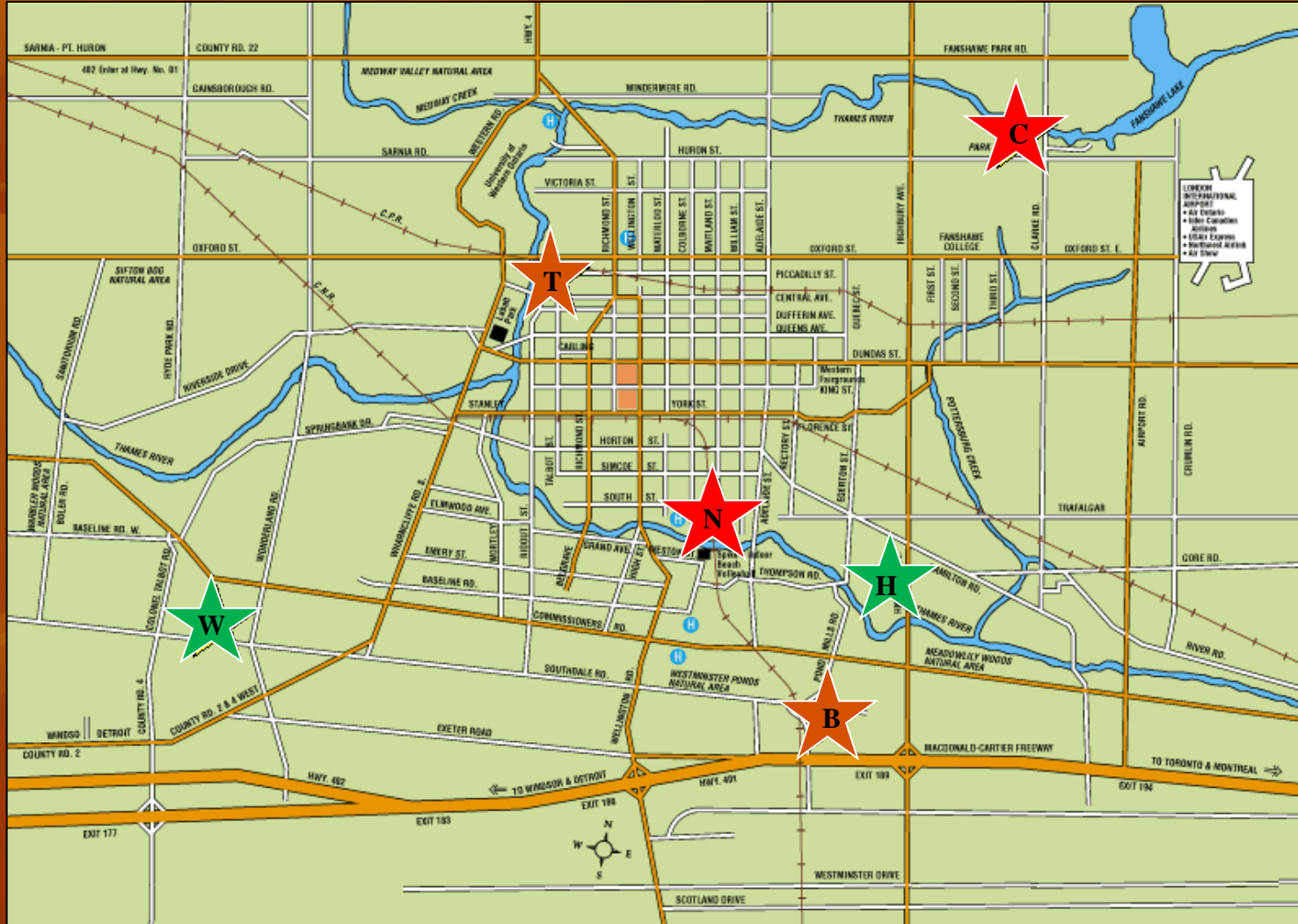
Today's Presentation Topics

- An overview of London Hydro
- London Hydro's past experience with distributed generation projects
- Ontario's Feed-In Tariff (FIT) program
- Renewable projects now in the queue
- Technical challenges
- London Hydro strategic solar investments
- Summary

London Hydro at a Glance

- Gross Revenue : \$338M; Net Income: \$9M
- 146,975 customers:
 - 133,452 residential
 - 11,898 general service < 50 kW
 - 1,621 general service > 50 kW
 - 4 large user > 5,000 kW
- Service territory 422 square kilometers (163 square miles); 61% urban & 39% rural
- Approx. 300 employees
- Average Peak Load of 700 MW (Max Peak Load of 719 MW recorded on August 2nd, 2006)
- Annual Consumption – 3,400 GWh

Supply to London Hydro from the Provincial Transmission Grid



B – Buchanan TS

C – Clarke TS

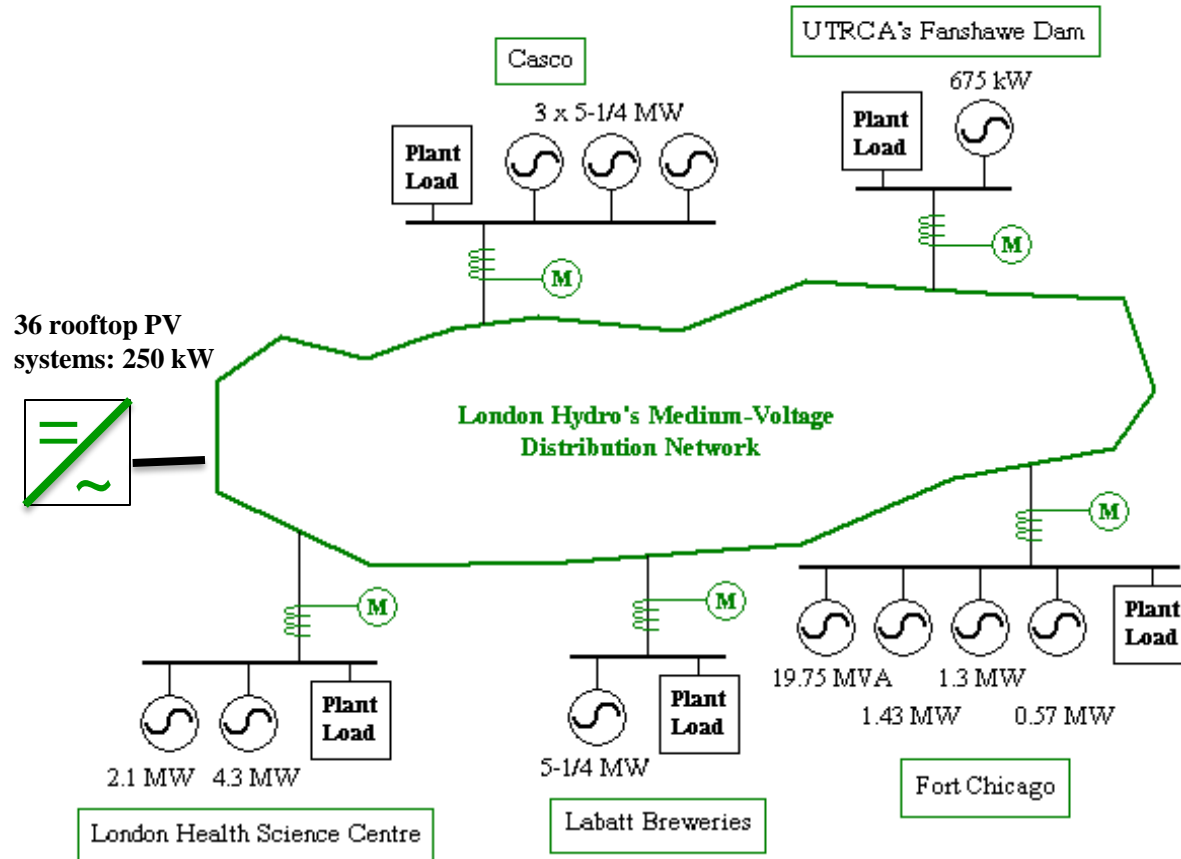
H – Highbury TS

N – Nelson TS

T – Talbot TS

W – Wonderland TS

Supply to London Hydro from Local Generators



FIT & microFIT

(Feed in Tariff)

- February 23, 2009, *Green Energy & Green Economy Act* introduced
- October 1, 2009, FIT and microFIT rules released
- January 1, 2011, Domestic content increased to 60%

Generator Classification	Rating
Micro	≤10 kW
Capacity Allocation Exempt (CAE)	≤500 kW connected to ≥15 kV ≤250 kW connected to <15 kV
Small	≤500 kW connected to <15 kV ≤1 MW connected to ≥15 kV
Mid-Sized	≤10 MW but >500 kW connected to <15 kV >1 MW but ≤10 MW connected to ≥15 kV
Large	>10 MW – mostly at transmission voltages

FIT & microFIT Program Update

As of the OPA's February 2011 release, the process for issuing contracts has changed. There are now three approaches to screening for connection capability in the FIT and microFIT programs:

Project type	Project size	Connection screening process
FIT Capacity Allocation Required (CAR)	Generally projects which are greater than 500kW	A contract is issued once a project passes the Transmission Availability Test and Distribution Test (TAT/DAT). A project which does not pass the TAT/DAT is considered for a contract through the Economic Connection Test process.
FIT Capacity Allocation Exempt (CAE)	Generally projects which are 500kW or less	A contract is issued if the OPA determines that the project may be able to connect.
μFIT	Projects which are 10kW and less	A conditional offer of μFIT contract is issued by the OPA once the LDC has issued an Offer to Connect for the project.

FIT & microFIT Program Update (cont'd)

In order to ensure a balance between CAR, CAE and microFIT applications, and to ensure available connection capability is appropriately managed, the OPA applies the following thresholds in determining when a contract may be issued:

	Threshold	Eligible applications
Scenario 1	More than 5 MW can be accommodated at the connection point	CAR, CAE and microFIT applications are eligible for a contract
Scenario 2	5 MW or less can be accommodated at the connection point	Only CAE and microFIT applications are eligible for a contract
Scenario 3	2 MW or less can be accommodated at the connection point	Only microFIT applications are eligible for a conditional offer of microFIT contract
Scenario 4	0 MW can be accommodated at the connection point	No applications are eligible for a contract until the required transmission/distribution investments have been made.

FIT & microFIT Program Update (cont'd)

CFIT

The OPA is introducing a new stream in the FIT Program for commercial aggregators, called the CFIT (commercial feed-in-tariff) Program, to accommodate the unique nature of commercial micro-generation projects.

Some draft details are:

- 71.3 cents/kWh for rooftop solar PV projects
- 44.3 cents/kWh for ground-mounted solar PV projects
- Minimum application fee of \$500

Minister's Directive to the OEB

- Hydro One to develop and seek approvals for:
 - Upgrading transmission lines west of London
 - A new transmission line west of London
- Hydro One to develop and implement:
 - Devices to enhance transfer capability such as VAR compensation in southwest Ontario
 - Increase short circuit and/or transformer capacity at up to 15 transformer stations to enable connection of small scale (CAE and microFIT) generation

Note: London Hydro is also investing its own money to upgrade the short circuit capacity at Clarke TS

microFIT Process at London Hydro

microFIT Projects

- On February 9th LDCs were informed that certain stations across the province were now closed to microFIT generation. As a result, the new OPA rules require each proponent to contact their LDC and request an Offer to Connect.
- Contact: Cristina Terek, P.Eng.
(519) 661-5800 x4511
terekc@londonhydro.com

Connection Process

- Generator registers with the OPA
- Generator contacts utility
- Generator submits connect request form
- Utility issues Offer to Connect if capacity exists
- Utility notifies the OPA
- OPA provides conditional offer
- Generator installs the system and gets ESA approvals
- Utility connects generator to grid
- Utility informs the OPA of connection
- The OPA offers a contract

FIT Process at London Hydro

FIT Projects:

- Capacity Allocation Exempt (CAE) Generation (<500kW depending on the feeder circuit voltage)
- Capacity Allocation Required (CAR) Generation (>500kW depending on the feeder circuit voltage)
- As of the February 2011 OPA release, these two categories follow essentially the same process.
- Contact: Greg Sheil, P.Eng.
(519) 661-5800 x5725
sheilg@londonhydro.com

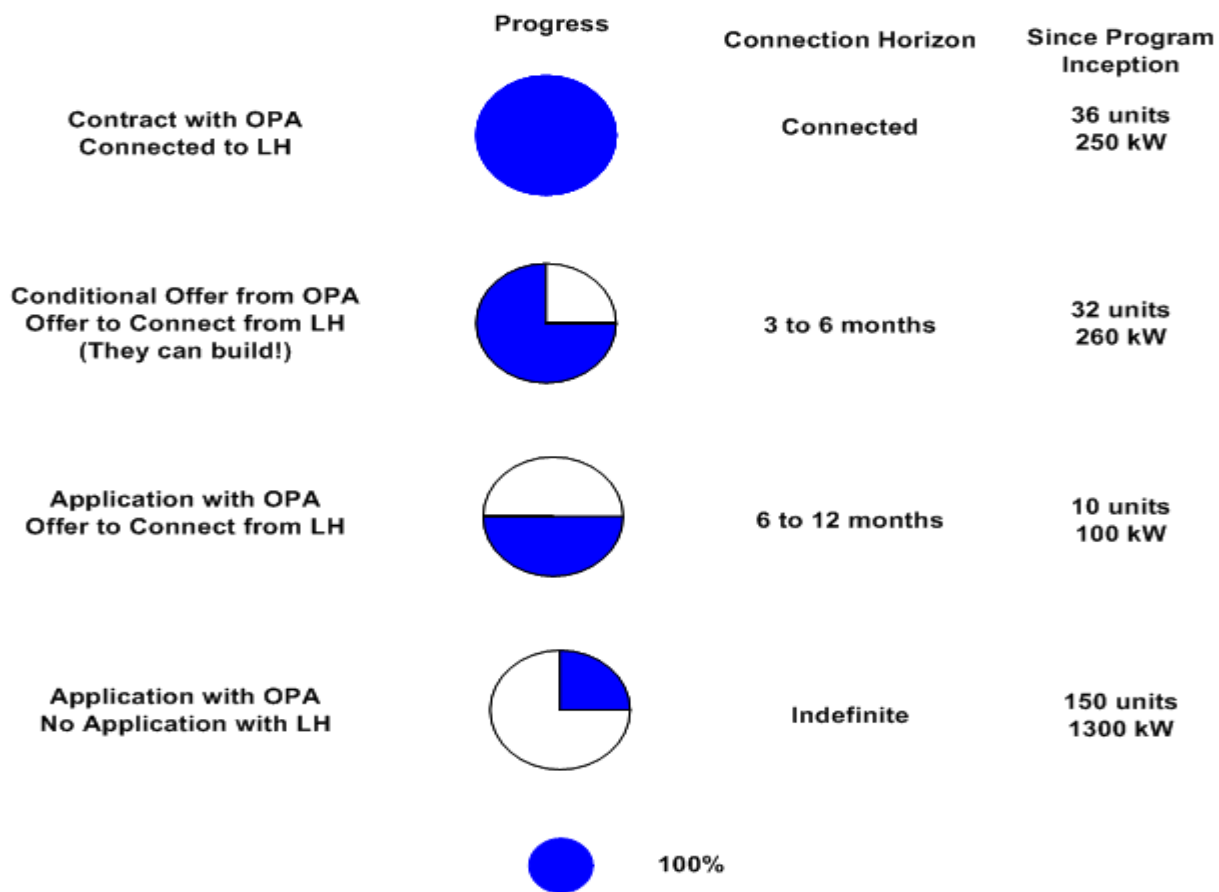
Connection Process

- Generator submits an Initial Feasibility Assessment (IFA) form to the LDC
- Generator applies to the OPA
- If approved, generator applies to LDC for a Customer Impact Assessment (CIA)
- Hydro One performs CIA study in tandem with LDC
- LDC develops Cost Connection Agreement
- Generator executes Connection Agreement and submits payment
- Generator installs system and gets ESA approvals
- Utility connects generator to grid
- Utility informs the OPA of connection
- The OPA offers a contract

Note: CAR projects of larger capacity could potentially be suspect; our suggestion is to please contact London Hydro at the earliest

London microFIT generation projects received to date

microFIT Activities for February 2011



London FIT projects approved to date

- Harvest Power Mustang Generation (Biogas) – 2.8MW
- OZZ Solar / Home Depot (Solar) – 500kW
- Wonderland Mini Storage (Solar) – 169kW
- Memorial Boys & Girls Club (Solar) – 120kW

All of these projects will be producing green energy this year.

Technical Challenges

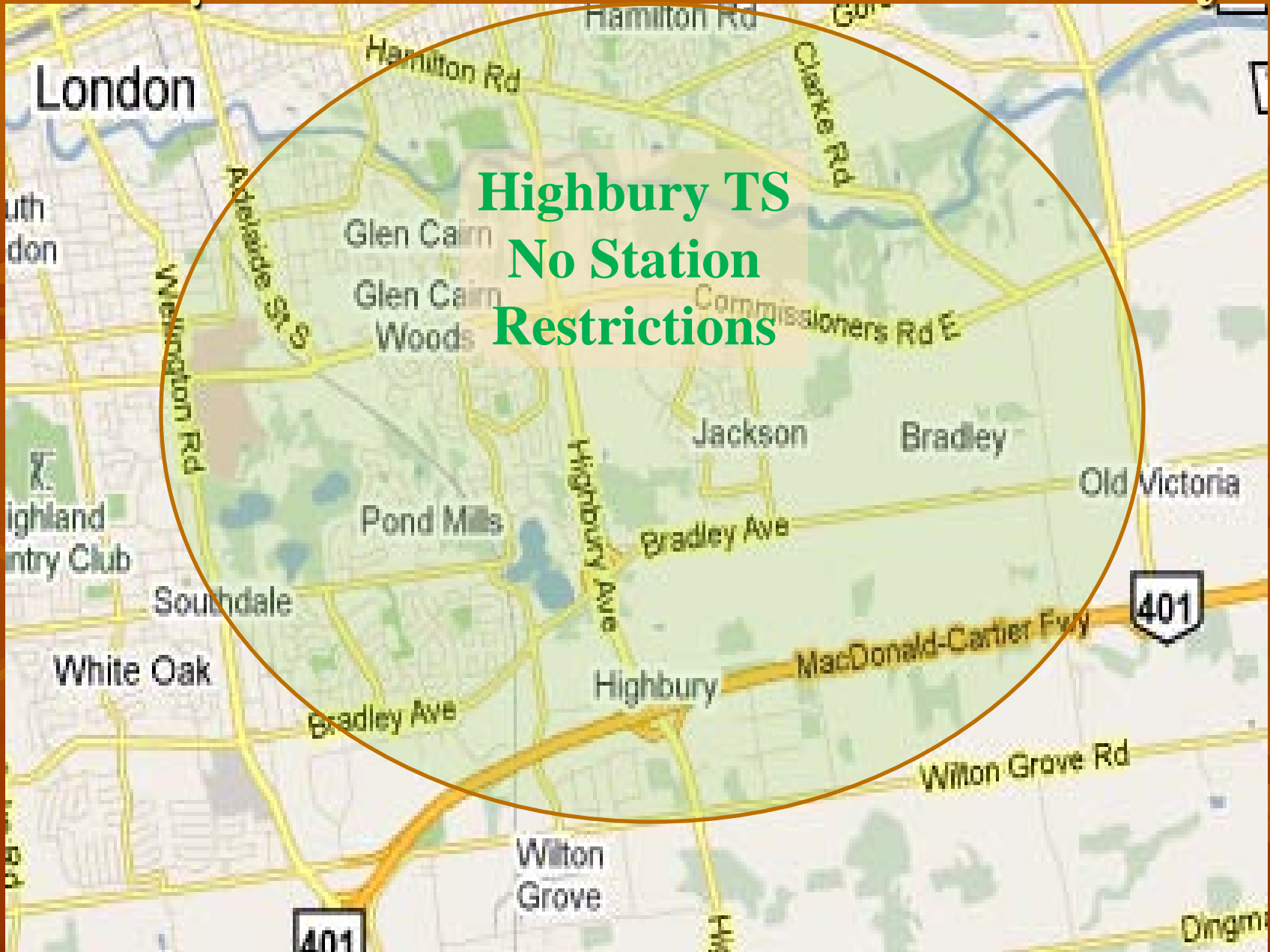
1. Safety
2. Station Capacity Issues
3. Operational Challenges
4. Transmission Constraints

Technical Challenges (cont'd)

Short circuit capability at the transformer stations continue to be the limiting factor regarding the connection of generation. The following is a list of transformer stations in the London area and their capacity to accept generation.

Transformer Station		Short Circuit Capacity	Thermal Capacity
Buchanan TS	B	Yes	Yes
	Y	No	Yes
Clarke TS	---	No	Yes
Highbury TS	---	Yes	Yes
Nelson TS DESN 1	BQ	No	Yes
Nelson TS DESN 2	PK	No	Yes
Nelson TS DESN 2	YJ	No	Yes
Talbot TS DESN 1	BY	No	Yes
Talbot TS DESN 2	J1J2	Yes	Yes
Talbot TS DESN 2	Q1Q2	Yes	Yes
Wonderland TS	---	Yes	Yes

FIT/ μ FIT Interconnection Availability



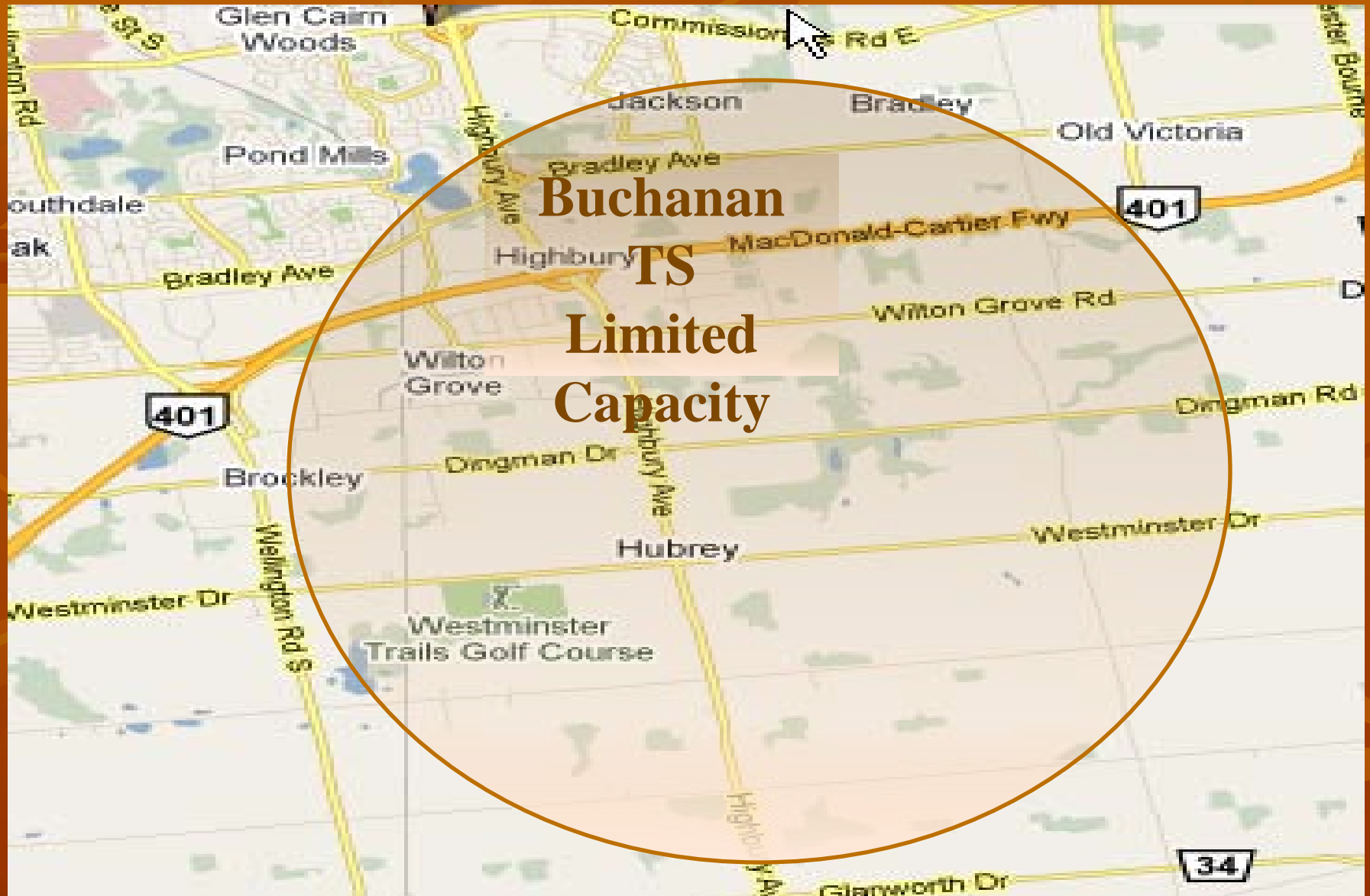
FIT/ μ FIT Interconnection Availability



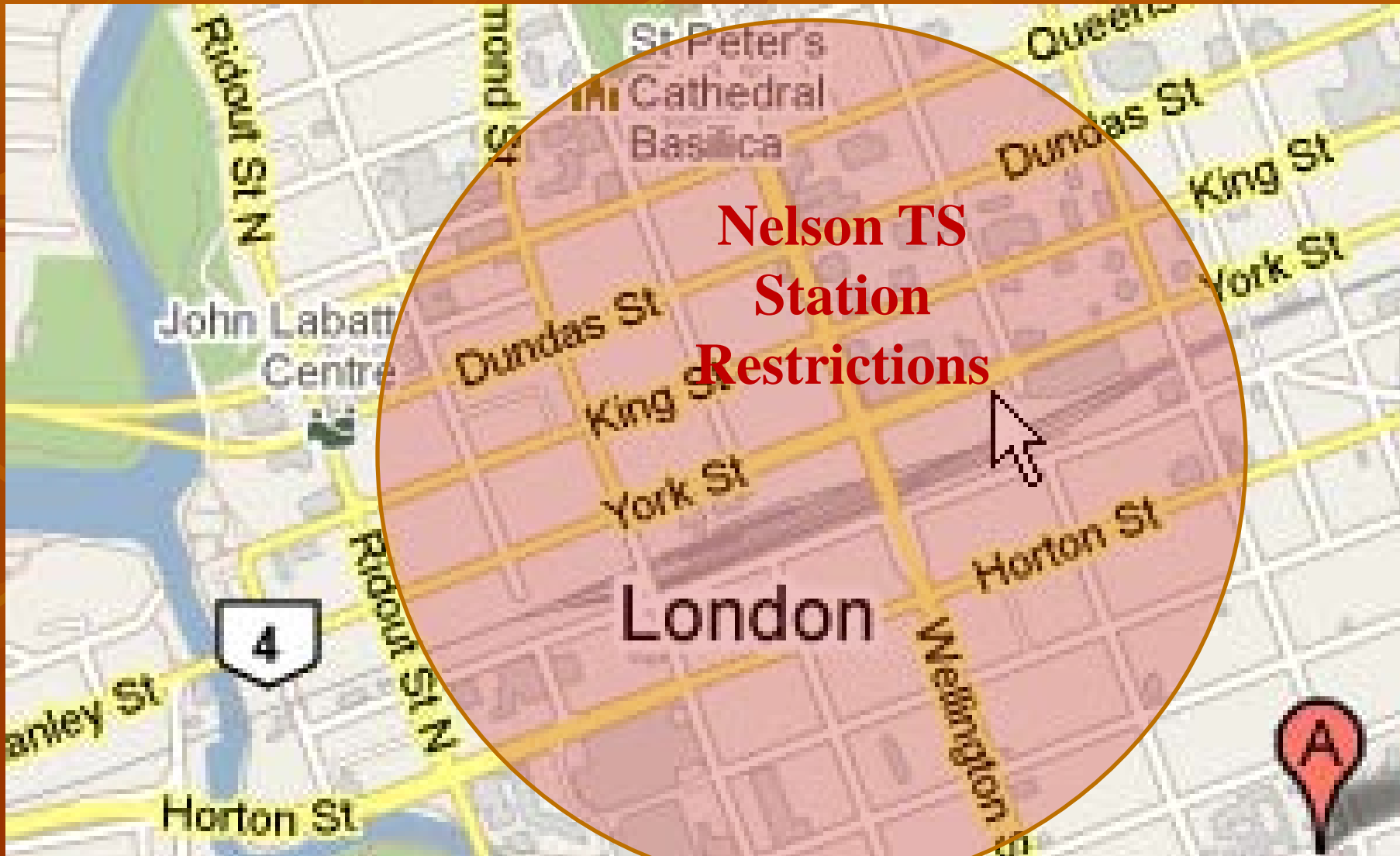
FIT/ μ FIT Interconnection Partial Availability



FIT/ μ FIT Interconnection Partial Availability



FIT/ μ FIT Interconnection Restrictions



FIT/ μ FIT Interconnection Restrictions



Technical Challenges (cont'd)

Short Term Operational Challenges

- London Hydro has a dynamic open grid with over 130 SCADA controlled devices that allow us to re-configure the system on a real time basis. Rural utilities have long radial feeders that are not re-configurable and therefore do not face the same challenges. Switching feeders with generation connected creates unique challenges.

Long Term Planning and Operational Challenges

- London Hydro must re-configure the system on an ongoing basis to meet load growth and load customer obligations, this requires line sections to be moved from one station to another including to a station or line section that has no generation capacity. An urban system will not stay static over a 20 year OPA contract.

London Hydro's Connection Guidelines & Online Forms for Generators

- Forms available to apply for a <10 kW connection:
 - ✓ Connection Request Form
 - ✓ Connection Agreement

- Forms available to apply for a >10 kW connection:
 - ✓ Initial Feasibility Assessment (IFA)
 - ✓ Connection Impact Assessment (CIA)
 - ✓ Protection Philosophy Template
 - ✓ Connection Agreement



London Hydro's Renewable Investments

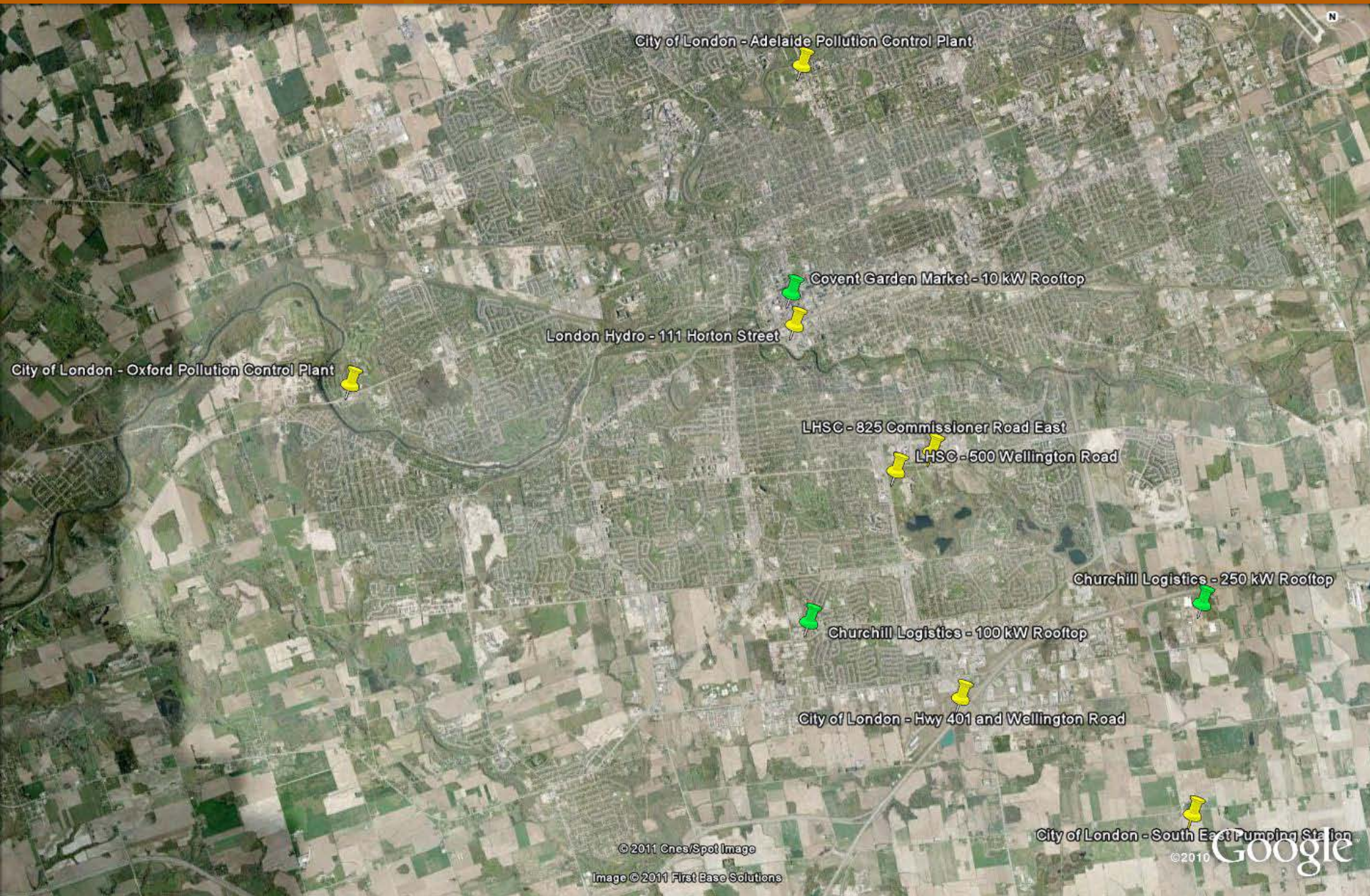
London Hydro Investment in PV Systems

MicroFIT #	Generation Location	Orientation	Partner	Size (kW)	Estimated Connection Date	Price (Cents/kWh)
<u>FIT-MR9NB2Z</u>	130 King Street - Covent Garden Market	Roof Top Mounted	Covent Garden Market	10	Energized	80.2
<u>FIT-MFD4FYV</u>	111 Horton Street - London Hydro	Ground-Mounted Tracker	London Hydro	10	Energized	80.2
<u>FIT-ME4YQZT</u>	500 Wellington Road - LHSC	Ground-Mounted Tracker	LHSC	10	Energized	80.2
<u>FIT-MM23CJV</u>	825 Commissioners Road E - LHSC	Ground-Mounted Tracker	LHSC	10	Energized	80.2
FIT-MFKNCBP	NW Corner of Hwy 401 & Wellington - COL	Ground-Mounted Tracker	City of London	10	May 15/11	80.2
<u>FIT-MVIH474</u>	1570 Oxford St W - City PCP	Ground-Mounted Tracker	City of London	10	May 15/11	80.2
<u>FIT-M6FTXUQ</u>	1159 Adelaide St N - City PCP	Ground-Mounted Tracker	City of London	10	May 15/11	80.2
<u>FIT-M2ZQN2I</u>	5200 Highbury Ave S - COL Pump Station	Ground-Mounted Tracker	City of London	10	May 15/11	80.2
FIT-F59T0WZ	3334 White Oak Road	Roof Top Mounted	Churchill Logistics	100	Dec. 31/11	71.3
FIT-FKEU5QG	1550 Global Drive	Roof Top Mounted	Churchill Logistics	250	Dec. 31/11	71.3

London Hydro Installation



Geographic Locations



City of London - Adelaide Pollution Control Plant

Covent Garden Market - 10 kW Rooftop

London Hydro - 111 Horton Street

City of London - Oxford Pollution Control Plant

LHSC - 825 Commissioner Road East

LHSC - 500 Wellington Road

Churchill Logistics - 250 kW Rooftop

Churchill Logistics - 100 kW Rooftop

City of London - Hwy 401 and Wellington Road

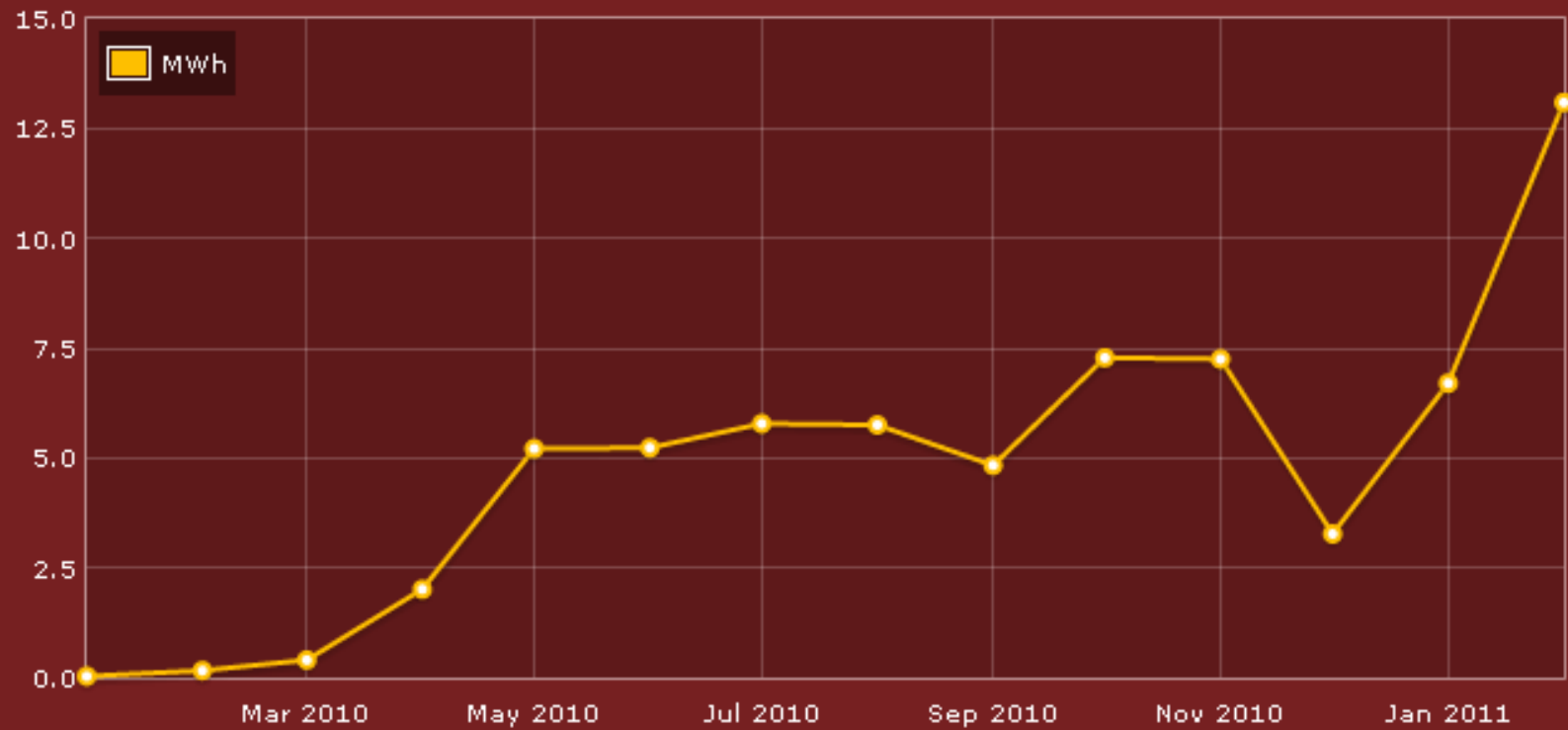
City of London - South East Pumping Station

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London Solar Power Generation to Date



1 MWh = 1000 kWh

Summary

- London Hydro is very supportive of renewable generation projects – we are here to help.
- There are certain areas where μ FIT/FIT project can be accommodated.
- Clark Station will be upgraded to accommodate the projects in the northeast corner of the city.
- If you are considering a project, please contact London Hydro as soon as possible by completing the appropriate forms that are available online.