WINDSOR-ESSEX REGION
INTEGRATED REGIONAL RESOURCE PLAN

April 28, 2015

ieso
Independent Electricity System Operator

Integrated Regional Resource Plan

Windsor-Essex Region

This Integrated Regional Resource Plan ("IRRP") was prepared by the IESO pursuant to the terms of its Ontario Energy Board licence, EI-2013-0066.

This IRRP was prepared on behalf of the Windsor-Essex Region Working Group, which included the following members:

- Independent Electricity System Operator
- Essex Powerlines Corporation
- E.L.K Energy Inc.
- Entegrus Inc.
- Hydro One Networks Inc. (Distribution) and
- Hydro One Networks Inc. (Transmission)

The Windsor-Essex Region Working Group assessed the adequacy of electricity supply to customers in the Windsor-Essex Region over a 20-year period; developed a flexible, comprehensive, integrated plan that considers opportunities for coordination in anticipation of potential demand growth scenarios and varying supply conditions in the Windsor-Essex Region; and developed an implementation plan for the recommended options, while maintaining flexibility in order to accommodate changes in key assumptions over time.

Windsor-Essex Region Working Group members agree with the IRRP's recommendations and support implementation of the plan through the recommended actions. Windsor-Essex Region Working Group members do not commit to any capital expenditures and must still obtain all necessary regulatory and other approvals to implement recommended actions.

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List of Abbreviations

Abbreviation	Description
C&S	Codes and standards ("C&S")
CDM	Conservation Demand Management
CEP	Community Energy Plan
CHP	Combined Heat and Power
CHPSOP	Combined Heat and Power Standard Offer Program
DE	District Energy
DG	Distributed Generation
DR	Demand Response
EA	Environmental Assessment
EM&V	Evaluation, Measurement and Verification
EMS	Energy Management Systems
DESN	Dual Element Spot Network
FIT	Feed-in Tariff
GEA	Green Energy Act, 2009
GHG	Greenhouse Gas
IAP	Industrial Accelerator Program
IESO	Independent Electricity System Operator
IPSP	(2007) Integrated Power System Plan
IRRP	Integrated Regional Resource Planning
L/R	Load Rejection
LAC	Local Advisory Committee
LDC	Local Distribution Company
LTEP	(2013) Long-Term Energy Plan
LTR	Limited Time Rating
MEP	Municipal Energy Plan
MEP/CEP	Municipal or Community Energy Planning
MTS	Municipal Transformer Station
OEB or Board	Ontario Energy Board
OPA	Ontario Power Authority
ORTAC	Ontario Resource and Transmission Assessment Criteria
PPS	(Ontario's) Provincial Policy Statement
PPWG	Planning Process Working Group
PV	Photovoltaic
Region	Windsor-Essex Region
RIP	Regional Infrastructure Plan
SCADA	Supervisory Control And Data Acquisition
SCGT	Simple-Cycle Gas Turbine
SECTR	Supply to Essex County Transmission Reinforcement
SPS	Special Protection System
TOU	Time-of-Use
TS	Transformer Station
Working Group	Technical Working Group for the Windsor-Essex Region

1. Introduction

This Integrated Regional Resource Plan ("IRRP") addresses the electricity needs of the Windsor-Essex Region ("Region") over the next 20 years. This report was prepared by the Independent Electricity System Operator ("IESO") on behalf of a Technical Working Group[1] composed of the IESO, EnWin Utilities Ltd. ("EnWin"), Essex Powerlines Corporation, E.L.K. Energy Inc., Entegrus Inc., and Hydro One Distribution and Hydro One Transmission ("Working Group").[2]

The Region encompasses the City of Windsor, Town of Amherstburg, Town of Essex, Town of Kingsville, Town of Lakeshore, Town of LaSalle, Municipality of Leamington, Town of Tecumseh, the western portion of the Municipality of Chatham-Kent and the Township of Pelee Island. With roughly 400,000 people presently living in the Region, population has remained flat over recent years[3] despite the impacts of the 2008 and 2009 global recession and the decline of automotive manufacturing facilities in the City of Windsor. While the manufacturing sector continues to face recovery challenges in the Region, economic diversification is changing the Region's growth and electricity use. The 2011 Windsor-Essex Regional Economic Roadmap identifies nine industry groups that hold potential for the Region, including advanced manufacturing, tourism, and agri-business.[4] The Region presently has a peak electricity demand of about 800 MW, and this demand is expected to increase at an average of nearly 1% per year.

In Ontario, planning to meet the electrical supply and reliability needs of a large area or region is done through regional electricity planning, a process that was formalized by the Ontario Energy Board ("OEB" or "Board") in 2013. In accordance with the OEB regional planning process, transmitters, distributers and the IESO are required to carry out regional planning activities for the 21 electricity planning regions at least once every five years.

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[1] Information on the working group is available at: www.ieso.ca/Windsor-Essex

[2] See Appendix B for a description of some of the LDCs serving the Region.

[3] *Population counts, for Canada, provinces and territories, census divisions, population centre size groups and rural areas, 2011 Census*, Statistics Canada. At https://www12.statcan.gc.ca/census-recensement/2011/dp-pd/hlt-fst/pd-pl/Table-Tableau.cfm?LANG=Eng&T=703&SR=1&S=80&O=A&RPP=99&CMA=0&PR=35

[4] Windsor--Essex Regional Economic Roadmap, Windsor-Essex Economic Development Corporation, February 2011.

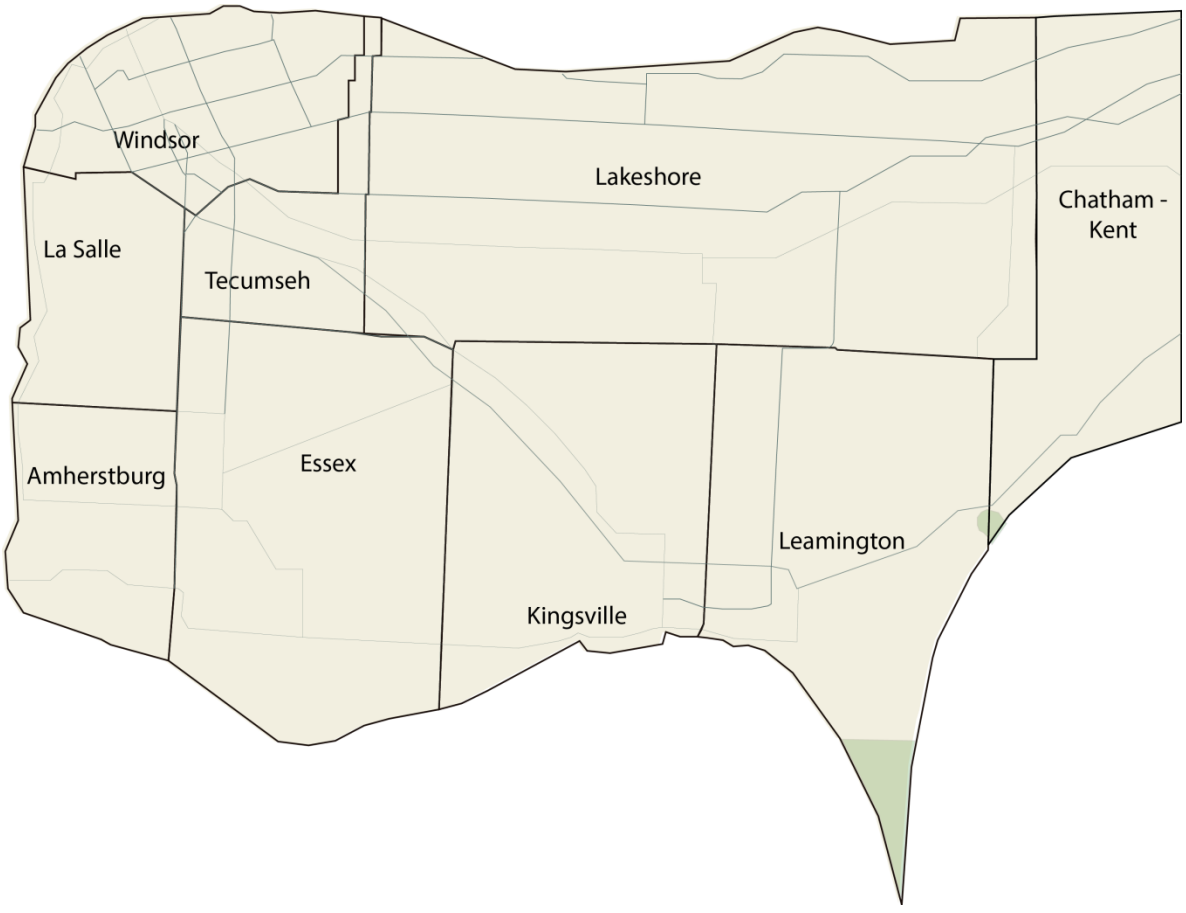
Figure 1-1: Ontario's 21 Regional Planning Zones

The area covered by the Windsor-Essex IRRP constitutes one of the 21 electricity planning regions established through the OEB's regional planning process which is shown in Figure 1-1. This IRRP fulfills the requirements for the region as mandated by the OEB.

This IRRP for Windsor-Essex identifies investments for immediate implementation to meet near- and medium-term needs in the Region, and considers whether there are any long-term needs that necessitate options to be developed. No needs were identified for the Township of Pelee Island. Since economic, demographic, and technological conditions will inevitably change, IRRPs will be reviewed on a 5-year cycle so that plans can be updated to reflect the changing electricity outlook. The Windsor-Essex IRRP will be revisited in 2020 or sooner, if

significant changes occur relative to the current forecast. The Region, shown in Figure 1-2 below, is defined electrically based on the connectivity of supply stations to Ontario's electricity grid. It is comprised of the City of Windsor, Town of Amherstburg, Town of Essex, Town of Kingsville, Town of Lakeshore, Town of LaSalle, Municipality of Leamington, Town of Tecumseh, and the western portion of the Municipality of Chatham-Kent. The Region has a peak electricity demand of about 800 MW and is served by five local distribution companies ("LDCs"): EnWin Utilities Ltd. ("EnWin"), Essex Powerlines Corporation, E.L.K. Energy Inc., Entegrus Inc., and Hydro One. EnWin and Hydro One are directly connected to the transmission system, while the three other LDCs have low voltage connections to Hydro One distribution feeders.

Figure 1-2: The Windsor-Essex Region



This report is organized as follows:

- A summary of the recommended plan for the Region is provided in Section 2;
- The process and methodology used to develop the plan are discussed in Section 3;
- The context for electricity planning in the Region and the study scope are discussed in Section 4;
- Demand forecast scenarios, conservation and distributed generation assumptions, are described in Section 5;
- The near- and medium-term plan is presented in Section 6;
- The long-term plan is presented in Section 7;
- A summary of community, aboriginal and stakeholder engagement to date in developing this IRRP and moving forward is provided in Section 8;
- A conclusion is provided in Section 9.

2. The Integrated Regional Resource Plan

The Windsor-Essex IRRP addresses the Region's electricity needs over the next 20 years, from 2014 to 2033, based on application of the IESO's Ontario Resource and Transmission Assessment Criteria ("ORTAC"). The IRRP identifies needs that are forecast to arise in the near term (0-5 years), medium term (5-10 years) and long term (10-20 years). These planning horizons are distinguished in the IRRP to reflect the different level of commitment required over these time horizons. The plans to address these timeframes are coordinated to ensure consistency. The IRRP was developed based on consideration of planning criteria, including reliability, cost and feasibility; and, in the near term, it seeks to maximize the use of the existing electricity system, where it is economic to do so.

For the near and medium term, the IRRP identifies specific investments that are already being implemented. This is necessary to ensure that they are in service in time to address the Region's more urgent needs, which have been forecast with relative certainty based on current demand trends, conservation targets and other local developments.

For the long term, the IRRP identifies a number of alternatives to meet needs. However, as these needs are forecast to arise further in the future, it is not necessary (nor would it be prudent given forecast uncertainty and the potential for technological change) to commit to specific projects at this time. Instead the IRRP for the long term focuses on developing and maintaining the viability of long-term electricity supply options, engaging with the community, and gathering information to lay the groundwork for future options. A particular emphasis of the long term is identifying the potential for integrating conservation, distributed generation ("DG"), or other localized solutions into the Region and gathering input on community preferences for long-term options.

The needs and recommended actions are summarized below.

2.1 Plan to Address the Near- and Medium-Term Needs

The first component of the near- and medium-term plan is the implementation of targeted conservation. While this planned CDM is expected to make a significant contribution to addressing growth in the

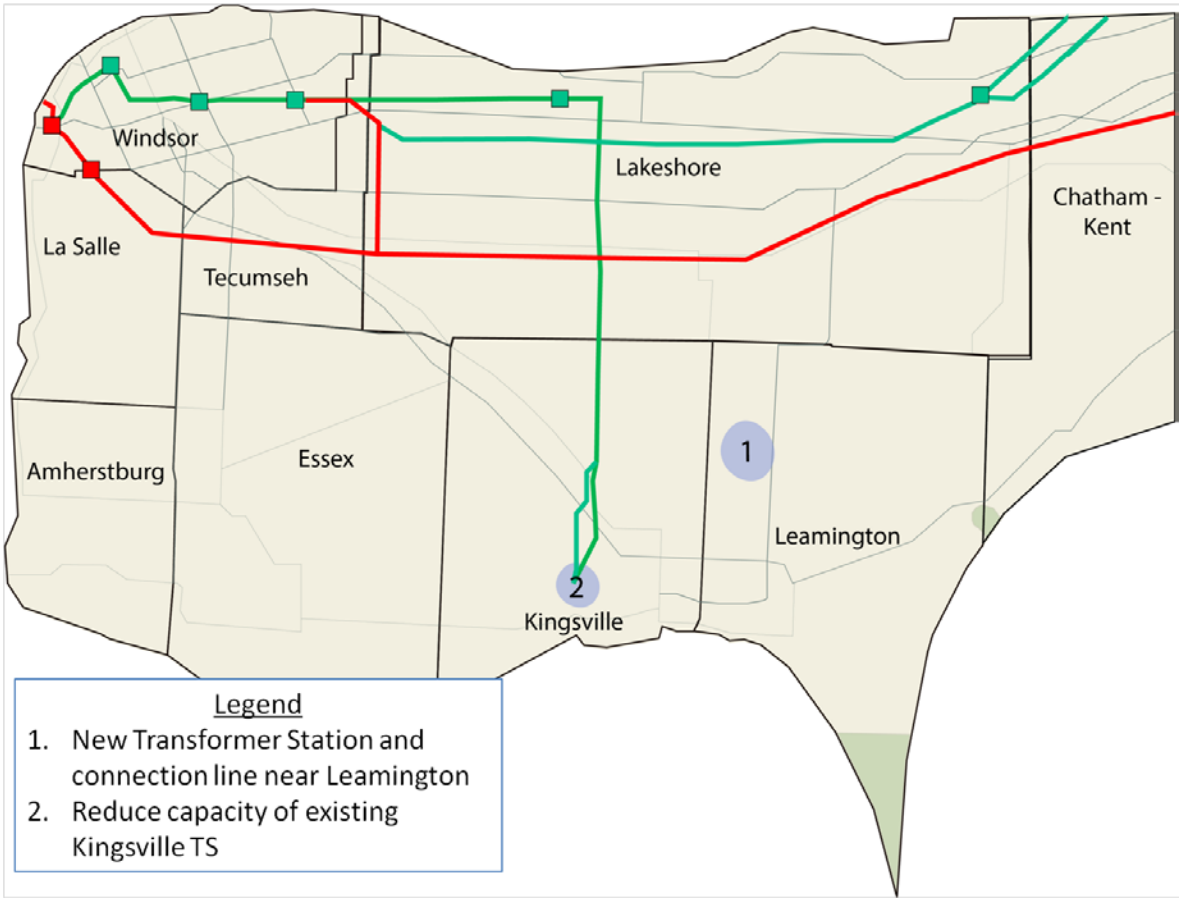
Near- and Medium-Term Needs

- Additional supply capacity in the Kingsville-Leamington area
- Additional restoration capability in the broader Region

Region, residual demand growth, as well as other reliability needs which are not growth related give rise to near-term supply capacity and restoration needs in the Region (see sidebar). Demand in the Kingsville-Leamington portion of the Region has exceeded the supply capacity in recent years and this is expected to continue over the 20-year forecast period. In addition, supply to a large portion of the Region does not comply with the prescribed ORTAC restoration criteria.

An integrated solution composed of conservation, DG resources, and transmission reinforcements in the Region is recommended to address these supply capacity and restoration needs. These components are described in further detail below and the location of transmission investments are indicated in Figure 2-1.

Figure 2-1: Transmission Projects Included in the Windsor-Essex Near-Term Plan



Recommended Actions:

1. Implement conservation and distributed generation

The implementation of provincial conservation targets established in the 2013 Long-Term Energy Plan ("LTEP") is a key component of the near- and medium-term plan for the Region. In developing the demand forecast, peak-demand impacts associated with the provincial targets established in the LTEP were assumed before identifying any residual need; this is consistent with the Conservation First policy. The achievement of these demand reductions will partially depend on the extent to which LDC conservation programs provide peak-demand reductions. Monitoring of conservation success, including measurement of peak demand savings, will be an important element of the near- and medium-term plan, and will also provide input for long-term planning by gauging the actual performance of specific conservation measures, and assessing the potential for future conservation initiatives in the Region.

Provincial programs that encourage the development of DG, such as the Feed-in Tariff ("FIT"), microFIT, and the Combined Heat and Power Standard Offer Program ("CHPSOP"), can also contribute to reducing peak demands on the transmission system in the Region, these will be influenced by local interest and opportunities for development. The LDCs and the IESO will continue supporting these initiatives and will monitor their impacts. Together, conservation and DG resources are expected to offset more than 90% of the growth in the area between 2014 and 2033.

2. Develop new transformer station in Leamington

The balance of the Region's supply capacity and restoration needs can be addressed by the new Supply to Essex County Transmission Reinforcement ("SECTR") project, plus planned sustainment work in the Region.[5] The transmitter that serves the Region, Hydro One, filed the regulatory application for approval of the SECTR project with the OEB in June, 2014. The project consists of the installation of a new 230 kV-supplied transformer station ("TS") near Leamington connected to the existing 230 kV circuits in the Region via a new 13 km double-circuit 230 kV connection line. The estimated completion date for the SECTR project is 2018 and

[5] Evidence on the SECTR project is available at the Ontario Energy Board's website at EB-2013-0421**:** http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/search/rec&sm_udf10=eb-2013-0421&sortd1=rs_dateregistered&rows=200
Evidence on the needs and alternatives is available in Exhibit B-1-5. Evidence on cost responsibility is available in Exhibit B-4-4.

the total cost is approximately $77 million. On completion, some of the load currently supplied by Kingsville TS will be transferred to the new Leamington TS.

3. Downsize the existing Kingsville transformer station

In conjunction with transferring the majority of the load from the existing Kingsville TS to the new Leamington TS, the Kingsville TS will be downsized through the retirement of aging assets. This will increase the cost-effectiveness of the overall solution.

Together with targeted conservation, these planned transmission facilities will meet the supply capacity and restoration needs of the Kingsville-Leamington area over the forecast period. The addition of a new supply point will also substantially meet the transmission restoration needs for the broader Region. This integrated solution benefits both local customers and broader transmission ratepayers.

2.2 Plan to Address the Long-Term Needs

No long-term needs have been identified in the Region. The Region's demand growth, conservation achievements and generation development will be monitored until the Region's needs are reassessed in the next regional planning cycle. If significant changes occur relative to the current forecast, the next planning cycle may be initiated in advance of the 5-year minimum review timeline.

3. Development of the IRRP

3.1 The Regional Planning Process

In Ontario, planning to meet the electricity needs of customers at a regional level is done through regional planning. Regional planning assesses the interrelated needs of a region - defined by common electricity supply infrastructure over the near, medium and long term, and develops a plan to ensure cost-effective, reliable, electricity supply. Regional plans consider the existing electricity infrastructure in an area, forecast growth and customer reliability, evaluate options for addressing needs, and recommend actions.

Regional planning has been conducted on an as needed basis in Ontario for many years. Most recently, the Ontario Power Authority ("OPA") carried out regional planning activities to address regional electricity supply needs. The OPA conducted joint regional planning studies with distributors, transmitters, the IESO and other stakeholders in regions where a need for coordinated regional planning had been identified.

In 2012, the Ontario Energy Board convened the Planning Process Working Group ("PPWG") to develop a more structured, transparent, and systematic regional planning process. This group was composed of industry stakeholders including electricity agencies, utilities, and stakeholders. In May 2013, the PPWG released the Working Group Report to the Board, setting out the new regional planning process. Twenty-one electricity planning regions in the province were identified in the Working Group Report and a phased schedule for completion was outlined. The Board endorsed the Working Group Report and formalized the process timelines through changes to the Transmission System Code and Distribution System Code in August 2013, as well as through changes to the OPA's licence in October 2013. The OPA license changes required it to lead a number of aspects of regional planning, including the completion of comprehensive IRRPs. Following the merger of the IESO and the OPA on January 1, 2015, the regional planning responsibilities identified in the OPA's licence were transferred to the IESO.

The regional planning process begins with a Needs Screening process performed by the transmitter, which determines whether there are needs requiring regional coordination. If regional planning is required, the IESO then conducts a Scoping Assessment to determine whether a comprehensive IRRP is required, which considers conservation, generation, transmission, and distribution solutions, or whether a straightforward "wires" solution is the

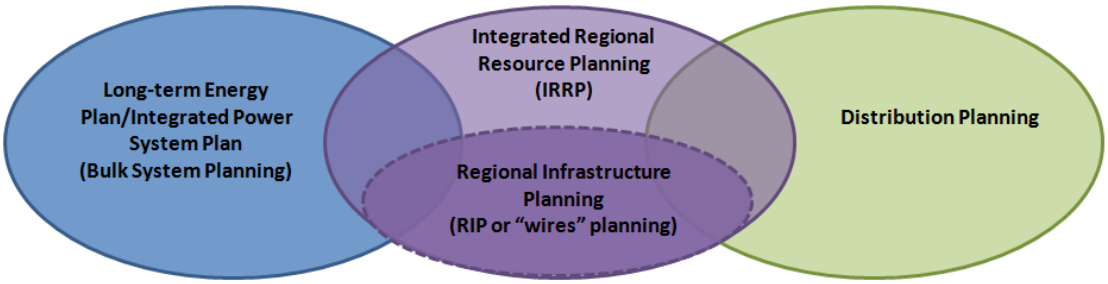
only option. If the latter applies, then a transmission and distribution focused Regional Infrastructure Plan ("RIP") is required. The Scoping Assessment process also identifies any sub-regions that require assessment. There may also be regions where infrastructure investments do not require regional coordination and can be planned directly by the distributor and transmitter, outside of the regional planning process. At the conclusion of the Scoping Assessment, the IESO produces a report that includes the results of the Needs Screening process – identifying whether an IRRP, RIP or no regional coordination is required - and a preliminary terms of reference. If an IRRP is the identified outcome, then the IESO is required to complete the IRRP within 18 months. If a RIP is required, the transmitter takes the lead and has six months to complete it. Both RIPs and IRRPs are to be updated at least every five years.

The final IRRPs and RIPs are to be posted on the IESO and relevant transmitter websites, and can be used as supporting evidence in a rate hearing or leave to construct application for specific infrastructure investments. These documents may also be used by municipalities and communities for planning purposes and by other parties to better understand local electricity growth and infrastructure requirements.

Regional planning, as shown in Figure 3-1, is just one form of electricity planning that is undertaken in Ontario. There are three types of electricity planning in Ontario:

- Bulk system planning
- Regional system planning
- Distribution system planning

Figure 3-1: Levels of Electricity System Planning



Bulk System Planning

- 500 kV & 230 kV transmission
- Interconnections
- Inter-area network transfer capability
- System reliability (security and adequacy) to meet NERC, NPCC, ORTAC
- Congestion and system efficiency
- System supply and demand forecasts
- Incorporation of large generation
- Typically medium- and long-term focused

Regional Planning

- 230 kV & 115 kV transmission
- 115/230 kV autotransformers and associated switchyard facilities
- Customer connections
- Load supply stations
- Regional reliability (security and adequacy) to meet NERC, NPCC & ORTAC
- ORTAC local area reliability criteria
- Regional/local area generation & CDM resources
- Typically near- & medium-term focused

Distribution Network Planning

- Transformer stations to connect to the transmission system
- Distribution network planning (e.g. new & modified Dx facilities)
- Distribution system reliability (capacity & security)
- Distribution connected generation & CDM resources
- LDC demand forecasts
- Near- & medium-term focused

Planning at the bulk system level typically considers the 230 kV and 500 kV network. Bulk system planning considers the major transmission facilities and assesses the resources needed to adequately supply the province. Bulk system planning is typically carried out by the IESO. Distribution planning, which is carried out by LDCs, looks at specific investments on the low voltage, distribution system.

Regional planning can overlap with bulk system planning. For example, overlap can occur at interface points where regional resource options may also address a bulk system issue. Similarly, regional planning can overlap with the distribution planning of LDCs. An example of this is when a distribution solution addresses the needs of the broader local area or region. Therefore, to ensure efficiency and cost-effectiveness, it is important for regional planning to be coordinated with both bulk and distribution system planning.

By recognizing the linkages with bulk and distribution system planning, and coordinating multiple needs identified within a given region over the long term, the regional planning process provides an integrated assessment of needs. Regional planning aligns near- and long-term solutions and allows specific investments recommended in the plan to be understood as part of a larger context. Furthermore, regional planning optimizes ratepayer interests by avoiding piecemeal planning and asset duplication, and allows Ontario ratepayers' interests to be represented along with the interests of LDC ratepayers. Where IRRPs are undertaken, they

allow an evaluation of the multiple options available to meet needs, including conservation, generation, and "wires" solutions. Regional plans also provide greater transparency through engagement in the planning process, and by making plans available to the public.

3.2 The IESO's Approach to Regional Planning

IRRPs assess electricity system needs for a region over a 20-year period. The 20-year outlook anticipates long-term trends so that near-term actions are developed within the context of a longer-term view. This enables coordination and consistency with the long-term plan, rather than simply reacting to immediate needs.

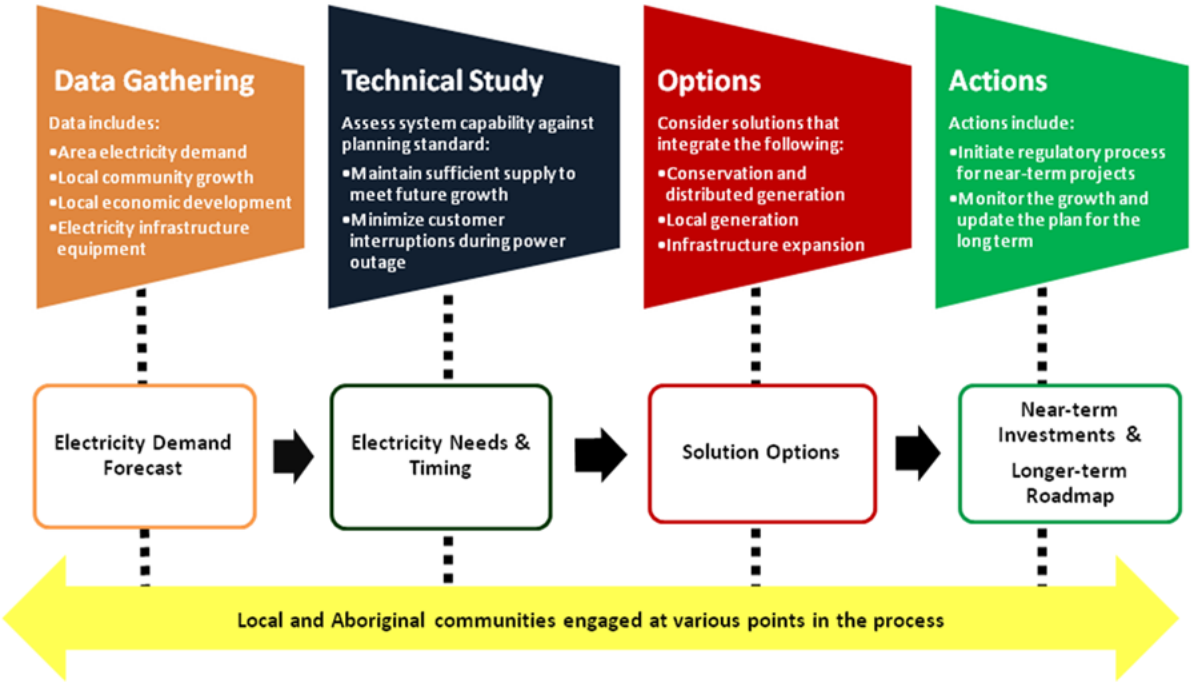
In developing an IRRP, a different approach is taken to developing the plan for the first 10 years of the plan—the near- and medium-term—than for the longer-term period of 10-20 years. The plan for the first 10 years is developed based on best available information on demand, conservation, and other local developments. Given the long lead time to develop electricity infrastructure, near-term electricity needs require prompt action to enable the specified solutions in a timely manner. By contrast, the long-term plan is characterized by greater forecast uncertainty and longer development lead time; as such solutions do not need to be committed to immediately. Given the potential for changing conditions and technological development, the IRRP for the long term is more directional, focusing on developing and maintaining the viability of options for the future, and continuing to monitor demand forecast scenarios.

In developing an IRRP, the IESO and regional working group (see Figure 3-2 below) carry out a number of steps. These steps include electricity demand forecasts; technical studies to determine electricity needs and the timing of these needs; the development of potential options; and, a recommended plan including actions for the near and long term. Throughout this process, engagement is carried out with First Nation and Métis communities, stakeholders and communities who may have an interest in the regional planning area. The steps of an IRRP are illustrated in Figure 3-2 below.

The IRRP report documents the inputs, findings and recommendations developed through the process described above, and provides recommended actions for the various entities responsible for plan implementation. Where "wires" solutions are included in the plan recommendations, the completion of the IRRP report is the trigger for the transmitter to initiate an RIP process to develop those options. Other actions may involve: development of

conservation, local generation, or other solutions; community engagement; or information gathering to support future iterations of the regional planning process in the region.

Figure 3-2: Steps in the IRRP Process



3.3 Windsor-Essex Working Group and IRRP Development

Regional planning was underway in the Windsor-Essex Region prior to the OEB's formalization of the regional planning process. The first phase of regional planning began with the regional plan developed by the former-OPA[6] as part of the 2007 Integrated Power System Plan ("IPSP"), which identified a need for conservation as well as transmission reinforcement in the Region. In 2010, Hydro One received environmental approval for the staged reinforcement identified in the IPSP. The planning work carried out for the IPSP has formed the basis for subsequent regional planning in the Region.

Beginning in 2008, the global economic downturn had a significant impact on electricity demand in the Region, especially the urban portion in and around Windsor. In 2010, a Regional working group consisting of members from the former OPA, the transmitter, the five LDCs, and

[6] On January 1, 2015, the Ontario Power Authority ("OPA") merged with the Independent Electricity System Operator ("IESO") to create a new organization that will combine the OPA and IESO mandates. The new organization is called the Independent Electricity System Operator.

the IESO, was formed. A study carried out by the former OPA and presented to the working group in 2011 recommended that development activities associated with the proposed Leamington TS temporarily be put on hold as a result of the reduced regional electricity demand.

In 2013 the former-OPA revisited the 2011 study based on an updated load forecast provided by the Region's LDCs. Based on the near-term needs identified, especially in the rural portion in and around Kingsville-Leamington, a transmission solution - the SECTR project - was recommended. In June 2014 Hydro One submitted a Leave to Construct application for this project with the OEB. This was the first of the two stages of transmission expansion described in Hydro One's environmental assessment. The second stage is not contemplated at this time.

As a continuation of this planning work for the Region the former-OPA in 2013 initiated an IRRP for the Region. The Working Group, first established in 2010 and consisting of staff from the former-OPA, the IESO, Hydro One, and the five LDCs serving the Region, was reconvened to support this work.

This Windsor-Essex IRRP is therefore a "transitional" IRRP in that it began prior to development of the OEB's regional planning process and much of the work was completed before the new process and its requirements were known.

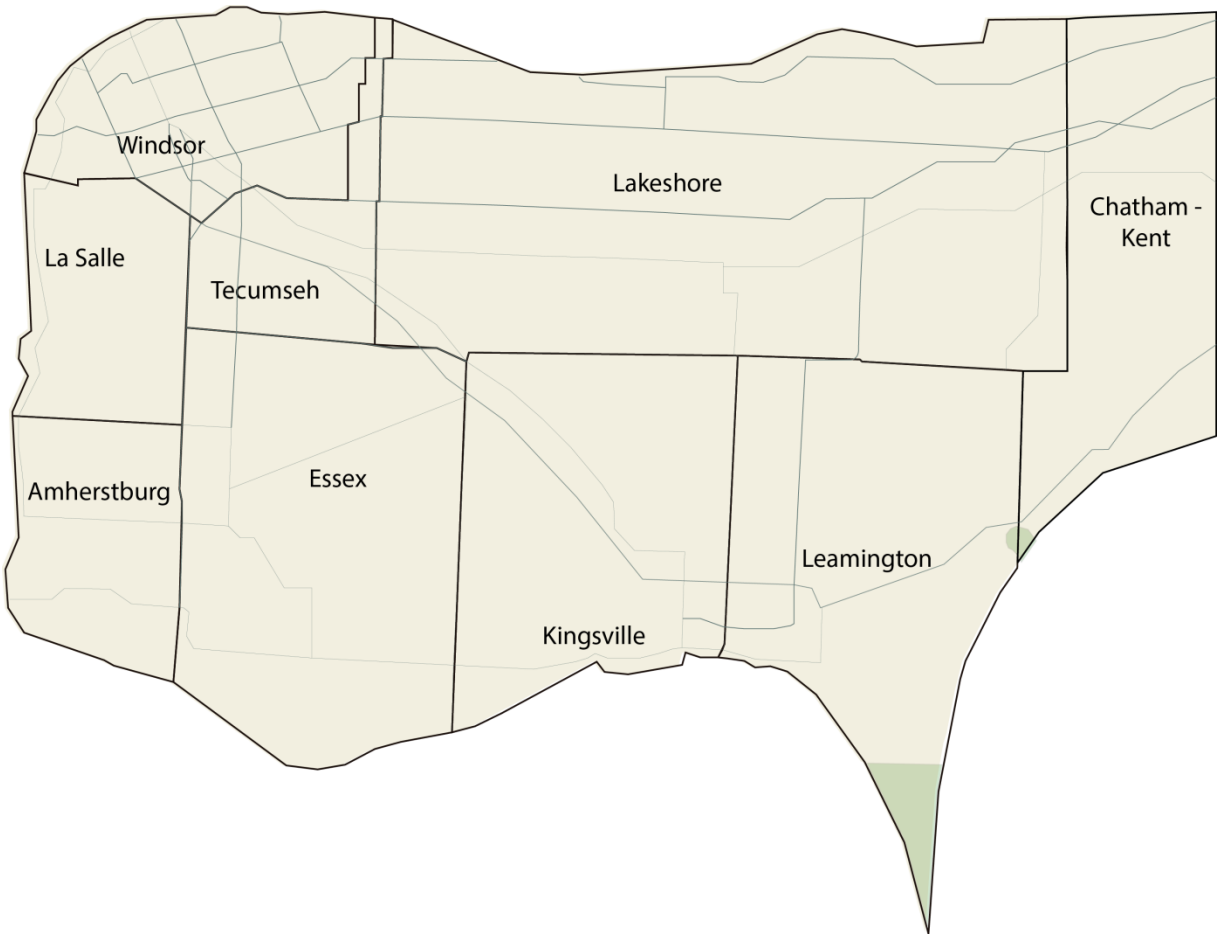
4. Background and Study Scope

This report presents an integrated regional electricity plan for the Windsor-Essex Region for the 20-year period from 2014 to 2033. To set the context for this IRRP, the scope of this IRRP and a description of the Region are described in Section 4.1. Section 4.2 details the transmission-connected generation that plays an important role in providing supply to this Region. Section 4.3 describes the transmission configuration in the Region, and defines the regional planning sub-systems which are used later in this report.

4.1 Study Scope

The Region is comprised of the City of Windsor, Town of Amherstburg, Town of Essex, Town of Kingsville, Town of Lakeshore, Town of LaSalle, Municipality of Leamington, Town of Tecumseh, and the western portion of the Municipality of Chatham-Kent and the Township of Pelee Island. This Region, shown in Figure 4-1 below is comprised of and is served by five LDCs: EnWin Utilities Ltd. ("EnWin"), Essex Powerlines Corporation, E.L.K. Energy Inc., Entegrus Inc., and Hydro One. EnWin and Hydro One are directly connected to the transmission system, while the three other LDCs have low voltage connections to Hydro One distribution feeders.

Figure 4-1: The Windsor-Essex Region



The urban portion of the Region in and around Windsor has a long history of advanced manufacturing, especially in the automotive sector. In light of this the transmitter and distributors over the decades have made investments in electricity infrastructure to enable a very high standard of reliability, which is of strategic importance to the regional and provincial economies. Entertainment tourism is particularly strong in the downtown core, the most significant individual component of which is a provincially owned resort casino.

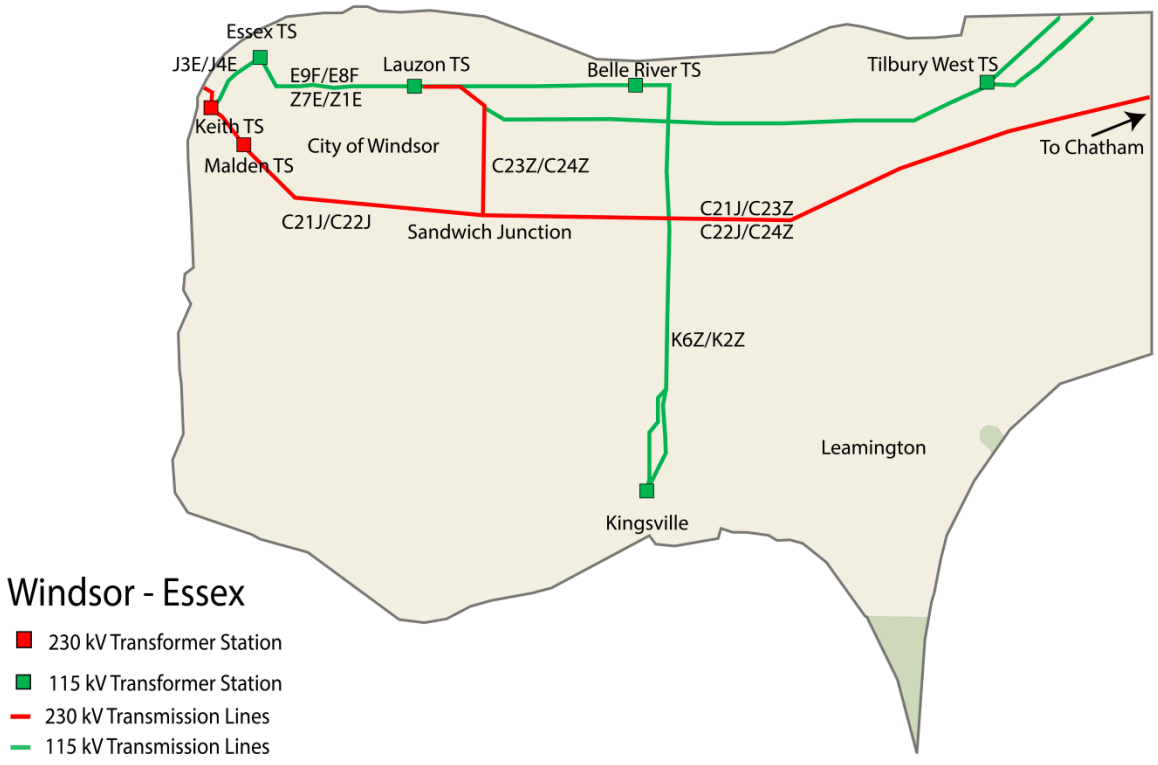
The rural portion of the Region in Essex County supports a combination of manufacturing and agri-business. Essex County contains the largest concentration of greenhouse vegetable production in North America.[7] This sector is expected to experience major growth in the future, with much of the activity taking place in the Kingsville-Leamington area, increasing electricity

[7] County of Essex website:
http://www.countyofessex.on.ca/wps/wcm/connect/COE/COE/ABOUT+ESSEX+COUNTY/

supply requirements in that part of the Region. The County is also home to several large food processing operations, and a growing winery sector.

The Region is supplied from a combination of local generation and from connection to the Ontario grid via a network of 230 kV and 115 kV transmission lines and stations shown in Figure 4-2 below. Electricity distribution and conservation initiatives are carried out by the five LDCs serving the Region.

Figure 4-2: Transmission System in the Windsor-Essex Region



4.2 Transmission Connected Generation

Transmission connected generation comes from a mix of large natural gas generators, load-offsetting behind-the-meter embedded generators, and renewable generation that is shown in Table 4-1 below.

The impact of DG on the demand forecast for the Region will be discussed in more detail later in this report.

Table 4-1: Transmission Connected Generation Facilities in the Region

Technology	Station Name	Contract Expiry Date	Connection Point	Contract Capacity (MW)	Summer Effective Capacity (MW)
Combined Cycle Generating Facility	Brighton Beach Power Station	December 31, 2024	Keith TS	541	526
Combined Heat and Power ("CHP")	West Windsor Power	May 31, 2016	J2N (Keith TS)	128	107
	TransAlta Windsor	December 1, 2016	Z1E	74	74
	East Windsor Cogeneration Centre	November 5, 2029	E8F/E9F	84	80
Renewables	Gosfield Wind Project	January 12, 2029	K2Z	51	8
	Point Aux Roches Wind Farm	December 5, 2031	K6Z	49	8

Electricity transmission connects the Region to the rest of the province through two 230 kV double circuits and two 115 kV single circuits. The principal connection points are Keith TS and Lauzon TS, both of which are transmission assets owned by Hydro One and are located in Windsor. Hydro One also owns Malden TS, Crawford TS, Essex TS, and Walker 1 TS in Windsor. Hydro One owns Belle River TS and Tilbury TS in the northern part of Essex county and Kingsville TS in the southern part of the county. Hydro One is currently seeking OEB approval to build Leamington TS (as part of the SECTR project), also located in the southern part of the county. EnWin owns five transformer stations. One of these serves a broad base of customers (Walker 2 TS); three others are dedicated to individual large users; and one is in the process of being repurposed to serve a broad base of customers as a result of the closure of the large user it previously served. There is also a customer-owned TS serving that customer's facility in Windsor.

The main transmission corridor in the Region connects with the rest of the province at Chatham SS in the Municipality of Chatham-Kent. Two 230 kV double-circuit lines, C21J/C23Z and C22J/C24Z, run east-west in this corridor, located south of Highway 401, from Chatham SS to Sandwich Junction in the Town of Lakeshore. The circuits are reconfigured at this location and double-circuit line C21J/C22J continues west to Keith TS in Windsor, while double-circuit line C23Z/C24Z runs northwest on another corridor to Lauzon TS in Windsor. Keith TS provides an interconnection with the Michigan system via 230 kV circuit J5D and an in-line phase shifter.

Keith TS and Lauzon TS, connect the Region's 115 kV network to the 230 kV transmission system via two auto-transformers in each station. As can be seen in Figure 4-2, above, the main 115 kV transmission corridor runs through the City of Windsor from Keith TS through Essex TS to Lauzon TS. Double-circuit line J3E/J4E located in this corridor connects Keith TS with Essex TS, and double-circuit line Z1E/Z7E connects Essex TS with Lauzon TS. Other 115 kV transmission corridors provide for circuits K2Z and K6Z. 115 kV circuits E8F and E9F are underground cables and provide supply to four EnWin-owned stations. Approximately 65% of the Region's load is supplied by the 115 kV system, with the remainder supplied by transformer stations connected directly to the 230 kV system. Given the large proportion of load which is supplied by the 115 kV system, the reliability of supply via the two connection points at Keith TS and Lauzon TS is especially important.

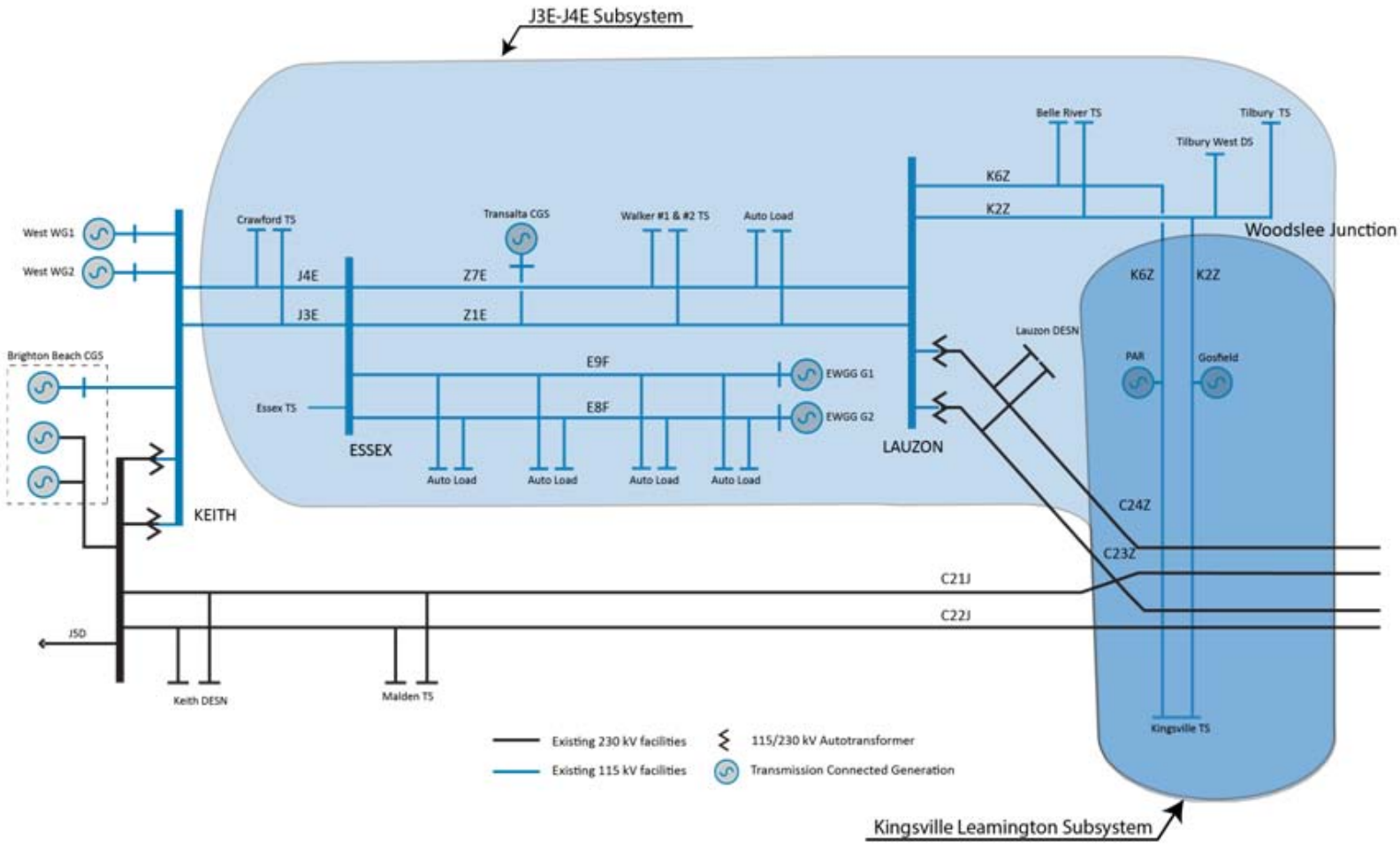
4.2.1 Regional Planning Sub-systems

For the purposes of this IRRP, the transmission system in the Region is divided into the two "nested" sub-systems described below and shown in Figure 4-3:

1. The Kingsville-Leamington sub-system: customers currently supplied from Kingsville TS; and
2. The J3E-J4E sub-system: customers supplied from the 230/115 kV auto-transformers at Keith TS and Lauzon TS via the 115k kV system, as well as customers supplied from the 230 kV Lauzon Dual Element Spot Network ("DESN").

It is important to note that the two sub-systems are overlapping, with the Kingsville-Leamington sub-system nested within the other. Therefore, where the demand for the J3E-J4E sub-system is referred to in this plan it is inclusive of demand in the Kingsville-Leamington sub-system. Similarly, increasing supply to the Kingsville-Leamington sub-system will impact the supply and demand balance in the J3E-J4E sub-system.

Figure 4-3: Windsor-Essex Region Sub-systems



5. Demand Forecast

This section describes the development of the regional demand forecast. Section 5.1 begins by describing electricity demand trends in the Region from 2004 to 2014. Section 5.2 describes the demand forecast used in this study and the methodology used to develop it.

5.1 Historical Demand

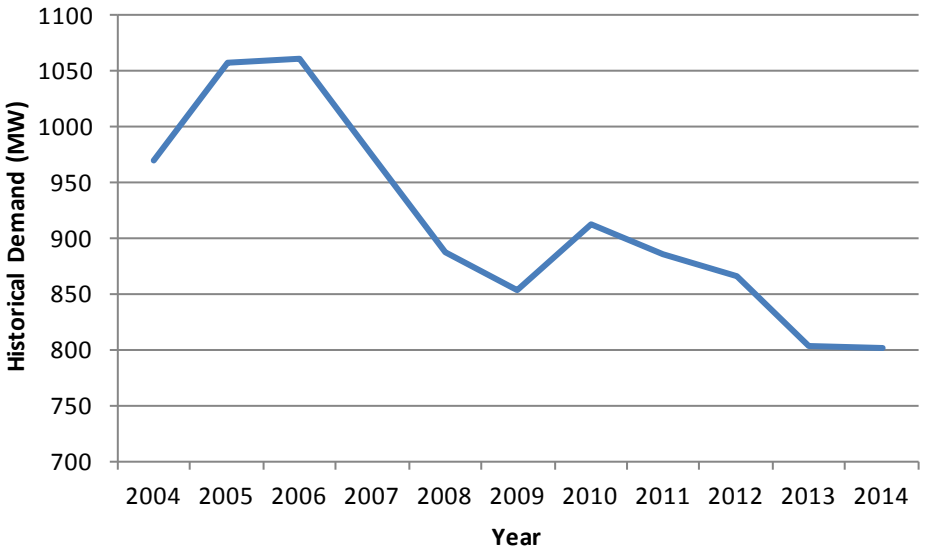
The peak demand in the Region has declined from a high of 1,060 MW in the summer of 2006 to approximately 800 MW in both 2013 and 2014. Figure 5-1 shows the historical summer peak demand observed in the Region from 2004 to 2014. A noticeable peak in 2006 is coincident with the all-time peak in Ontario power demand, while a dip in 2008 and 2009 shows the area's response to the global recession. There is a large concentration of automotive manufacturing facilities in the City of Windsor. The sector is a major economic driver and electricity user within the Region. The decline in Ontario's manufacturing sector and the 2008/09 economic downturn have both caused a decline in electricity use in the Region.

While the manufacturing sector continues to face challenges in recovering, economic diversification is changing the Region's growth and electricity use. The 5-year Windsor-Essex Regional Economic Roadmap, released in 2011, identifies nine industry groups that hold growth potential for the Region, including advanced manufacturing, tourism, and agri-business.[8]

It is important to note some other trends that are reflected in this data. First, this measured demand includes the impact of summer weather conditions, which were unusually cool across the province in 2014. Second, demand on the distribution system that was being met by DG resources operating at the time of the annual peak is not reflected in the measured demand that is supplied from the transmission system. Finally, the data also reflects the achievements of provincial conservation and peak-shifting initiatives, including the Industrial Conservation Initiative for large customers.

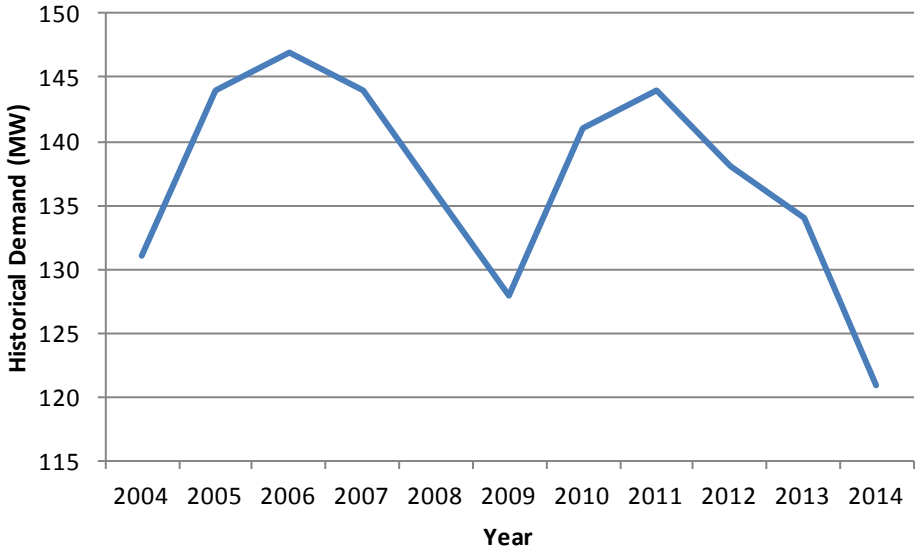
[8] Regional Economic Roadmap, Windsor-Essex Economic Development Corporation, February 2011

Figure 5-1: Historical Electricity Demand in the Region



Peak demand in the Kingsville-Leamington area has experienced fluctuations comparable to the Region since 2004, which is shown in Figure 5-2 below. In addition to the trends described above, this figure shows the impact of approximately 16 MW of effective capacity of DG connected at Kingsville TS by 2015, none of which was connected in 2004.

Figure 5-2: Kingsville-Leamington Historical Electricity Demand[9]



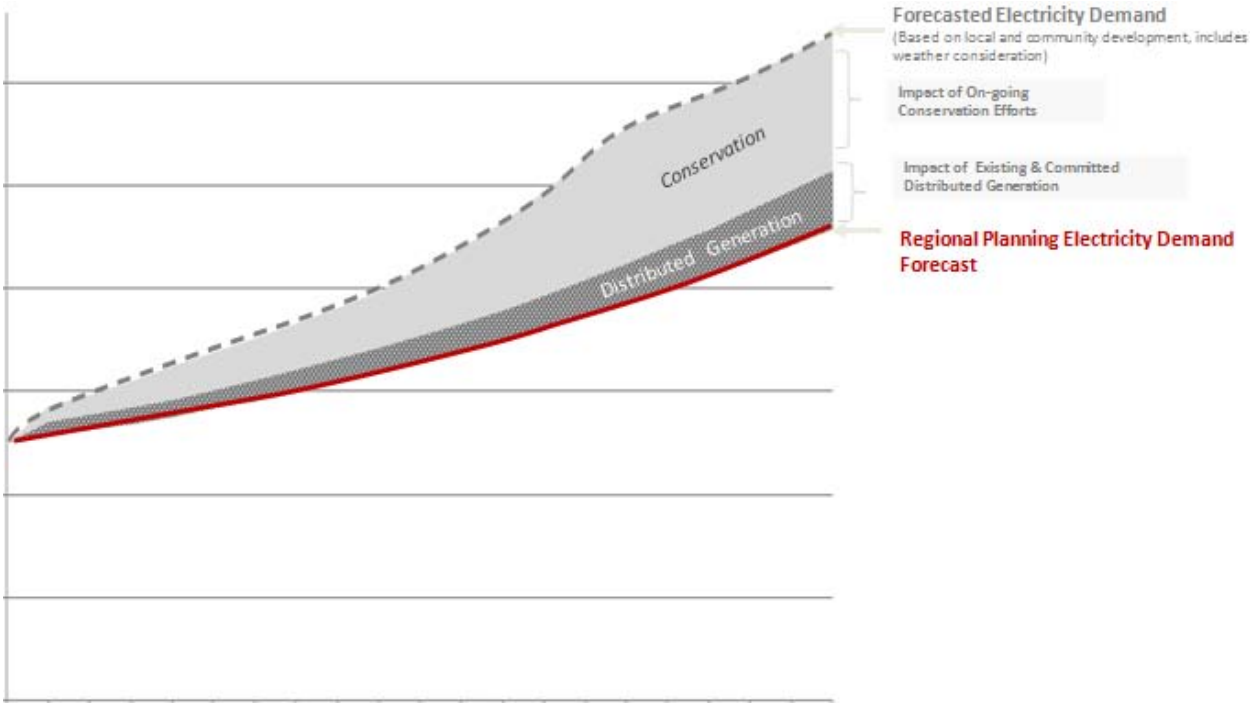
[9] Historical electricity demand reflects the weather experienced at the time of system peak.

5.2 Demand Forecast Methodology

Regional electricity needs are driven by the limits of the infrastructure supplying an area, which is sized to meet peak demand requirements. Therefore, regional planning typically focuses on growth in coincident peak demand, which is the electricity demand of individual stations that coincides in time with the annual peak demand of the region. This represents the electricity demand when the assets in the area are most stressed and resources are most constrained. Energy adequacy is usually not a concern in regional planning, as the Region can generally draw upon energy available from the provincial electricity grid and energy adequacy for the province is planned through a separate process.

A regional peak demand forecast was developed for the forecast period. The steps taken to develop the planning forecast are depicted in Figure 5-3. Gross demand forecasts assuming extreme weather conditions were provided by EnWin and Hydro One, which are directly connected to the transmission system. These forecasts were then modified to reflect the peak demand impacts of provincial conservation targets and DG contracted through provincial programs such as FIT and microFIT to produce a reference planning forecast. The reference planning forecast was then used to assess electricity supply needs in the Region.

Figure 5-3: Development of Demand Forecasts



Using a planning forecast that is net of provincial conservation targets ensures consistency with the province's Conservation First policy by reducing demand requirements before assessing any growth-related needs. However, it should be noted that this inherently assumes that the targets will be met, and that the targets, which are energy-based, will produce the expected local peak demand impacts. An important aspect of plan implementation will be monitoring the actual peak demand impacts of conservation programs delivered by the local LDCs.

For the long-term outlook, from 2024 to 2033, a second demand forecast scenario, consistent with the growth assumptions embodied in the government's 2013 LTEP was added. This low-demand scenario represents a future with lower electricity demand growth, due to higher electricity prices, increased electricity conservation, and lower energy intensity of the economy.

5.3 Reference Forecast

5.3.1 Gross Demand Forecast

Summer peak gross demand forecasts for the 20-year planning horizon were provided by EnWin and Hydro One, the two LDCs which are directly connected to the transmission system, for each of the transformer stations and transmission connected customers in the area. These

forecasts reflect the expected demand at each station at the time of the Region's coincident peak under extreme weather conditions, based on factors such as population, household and economic growth, consistent with municipal planning assumptions. It is expected that each station will reach its individual peak demand at a different point in time. From the perspective of ensuring sufficient transmission supply to the Region, it is important to consider the coincident peak, the point in time when the total demand from the stations in the Region peaks. Aggregating the station forecasts identifies the peak electricity demand that must be served by the Region's transmission system.

Based on the LDC's gross demand forecasts, the Region's peak electricity demand is expected to grow by about 175 MW over the next 20 years, with an average annual growth rate of just under 1%, not including the impacts of conservation or DG. The Kingsville-Leamington area is expected to experience over 50 MW of demand growth, or average annual growth of about 1.6%. The reference gross demand forecasts provided by the LDCs are shown in Appendix A.

5.3.2 Conservation Assumed in the Forecast

Conservation plays a key role in maximizing the useful life of existing infrastructure and maintaining reliable supply. Conservation is achieved through a mix of program-related activities including behavioral changes by customers and mandated efficiencies from building codes and equipment standards ("C&S"). These approaches complement each other to maximize conservation results. The conservation savings forecast for the Region are applied to the gross peak demand forecast, along with contracted DG resources, to determine the net peak demand for the Region.

In December 2013 the Ministry of Energy released a revised LTEP, which outlined a provincial conservation target of 30 TWh of energy savings by 2032. In order to represent the effect of these targets within regional planning, the IESO developed an annual forecast for peak demand savings resulting from the provincial energy savings target, which was then expressed as a percentage of demand in each year. These percentages were applied to the LDCs' demand forecasts to develop an estimate of the peak demand impacts from the provincial targets in the Region. The resulting conservation assumed in the reference forecast is shown in Table 5-1. This contribution from conservation is expected to offset most of the growth in electricity demand in the Region to 2033. The above conservation forecast methodology was not applied in developing the low-demand forecast scenario used for the long-term because the scenario

already accounts for the anticipated impact of the 2032 conservation targets in its overall growth rate assumptions.

Table 5-1: Peak Demand Savings from 2013 LTEP Conservation Targets in the Windsor-Essex Region

Year	2015	2017	2019	2021	2023	2025	2027	2029	2031	2033
Savings (MW)	12	20	40	58	72	89	105	122	139	149

It is assumed that demand response ("DR") resources already existing in the base year will continue. Savings from potential future DR resources are not included in the forecast and are instead considered as possible solutions to identified needs.

The 2013 LTEP also committed to establishing a new 6-year Conservation First Framework beginning in January 2015 to enable the achievement of all cost-effective conservation. In the near term, Ontario's LDCs have an energy reduction target of 7 TWh to be achieved between 2015 and the end of 2020 through LDC conservation programs enabled by the new Framework. For the program targets, each LDC is required to prepare a conservation plan describing how the target will be achieved. The first conservation plans are due to be completed by LDCs by May, 2015. The LDC conservation plans will link closely with regional plans, providing more detail about how a portion of the conservation targets that have been incorporated into regional planning will be realized.

5.3.3 Distributed Generation Assumed in the Forecast

In addition to conservation resources, DG connected alongside load on the distribution system reduces the amount of demand needed to be supplied via the transmission system. The introduction of the Green Energy and Green Economy Act, and the associated development of Ontario's FIT program, has increased the development of DG in Ontario from renewable fuel sources including wind, solar and biomass. There are also thermal DG resources in the Region, such as combined heat and power generation ("CHP") associated with industrial customers.

With respect to renewable generation, the full installed capacity of these facilities cannot be relied upon to meet the Region's electricity needs due the intermittent nature of the generation. The installed capacity of these facilities is adjusted to reflect the expected, or effective, power output at time of coincident peak. In other words, the effective capacity is the portion of

installed renewable generation capacity that contributes to meeting peak demand. Distributed thermal generation is expected to fully contribute to meeting peak demand.

After netting-off the conservation savings, as described above, the forecast is further reduced by the effective capacity of existing and committed DG in the Region. It is estimated that DG in the Region will contribute approximately 65 MW of effective capacity to meeting area peak demand in 2014.

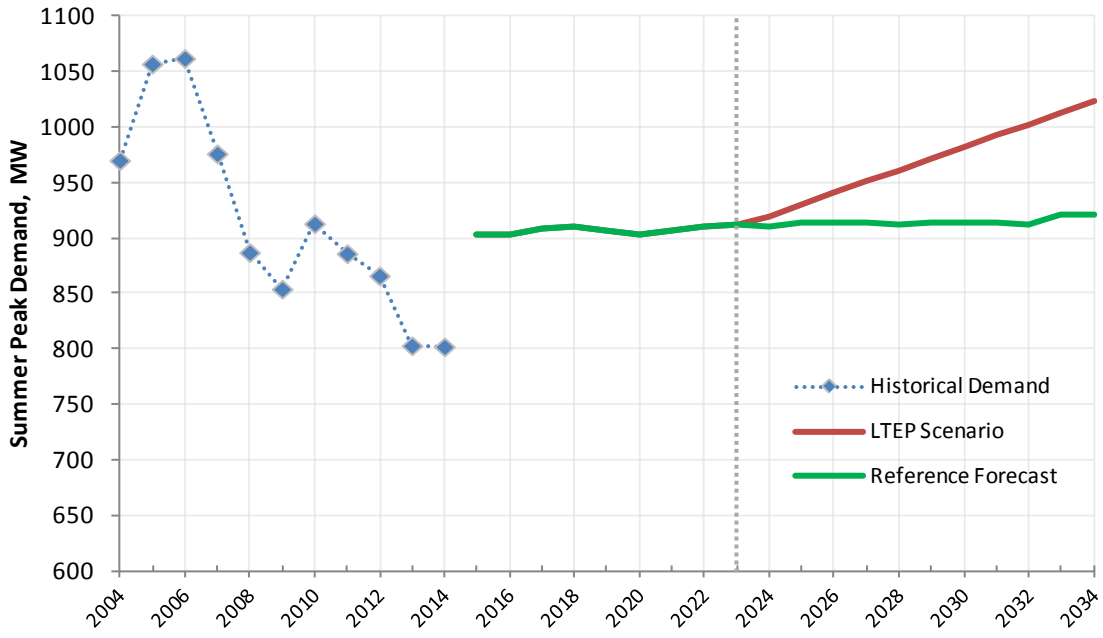
5.4 Windsor-Essex Low Growth Scenario

As noted in Section 5.2, beyond the first 10-years of the planning horizon (ie. beginning in 2024) the IESO developed a second forecast scenario based on the 2013 LTEP. Similar to the reference forecast, this scenario reflects the impact of the conservation targets described in the LTEP. This scenario projects growth over a region, rather than on a station-by-station basis. It was developed by applying the average annual growth rate assumed for southwestern Ontario in the low-demand forecast, about 1.0% per year, to the Region, starting from 2024.

5.5 Planning Forecasts

Figure 5-4 shows the reference forecast and the 2013 low-demand scenario, along with historic demand in the Region.

Figure 5-4: Reference Forecast, 2013 Low-Demand Scenario and Historic Demand in the Region



6. Near- and Medium-Term Plan

Regional planning requires comparing future electricity demand (based on planning forecast) with the capability of the existing system (based on provincial planning criteria). This section includes discussion of the near-term needs and the options to address those needs. No medium-term needs have been identified in the Region. As noted in the previous section, these near-term needs are based on the reference planning forecast provided by the Region's LDCs, reflecting known developments in the area as well as the impact of planned conservation initiatives and DG. These conservation and DG resources are already making a significant contribution toward managing the growth across the Region. For needs related to meeting ORTAC load restoration and load security criteria, which are described in 6.1 Planning Criteria, conservation is not considered a feasible alternative, as these needs are driven by the configuration of the transmission and distribution systems, and are not related to demand growth. Therefore, the Working Group did not consider additional conservation as an alternative to address load restoration times in the Region, and therefore, the near-term plan focuses on improvements to the transmission system.

6.1 Planning Criteria

ORTAC[10] is the provincial standard for assessing the reliability of the transmission system and was applied to assess supply capacity and reliability needs in the Region.

ORTAC includes criteria related to assessment of the bulk transmission system, as well as the assessment of local or regional reliability requirements. The latter criteria are of relevance to regional planning. They can be broadly categorized as addressing two distinct aspects of reliability: (1) providing supply capacity, and (2) limiting the impact of supply interruptions.

With respect to supply capability ORTAC specifies that the transmission system must be able to provide continuous supply to a local area, under specific transmission and generation outage scenarios. The performance of the system in meeting these conditions is used to determine the load meeting capability ("LMC") of an area for the purpose of regional planning. The LMC is the maximum load that can be supplied in the local area with no interruptions in supply or, under certain permissible conditions, with limited controlled interruptions as specified by the ORTAC.

[10] http://www.ieso.ca/imoweb/pubs/marketadmin/imo_req_0041_transmissionassessmentcriteria.pdf

With respect to supply interruptions ORTAC requires that the transmission system be designed to minimize the impact to customers of major outages, such as a contingency on a double-circuit tower line resulting in the loss of both circuits, in two ways: by limiting the amount of customer load affected; and by restoring power to those affected within a reasonable timeframe. Specifically, ORTAC requires that no more than 600 MW of load be interrupted in the event of a major outage involving two elements. Further, load lost during a major outage must be restored within the following timeframes:

- All load lost in excess of 250 MW must be restored within 30 minutes;
- All load lost in excess of 150 MW must be restored within four hours; and
- All load lost must be restored within eight hours.

6.2 Near-Term Needs

Based on an application of ORTAC two near-term transmission system reliability needs, shown in Table 6-1 below, have been identified. These needs affect different groups of customers in the Region (i.e., different sub-systems), however they can be addressed through the same transmission reinforcement project consisting of a new TS located in Leamington.

Table 6-1: Summary of Windsor-Essex Region Reliability Needs

Sub-system	Need Type	Need Description	Need Date
Kingsville-Leamington Sub-system	Capacity to Meet Demand	Forecast loading on K6Z exceeds the thermal load meeting capability	Today
J3E-J4E Sub-system	Minimize the Impact of Interruption	J3E-J4E does not comply with ORTAC service interruption criteria — i.e., restoration of all load within 8 hours	Today

6.2.1 Kingsville-Leamington: Plan to Address the Need for Additional Supply Capacity and End-of-Life Replacement

Within the Region, the strongest growth in electricity demand is expected to occur in the Kingsville-Leamington area. This growth is predominantly attributable to growth in the greenhouse sector as indicated by customer connection requests received by the applicable LDC, the current outlook for expansion of existing greenhouse operations, and anticipated

growth from new operations. Such growth expectations are based on approved and proposed development plans provided by the municipalities of Leamington and Kingsville, and a survey completed by the Ontario Greenhouse Vegetable Growers on behalf of local greenhouse growers.

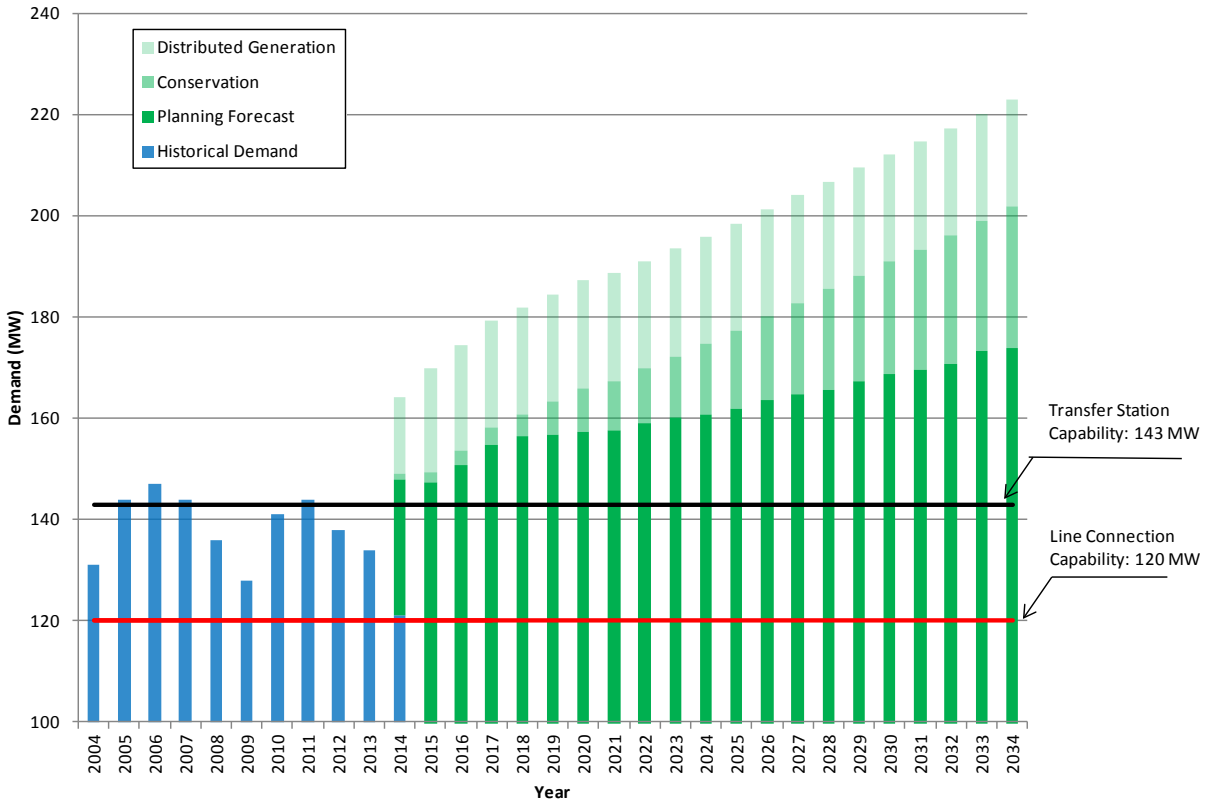
Similarly, the population of Kingsville is expected to increase by 0.5% per year over the next decade, which is higher than the slight population decline expected in the Region overall during the 2014 to 2033 planning horizon.[11]

The planning forecast for the Kingsville-Leamington area is shown in Figure 6-1 below, along with the LMC for the existing Kingsville TS. The approximate planned peak demand reduction between 2014 and 2033 for the Kingsville-Leamington sub-system is 25 MW from conservation, and 6 MW from DG. The peak demand reduction from conservation and DG is expected to offset about 57% of the forecast gross demand growth in the Region between 2014 and 2033. The LMC is based on the 120 MW thermal capability of the 115 kV connection line between Lauzon TS and Kingsville TS, which is the most limiting element of supply to the station. The Kingsville TS capability is higher, at 143 MW.

As shown in Figure 6-1, during the summer months the peak demand has exceeded the 120 MW limit, requiring the use of operating measures. The figure shows that based on the planning forecast, the Kingsville-Leamington area is expected to continue to exceed the capability of the existing Kingsville TS for the forecast period. Additional capacity is therefore required to meet current and future electricity demand in the Kingsville-Leamington sub-system. Until additional capacity is provided, operating measures such as an existing load rejection scheme (which is in violation of ORTAC) will be required. The existing system does not meet ORTAC criteria for supply capacity.

[11] Windsor-Essex Economic Development Corporation website. At www.choosewindsoressex.com.

Figure 6-1: Historical and Forecast Demand and Supply Capabilities in the Kingsville-Leamington Sub-system[12]



After considering "non-wires" and "wires" alternatives, the former-OPA, with the support of working group members, recommended a new station in Leamington to address the need.

In 2014 Hydro One filed a Leave to Construct application with the OEB for transmission expansion in the Leamington area, the SECTR project. The application is currently proceeding through the regulatory process and has a planned in-service date of 2018.

As part of the SECTR planning process, Hydro One identified a near-term need for transformer refurbishment due to end-of-life assets at Kingsville TS. There are currently four transformers at Kingsville TS. One of these units was recently replaced, but the other three units are reaching their end-of-life in the near future. In conjunction with the Leamington area transmission expansion, the option of partially refurbishing Kingsville TS by replacing one of the three transformers that are near end-of-life was recommended. This plan reduces the capacity at

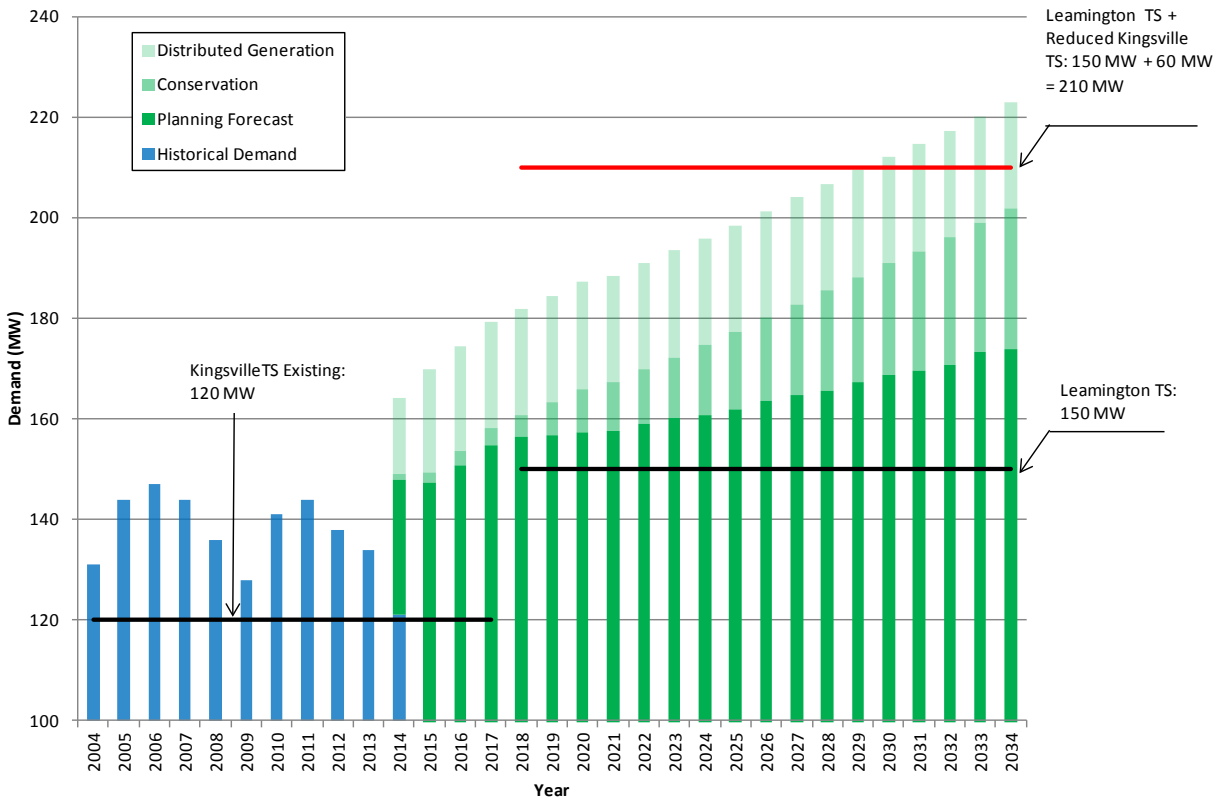
[12] Historic demand values reflect actual electricity demand and weather.

Kingsville TS by reducing the number of the station's transformers from four to two and reduces the LMC of the station from 120 MW to 60 MW, depending on the ability to transfer sufficient existing demand to the new Leamington TS. The result is a net increase in station capacity in the Kingsville-Leamington area, but with a different geographic distribution. This plan results in reduced flexibility for LDCs supplying customers in the Kingsville area. It will, however, be possible to return Kingsville TS to its current capacity in the future, should the forecast indicate the need for additional capacity.

The former-OPA prepared evidence to support Hydro One's regulatory application to the OEB for SECTR. This evidence details the needs in the Region; evaluates "non-wires" and "wires" alternatives; and recommends an integrated solution, comprised of planned conservation and DG resources, the new TS at Leamington, and partial refurbishment at Kingsville TS.

When the SECTR project is completed, and Kingsville TS refurbished with a reduced capacity, the combined supply capability in the Kingsville-Leamington area will be 210 MW. Figure 6-2 shows the supply capability in the Kingsville-Leamington area.

Figure 6-2: Kingsville-Leamington Sub-system Capability after Leamington TS is In-Service



6.2.2 Plan to Minimize the Impact of Supply Interruptions in the Windsor-Essex Region

A large portion of the transmission system in the Region, referred to as the "J3E-J4E sub-system", does not currently comply with ORTAC restoration criteria. In addition to addressing the supply capacity need in the Kingsville-Leamington area, the plan to build a new TS at Leamington will address the restoration need. This need is described in Figure 6-3.

Sub-system Configuration and the Limiting Outage

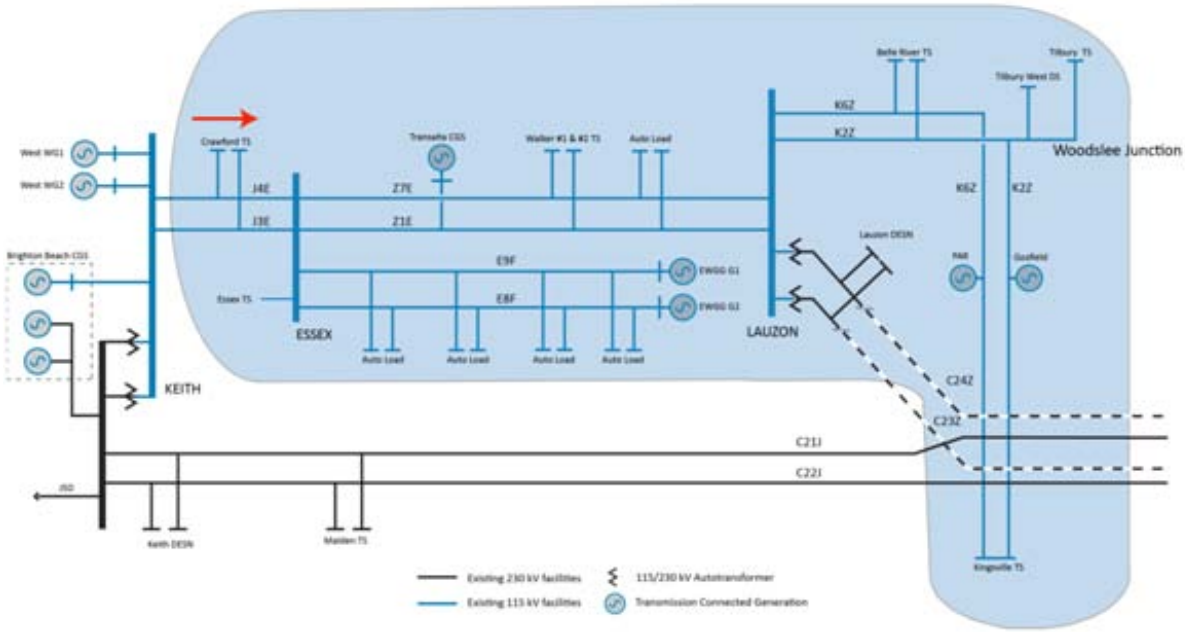
The J3E-J4E sub-system is supplied by two double-circuit 230 kV transmission lines between Chatham SS and Lauzon TS and Keith TS, respectively. The loss of one of these lines (C23Z/C24Z between Chatham and Lauzon) is the most limiting outage for this sub-system. In the event of the loss of the C23Z/C24Z transmission line, the Lauzon DESN station, which is directly connected to this line, is lost immediately. Subsequent to the outage, the 115 kV system supplying most of the City of Windsor, as well as Kingsville, Belle River and Tilbury, must be supplied entirely through the path consisting of the transformers at Keith TS and the 115 kV transmission line between Keith TS and Essex TS (J3E/J4E). The thermal capacity of the two

230/115 kV transformers at Keith TS limits the supply to the 115 kV system to approximately 300 MW. The C23Z/C24Z outage, and the J3E-J4E sub-system which is affected by this outage, are shown in Figure 6-3 below.

One of the Brighton Beach GS gas-fired generators is connected to the 115 kV bus at Keith TS between the Keith transformers and the J3E/J4E transmission line. The capability of the J3E/J4E line, which is higher than the capability of the Keith transformers, can be fully utilized by a combination of supply from the transmission system and generation at Brighton Beach GS. Due to this arrangement, the thermal capacity of the J3E/J4E transmission line limits the supply to the 115 kV system after the C23Z/C24Z double-circuit outage to approximately 440 MW. Because this would not be enough to meet the peak demand on the 115 kV system, the existing load rejection scheme would reject sufficient load immediately following the outage to respect the ratings of J3E/J4E.

The amount of load rejection required will depend on whether or not all local generation is in operation. For example, based on the planning forecast for 2017, following the loss of the C23Z/C24Z double-circuit transmission line, a total of 245 MW of load is interrupted, consisting of about 175 MW at Lauzon DESN and about 70 MW which is interrupted through load rejection, assuming local gas and renewable generation sources are running. This represents approximately 28% of the Windsor-Essex Region electricity demand, and is a substantial amount of demand to be interrupted following an outage. Following the contingency this load must be restored within the period of time prescribed by the ORTAC.

Figure 6-3: Windsor-Essex Region Transmission System Following an Outage to the C23Z/C24Z Transmission Line



Restoration Capability

The existing system lacks the capability to restore power to customers in the J3E-J4E sub-system in accordance with the ORTAC criteria which specifies that load greater than 250 MW must be restored within half an hour, load greater than 150 MW must be restored within 4 hours, and all load interrupted must be restored within 8 hours.

There are three sources of restoration capability which have been identified in the J3E-J4E sub-system: 1) gas-fired generation at Brighton Beach GS and in the J3E-J4E sub-system, 2) transferring load out of the J3E-J4E sub-system, and 3) transmission connected renewable generation within the J3E-J4E sub-system. These three contributors are discussed further below.

As noted previously, one of the gas-fired generating units at Brighton Beach GS is connected to the 115 kV bus at Keith TS. This generation capacity allows the capability of the J3E/J4E transmission line to be fully utilized after the C23Z/C24Z outage.

In addition, there is currently 154 MW of gas-fired generation within the J3E-J4E sub-system, consisting of East Windsor Cogeneration and TransAlta Windsor. The contract for one of these generators, TransAlta Windsor (74 MW), expires in December, 2016. Beyond this date, the

amount of gas-fired generation within the sub-system will be reduced to 80 MW. This 80 MW of effective generation will help supply demand in the J3E-J4E sub-system following a major transmission outage until the expiry of the East Windsor Cogeneration contract in November, 2029.

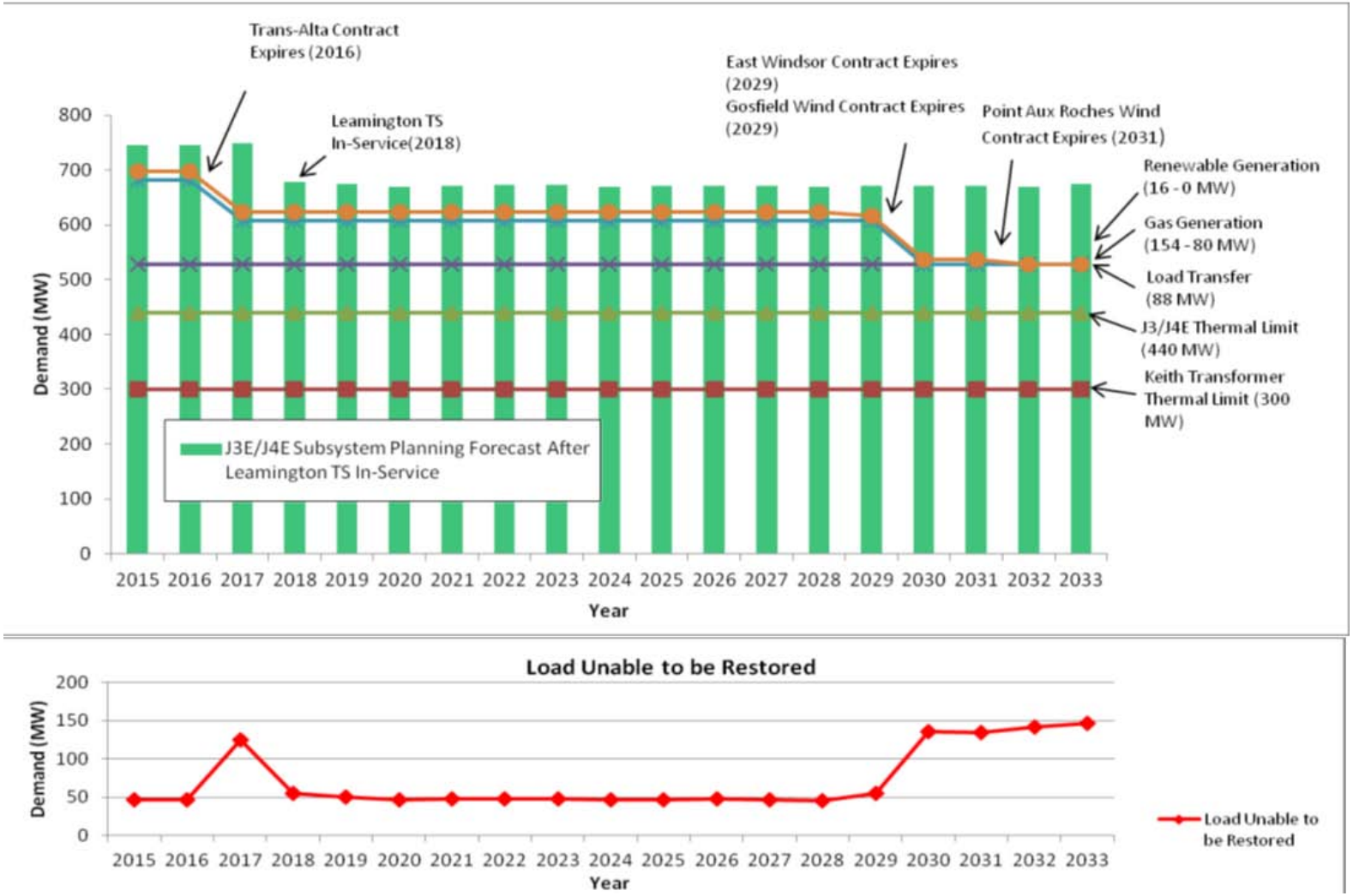
Hydro One has identified that there is a total of 88 MW of capability to transfer load supplied by the 115 kV system to stations supplied by the 230 kV system. This consists of 18 MW of transfer capability to Keith TS, 50 MW to Malden TS, and up to 20 MW of load at Tilbury West DS which can be supplied by the N5K circuit (outside the Region, near Chatham). These transfer capabilities are based on the station capability of Keith TS and Malden TS, and the capability of the N5K circuit.

In addition, as noted in Section 4.2 there is 100 MW of transmission connected renewable generation within the Kingsville-Leamington sub-system. It is reasonable to count on the effective capacity of 16 MW from these facilities for the purpose of providing restoration capability until the two contracts expire in 2029 and 2031 respectively.

The new Leamington TS which has a planned in-service date of 2017 would improve the restoration situation by moving some of the load out of the J3E-J4E sub-system to a new 230 kV supply point. Leamington TS will be supplied by C21J and C22J and will therefore not be affected by the C23Z/C24Z contingency.

Figure 6-4 summarizes the above analysis. After 2016 there is a need for approximately 125 MW of additional restoration capability in order to fully restore the J3E-J4E sub-system following the C23Z/C24Z double-circuit contingency. With the planned Leamington TS in-service in 2018 this requirement will decrease to about 50 MW.

Figure 6-4: J3E – J4E Sub-system Restoration



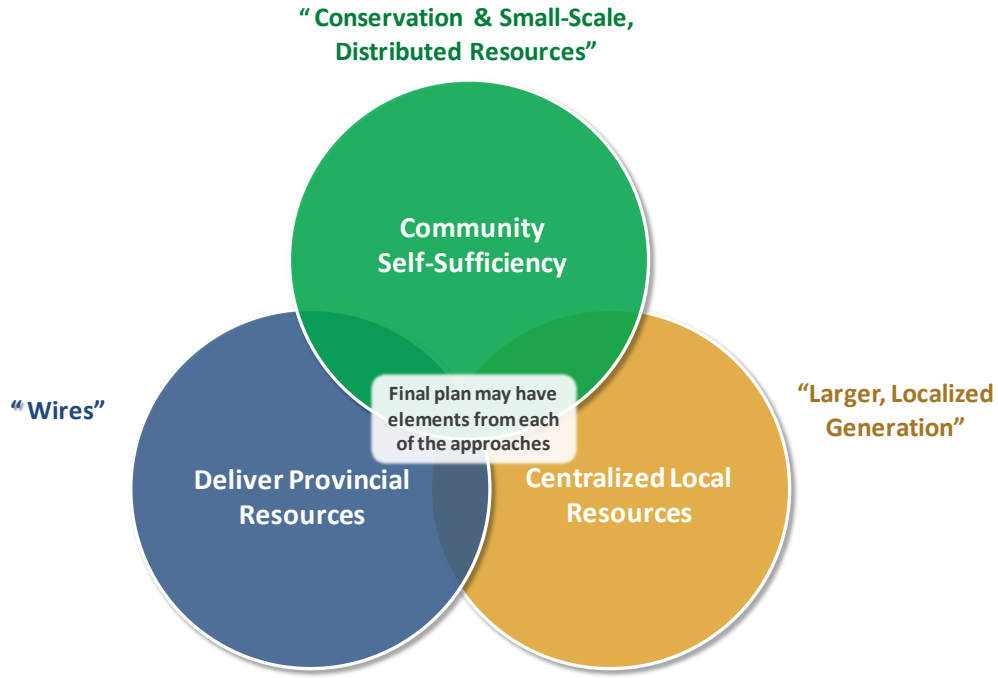
7. Long-Term Plan

No long-term supply capacity needs have been identified in the Region at this time. Therefore, instead of considering specific needs and planning options, long-term planning activities for the Region will include engaging with stakeholders and communities; monitoring demand, conservation, and DG trends in the area; coordinating with municipal or community energy planning activities; and generally laying the foundation for informed planning in the future. The OEB's regional planning process suggests a minimum 5-year cycle, however if significant changes are noted in the region over the coming years the process may be initiated earlier.

In recent years, a number of trends, including technology advances, policy changes supporting DG, greater emphasis on conservation as part of electricity system planning, and increased community interest and desire for involvement in electricity planning and infrastructure siting, are changing the landscape for regional electricity planning. Traditional, "wires" based approaches to electricity planning may not be the best fit for all communities. New approaches that acknowledge and take advantage of these trends, in addition to more traditional "wires-based", should also be considered.

To facilitate discussions about how a community might plan its future electricity supply, three conceptual approaches for meeting a region's long-term electricity needs provide a useful framework (see Figure 7-1). Based on regional planning experience across the province over the last 10 years, it is clear that different approaches are preferred in different regions, depending on local electricity needs and opportunities, and the desired level of involvement by the community in planning and developing its electricity infrastructure.

Figure 7-1: Approaches to Meeting Long-Term Needs



The three approaches are as follows:

- **Delivering provincial resources**, or "wires" planning, is the traditional regional electricity planning approach associated with the development of centralized electric power systems over many decades. This approach involves using transmission and distribution infrastructure to supply a region's electricity needs, taking power from the provincial electricity system. This model takes advantage of generation that is planned at the provincial level, with generation sources typically located remotely from the region. In this approach, utilities (transmitters and distributors) play a lead role in development.
- The **Centralized local resources** approach involves developing one or a few large, local generation resources to supply a community. While this approach shares the goal of providing supply locally with the community self-sufficiency approach below, the emphasis is on large central-plant facilities rather than smaller, distributed resources.
- The **Community self-sufficiency** approach entails an emphasis on meeting community needs largely with local, distributed resources, which can include: aggressive conservation beyond provincial targets; DR; DG and storage; smart grid technologies for managing distributed resources; integrated heat/power/process systems; and electric vehicles. While many of these applications are not currently in widespread use, for regions with long-term needs (i.e., 10-20 years in the future) there is an opportunity to develop and test out these options before commitment of specific projects is required.

The success of this approach depends on early action to explore potential and develop options, and on the local community taking a lead role. This could be through a municipal energy planning or community energy planning process, or an LDC or other local entity taking initiative to pursue and develop options.

Given that no long-term supply capacity needs have been identified in the Region, it is not necessary to consider the application of these options to Windsor-Essex at this time. These concepts, which are being referenced in other planning regions around the province, are provided as background information for community members and stakeholders who are interested in the long-term considerations for regional electricity supply in Windsor-Essex.

8. Community, Aboriginal and Stakeholder Engagement

Community engagement is an important aspect of the regional planning process. Providing opportunities for input in the regional planning process enables the views and preferences of the community to be considered in the development of the plan, and helps lay the foundation for successful implementation. This section outlines the engagement principles as well as the activities undertaken to date for the Windsor-Essex Region IRRP and those that will take place to discuss the Regional planning process and electricity supply needs in the area.

A phased community engagement approach has been developed for the Windsor-Essex IRRP based on the core principles of creating transparency, engaging early and often, and bringing communities to the table. These principles were articulated as a result of the IESO's outreach with Ontarians to determine how to improve the regional planning process, and they are now guiding the IRRP outreach with communities.

Figure 8-1: Summary of Windsor-Essex IRRP Community Engagement Process

Creating Transparency

To start the dialogue on the Windsor-Essex IRRP and build transparency in the planning process, a number of information resources were created for the plan. A dedicated web page was created on the IESO (former-OPA) website to provide a map of the regional planning area, information on why the plan was being developed, the terms of reference for the IRRP and a listing of the organizations involved was posted on the websites of the Working Group members. A dedicated email subscription service was also established for the Windsor-Essex IRRP where communities and stakeholders could subscribe to receive email updates about the IRRP.

Engaging Early and Often

The first step in the engagement of the Windsor-Essex IRRP was providing information to representatives from the municipalities and First Nation communities in the Region. For the municipal meetings, presentations were made to the Windsor-Essex Region municipal planners and Chief Administrative Officers at three group meetings held in Windsor and Chatham during October and November, 2014. Key topics discussed during the meetings included confirmation that the demand forecast reflects municipal planning expectations, system restoration needs, and the strong interest shown by the local greenhouse industry in CHPSOP offered by the former-OPA.

Bringing Communities to the Table

This engagement will begin with a webinar hosted by the Working Group to discuss the plan and approaches for near-term options. Presentations on the Windsor-Essex IRRP will also be made to Municipal Councils, First Nation communities and the Métis Nation of Ontario on request.

To strengthen the discussion, an informational meeting will be held with local representatives from Municipalities including Mayors and economic development groups, Aboriginal communities, local industry and community groups. Following this meeting, a public open house will be held to further expand the discussion and awareness at a community level.

Strengthening processes for early and sustained engagement with communities and the public were introduced following an engagement held in 2013 with 1,250 Ontarians on how to enhance regional electricity planning. This feedback resulted in the development of a series of

recommendations that were presented to, and subsequently adopted by the Minister of Energy. Further information can be found in the report entitled "Engaging Local Communities in Ontario's Electricity Planning Continuum"[13] available on the IESO website.

Information on outreach activities for the Windsor-Essex Region IRRP can be found on the IESO website and updates will be sent to all subscribers who have requested updates on the Windsor-Essex IRRP.

[13] http://www.powerauthority.on.ca/stakeholder-engagement/stakeholder-consultation/ontario-regional-energy-planning-review

9. Conclusion

This report documents the IRRP that has been carried out for the Windsor-Essex Region and it largely fulfils the OEB requirement to conduct regional planning for this Region. The IRRP identifies electricity needs in the Region over the 20-year period from 2014 to 2033, recommends a plan to address near-term needs, and identifies a monitoring and engagement plan for the next few years, to inform the next regional planning cycle.

Implementation of the near-term plan is already underway, with the LDCs developing conservation plans consistent with the Conservation First policy and with infrastructure projects being developed by Hydro One.

The planning process does not end with the publishing of this IRRP. The Windsor-Essex Working Group will continue to meet at least annually to monitor progress and developments in the Region.