



**OEB Natural Gas Electricity
Interface Review
(NGEIR)
Stakeholder Workshop**

September 19, 2005





Topics

- The Process
- Existing Infrastructure and Capacities
- Factors Affecting Facilities Requirements
- Generator Location
- Assumptions
- Key Findings
 - Example of flows
 - Costs
- Generator Services
- Other Jurisdictions

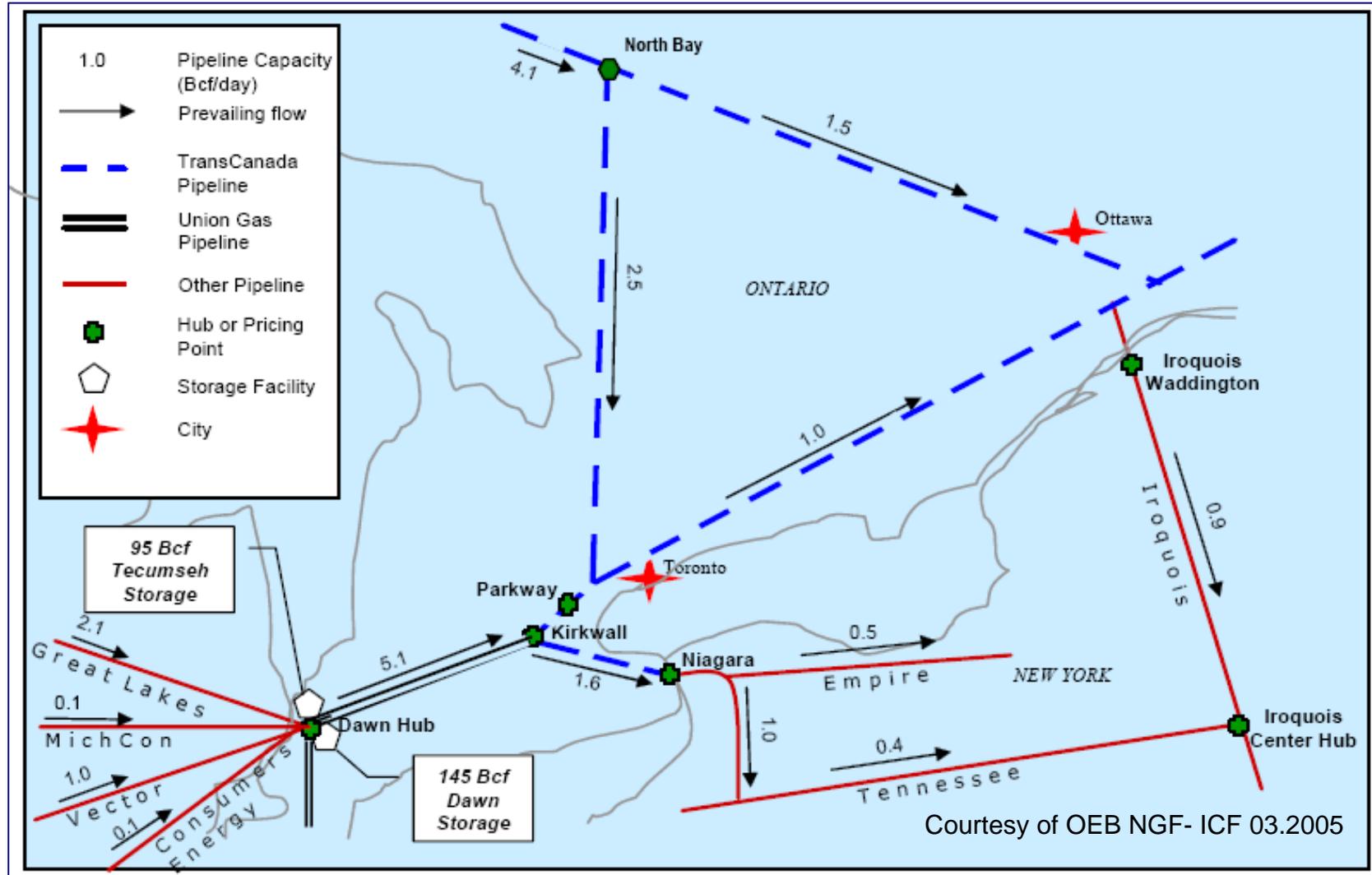
The Process



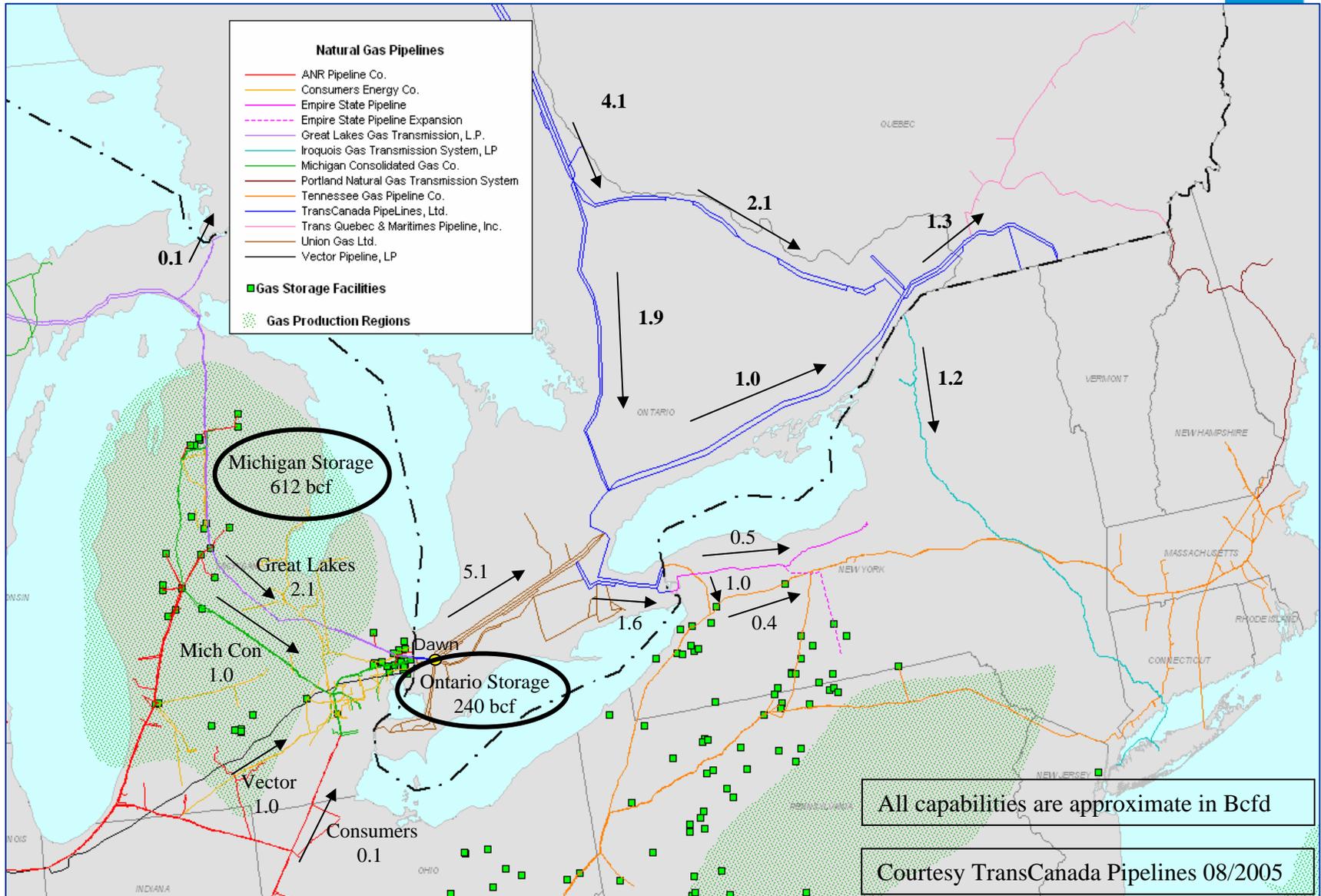
- Met and obtained views of over 25 stakeholders on:
 - New gas service requirements that generators wanted and would likely value and use
 - The primary drivers of generator location and
 - The likely supply and necessary arrangements that would be required to serve the generators.
- Met with the OPA, IESO, Hydro One and Ministry of Energy to discuss the development of the assumptions and scenarios for the analysis.
- Scenarios developed and reviewed by stakeholders
- Modified scenarios provided to Enbridge, TransCanada, Union Gas and Vector with a request for them to assess the likely gas loads and required facilities under 6 scenarios.
 - Enbridge, TransCanada, Union Gas and Vector provided high level estimates of possible loads and potential costs for the selected scenarios for the portions of the facilities that they were each potentially providing.
 - North Canadian Energy provided high level storage and pipeline costs for storage development in the Goderich area.
- Using this input ERA developed preliminary estimates of potential gas requirements, facilities and costs. These were reviewed and modified based on feedback that ERA obtained from the stakeholders.
- Stakeholders provided opportunities to provide written and verbal comment as well as provided a copy of the scenario template that was used by Enbridge, TransCanada and Union.
- Board Staff provided all registered Natural Gas Forum participants with a summary of ERA's report on August 31 followed by an update on September 13, 2005.



EXISTING NATURAL GAS FACILITIES

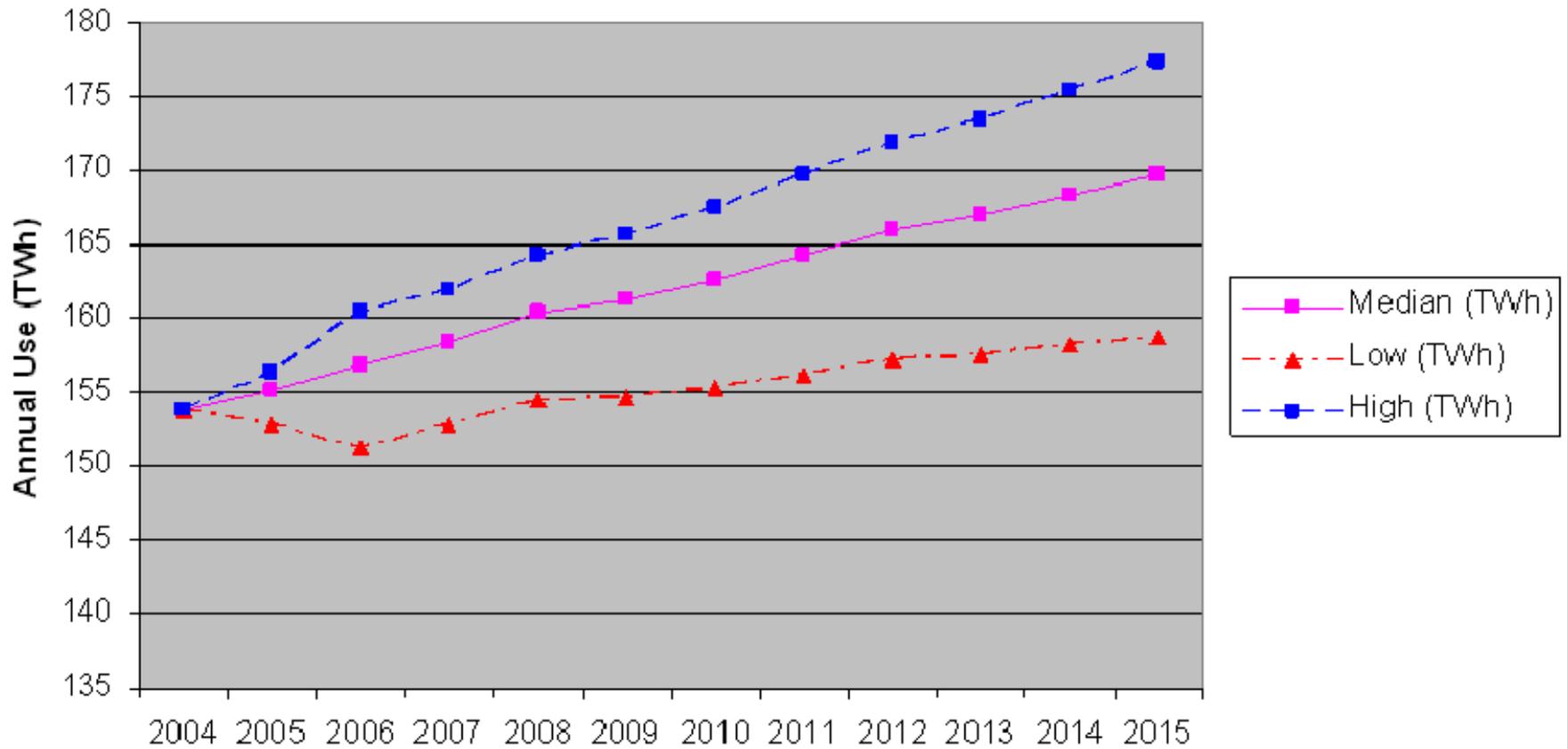


Pipeline Capacities to Ontario





Ontario Electricity Demand (TWh)



Factors Affecting Facilities Requirements



- Amount of new gas fired generation built;
- Location of new generators (urban vs. rural, proximity to transmission and storage and east or west of Dawn);
- Generator Characteristics (peaking, intermediate or base load, fuel rate);
- Gas supply source and type (firm versus interruptible);
- Delivery point of gas to Ontario;
- Generator contracting practices (supply, transportation, storage and distribution). The mix of storage and transmission facilities and the underlying contracts (i.e. deliverability, space and contract demands)
- Types, attributes and pricing of new gas services for generators;

Factors Affecting Facilities Requirements



- Power contract terms and conditions i.e.:
 - Price index used to determine power price (i.e.: NGX Dawn Daily Index could bias delivery to Dawn)
 - Underlying risk components of the power supply contract (how costs are recovered and embedded in the power contracts)
- Gas nominations, provision of intraday nominations and alignment with the power dispatch windows;
- Range of products and services that wholesalers provide and degree of wholesale gas competition within the Ontario Market;
- Rules, regulations and gas contract terms and conditions for gas services provided to generators that allow for the movement of gas within Ontario

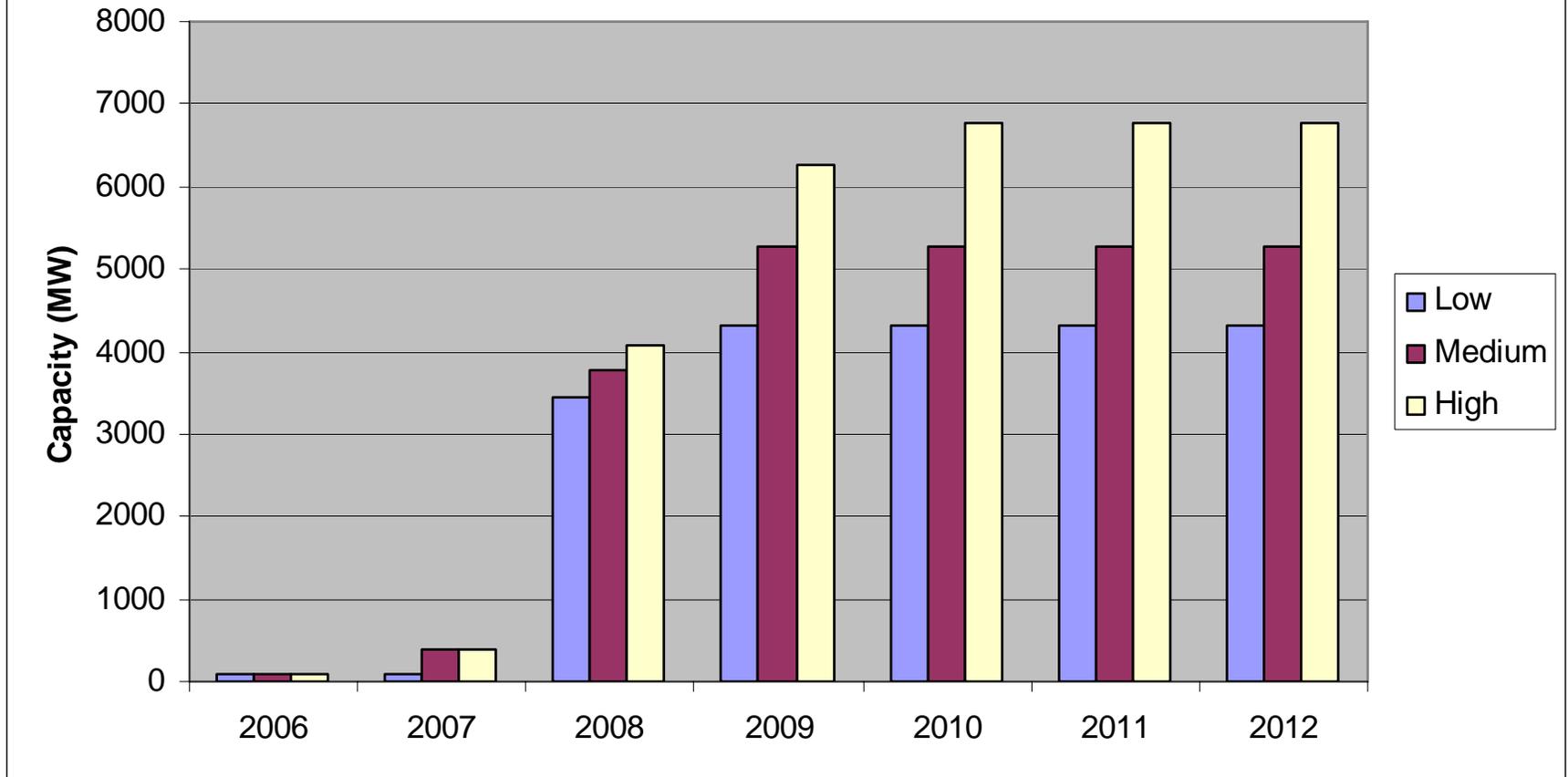


Generator Location

- In close proximity to power transmission
- In close proximity to gas transmission
- Close to load centers
- Influenced by Power RFP/contract
- Environmental and Zoning issues



New Gas Fired Power Generation Scenarios



BASE CASE GAS ASSUMPTIONS



1. Adequate transmission built to and across Ontario
2. Required expansion of storage space and deliverability provided by Ontario
3. Ontario Distribution infrastructure can be built to meet needs of generators on a timely basis (1-2 years)
4. 1 LNG facility on St. Lawrence post 2010 tied into eastern end of TCPL
5. Renewal of TCPL contracts either short haul or long haul
6. Significant move to short haul Dawn delivery versus long haul TCPL and or Alliance (200 mmcf plus CES supply)
7. Modification and or resolution of dispatch windows misalignment by November 2007
8. New gas services for generators developed and introduced into Ontario
9. OPA contracts, incentives and pricing do not preferentially discriminate against nor in favour of a gas delivery route
10. DAM post 2008
11. Coal Replacement at approximately 40% utilization 26.8 TWh



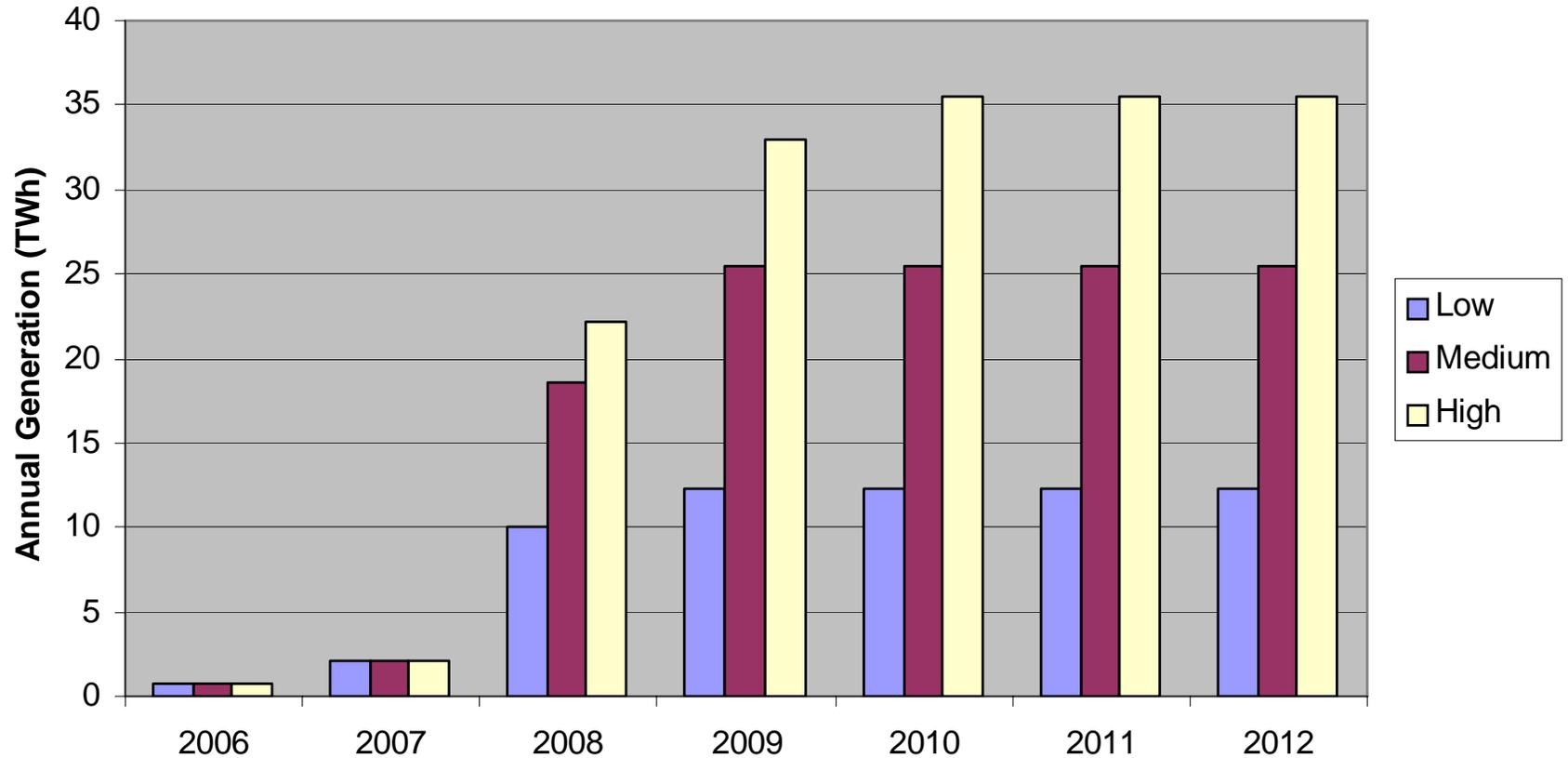
Assumptions

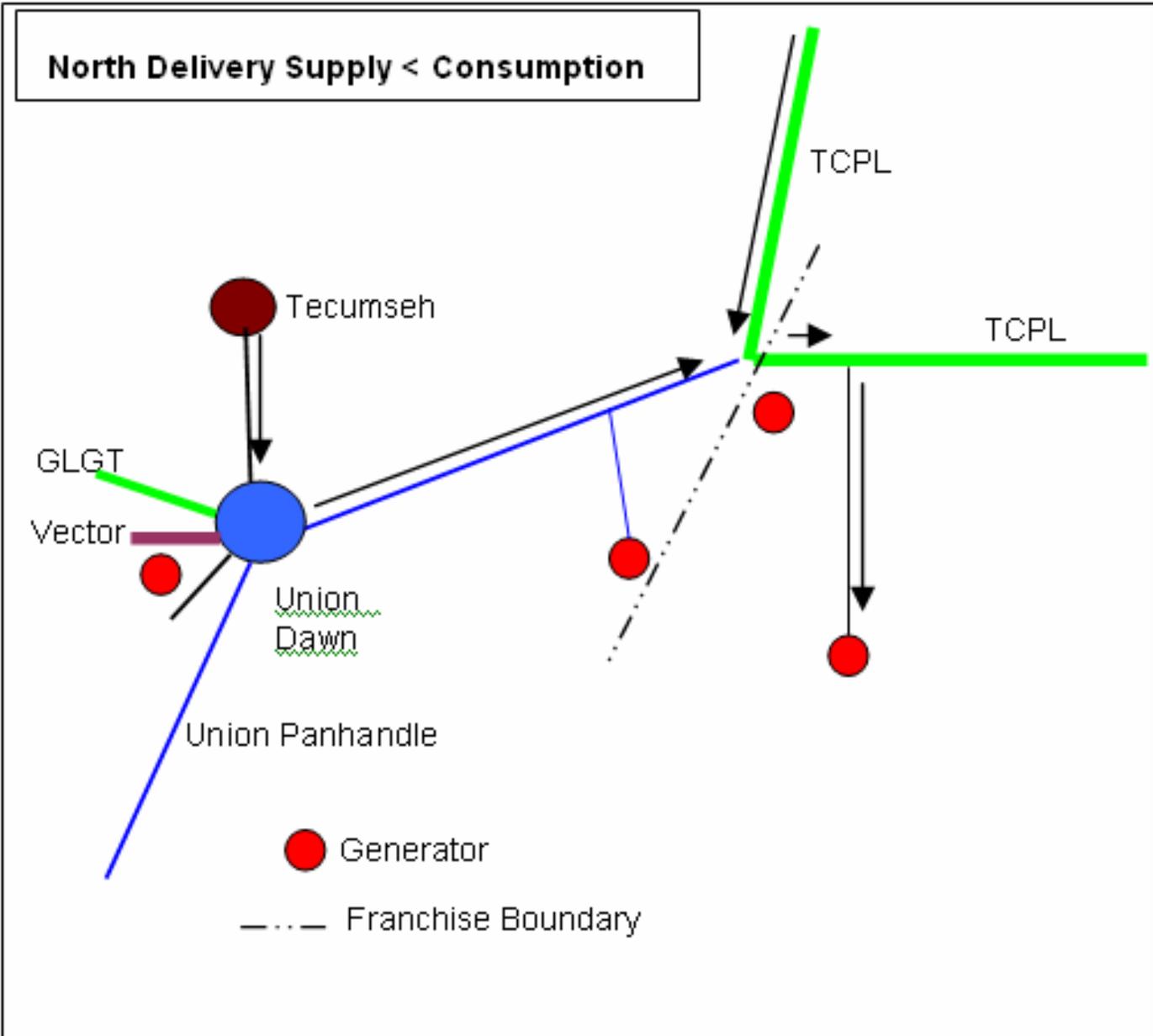
IESO Timeline

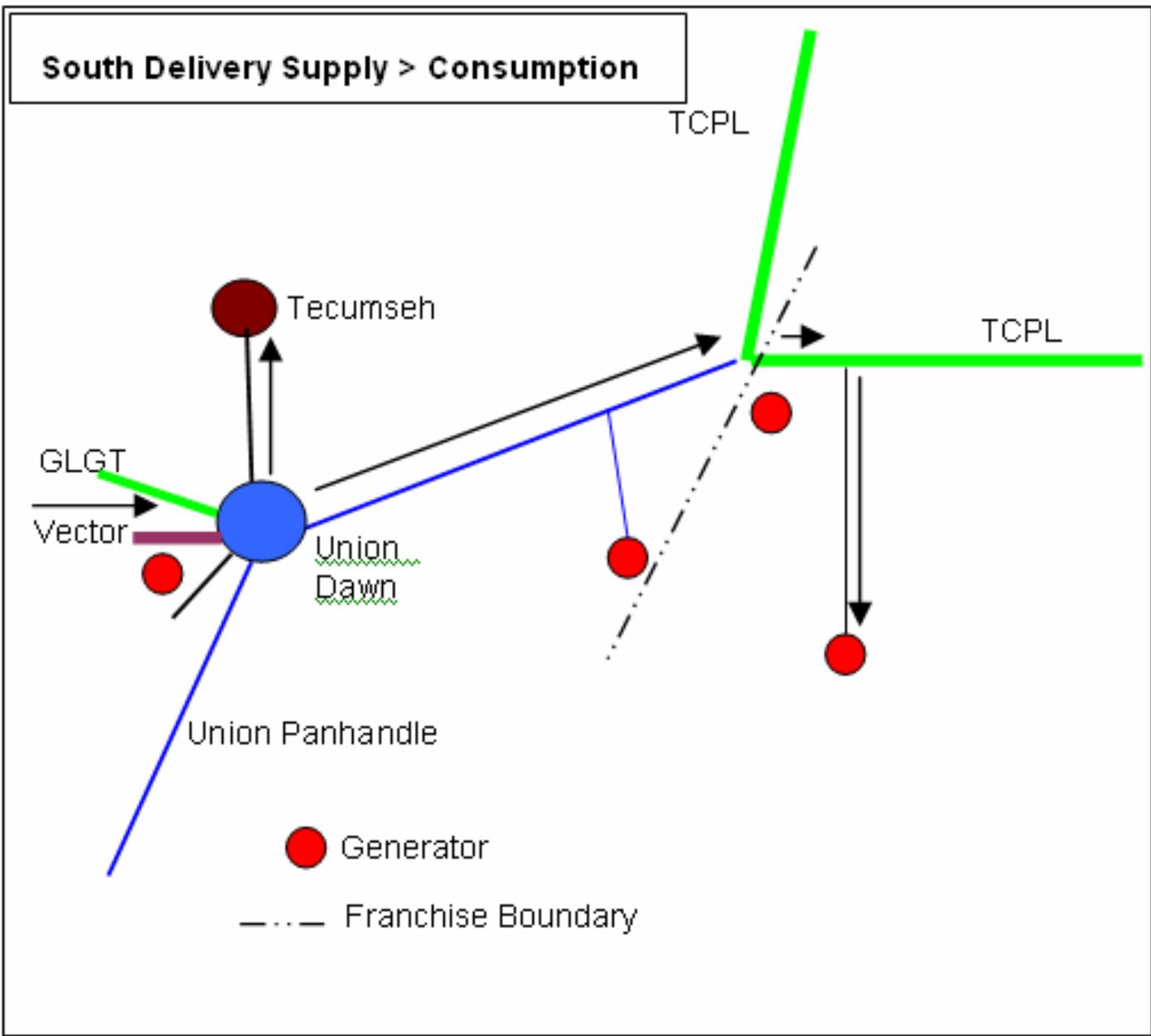
2005 Greater Toronto Airports Authority	90
2007 Thunder Bay 3 converted	150
2007 Thunder Bay 2 converted	150
2007 Greenfield South Power Project	280
2007 Greenfield Energy Centre	1005
2007 Cogeneration 1st tranche	500
2008 St. Clair Power	570
2008 Cogeneration 2nd tranche	500
2009 West GTA	1000
2008 Downtown Toronto	500
2009 Greenfield North Power Project	280
TOTAL	5025

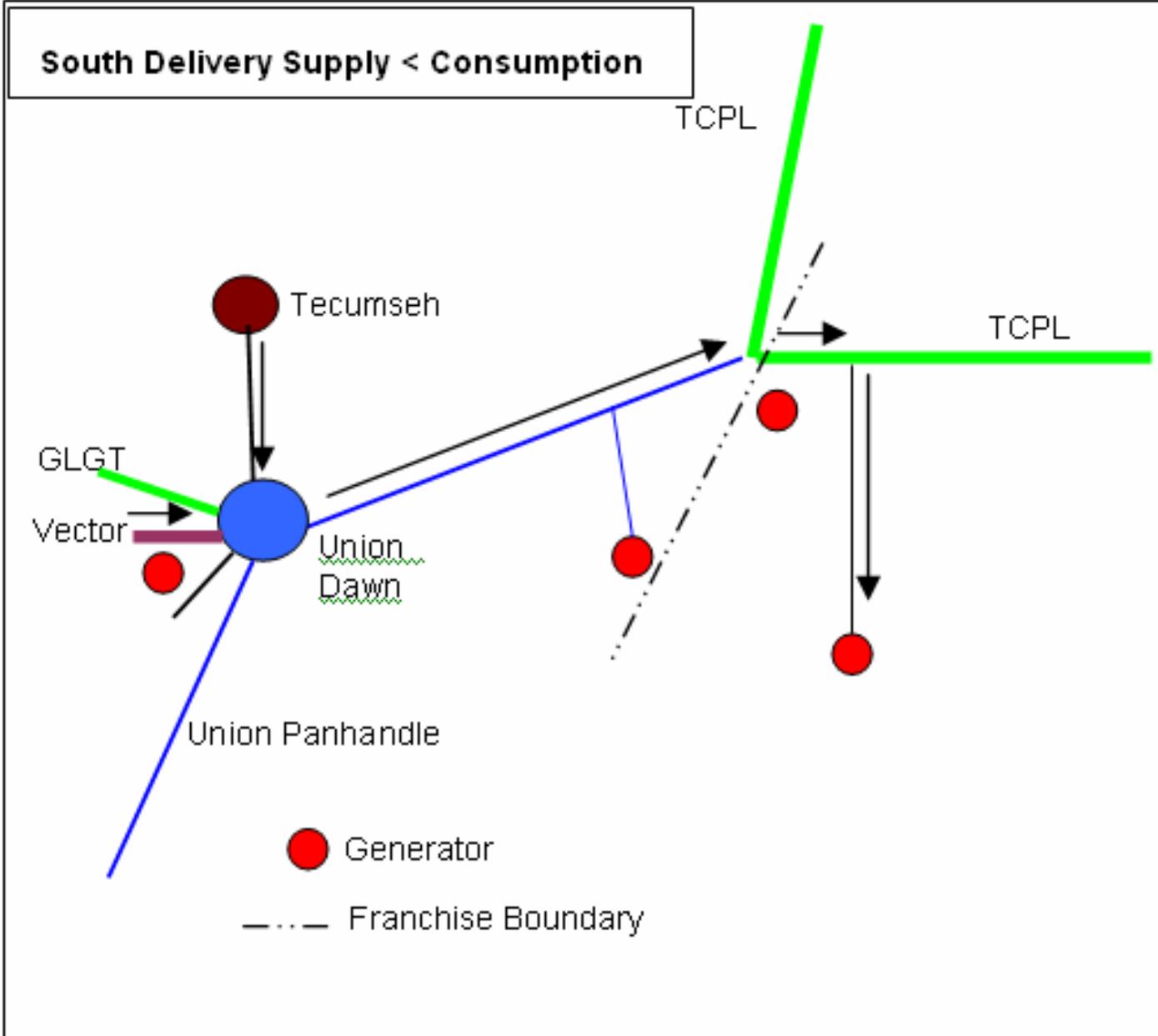


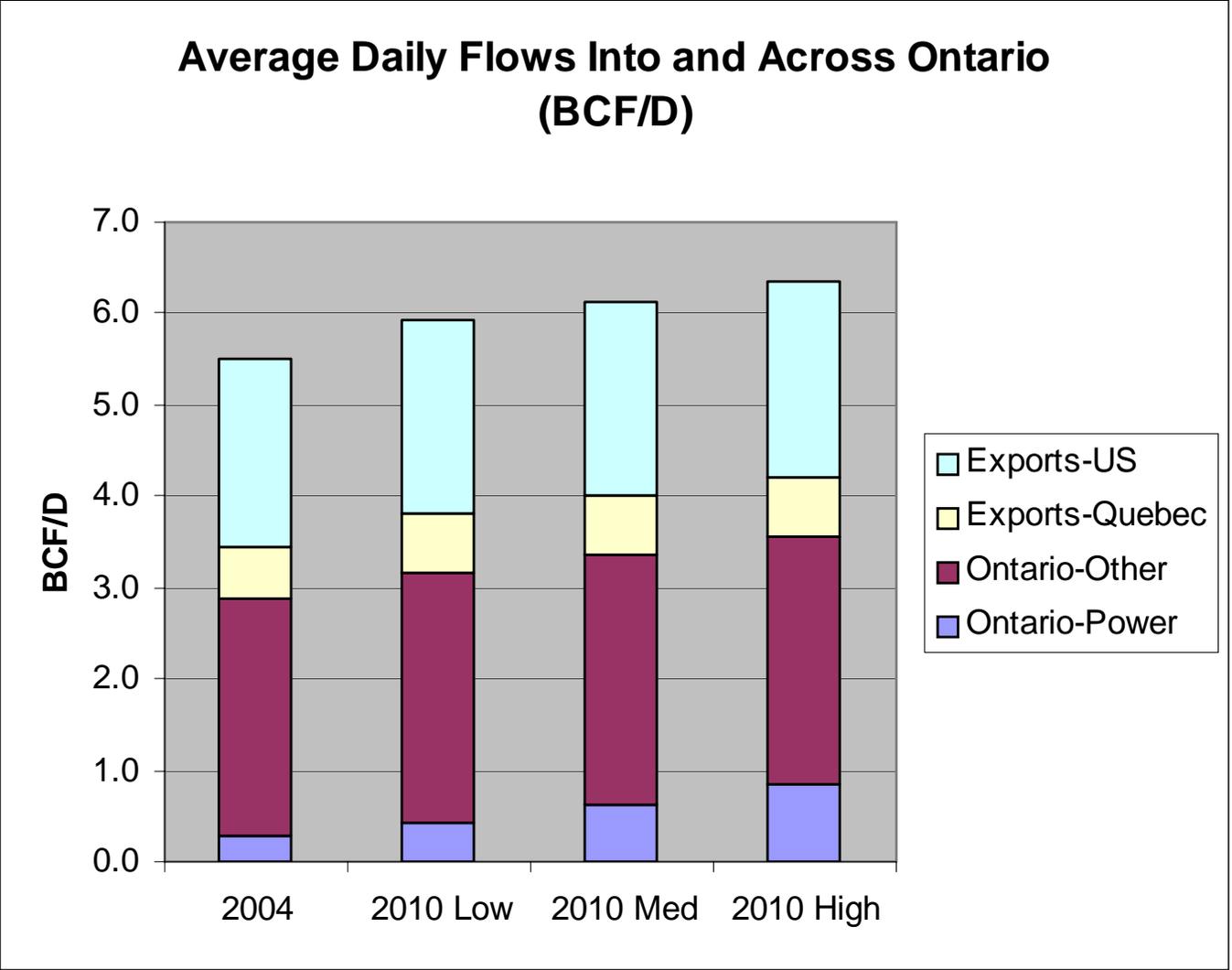
Generation From Gas Fired Generators





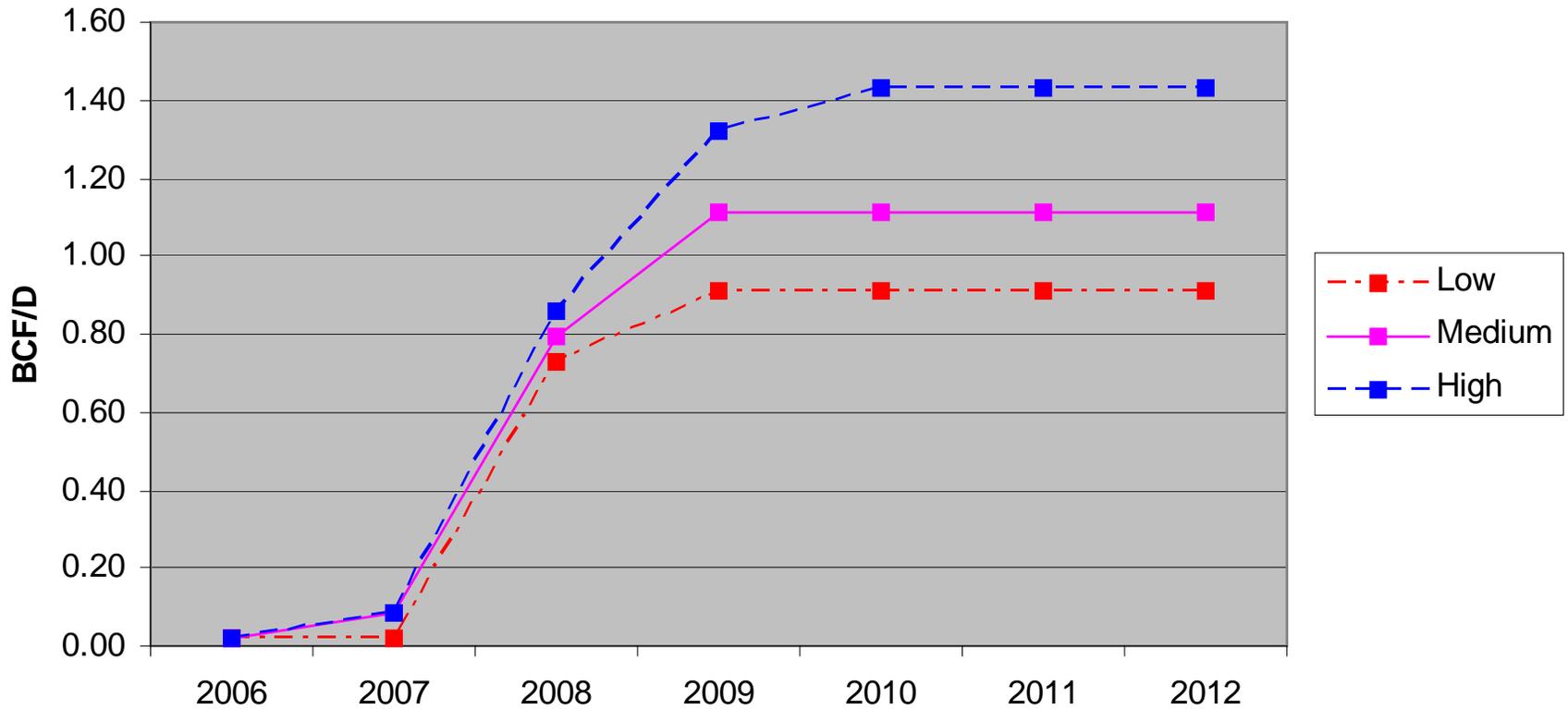


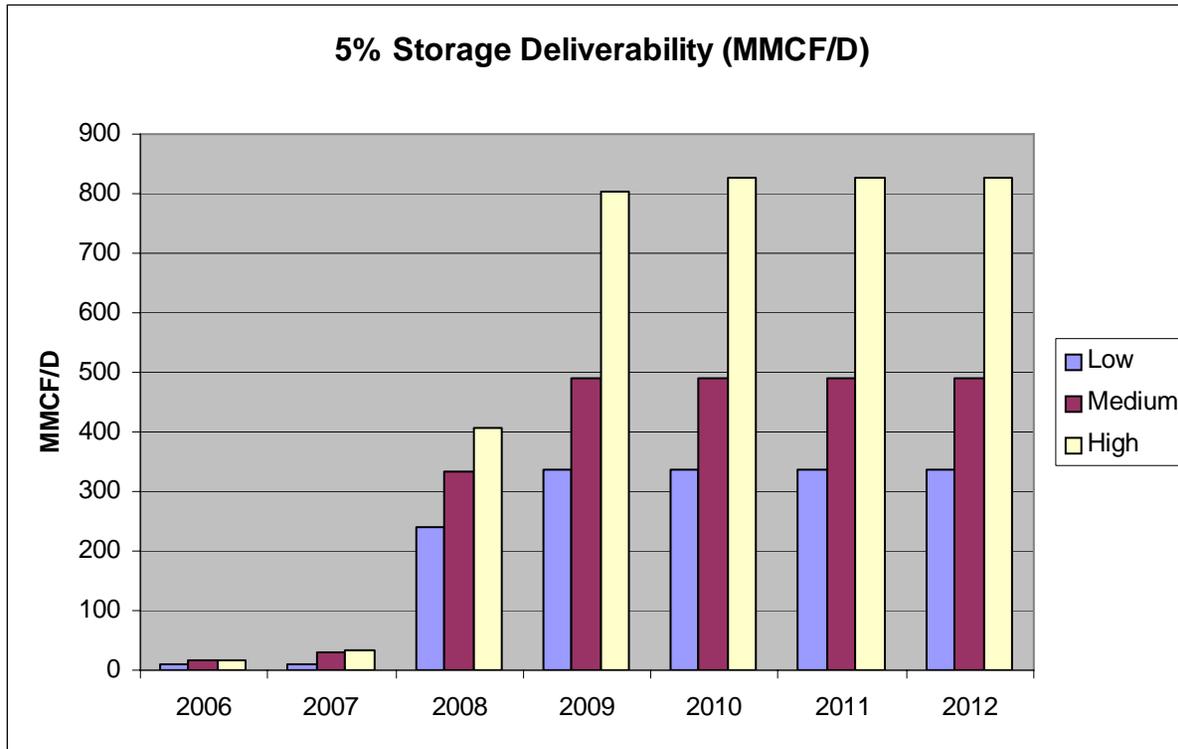






Approximate New Gas Fired Generation In Ontario Peak Day Requirements (BCF/D)







2012 TOTAL FACILITIES COST ESTIMATES (\$ Million)						
	Low Scenario		Medium Scenario		High Scenario	
	Low	High	Low	High	Low	High
Dawn To Parkway	75	115	110	170	145	230
Storage (Space & Deliverability)	40	240	55	255	90	270
Dist/Reg/Meters	130	225	150	250	205	315
TOTAL Ontario Only	245	580	315	675	440	815
Upstream	30	60	210	255	460	560
TOTAL	275	640	525	930	900	1375

Notes:

1. Preliminary high level estimates. Costs could vary significantly due to: plant location, lead times, land acquisition, highway crossings and ROWs,
2. Assumes in the high case 3725 MW served east of Dawn and 3050 MW in the Northwest and cogeneration sourced via TCPL or west of Dawn
3. Assumed LNG on St. Lawrence only in the high case beyond 2010

Desired Generator Services



Generators want tools to effectively manage price and demand risks in the Ontario power and gas markets. The issues they identified are:

- Access to fully unbundled assets and services along with a right to select only those services that they require or desire.
- LDC service consistency across Ontario (including unbundling) along with seamless operational flexibility across LDC franchises within Ontario, as well as, into and out of Ontario;
- Enhanced hourly services that allow non-uniform delivery of gas over the day on a firm basis;
- The option to connect directly to the transportation system without a requirement to contract for distribution services;
- Multi year contracts with negotiated service and pricing for term of the agreement;
- Right to redirect and acquire gas on short notice;
- Access to a range of balancing and storage services from multiple suppliers;
- Greater intra day nomination flexibility (preferably hourly nominations);
- Imbalance management options and services;
- Access to cost based storage;
- Removal of contractual requirements that unnecessarily increase costs and reduce flexibility (ie minimum annual volumes, daily delivery obligations, restricted delivery points, restrictive nomination windows, imbalance penalties).
- LDC contracts redesigned for new generator services.

Examples of Desired Generator Services



- Firm Short Notice Service
- Firm Park and Loan Services
- Rolling Gas Day (i.e. true-up windows)
- More Frequent Firm Intra-day Nominations
- High Deliverability Storage Service

Examples Other Pipeline Services



Portland Natural Gas Transmission System

- HRS (Hourly Reserve Service)
 - Approved March 25, 2004
- Characteristics
 - Designed to provide options and flexibility to shippers serving electric generators, whose requirements are: non-uniform intra-day delivery, accelerated flow rates and minimum delivery pressures during particular periods of the gas day.
 - Main Features
 - Firm transportation service up to a specified Maximum Hourly Quantity (MHQ), and Maximum Daily Quantity (MDQ);
 - Delivery of MDQ at accelerated rate over a specified number of hours during gas day;
 - Non-discriminatory, first-come, first-served basis;
 - Single Primary Delivery Point with right to utilize any other delivery point on a secondary basis at a uniform hourly flow basis
 - 4.16% up to 8.33% of MDQ
 - Higher reservation rate for the additional firm capacity required to provide the higher hourly deliverability.
- Rates
 - Bifurcated reservation rate
 - capacity reservation rate; and
 - deliverability reservation rate
 - Derived from FT reservation rate of \$25.8542/month.
 - Maximum capacity reservation rate (for 8.33%) = \$12.9271/month/Dth (i.e. one-half of the existing FT reservation rate). The deliverability reservation rate varies based on firm hourly flow rate elected. The higher the firm hourly flow rate, the higher the deliverability reservation charge.
 - Zero usage rate

Examples Other Pipeline Services



Vector Pipeline L.P.

- **Hourly Firm Service (FT-H)**
 - Approved January 29, 2004
- **Service Characteristics**
 - Accommodate needs of electric generators who require accelerated flow rates on short notice during limited periods of time within a gas day.
 - FT-H service is available to any shipper that satisfies eligibility criteria;
 - Can take up to its MDCQ within designated periods of time in one hour increments between one and twenty-four hours;
 - Shipper elects a contract quantity and selects whether to receive its entire contract capacity over any hourly period within the gas day, but for not less than a four hour period
 - Chooses an hourly delivery quantity within the delivery day;
- **Eligible for FT-H service only at points directly connected to Vector's system that have electronic flow equipment, FT-H service is restricted to only one contract per delivery point because Vector cannot distinguish among multiple contracts delivering at the same point; and**
- **Nominated and scheduled daily but may nominate by telephone up to one hour before the start of delivery.**
- **Rates**
 - Derivative of FT-1 service, adjusted to reflect the value of accelerated delivery;
 - The maximum reservation rate is the product of: 1) the contract quantity times 24 hours divided by the minimum hourly delivery period and 2) the maximum reservation rate for FT-1 service;
 - The usage rate for FT-H is \$0.00 per Dth; and
 - Dth charge for each Dth taken in excess of its contracted hourly delivery quantity. Charge based on Unauthorized Overrun Charge.

Examples Other Pipeline Services



CenterPoint Energy Gas Transmission Company

Hourly Firm Transportation Service (HFT)

- Approved June 16, 1999

Service Characteristics

- Designed to serve peaking needs of electric generation customers and others with similar requirements by allowing them to purchase capacity on an hourly basis.

Main Features:

- Adapted from existing FT with the essential difference being that minimum duration of service HFT is one hour
- Contracting for service will be done over the internet;
- Maximum term of service agreement is 90 days;
- Service agreements may not be entered into more than 30 days prior to the effective dates;
- Imbalance resolution will be tailored to the hourly nature of the service;
- Shippers will have capacity release and flexible receipt and delivery point rights corresponding to those of FT shippers; and
- HFT may bump interruptible service on as little as one hour's notice.

Rates

- The rate comprised of a reservation rate, a commodity rate and an overrun rate.
- Reservation rate is derived from the maximum FT reservation rate by converting the FT rate from a monthly to a unit rate, then multiplying the unit rate by 24 hours to derive the daily recovery rate, which is then divided by the projected 8 hours of usage per day
- Commodity rate same as FT

Regulatory

- No costs relating to existing services were reallocated to service under HFT.
- HFT revenues included as short-term firm revenues in the crediting calculations provided for in GT&C.

Examples Other Pipeline Services



ANR Pipeline Company

FTS-3 Service

- Approved March 20, 2000

Characteristics

- Permits shippers to have variable hourly flow rights, short notice commencement and shut-down of service and flexibility to manage variances between receipts and deliveries.
- Shippers select a Maximum Daily Quantity (MDQ) and a Maximum Hourly Quantity (MHQ) set at no less than 1/24th of the MDQ and no greater than 1/4th of the MDQ;
- The highest rate of hourly flow that a shipper can elect enables delivery of daily entitlement in four hours
- Above MDQ further capacity only be available on an interruptible basis as overrun of the MDQ or MHQ.

Rates

- Priced higher on a unit basis than the other firm services to reflect the additional features and flexibility underlying the services.
- Calculated using other firm service rates such as no-notice service and storage service.
- Pay three parts:
 - a) deliverability reservation rate for the amount of MHQ reserved;
 - b) capacity reservation rate for the amount of MDQ reserved; and
 - c) a commodity rate for each dekatherm of gas delivered.
- The unit rate is the result of hourly flow election. As it increases, monthly charges increase proportionately.

Note: ANR also introduced Rate Schedule ITS-3, an interruptible hourly service.

Examples Other Pipeline Services



Texas Eastern Transmission

MLS-1 (Lateral Line only) Service

- Approved June 12, 2002

Characteristics

- Will build necessary facilities to provide firm hourly flexibility under MLS-1.
- Available to any party requesting firm or interruptible service on a portion of Texas Eastern's system designated as a Market Lateral;
- A 'lateral line only' service with no transportation rights, secondary or otherwise, other than on the designated Market Area Lateral;
- the Maximum Daily Quantity (MDQ) and the Maximum Hourly Quantity (MHQ) to be delivered, not to exceed for the Gas Day MDQ;
- Required to pay incremental facilities required to provide requested service, including cost of the lateral if necessary;
- Service restricted to lateral and is entirely separate and distinct from Texas Eastern's service under other open access rate schedules;
- Firm customers will have secondary and capacity release rights only on the lateral;
- The firm hourly rights applicable only as to flows between the Primary Receipt Point and Primary Delivery Point(s) on the lateral; and
- The firm hourly swing service provided by the creation of additional line pack in Texas Eastern's pipeline system and installation of a new compressor unit (for this particular customer).

Rates

- Customer pays an incremental rate for this service,
- Based on cost of facilities needed to provide the service.
- Incremental reservation rate charged for the service includes cost of the line pack necessary to provide the required pack and draft service.
- The recourse rate for service under MLS-1 is a 100% reservation rate.
- This rate is over and above the rate paid for firm transportation on Texas Eastern's mainline from the receipt point to the lateral where the MLS-1 service is provided.



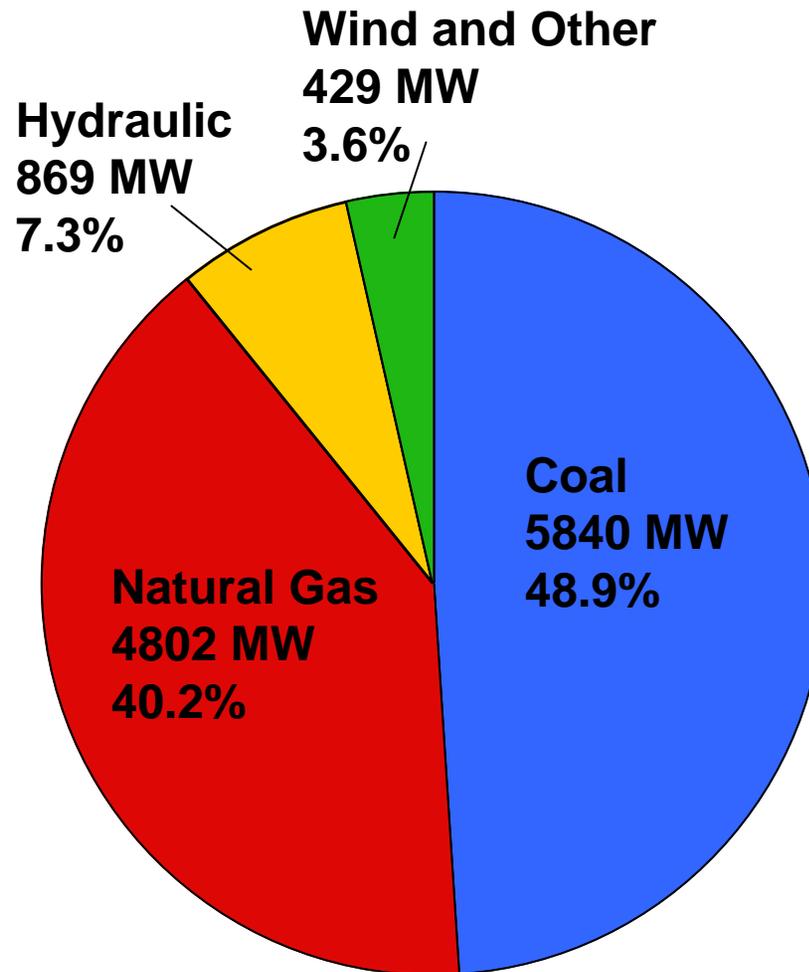
Summary of Practices in Other Jurisdictions





Alberta

(Total=11 940 MW)



Alberta - Energy Market



- Very favourable to natural gas fired generators, fuel sources are readily available
- Market fully unbundled and is operated by the independent Alberta Electric System Operator (“AESO”).
- Government and regulatory authorities are largely not intrusive and are supportive of open markets.
- Market is also extremely competitive.



FERC

- Interstate transmission pipeline and storage companies provide services in many US jurisdictions under the regulation of the FERC.
- FERC requires contractual commitments from purchasers of gas transportation/storage capacity to approve new interstate pipeline/storage construction.
 - pre-1999 certification policy required an applicant to submit a contractual commitment for at least 25 percent of the capacity. "The 1999 Statement of Policy, on the other hand, established that, when a certificate application is filed, the threshold question applicable to existing pipelines is whether the project can proceed without subsidies from their existing customers."
- The typical allocation of cost of investment on new gas infrastructure (transportation/storage) has been incremental.
- Instances when FERC has allowed costs to be rolled-in provided rates increased by no more than 5% and the new pipeline capacity increases reliability to all shippers.

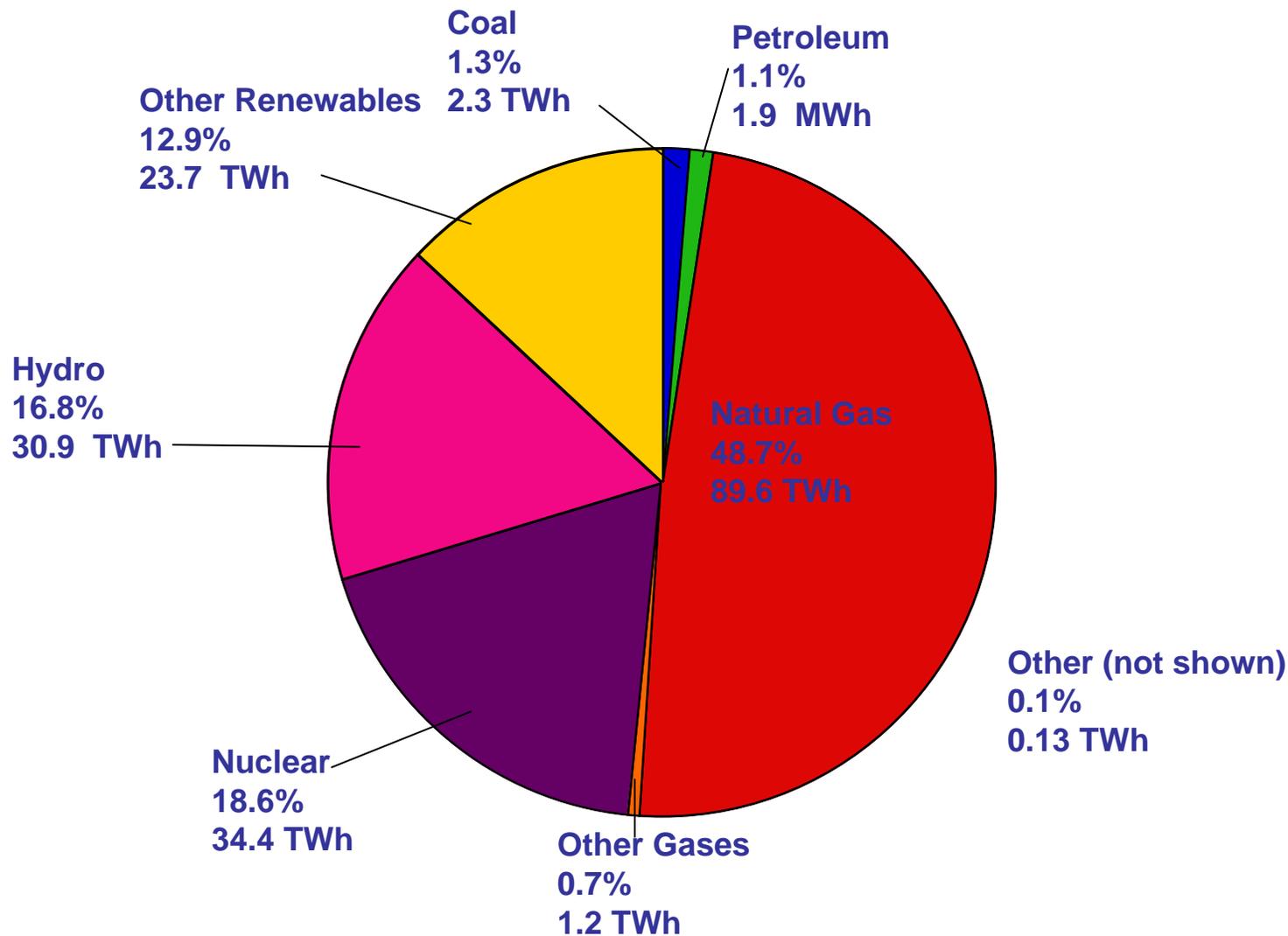


FERC - Storage

- Interstate Storage operators must receive a certificate of public convenience and necessity from FERC to construct and operate storage facilities.
- Rates for independent storage can be at cost-of-service or market-based subject to a market power test.

California

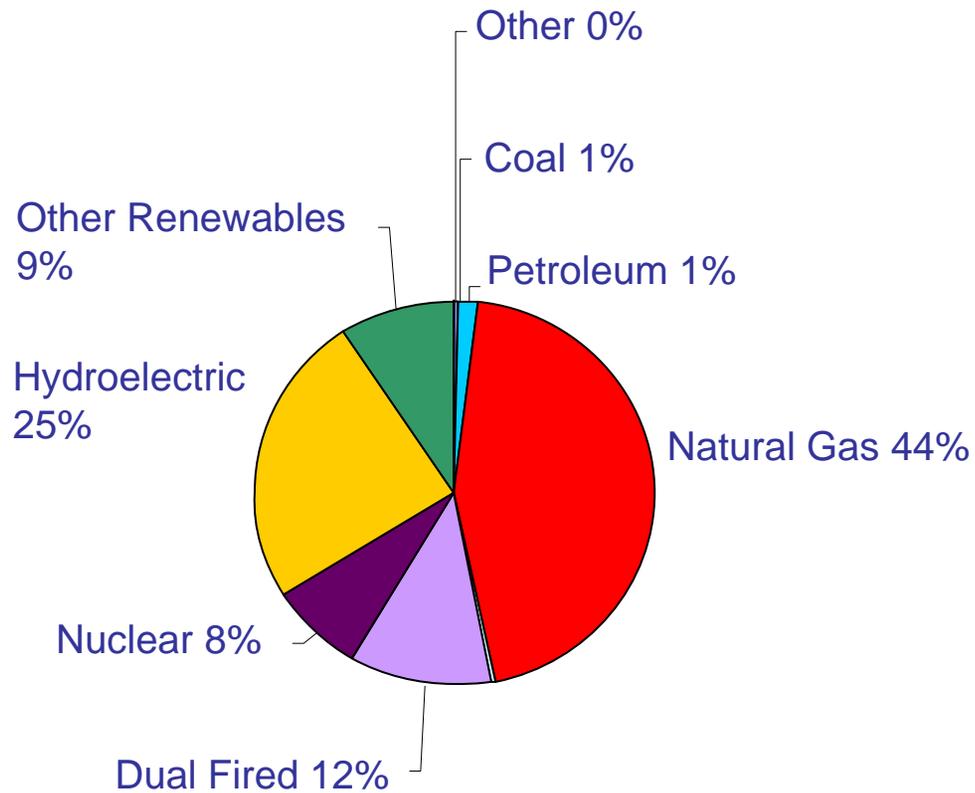
(2002 Total = 184.3 TWh)





California

(2002 Total =54 675 MW)



California - Gas Generation



- Natural Gas primarily a “swing fuel”,
 - amount used depends on amount of hydro
 - in a wet year (1983) hydro produced 45%,
 - in a dry year (2001) 12%
- Increased focus on reliability of older generators
 - although 9 369 MW has been added since 2000;
 - 3 873 MW dates prior to 1960



California - Storage

- SoCalGas owns all storage in southern California
- PG&E owns most of the storage in northern California
- CPUC unbundled storage in 1993
- Storage built by the utilities is available to core and non-core customers at regulated rates
- Market based pricing used to encourage infrastructure investment
- Wild Goose (1999) and Lodi (2001) Gas Storage facilities are independent, use market-based rates



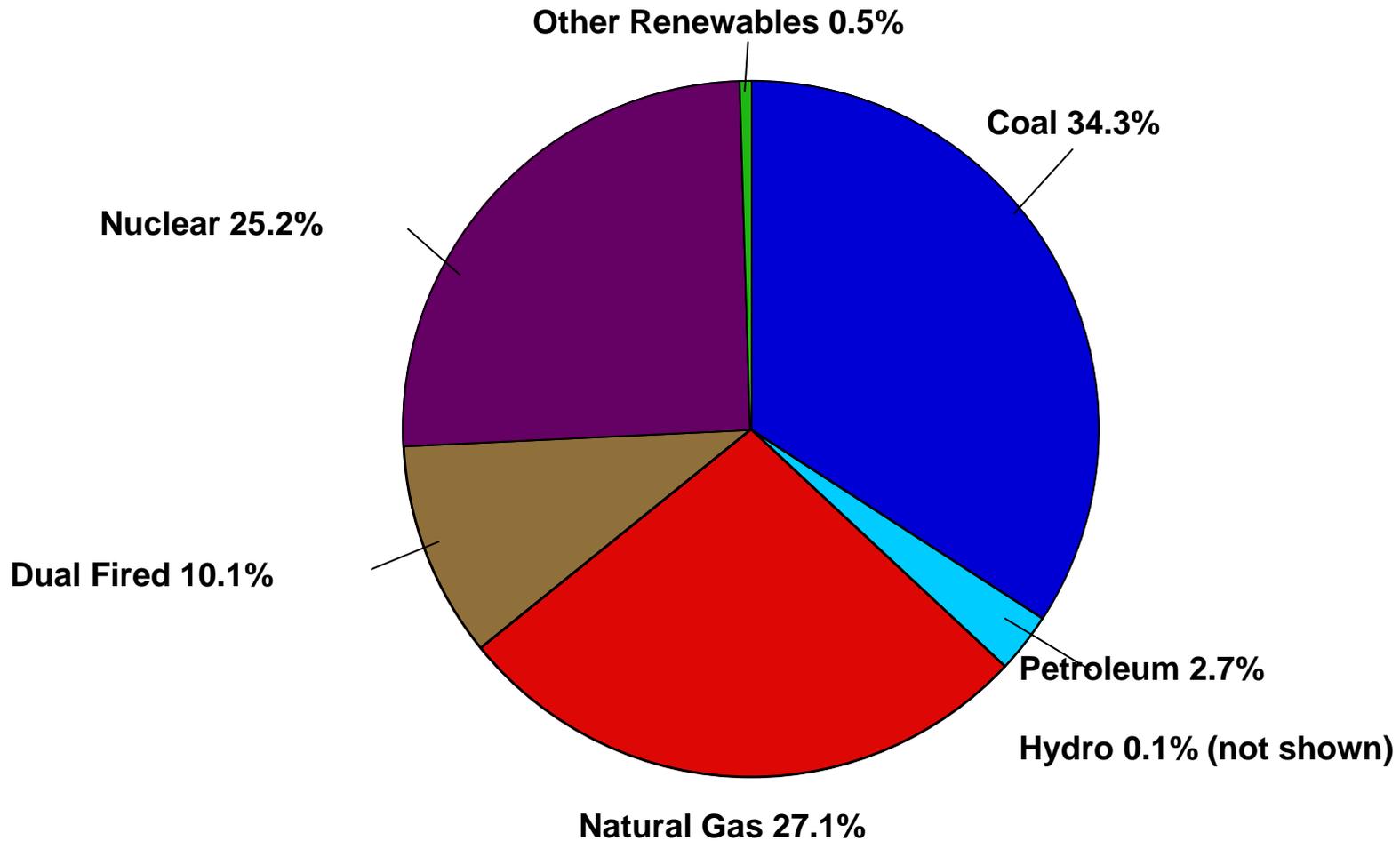
California - Services

- **El Paso Natural Gas (EPNG) and its' subsidiary Mojave Pipeline Company offer various transportation, parking and lending services**
- **Some LDC's, have tariffs that are designed to accommodate the needs of electric generators.**
- **SoCalGas has preferred rates for gas generators using over 250,000 therms per year (the equivalent of a 220 kW generator running 24/7 all year-round).**



Illinois - Energy Market

(2003 Total = 45 411 MW)





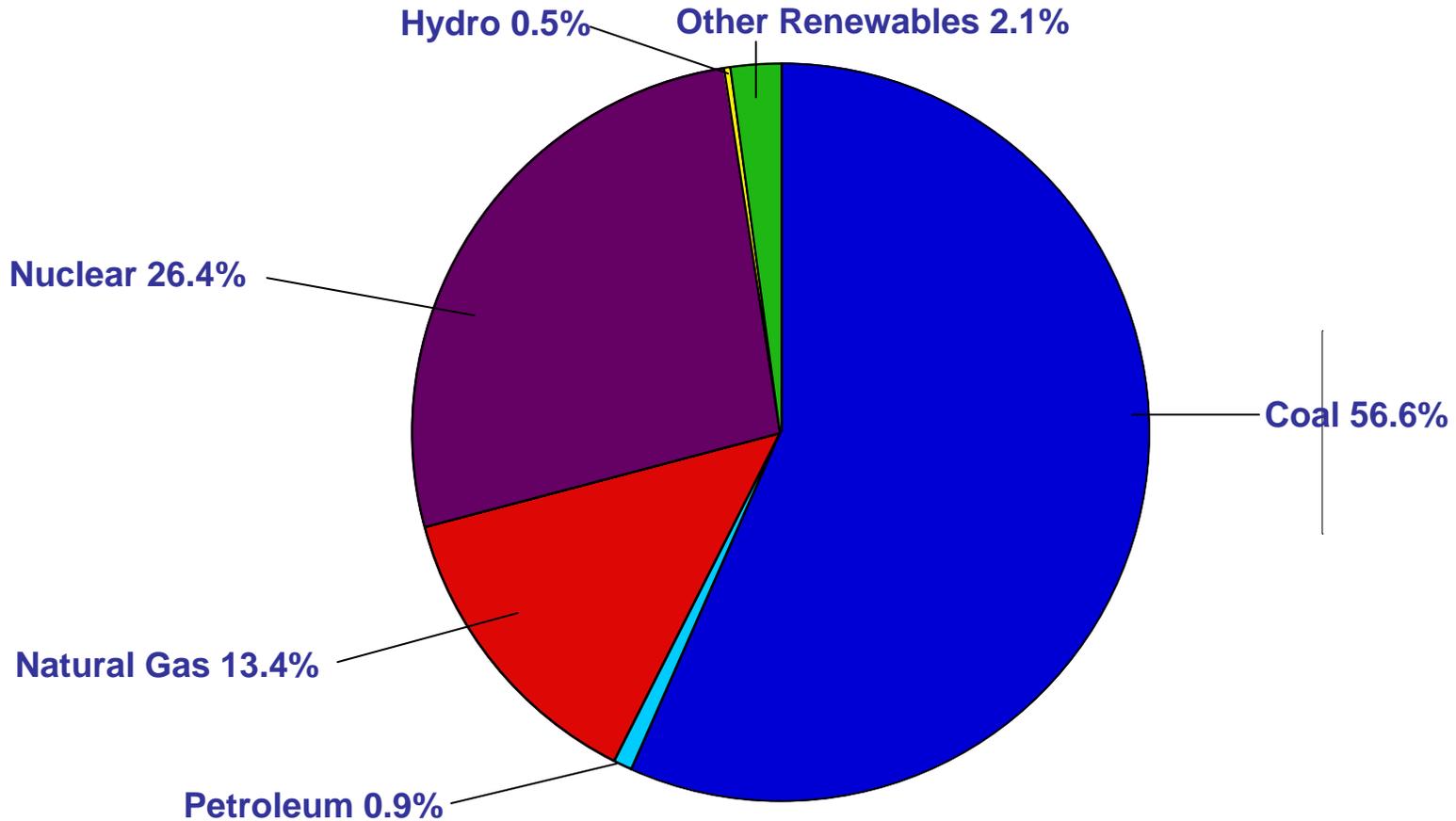
Illinois - Gas Generation

- Natural gas fired generating capacity in Illinois grew by over 310% between 1997 and 2002, an average rate of over 62% per year.
- In the 2002 to 2003 period the rate of growth slowed to 3.4%.
 - Due to the fact that many of the natural gas-fired generating facilities in the state are dispatchable.
- When gas-fired generation decreased, the predominate sources were nuclear and coal fired generation.
- Many of the pipelines have tariffs which are supportive of gas fired generation.



Michigan

(2002 Total = 117.9 TWh)





Michigan - Policy

- The MPSC is responsible for approval of applications to construct intrastate transmission facilities. Any contracts for service must be included in the filing; however, the Commission has not established any minimum purchase commitment.
- The cost of investment on new gas infrastructure could be rolled-in or incremental. Individual circumstances determine the approved allocation method.
- Tariffs for intrastate gas transmission/storage can be cost of service based or market based subject to market power test. Initial rates for a new intrastate pipeline are filed with the Commission. No change in rates can be made until such change is approved by the Commission.



Michigan - Storage

- Michigan's storage is significant: approx. 623 Bcf, more than any other state
- Storage provides for more efficient use of transmission pipelines that bring supply to utilities, and helps stabilize prices despite highly seasonal use.
- Storage is provided by distribution utilities and gas storage companies under rates and services approved by the MPSC and FERC (if interstate company)

Michigan - Gas-Generation



- Natural gas-fired generation in Michigan accounted for 13.4% of electricity produced in the State in 2002, a growth rate of 5.2% for the period 1993-2002.
- Gas-fired Generators could be firm or non-firm customers. Obtain transportation services from regulated utilities and purchase gas supplies from unregulated marketers. Special contracts for transportation and storage are typically negotiated.
- The price of electricity generated by gas-fired generators is market-based.



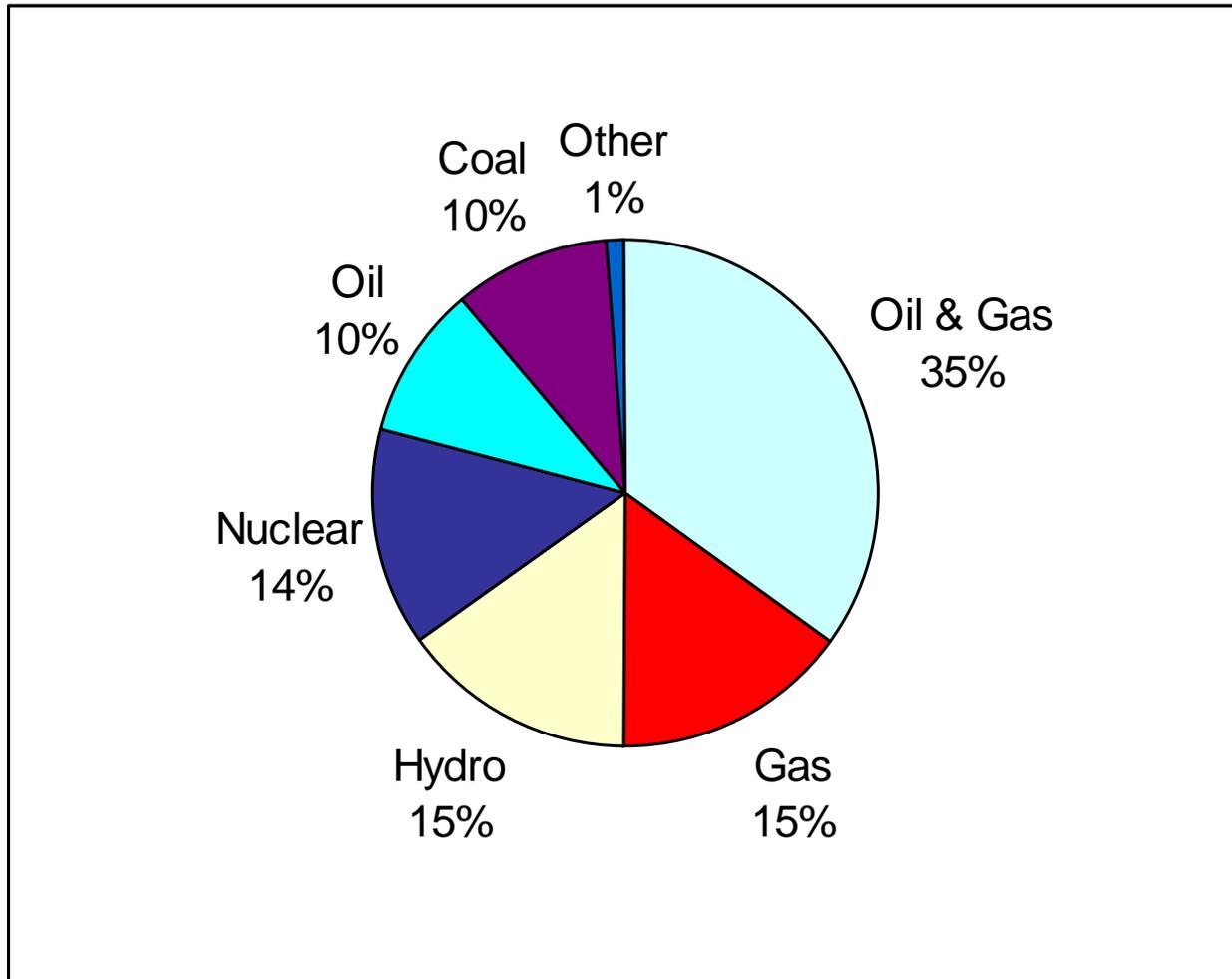
Michigan - Services

- Pipelines and storage companies offer a variety of services, not specifically designed for gas-fired generators but which are attractive to generators, including peaking, no notice, balance, over run services, intra-day nominations and others.
- Some companies also indicate that they have services that are specifically designed for power generators.
- Special Gas Transportation and Storage Agreements (SGTAs) approved on a case by case basis by the MPSC – 85% of generators contracts under SGTAs
- LDCs accountable to prove that SGTAs are in the public interest
- 1 Bypass approved (National Steel)



New York

(2005 Capacity = 38 340 MW)



New York - Gas Generation



- In 2001, the NYISO recommended that between 5,000 and 7,000 megawatts (MW) of in-state generation was needed by 2008 to maintain reliability. More than 3,000 MW have been installed since then.
- Natural gas for electric generation most significantly during winter peaking periods.
- Recent significant gas price increase and volatility and concerns over the reliability implications of the increasing use of gas-fired electricity generation are on the rise.



New York - Storage

- Total storage working capacity is 97.8 Bcf (207 including cushion)
- 1.93 Bcfd deliverability
- Recent storage field addition
 - Stagecoach project (13 Bcf)
- Planned storage projects include:
 - Wyckoff Storage, Seneca Lake II,
 - Tennessee's planned "Northeast ConneXion" in Pennsylvania, geared to serving the entire Northeast market.
- LNG an important part of Northeast storage portfolio.
 - Total LNG storage capacity is about 3.4 Bcf.



New York - Policy

- FERC's general rule on rolled-in ratemaking applies
- For example, in 2002 Wyckoff was granted approval for market based rates for its gas storage facility, because it "will serve the public interest by providing firm and interruptible high-deliverability, single and multi-cycle natural gas storage service"



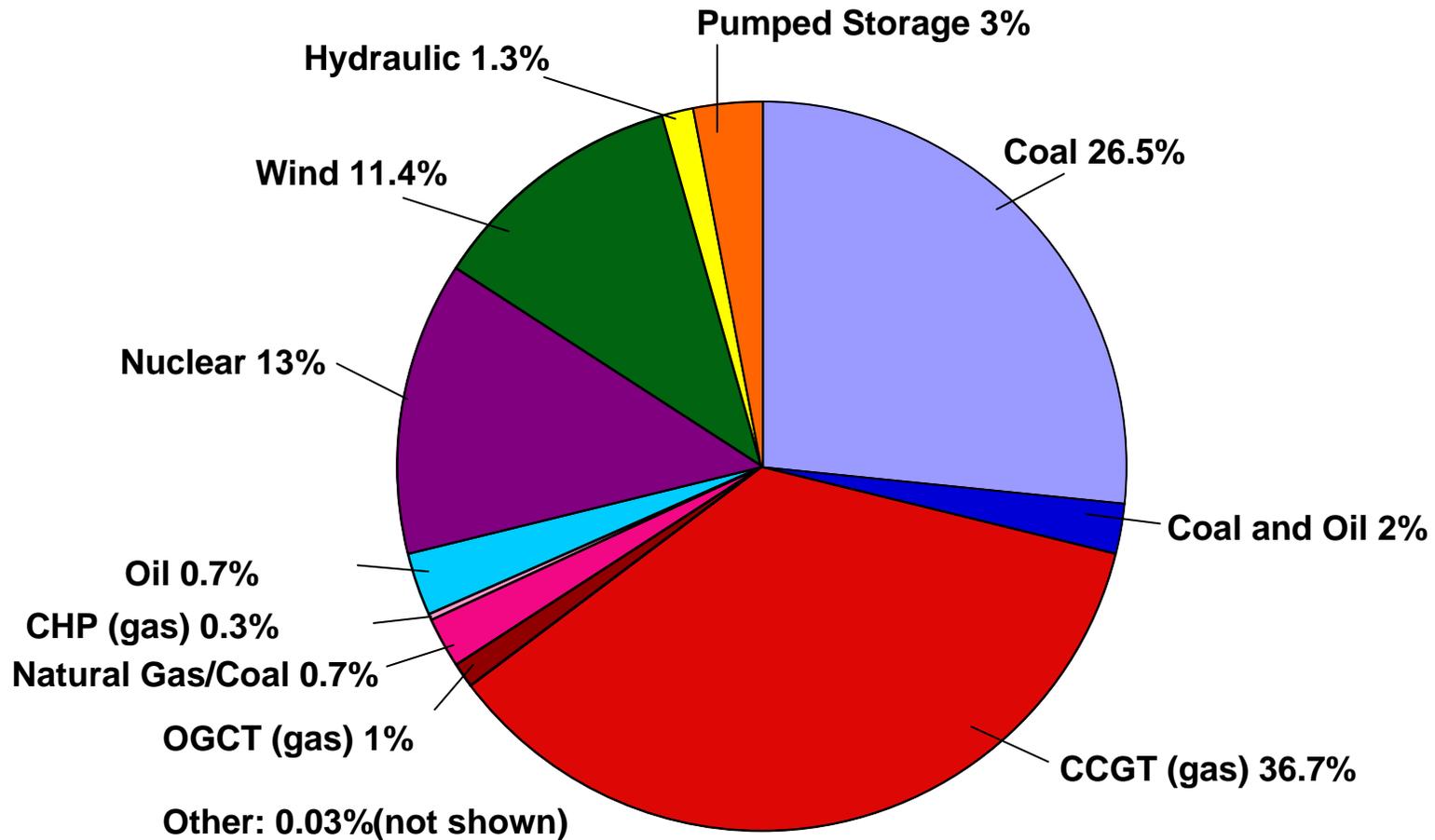
New York - Services

- Iroquois Gas Transmission System, L.P., through its subsidiary Iroquois Pipeline offers Firm (RTS) and Interruptible (ITS) transportation, as well as Park and Loan Service (PALS). Rates for this service are market-based and are structured to be competitive.
- Empire State Pipeline-Intrastate offers flexible nomination cycles
- The New York State Electric & Gas Corporation has a basic electric generation transportation service.



Great Britain

(2005 Total = 92 294 MW)



Great Britain - Energy Market



- Once largely dependent upon coal,
 - become far more diverse with an increasing emphasis on natural gas and renewable sources, particularly wind.
- Impediment to gas-fired generation
 - government initiatives favouring wind power
- Sources are also augmented with inter-ties with both the Europe and Ireland.
- Some mothballed plants can be reactivated.
- Natural gas prices have risen over the last few years and there are indications that the production from the fields in the North and Irish Sea, which facilitated earlier increases in natural gas-fired generation has peaked and may even be in decline.

Great Britain - Gas Market



- Parties wishing to ship gas on the NTS must first obtain a licence from the energy regulator the Office of Gas and Electricity Markets (“Ofgem”).
- Operators of storage facilities must make them available to third party users on a non-discriminatory basis unless granted an exemption by a competent authority (Ofgem) The exemption must also be accepted by the European Authority.

Services Summary



UTILITY	SCHEDULES/SERVICES
Alberta	
Nova Gas Transmission Ltd	Facilities Connection Service
EnCana Gas Storage	A multi-time nomination schedule with intra-day nominations and the possibility of multiple storage cycles
ATCO Midstream Carbon Storage	Multi-cycling and intra-day nominations
California	
El Paso Natural Gas	<ul style="list-style-type: none"> -Firm transportation service (FT-1 and FT-2) -Interruptible transportation service (IT-1) -Interruptible parking and lending service (PAL)
Mojave Pipeline Company	<ul style="list-style-type: none"> -Interruptible authorized loan service (ALS-1) -Parking service (APS-1)
SoCalGas	<ul style="list-style-type: none"> -Electric generation rate GT-F5 -GN-10 gas rate is a 3-tier gas rate that includes both transportation and the cost of natural gas
PG & E	<ul style="list-style-type: none"> -Schedule G-EG for electric generators - A "Timely Nomination" -An "Evening Nomination" -An "Intraday 1 Nomination" -An "Intraday 2 Nomination"
SoCalGas Storage	<ul style="list-style-type: none"> -BSS, or "Basic Storage" -LTS, or "Long Term Storage" -TBS, or "Transaction Based Storage"

Service Summary



UTILITY	SCHEDULES/SERVICES
Illinois	
ANR	Firm transportation service, FTS-3
Panhandle Eastern	<ul style="list-style-type: none"> -Hourly Firm Transportation Service -Enhanced Firm Transportation Service -Quick Notice Transportation Service
Midwestern Gas	-Firm Transportation Service
Peoples Energy	<ul style="list-style-type: none"> -Contract Service for Electric Generation - Standby Service
Northern Illinois Gas Company	<ul style="list-style-type: none"> -Rate 11 includes the provision of gas supply -Rate 81 is a transportation rate -Large Volume Transportation Service, Rate 77
Panhandle Eastern	<ul style="list-style-type: none"> -Flexible Storage service -Parking and loan service

Services Summary



UTILITY	SCHEDULES/SERVICES
Michigan	
ANR Pipeline Company (ANR)	FTS-3 (firm transport) ITS-3 (Interruptible transport) Premium no-notice service ("NNS")
Panhandle Eastern Pipe Line Company, LP	<ul style="list-style-type: none"> -Standard FT and IT services -Hourly Firm Transportation -Quick Notice Transportation -Enhanced Firm Transportation -Gas Parking Service -Flexible Storage Service -No Notice Service -Flexible Field Zone Firm Transport -Intraday Gas Parking Service -Delivery Variance Service
New York	
Iroquois Gas Transmission System, L.P	<ul style="list-style-type: none"> -Firm (RTS) and Interruptible (ITS) transportation -Park and Loan Service (PALS)
Empire State Pipeline-Intrastate	<ul style="list-style-type: none"> -Timely Nomination Cycle -Evening Nomination Cycle -Intra-day 1 Nomination Cycle -Intra-day 2 Nomination Cycle
The New York State Electric & Gas Corporation	Basic electric generation transportation service