

Introduction

The day-ahead commitment process (DACP) was launched in June of 2006 as an initiative to improve the reliability of Ontario's electricity market. The development of the DACP was initiated as a result of operating experience during previous summer seasons where numerous emergency control actions were taken to maintain reliability. The initial DACP trial was set for six months duration, upon which a review was to take place to assess the effectiveness of the program. Last November, at the conclusion of the trial period, the IESO Board voted to continue the program until a time when a market based program of equal reliability benefit can be integrated into operation. The decision to continue the program was a direct result of the benefits and efficiencies that have been derived directly from the DACP initiative.

The following report will analyse the continuing contribution of the DACP in satisfying the original set of objectives for the program. The report will present data extracted from this past summer, and compare it against the previous two years, in order to assess reliability and efficiency impacts.

The DACP was introduced to enhance reliability through day-ahead import and generator commitment. The IESO developed three main criteria to assist in determining whether this objective was met, they included:

- Day-ahead scheduling of imports
- Reducing import failures
- Ensuring sufficient internal generation was online to meet demand

Program Criteria

Criteria	2005	2006	2007	Criteria Met?
Provide maximum opportunity for scheduling imports day-ahead	0 imports scheduled day-ahead	68,642 MWh of imports scheduled day-ahead	181,793 MWh of imports scheduled day-ahead	Yes
Reduce import failures	Total Failure Rate 2005: 3.58% Total Imports: 3,706,426 MWh Total Failures : 149,944 MWh Peak week real-time failure rate: 8.3%	Total Failure Rate 2006: 2.82% Total Imports: 1,835,186 MWh Total Failures within participant control: 59,017 MWh Peak week DA failure rate: 1.44% Peak week RT failure rate: 4.8%	Total Failure Rate 2007: 2.85% Total Imports: 1,886,873 MWh Total Failures within participant control: 56,430 MWh Peak week DA failure rate: 0.61% Peak week RT failure rate: 3.68%	Yes
Ensure sufficient internal generation resources are online	While there was no day ahead scheduling of internal generation in 2005, the SGOL program allowed for commitment three hours prior to the dispatch hour.	97.8% of internal generation was economically scheduled day-ahead on the peak day of the summer.	98.4% of internal generation was economically scheduled day-ahead on the peak day of the summer.	Yes

**Table 1 – DACP Performance
(June 1 – September 12)**

Similar to its first year of operation, the DACP has been successful at satisfying the program criteria. The program's achievement can be demonstrated during this summer's peak day. The DACP process was able to schedule both 98.4% of internal generation including three fossil unit starts under the day-ahead generator cost guarantee, and 3,670MWh of peak hour imports day-ahead. These actions contributed positively to successful operation on a day where demand reached 25,737MW.

**Hourly Contribution of Day-Ahead Imports During Peak Day
June 26, 2007**

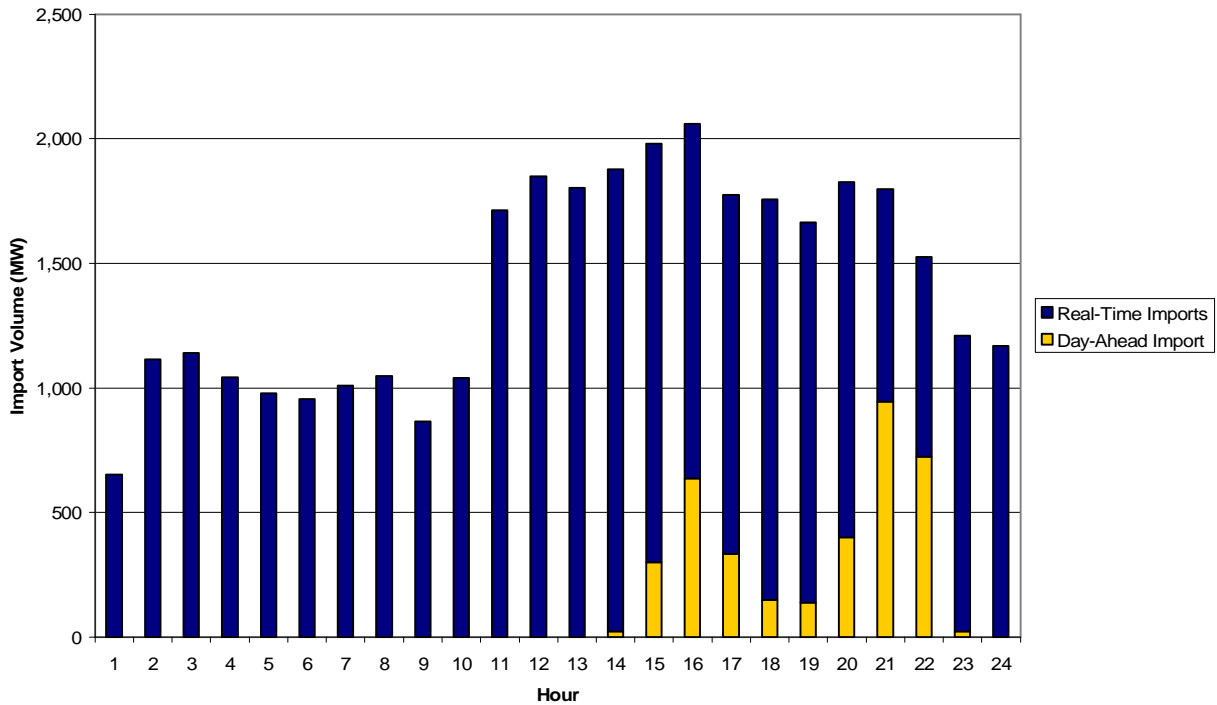


Figure 1 – Real-Time to Day-Ahead Import Breakdown for Summer Peak

The DACP is a reliability based program designed to improve real time operation. This process allows for the commitment of certain dispatchable generators and the economic selection of imports in the day-ahead time frame in return for a financial guarantee. The following sections will evaluate the current year summer performance and compare it to the previous two years.

Day-Ahead Scheduling of Imports

The financial incentive for imports to schedule in the DACP is the day ahead intertie offer guarantee (DA IOG). This guarantee keeps importers whole to their offer price, should the real-time price drop below intertie offer guarantee below their day ahead offer price. Although it is difficult to predict participant behaviour, at the inception of the DACP it was predicted that the DA IOG could be higher than the real time intertie offer guarantees (RT IOG's) being paid prior to the introduction of the program. The table below illustrates that there is a significant difference between the value of a DA IOG and a RT IOG. However, while DA IOG costs are significant on a per MW basis, it is important to note that the total cost of IOG paid in the summer of 2006 and 2007 were significantly lower than that paid out for RT IOG in 2005. Specifically, the average IOG per MW imported in 2005 was \$10.77, while the average for 2006 & 2007 was ~\$4.15.

			2005 (June 1 – Sept 12)	2006 (June 1 – Sept 12)	2007 (June 1 – Sept 12)
Market Conditions	Demand	Total (TWh):	46.6	44.3	43.3
		Daily Avg. (MWh):	448,064	425,649	416,312
		Avg. Hourly Peak (MWh):	18,947	17,996	17,606
	Available Capacity	Proportion of installed capacity available (%):	76%	78%	78.7%
	Imports	Total (MWh):	3,706,426	1,835,186	1,886,873
		Day-Ahead (MWh):	n/a	68,642	181,793
Real-Time (MWh):		3,706,426	1,766,544	1,705,080	
Incentive Costs	IOG Payout	Total (\$):	\$39,906,875.88	\$8,602,506.80	\$10,852,414.52
		Day-Ahead (\$):	N/A	\$1,587,566.42	\$3,724,793.20
		Real-Time (\$):	\$39,906,875.88	\$7,014,940.38	\$7,127,621.32
	IOG Payout /MW	Total (\$/MW):	\$10.77	\$4.69	\$5.75
		Day-Ahead (\$/MW):	N/A	\$23.13	\$20.49
		Real-Time (\$/MW):	\$10.77	\$3.97	\$4.18

Table 2 – Summer Demand, Generation Capacity and Imports Breakdown for 2005, 2006 and 2007

Ontario's dependence on imports for supply during summer periods has reduced since the period prior to the implementation of the DACP. This is a direct result of lower demand, and increased amounts of generation capacity. With a lower demand requirement during the summer period and increased rate of available generation, imports have continued the trend of approximately halving the import transactions seen in 2005.

Although imports have reduced, 2007 has seen a three fold increase in day ahead scheduling of imports over the previous year. This can be seen as a sign that the DACP is gaining value with inter-jurisdictional energy traders.

Total cost of the intertie offer guarantee program for 2007 has increased compared to 2006, most of which can be attributed solely to the increased quantity of day-ahead imports. However total IOG costs in 2007 are still a quarter of IOG cost in 2005. Real time payouts have remained consistent with 2006, where we first experienced a considerable savings over amounts paid out in 2005.

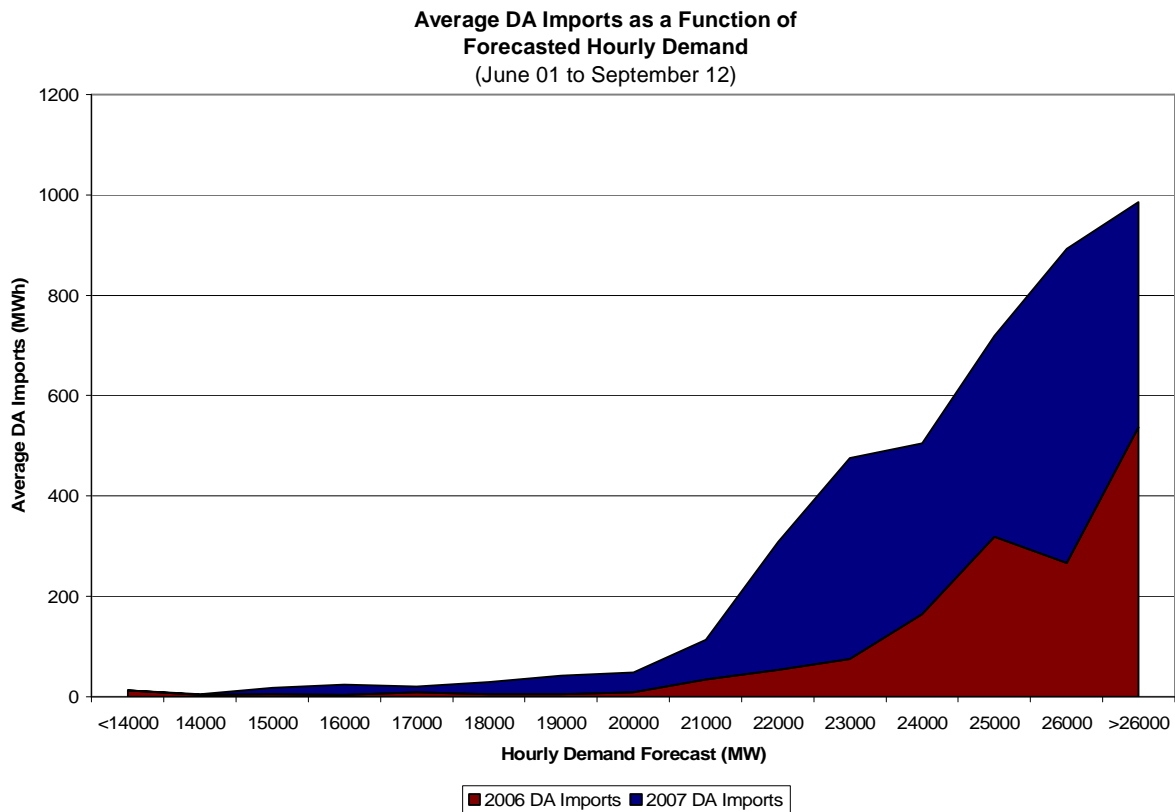


Figure 2 – Day-Ahead Imports and Forecasted Demand

Figure 2 illustrates average day-ahead imports scheduled during the 2006 and 2007 summer periods correlated against day-ahead demand forecast. The majority of day-ahead imports scheduled in 2007 are concentrated around high levels of forecast demand.

**Largest Hourly Contribution of Day-Ahead Imports
September 07, 2007**

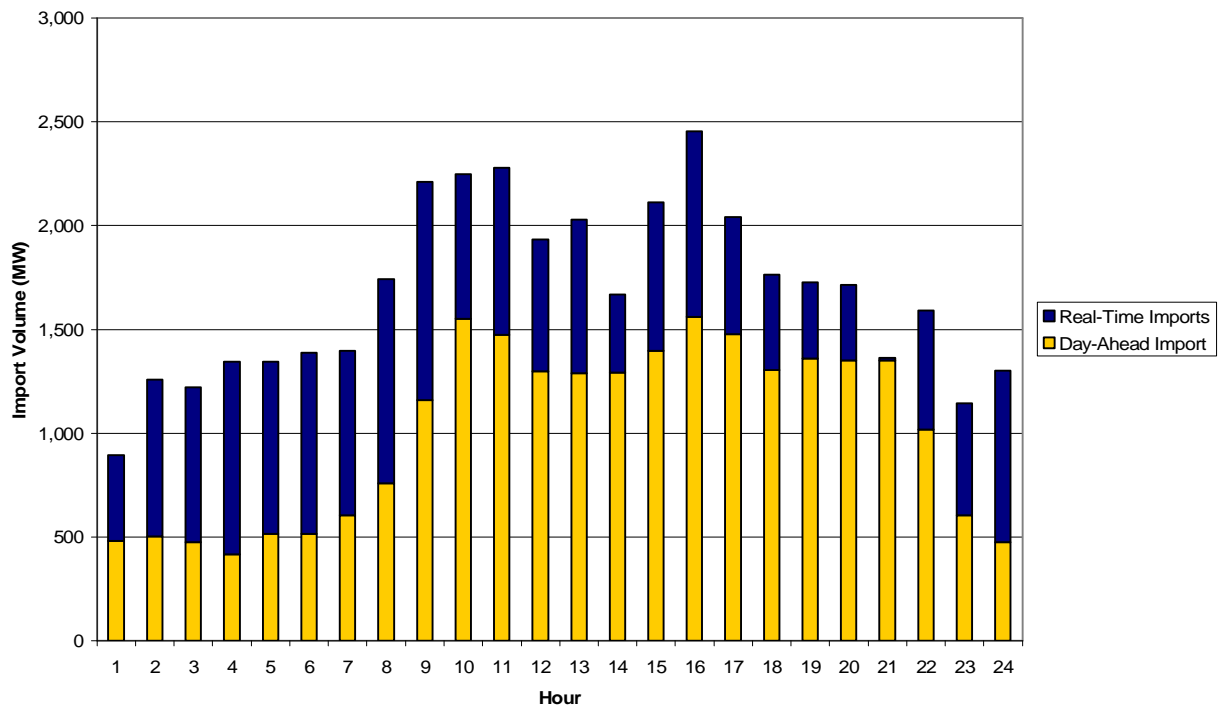


Figure 3 – Largest Day-Ahead Import Schedule

Another example of the positive contribution of day-ahead imports can be seen in figure 3. On September 7th, imports that were scheduled through the DACP provided significant supply to the market on a day with significant adequacy concerns. Although not our highest demand day of the summer, Ontario faced a high of 33°C and a shortfall in internal generation. Imports were effective in mitigating the reliability risk to the system. The DACP successfully committed 60.3% of next day imports and prevented the use of emergency control actions.

Reduction of Import Failures

			2005 (June 1 – Sept 12)	2006 (June 1 – Sept 12)	2007 (June 1 – Sept 12)
Performance Comparison	Import Failure Rates	Total Failed Imports:	318,597	120,688	125,396
		RT Failures (MWh):	318,597	120,136	125,205
		DA Failures (MWh):	n/a	552	191
		Peak Week Failed Imports (HE15-HE19):	4,835	3,019	1,350
		Peak Week DA Failure Rate (HE15-HE19):	n/a	1.44%	0.61%
		Peak Week RT Failure Rate (HE15-HE19):	8.3%	4.8%	3.68%
		Failure Rate Under MP Control:	4.20%	2.65%	2.67%
		Failure Rate Not Under MP Control:	5.36%	6.81%	3.03%

Table 3 – Import Failure Rate and Intertie Offer Guarantee Payout

Import failures were of particular concern in the summer of 2005. On August 3, 2005 over 1600 MW of imports failed in a single hour, half of which were attributed to economic failures on the New York intertie. These import failures resulted in IESO staff having to initiate emergency control actions on a system that was already operating at its limits.

To counteract such events, two initiatives were brought in by the IESO in order to reduce the number of failures. The day-ahead and real-time failure charges, along with the DACP, worked to reduce the number of import transactions which failed for reasons under the market participants' control.

A positive trend that is evident in 2007 data is that in spite of a considerable growth in day-ahead imports, the amount of DA intertie failures have decreased over 2006 amounts. General import failures which include both real-time and day-ahead have remained at consistent levels since 2006.

The day-ahead failure rate of 0.1% is well below the real-time failure rate of 7.3%. This indicates growing security of import transactions generated through the DACP and the associated increased contribution to reliability.

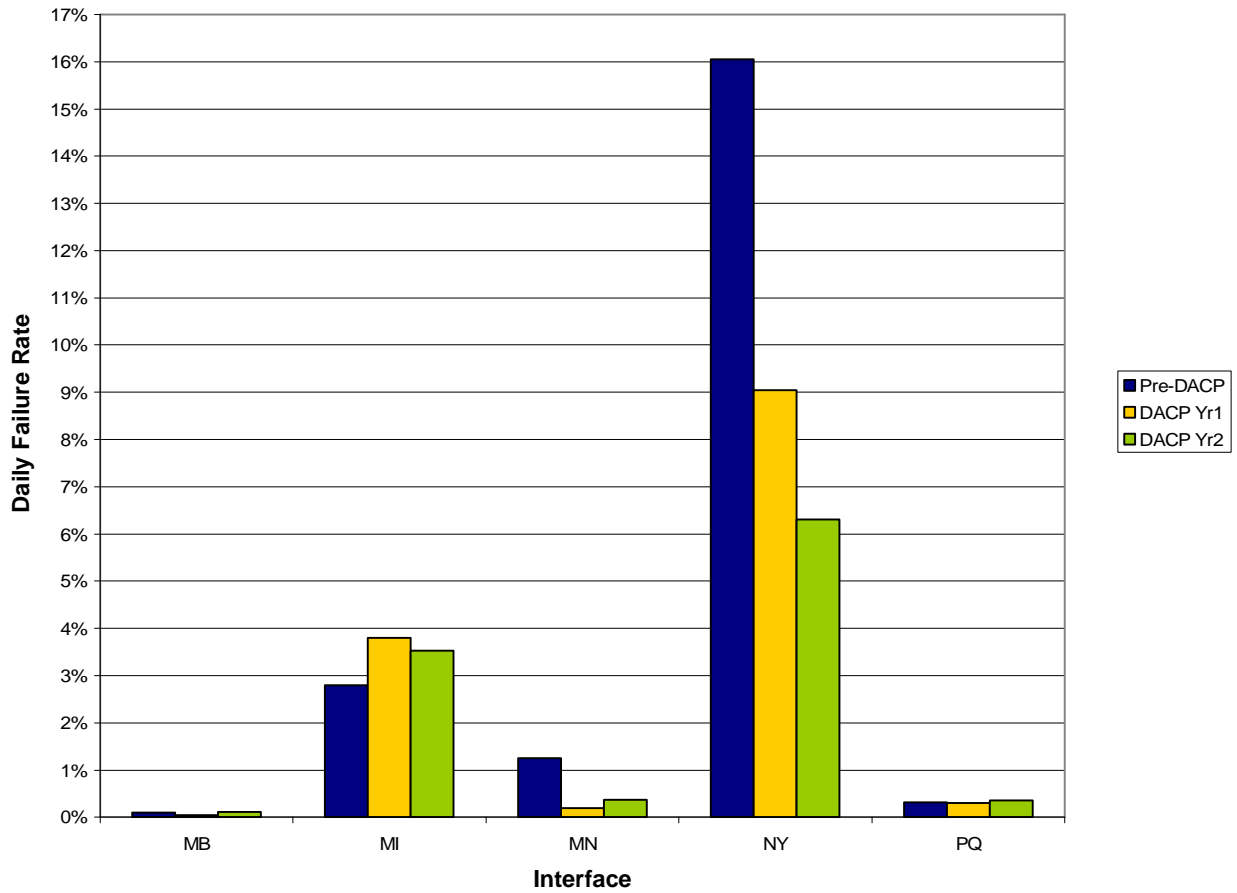


Figure 4 – Daily Import Failure Rate by Interface

For a more detailed look at import failures, figure 3 has isolated failures according to geographical interface. It is immediately apparent that import transactions on the New York intertie have been a leading source of reliability problems based on the high rate of failures.

While the failure rate on the remainder of intertie connections has remained comparable with historical experience, the New York intertie has seen a 62.5% improvement over pre-DACP levels.

Day-Ahead Scheduling of Internal Generation

			2006 (March 1 – May 13)	2006 (June 1 – August 13)		2007 (June 1 – August 13)	
Performance Comparison	SGOL/DA-GCG Generator Starts & Fuel Mix	# of Generator Starts:	262	SGOL:	164	SGOL:	72
				DA-GCG:	267	DA-GCG:	167
		Fuel Mix:	71% Gas, 29% Fossil	SGOL:	100% Gas	SGOL:	100% Gas
				DA-GCG:	61% Gas, 39% Fossil	DA-GCG:	42% Gas, 58% Fossil
	SGOL/DA-GCG Costs:	# of Cost Submissions	262	SGOL:	164	SGOL:	72
				DA-GCG:	267	DA-GCG:	167
		Average Cost Submission (\$):	\$24,098.98	SGOL:	\$13,111.31	SGOL:	\$17,997.96
				DA-GCG:	\$57,283.83	DA-GCG:	\$52,706.62
		Total Payment (\$):	\$1,253,593.26	SGOL:	\$348,938.79	SGOL:	\$288,850.48
				DA-GCG:	\$4,827,348.66	DA-GCG:	\$4,280,806.98
	Total:			\$5,176,287.45	Total:	\$4,569,657.46	

Table 4 – Day-Ahead Generation Cost Guarantee and Spare Generation On-Line Performance Comparison

In order to gain an accurate picture of available capacity, internal generators who wish to deliver energy in real-time to Ontario are required to submit their offers by 11 am on the day prior to delivery.

In order to support the participation of generators who have significant start-up times and associated costs, the day-ahead generation cost guarantee (DA-GCG) was brought in to supplement the spare generation on-line (SGOL) program. The DA-GCG program, like its real-time counterpart SGOL, guarantees facility fuel cost used to start and maintain minimum loading of the generating unit. The DA-GCG provides a further incentive by covering off of the incremental operating and maintenance costs associated with the start.

The total number of unit starts in 2007 under the DA-GCG and SGOL programs has decreased in quantity over the previous year. Although there were 92 less SGOL starts, and 100 less DA-GCG starts, the total combined cost of the programs has remained comparable. The added cost can be attributed to the rate at which a unit start led to a compensation payment for un-recovered costs. In the DACP period up to August 13, 2007 there were 239 cost submissions for SGOL and DA-GCG starts. In all 239 of these cost submissions, eligible start-up costs exceeded the associated market revenue, and resulted in a guarantee payout.

	2006	2007
% of SGOL starts requiring payout of a guarantee	73.8%	100%
% of DA-GCG starts requiring payout of a guarantee	67.8%	100%

Table 5 – Rate of Compensation Payment for Reliability Start

Through both the GCG and 11 am bidding, the Ontario market has seen an increase in the internal resources that are available for each delivery day. This was especially seen during the peak week of the summer, when reliability concerns are usually the most acute. For the forecast peak hour on June 26, 2007, the IESO economically scheduled 98.4% of its internal resources one day in advance. The increase in available resources has allowed the IESO to ensure that there was sufficient generation online to meet Ontario demand.

Other Topics of Interest:

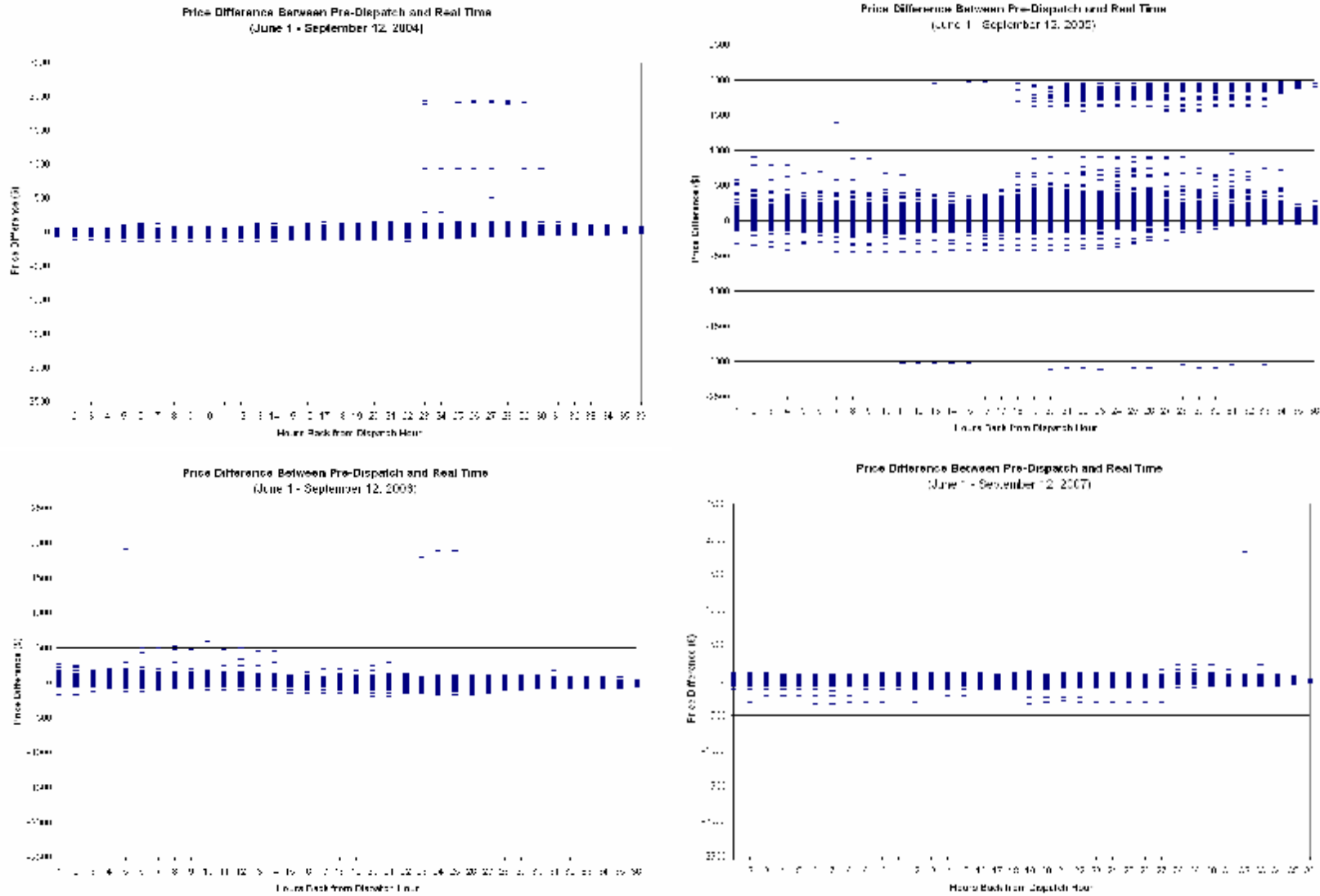


Figure 5 - Day-Ahead and Real-Time Pricing Comparison

A related item that has been realized since the introduction of the DACP program was an improvement to the accuracy of day-ahead hourly pre-dispatch price compared with the real-time hourly Ontario energy price (HOEP). Plots in figure 5 show the difference between forecasted prices calculated by the final DACP run versus the actual energy price in Ontario for all hours of the day for the last four years. Table 6 further shows the average and standard deviation of the pre-dispatch to real-time price differences, grouped by hours back from the dispatch hour. This data indicates a general trend towards greater convergence between DACP Pre-Dispatch of Record (PDoR) and RT price as well as a general trend towards less volatility.

Hours Back	2004		2005		2006		2007	
	Avg PD – RT Price Difference	σ PD – RT Price Difference	Avg PD – RT Price Difference	σ PD – RT Price Difference	Avg PD – RT Price Difference	σ PD – RT Price Difference	Avg PD – RT Price Difference	σ PD – RT Price Difference
1 to 6	4.74	11.46	13.69	47.20	5.96	24.32	4.88	19.69
7 to 12	3.19	13.32	9.79	58.23	3.03	27.24	2.16	19.76
13 to 18	4.66	23.01	14.85	83.68	-0.39	23.64	1.47	22.78
19 to 24	16.68	127.55	127.54	398.06	-1.54	35.76	0.82	27.32
25 to 30	39.91	227.60	291.36	621.73	-3.26	48.11	2.05	26.24
31 to 36	28.41	176.24	361.52	683.60	-6.01	20.48	-0.91	17.54
Total:	10.46	94.78	69.90	303.48	1.35	30.03	2.35	22.40

Table 6 – Average and Standard Deviation of Pre-Dispatch to Real-Time Price Difference
 Grouped by Hours Back from the Dispatch Hour
 2004, 2005, 2006 & 2007 (June 1 to October 1)

Conclusions

The benefits provided by the DACP are crucial to the reliable operation of Ontario's electricity system year-round, and are not exclusive to the summer months. Benefits that have been shown earlier in this report for summer periods, have also been realized in the annual DACP data shown in Appendix A.

The 18-Month Outlook released on September 10, 2007, reports that although 2,900MW of new supply is expected to come into service over the next 18 months. Despite this Ontario may need to rely on power from neighbouring jurisdictions, particularly if extreme weather occurs or if equipment performance is below normal. A functioning DACP that enables domestic resources and import transactions to be scheduled in the day-ahead timeframe will allow maximum flexibility for importers to schedule themselves in neighbouring markets and to purchase "firmer" transmission service.

Update on Items for Further Investigation

In its assessment of the DACP carried out in 2006, IESO staff identified a number of issues which warrant further investigation:

- Review the interplay between the DA-GCG and the real-time SGOL program. These mechanisms are fundamentally different and provide different drivers to participants, which may create market inefficiencies. The IESO expects that the DA-GCG will have its greatest impact during shoulder periods and will continue to assess its performance, including the effectiveness of guaranteeing the recovery of incremental OM&A costs through the DA-GCG. A review of the reliability programs is ongoing under Stakeholder Engagement #21 - Day-Ahead Market Evolution, with results forthcoming.
- Financially binding status, which is currently offered on the Michigan interface, has had a very low participation rate since its inception on August 1, 2006. A review of financially binding status is identified as an initiative of the Intertie Trading Standing Committee.
- The IESO regularly reviews the impact of demand forecast errors and considers methods to improve performance. A stakeholder Engagement Plan (SE 28 - Demand Forecast Deviations) was developed to review the IESO demand forecasting methodology and to make recommendations to improve demand forecast accuracy. This stakeholder engagement was conducted from October 2006 to January 2007. The recommendations from this stakeholder engagement were accepted by the Stakeholder Advisory Committee in January of 2007. Included in these recommendations were requirements for a new demand forecasting application that was being considered at the time. The application is currently being used in the day-ahead timeframe and will be fully integrated and deployed as part of the EMS/MIS upgrade that is in progress at the IESO. Use of the new demand forecasting application has resulted in improved demand forecasting performance in the day-ahead timeframe and similar improvements are expected when it is deployed in real time.

APPENDIX A – Annual Performance and Cost Comparison

			June 1, 2005 – May 31, 2006	June 1, 2006 – May 31, 2007		
Market Conditions	Demand	Total (TWh):	155.3	151.7		
		Daily Avg. (MWh):	425,419	415,727		
		Avg. Daily Peak (MWh):	17,973	17,559		
	Available Capacity	Proportion of installed capacity available (%):	76.6%	74.8%		
	Imports	Total (MWh):	9,239,185	5,813,427		
		Day-Ahead (MWh):	N/A	622,970		
		Real-Time (MWh):	9,239,185	5,190,457		
Performance Comparison	Import Failure Rates	Total Failed Imports:	689,454	324,816		
		RT Failures (MWh):	689,454	319,680		
		DA Failures (MWh):	N/A	5,136		
	SGOL/ DA-GCG Generator Starts & Fuel Mix (Jan 1 – May 31)	# of Generator Starts:	337	SGOL:	232	
				DA-GCG:	282	
		Fuel Mix:	51.6% Gas 48.4% Fossil	SGOL:	100% Gas	
				DA-GCG:	55.0% Gas 45.0% Fossil	
Cost Comparison	Total IOG	Total (\$):	\$82,209,530	\$39,911,981		
		Day-Ahead (\$):	N/A	\$8,394,968		
		Real-Time (\$):	\$82,209,530	\$31,517,013		
	SGOL/ DA-GCG Costs: (Jan 1 – May 31)		Jan 1 – May 31, 2006	Jan 1 – May 31, 2007		
		# of Cost Submissions	337	SGOL:	232	
				DA-GCG:	282	
		Average Cost Submission (\$):	\$33,688.41	SGOL:	\$18,569.40	
				DA-GCG:	\$70,136.57	
		Total Payment (\$):	\$4,003,958.27	SGOL:	\$810,392.67	
	DA-GCG:			\$9,648,243.05		
			Total:	\$10,458,635.72		

Most of the analysis in the paper concerns comparisons between summer periods to take advantage of two completed summer periods under the DACP. This appendix provides a year to year comparison. The analysis includes a comparison of the first full 12 month period of the DACP against the year beforehand.

The yearly assessment has produced similar results to the summer results presented in the body of this report.

- Ontario's dependence on imports has reduced by 37%, driven by lower Ontario demand and increased internal generation capacity
- Overall volume of import failures has decreased by 53.6%
- The volume of failed imports is proportionally smaller than the drop in import transactions
- The DA-IOG and RT-IOG incentives costs have decreased by 51.5% to IOG costs prior DACP, indicating a savings in the IOG program on a cost per volume basis
- The addition of the DA-GCG program has increased the total number of reliability starts for non-quick start units
- The total combined cost of the DA-GCG/SGOL program have increased, likely as a result of maintenance and operation costs covered under the DA-GCG program

The DACP has fulfilled the three main criteria behind its objective equally during the summer season as the remaining seasons. Through continued day-ahead commitment of imports and internal generation, as well as the declining failure rate, benefits and market efficiencies continued being realized over the entire calendar year.