



QUICK-HIT DR PROGRAMS: A CASE STUDY OF CALIFORNIA'S 20 -20 PROGRAM

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1. INTRODUCTION

The objective of this internal review effort is to examine the characteristics of a demand response program used during California's energy crises of 2001 termed the 20/20 program, to see if there are lessons learned that might be relevant for Ontario. The original 20/20 program instituted by Executive Order of the Governor of California (March 13, 2001) was targeted at both mass-market (residential and small commercial with loads under 200 kW) and large customers (loads above 200 kW). While targeted at both sectors, at that time it was principally viewed as a program that would allow the residential sector to provide load reductions and receive rate reductions for the loads reduced. Still, evaluations of the program showed that large customers also were a significant component of the program.

This review focuses on the 20/20 program concept as it might be applied to large customers that have interval metering in Ontario. Some comments on the 20/20 program as it was applied to mass-market customers are included for context.

1.1 Original 20/20 Program Design – Key Concepts

The original 20/20 program was meant to be simple and it was also meant to overcome what was believed to be a significant hurdle in implementing demand response (DR) by customers, i.e., the time and effort required to recruit and sign-up customers into a DR program. These two attributes are addressed in the design of the original program implemented as a result of the March 31st Executive Order by the Governor of California:

1. Simplicity – Customers would receive a 20% bill credit if they reduced their consumption for a given month by 20%¹ over their use in that month a year before (there were slight variants between the small customer and large customer applications); and,
2. Participation in the program was automatic and available to all customer classes, i.e., all customers were automatically participants; the program was supported with considerable advertising to inform customers about the program, and any customer that achieved a 20% reduction received the bill credit.

These points in the 20/20 program were viewed favorably in a number of areas, with PacifiCorp (in the neighboring state of Oregon)² quickly adopting the same program, and the program received attention in across North America and even internationally.³ PacifiCorp appealed to the oft-cited advantages of this 20/20 program: keep the program simple for customers; keep it simple to promote; and keep it simple to implement—no enrollment and a credit on bill each month (PacifiCorp's "Customer Challenge Credit"). PacifiCorp extended the 20/20 program to include a 10/10 variant where customers that reduced consumption by 10% received a 10% bill credit.

¹ Customers of San Diego Gas & Electric (SDG&E) were only required to reduce their usage by 15%, because the California Public Utility Commission had lifted the freeze on their electricity rates in July 1999 and it was assumed they had already reduced their electricity usage in summer 2000 in response to rising electricity rates.

² The PacifiCorp program used the "save twice" slogan in its customer literature "Reach a 20% reduction and your bill will actually be reduced twice for that month, because we credit you 20% and you've used 20% less energy. What if you fall short of 20%? Your bill is still lower by the amount of energy saved. And you can try again next month."

³ For example, the 20/20 program was featured in Meier, Alan, **Saving Electricity Quickly**, *The Power to Choose: Demand Response in Liberalized Electricity Markets*. International Energy Agency, Paris, France, 2003.

These “simplicity attributes” have defined the basic concept of the 20/20 program; however, the program has evolved in a number of important ways to its current application by the California utilities in 2005.

1.2 Implementation of the 20/20 Program(s) – Differentiating Points

Basic design factors of the 20/20 program and how they evolved over time are discussed in this section. Four cornerstone design principles of the 20/20 programs are:

- Design Factor #1: Monthly versus Seasonal 20% Reductions Targets
- Design Factor #2: Application to Hourly Interval Metered Customers
- Design Factor #3: The Voluntary Nature of the 20/20 Programs both in Enrollment and Response
- Design Factor #4: Use of Designated Event Days with Hourly Interval Metered Customers

Each of these is discussed below.

Design Factor #1: Monthly versus Seasonal Reductions – The original Executive Order in 2001 called for consumption in each summer month of 2001 to be compared to that same month’s consumption in 2000. If a 20% reduction was attained, the customer not only saw their bill reduced by the 20% due to the lowered consumption, but they also received a 20% bill credit in a subsequent bill. In effect, they were paid twice for the conservation attained.

Design Issue: By having the bill credits paid on a monthly basis, customers whose normal year-to-year variation in monthly consumption might result in a 20% variation in their monthly bills due to vacations being taken in different months, changes in occupancy patterns (children at home) would receive a bill credit even though they had taken no action to reduce demand (i.e., a free rider factor). According to an analysis conducted by Pacific Gas and Electric (PG&E), approximately 21% of all residential customers would be expected to reduce their electricity use by 20% or more during at least one month from June through September due to normal year-to-year variations in usage under similar weather conditions. This normal month-to-month variation should be factored out of any impacts attributed to the program. This variation would be expected to be substantially larger for residential customers than for commercial customers.

20/20 Program Adaptation: The program was modified to require a 20% reduction over a four-month summer period (June through September). This reduced the month to month variability, but no study has been found in this review that indicates the degree to which this reduces free ridership. Some free riders may still be present as there may be factors that cause one month’s energy use to be so low as to reduce the entire season’s energy demand by 20%; and/or there may be a naturally occurring factor (such as a college student spending the summer at home the prior year) that could impact a large portion of the season’s energy consumption. Clearly, this adaptation reduces free ridership, quite possibly by a substantial margin, but no study quantifying the degree of improvement has been found.

Implication: The use of seasonal reductions rather than monthly reductions would seem to be a clear improvement in the program and lead to a more cost-effective program by not providing bill credits to those who took no specific action to reduce demand, i.e., the 20% reduction was due to factors that would have taken place even if the program had not been offered.

Design Factor #2: Application to Hourly Interval Metered Customers – There has always been a distinction in the 20/20 programs between customers that had hourly interval meters and those whose consumption was accumulated via standard billing meters on a monthly basis.

Design Issue: The goal of the 20/20 program is to reduce on-peak demand when system resources are stretched and also when the cost of electricity is unusually high. However, a 20% reduction in monthly energy use may not result in a 20% reduction in these critical peak hours and, in fact, does not guarantee any reduction in peak use at all. As a result, any change to make the program more focused on peak demand hours would make the program more efficient.

20/20 Program Adaptation: Large customers that had hourly interval meters had to achieve the 20% reduction between what are generally considered the on-peak summer hours (noon to 6:00 PM) totaled for the month as compared to either the same hours in the month in the prior year or on a summer season basis as called for by the program. If this reduction was achieved, they received a 20% credit off of their demand and energy charges.

Implication: Targeting the reduction to those hours that are likely to represent the high cost or supply constrained hours would make the program more efficient. The variability issue between month to month comparisons and seasonal comparisons still remains, with a seasonal 20% reduction target likely to reduce free ridership.

Design Factor #3: The Voluntary Nature of the 20/20 Programs both in Enrollment and Response – A consistent feature across all the 20/20 programs has been the fact that they are entirely voluntary. If enrollment is required, it is voluntary and even if a day-ahead event is called (see design factor #4), a customer's response is totally voluntary, i.e., they are not obligated to achieve any load reductions at all and there are no penalties associated with this program.

Design Issue: The issue with voluntary programs is that you may get customers to enroll, but then not take any action. This is the focus of the evaluations of current day-ahead, event-based programs now being implemented in California, e.g., the Demand-Bid Program (DBP) and the critical peak pricing (CPP) program. In both of these programs, a DBP event or a CPP event day is called on a day-ahead basis with the enrolled participants notified using several modes – telephone, pager, e-mail, and website. In the case of the DBP program, there is no requirement that the customer bid in any load reductions during the identified peak hours, and there is no obligation for customers to respond to the CPP price when a CPP event is called. Some believe that this makes these programs less reliable. Others believe that, over time, experience will be gained with these voluntary programs such that reasonably accurate estimates for response to these voluntary programs can be forecasted.

20/20 Program Adaptation: There really has been no adaptation to the voluntary design of the 20/20 programs – all 20/20 programs have been voluntary. The adaptation that has occurred has been to develop better information for the customer and better analysis tools that can help the customer attain a 20% reduction.

Implication: It does appear that the 20/20 program did elicit some response (see Section 2) in 2001 during the height of the energy crisis in California. Based on interviews and reports, this dropped off in 2002 when the crisis abated somewhat. It would be possible to adjust the completely voluntary nature of the programs, i.e., make this program voluntary from an enrollment perspective but, once enrolled, there could be some expectations for demand reduction during the specified peak period (e.g., 5% minimum on a called event day without a penalty, up to 20% reduction which would earn the full rebate). However, this change makes the program seem very much like a standard interruptible program and much of the uniqueness of the 20/20 program that was believed to attract customers may be lost. A lot more will be known after the evaluation of the 20/20 programs being implemented for the 2005 summer where the customer response to day-ahead event notification is to be assessed (see design factor #4 below).

Design Factor #4: Use of Designated Event Days with Hourly Interval Metered Customers – Under this design factor, customers only receive credit if they reduce consumption by 20% on specific days designated by the utility.

Design Issue: Concentrating on the hours between noon and 6:00 P.M. focuses the program on those hours that are most likely critical peak hours where load reductions are needed, but it still includes many hours where supply might be fully adequate and no reduction is needed.

20/20 Program Adaptation: The 2005 large customer programs are all “day-ahead” event-based programs where the customer must have the flexibility to reduce consumption during designated peak hours that are determined one day in advance by the utility.

Implication: This focuses the program more on hours likely to be critical peak hours, but it also reduces some of the elements that made the initial 20/20 program variants unique and accepted by customers. Now, customers must: 1) sign up (they are not automatically signed up); 2) respond to day-ahead notifications; and 3) receive payments based on a more complex baseline calculation. These programs are being offered in 2005 by San Diego Gas and Electric (SDG&E) Company and Pacific Gas & Electric (PG&E) Company, but no evaluations of these programs have been conducted. As a result, little information is available; however, in a preliminary filing with the California Public Utilities Commission (CPUC), SDG&E estimated the Total Resource Cost test to exceed 5.0 for this 20/20 program variant using planning assumptions, i.e., it was represented as a very cost-effective program as part of SDG&E’s DR Peak Day 20/20 program (see text box on the next page). However, the number of customers that will actually sign up for the program and the total MW size of the program will not be known until after the 2005 summer data become available.

SDG&E 20/20 PEAK DAY PROGRAM FOR SUMMER 2005

During the 2005 20/20 season – May 1 through September 30 – when a peak energy day is called, participating businesses that can use an average of 20% less electricity during the on-peak hours of 11 a.m. to 6 p.m. will receive a 20% credit on their bill.

Q1: How does the 20/20 program work?

Once you enroll in the program, you will be notified a day in advance of a called peak energy day—a maximum of 15 peak energy days are projected during the 20/20 season. On a peak day you will be asked to reduce your electricity consumption by an average of 20% from 11 a.m. to 6 p.m. Once you enroll in the program, you will be notified a day in advance of a called peak energy day. A maximum of 15 peak energy days are projected during the 20/20 season. On a peak day you will be asked to reduce your electricity consumption by an average of 20% from 11 a.m. to 6 p.m.

Q2: How is a peak energy day determined?

A peak energy day is when both the forecasted temperature for the next day is expected to reach or exceed 84 degrees at Miramar Marine Corps Air Station and the current day's electric system load locally reaches 3,620 megawatts. Or, a peak energy day can be called by the California Independent System Operator.

Q3: How will the 20% credit be calculated and applied?

The 20% reduction is calculated by reviewing your on-peak electric energy consumption for the last 10 days prior to a peak day (excluding weekends). The reduction is based on a comparison of your on-peak energy use on the peak day with the average consumption of the three highest days of on-peak electric usage during the previous 10-day period. In addition, you must reduce electric consumption (kilowatt hours) by an average of 20% for all peak day events called during that billing period. If you are able to do so, you will receive a one-time bill credit of 20% toward your on-peak energy and demand charges for that billing period. If no peak day events are called or you do not reduce an average of 20% over all called peak day events during a billing period, no bill credit will be given.

Q4: Do I need to enroll in the program?

Yes, you must contact SDG&E to determine your eligibility.

Q5: Do I need special equipment to participate in the program?

Yes. An interval data recorder (IDR) meter is required to participate in this program. If you don't already have an IDR, SDG&E will attempt to replace your current meter at no cost to you. Unfortunately, SDG&E cannot guarantee that all meters will be replaced in time to participate for the entire summer season.

Q7: What tips do you have that might help me reduce my energy consumption by 20%?

Reducing lighting and cooling provide the biggest energy savings. Try turning off unnecessary lighting in your work environment and setting the air-conditioning to a higher temperature set point. For more energy-saving tips take our online Business Energy Analyzer for cost-saving recommendations. Get started at www.sdge.com/business/analyzer.html.

The text box below outlines the major milestones in the development of 20/20 programs in California.

History of 20/20 Programs in California	
January 17 2001	Grey Davis, Governor of California, declared a state of emergency.
March 13, 2001	Executive order of governor establishes California 20/20 Monthly Rebate Program to give rebates to customers of investor-owned utilities that reduced summer electricity usage (June – September) by 20% in that month compared to 2000 usage levels in the same month.
Summer 2001	California utilities offer 20/20 programs to all customers with no enrollment required.
May 23, 2002	Executive order to renew the 20/20 program with two changes: eligibility was restricted to residential customers, and the period covered changed from June through September to July through October.
2003	SDG&E offers Peak Day 20/20 program for customers with interval meters.
2004	<ul style="list-style-type: none"> – SCE offers 20/20 program for customers over 200 kW paying 20 ¢/kWh load reduction when program triggered with a day-ahead notification (i.e., day head market price > 20 ¢/kWh for 4 hours) – PG&E offers E-SAVE program for customers over 200 kW giving 20% credit on on-peak energy & demand charges if average on-peak usage/day is 20% less than usage for same period year before.
Nov 4, 2004	CPUC orders utilities to propose 20/20 programs for summer 2005.
January 27 2005	CPUC approves 2005 demand response programs.
2005 (through summer)	<p>All three California utilities offer 20/20 programs for residential & small commercial.</p> <ul style="list-style-type: none"> – SDG&E offers Peak Day 20/20 program for customers with loads between 20 and 200 kW with interval meters. – PG&E offers E-SAVE Rate schedule for customers with interval meters and loads greater than 200 kW

2. REVIEW FINDINGS

This section presents some of the findings from the literature review and interviews with personnel at energy agencies in California. Despite all the attention the 20/20 programs have received, there is little evidence regarding impacts. This stems in part from implementing the program during a crisis period which resulted in little if any planning for evaluation considered at the time of program initiation and implementation. After the fact, it was difficult to disentangle the effects of the 20/20 program from the myriad public conservation appeals, and numerous other DR programs and actions taken by California State agencies and utilities.

What does exist focuses mostly on the residential sector, with little information available for the larger customer sectors. An evaluation of the summer 2005 commission-approved 20/20 programs will be started this fall when summer billing and metered data become available.

Most of the evidence that exists is focused on the original 20/20 program, initiated in 2001 by Executive Order of the Governor of California, providing rebates to customers of investor-owned utilities that reduced monthly summer electricity usage (June – September). The rationale for the 20/20 program was that, for “qualifying customers,” the rebates would dampen the effect of increased rates, and the program might lower the overall cost of electricity by reducing spot market volumes and prices. Residential and small commercial/industrial customers received a 20% rebate off the electricity commodity portion of their monthly bill if they reduced their total monthly electricity use by at least 20% compared to the same month in the previous year. Large commercial/industrial customers with time-of-use meters received a 20% rebate off their summer on-peak (weekdays, 12 - 6 PM) demand and energy charges if they reduced their on-peak electricity use by 20% or more. Customers of SDG&E were only required to reduce their usage by 15%, because the CPUC had lifted the freeze on their electricity rates in July 1999 and it was assumed they had already reduced electricity usage in summer 2000 in response to rising electricity rates.

2.1 Impact Evaluation of the 20/20 Program for 2001

Two comprehensive assessments of California’s 2001 DR programs were undertaken—one conducted by Lawrence Berkeley National Laboratory (LBL)⁴ and a second performed for the California Measurement Advisory Council (CALMAC).⁵ The CALMAC study outlines some of the evaluation problems that stem from trying to recreate both the events and influences of the 2001 year in California energy markets:

“With so many disparate entities administering programs in 2001, there was a great deal of variability in the availability, quality and consistency of program documentation. California’s Investor Owned Utilities (IOUs) and the California Energy Commission (CEC) provided the most consistently rigorous and conservative savings documentation, while most of the municipal, local government and private third-party administrated programs did not conform to the same documentation standards. This unevenness in documentation, as evidenced by differing conventions and assumptions for estimating savings and characterizing costs, made it a challenge to aggregate and compare the effects of programs.” (CALMAC, p. RS-2).

⁴ Goldman et al. **California Customer Load Reduction during the Electricity Crisis: Did they Help to Keep the Lights On?** Report LBNL-49733, Energy Analysis Department Ernest Orlando Lawrence Berkeley National Laboratory, May 2002.

⁵ California Measurement Advisory Council, **California Summary Study of 2001 Energy Efficiency Programs**, by Global Energy Partners, LLC; March, 2003.

Data from the LBL study indicates that, based on the number of rebates given, the 20/20 program in 2001 would seem to be judged as successful. Nearly 32% of all customers (residential and commercial) received rebates in one or more of the four summer months. The three IOUs reported that they provided \$286⁶ million in rebates on customers' bills through the 20/20 program for about 5,300 GWh of reduced electricity consumption.

Table 1. State-Wide Results 20/20 Program – SDG&E, SCE and PG&E for 2001⁷

Class	% customers receiving credit	GWh Reduced	Total Rebate (\$M)	\$/MWh (Rebate Costs Only)
Residential	33	3,021	134	44
Non-residential	26	2,237	153	68
Total	32	5,258	286	55

Table 1 shows the raw numbers based on the calculated energy reductions from bills for residential customers and during the period noon to 6:00 PM for each month for the non-residential sector. However, these numbers do not easily translate into program impacts attributable to the 20/20 program. Some of the factors that should be considered are:

1. Some customers received 20/20 rebates but may have taken little, if any, action related to the 20/20 program. For some customers, the 20% reduction in energy use in a summer 2001 month as compared to the same month in 2000 was likely due to inherent fluctuations in their baseline energy use. These customers would have reduced energy use even if the 20/20 program had not existed. These “savings” should not be attributed to the program.
2. Some customers may have taken actions to qualify for 20/20 rebates in a particular month, but were unable to reach the full 20% reduction required for the rebate. These energy reductions were caused by the 20/20 program and should be counted as program savings, but no rebate was given and these savings are not counted in program records.
3. There were many programs being offered in California in 2001, plus many public appeals. Isolating the impact of the 20/20 program is difficult in this environment. Table 2 shows the number of programs being offered in California in 2001.
4. Finally, the energy-only savings used for residential and other smaller customers, which were the basis for qualifying for the rebate, may not have been accompanied by reductions in peak period electricity use.

The LBL 2002 study examines a number of these confounding factors. With respect to the free ridership caused by natural fluctuations in energy use, PG&E data indicate that about 21% of residential customers would reduce their electricity use by 20% or more during at least one summer month due to normal year-to-year variations in usage under similar weather conditions.^{8,9} The monthly reductions from these

⁶ The utilities were reimbursed for these rebates by California Department of Water Resources which was purchased power on behalf of the utilities because of their credit problems or insolvency.

⁷ Source: Goldman *et al.* Report LBNL-49733, Lawrence Berkeley National Laboratory, May 2002.

⁸ The LBL, 2002 study cites private correspondence with Mr. Andrew Bell at PG&E.

customers must be taken out of the 20/20 program numbers. Similar numbers on the natural fluctuation in energy use among non-residential customers during the noon to 6:00 PM period on a monthly basis were not available; LBL assumed the effect was half as large for non-residential customers. Overall, LBL assumed that 2,000 GWh, or 38%, of the electricity savings paid for by the 20/20 program was unrelated to 20/20 conservation efforts.

However, it may be more appropriate to incorporate the 21% of residential customers that would have naturally attained a 20% reduction into the baseline against which the 33% of residential customers that received rebates should be compared. Under this assumption, total residential savings is reduced to 1,098 GWh. Using the LBL assumption that the effect is half as large in the nonresidential sector implies that 10.5% would have attained the reduction anyway, producing a net impact estimate of 1,333 GWh in the non-residential sector. Overall, the total net savings of those reductions estimated to be due to natural fluctuations in energy use based on free ridership of 65% in residential sector (i.e., 21% natural ÷ 33% program), and free ridership in the non-residential sector of 40% (i.e., 10.5% natural ÷ 26% program). Multiplying these free ridership numbers through the program recorded impacts in Table 1 produces a total net program impact estimate of 2,431 GWh. This differs from that used in the LBL reported net numbers of 3,260 GWh. As a result, our simple approach was not able to fully replicate the net savings numbers developed in the LBL report. The numbers found in this analysis were about 25% less than the LBL numbers.

The LBL report went on to develop an estimate of savings for customers who took actions caused by the 20/20 program, but did not reach the full 20% savings reduction required for a rebate. These savings should be attributed to the program. The LBL report looked at historical trends in energy use and took a rough cut estimate across residential and nonresidential customers which indicated that the customers would normally increase their summer energy use by about 2,000 GWh more than in the previous summer (assuming similar weather). In fact, LBL found that this group only increased their total energy use by 300 GWh in the summer of 2001. This implies that these customers, in effect, reduced their consumption by 1,700 GWh from what it otherwise would have been; some portion of this reduced usage can be attributed to the 20/20 program. LBL estimated that at least 30% of the 1,700 GWh reductions in electricity sales (500 GWh) may be attributable to the 20/20 program, based on surveys of customer awareness of the 20/20 program.¹⁰

The overall LBL estimate is then about 3,800 GWh of load reductions (3,300 GWh from customers who qualified for the program plus 500 GWh from non-qualifying customers) may have been influenced to some degree by the 20/20 program. Based on a 20/20 program cost of \$350M, the lower bound for the cost of purchasing savings through the 20/20 program was approximately \$90/MWh if we assume that these load reductions are solely attributable to the 20/20 program. Using the more conservative free

⁹ In another analysis of billing data, Lutzenhiser (2001) analyzed utility billing data for June 2000 and 2001 for 590 households in Southern California and found that 16% of households increased their usage by 20% or more. Showing that this is upward variability as well as downward variability is interesting, but not necessarily relevant to estimating free ridership. The LBL used this 16% number to calculate a lowered free ridership number. We believe a more conservative approach is needed, since the 20/20 program only rewards customers for lowering their energy use, the baseline should be the number of the customers that would have lowered the consumption by 20%, even if the program had not existed. It is not clear how data on the number of customers that increase energy consumption due to natural variability should be used in an adjustment for free riders.

¹⁰ A survey of 400 residential customers in California conducted by E Source in October 2001 found that about 70% of residential customers took active steps to reduce their electricity consumption during Summer 2001. Of these customers, only 57% were aware of the 20/20 program – thus, at most 40% of all residential consumers could have been motivated by the program to reduce their consumption.

ridership numbers developed in this analysis, a total of 2,975 GWh would be attributable to the 20/20 program. This produces a number of \$118/MWh, not too dissimilar from that reached by the LBL study, but this also assumes the 500 GWh of impacts from non-rebated customers.

As a point of comparison, LBL compares these numbers to the average prices for contracted energy purchased by the California Department of Water Resources (DWR). During January-May 2001 it was ~\$260/MWh while spot market purchases averaged ~\$281/MWh (DWR 2001).¹¹ LBL regarded \$90/MWh estimated cost of purchasing energy savings as a lower bound because of the synergistic effects from other state and utility programs, regulatory actions, and public awareness/media campaign. Many customers undoubtedly became aware of the 20/20 program through public media campaigns and/or might have reduced their usage in response to higher rates. Moreover, customers that received financial incentives for purchasing high-efficiency appliances, lights, or equipment could also qualify for rebates on their monthly utility bills if they qualified under the 20/20 program provisions. LBL acknowledged that accounting for these cross program synergies was beyond the scope of that effort, but noted that even if the savings attributable to the 20/20 program was only one third of what LBL estimated, the cost per MWh would be in the range of \$280/MWh, which is comparable in cost to power purchased by DWR.

2.1.1 Interpretation of the LBL Impact Results

The LBL study is useful in two ways: First, it shows that a sizeable fraction of incremental energy consumption could have been reduced by the 20/20 residential and non-residential program efforts; and it produces some costs for these efforts based on the dollar value of the rebates and the estimated program administrative costs. The costs ranged from \$90 per MWh at the low end up to a high of \$280/MWh, assuming only one third of LBL's estimated impacts were due to the 20/20 program and were not due to other programs offered by state and utility programs. While the electricity prices are higher in California (more than double Ontario's current rates) making the rebates higher as well, these are still very expensive values for purchasing energy with quite a bit of uncertainty about how actual peak hours are being impacted.

The costs per MWh for both the residential and nonresidential program elements of the 20/20 program seem to be about the same order of magnitude. The original estimates of programs savings is larger in the residential sector, but the larger free-ridership number estimated for this sector tends to balance out the per MWh costs. This study developed an estimate of about \$108/MWh for the non-residential sector and about \$118/MWh for residential impacts. In addition, one must consider that *it is more likely that the nonresidential impacts impacted actual peak hour demands given that the savings were required to occur between noon and 6:00 PM.*

It is important to recognize that these costs are for the 20/20 program as it was implemented in 2001. The current 20/20 programs being implemented in 2005 are structurally different in ways that should substantially reduce free ridership in the residential sector (i.e., a 20% seasonal reduction in energy use as opposed to a monthly reduction). Also, the nonresidential 20/20 program is much more targeted through the use of called events. This should result in the load reductions occurring during on-peak hours. The results of the 2005 programs will not be available until the summer load data become available and the analysis completed later this year.

¹¹ LBL chose supply option prices for the January-May 2001 period because this was the time frame when the 20/20 program was designed and the state was assessing the merits of demand-side strategies compared to supply purchase options. In retrospect, these were very high prices at which to be purchasing energy.

2.1.2 Contrary and Other Information on 20/20 Impacts

Finally, there is some evidence that the LBL estimates might be too optimistic. A survey conducted on behalf of the California Energy Commission¹² showed that only 38% of residential participants had heard of the 20/20 program and only 7% claimed to have participated (although all customers were automatically participants). This very low number of residential customers that indicated that they tried to participate in the 20/20 rebate offer seems somewhat inconsistent with the overall LBL results and the survey conducted by ESource for Southern California Edison.

The CALMAC (2003) study attempted to calculate the likely double counting of savings between the different DR programs offered in California in 2001. They estimated that the impact estimates from the LBL study should be reduced by roughly another 20% to account for overlaps with other programs. Where LBL focused only on estimating energy savings (GWh), the CALMAC study did develop a rough MW impact estimate for the 20/20 program. This number was 2,616 MW (assumed to be on peak, but not stated in the CALMAC report). This is a large number, but it also had one year costs of \$350 million and the CALMAC study added in the \$65 million spent on the Flex Your Power program as part of the 20/20 costs. This results in a cost of approximately \$159,000 per MW reduced, or \$159 per kW reduced. If the 20/20 savings were expected to persist over time, these costs should be spread out over the life time of the impacts. But, most research showed that the impacts largely resulted from behavioral changes and therefore not much persistence beyond the crisis year should be expected. Avoiding power outages with their attendant high costs and given a time frame with few other choices, these costs can be viewed as reasonable given the estimates of outages that were avoided in 2001 in California.

2.2 Overall Findings on Impacts of 20/20 Programs for Year 2001

The 20/20 program was analyzed in some depth in the LBL study, but this effort still was obliged to make a number of aggregate assumptions. Still, this study found that at least 2,700 GWh of energy reduction could be attributed to the 20/20 program with about half allocated to residential and nonresidential customers. The costs of the program likely exceed \$100 MWh and could be as high as \$200+ per MWh reduced – and much of the program is directed at monthly energy savings with actual on-peak load reductions being uncertain. Further work in a study for CALMAC showed that the MW costs were approximately \$159,000 per MW (or \$159 per kW).¹³

Combining the results of the LBL (2002) and the CALMAC (2003) study, it seems fair to conclude that the 20/20 program had a significant impact on energy use with about 3,000 GWh reduced. After taking into account free ridership and overlapping programs, the sector savings were about 1,650 GWh in residential and about 1,400 GWh in non-residential (recall non-residential reductions must occur between noon and 6:00 PM for interval metered customers). The LBL study concluded that the 20/20 rebate program was a simple, easily understood program that was effective in stimulating MWh reductions, although its influence is not easily separated from the many other complementary activities that took place in California. We estimated a lower bound cost for savings achieved in the 20/20 program at about \$90/MWh, which compares favorably to supply-side options under consideration when the program was approved. However, if two-thirds of the 20/20 load reductions paid for by utilities were actually attributable to other initiatives (e.g., media campaign, other utility or State programs), then the program's

¹² *Conservation Behavior by Residential Consumers During and After the 2000-2001 California Energy Crisis, CEC Evaluation Workshop*, by Dr. Loren Lutzenhiser, Portland State University, June 8, 2004.

¹³ See CALMAC (2003) page ES-3 for this estimates of cost per MW.

economics are comparable to supply-side options that were expected to be available during this period (e.g., \$260-280/MWh).”

The CALMAC study concluded that the *“20/20 Rebate program was a remarkable story, accounting for 64% of first-year energy savings among the programs in scope. However, concerns about the accuracy of these savings due to double counting with other programs and the sustainability of these savings without the backdrop of an energy crisis mitigate the likelihood of repeated future success.”* The CALMAC study also recommended that a detailed review of the 20/20 Rebate program prior to renewing the program *“to assess the sustainability of savings and likelihood of similar success in the absence of a clear and present energy crisis.”*

The Summit Blue project team also interviewed several staff in regulatory agencies in California involved in current work on DR programs to assess more recent views of the 20/20 program. In general, the responses were pretty uniform, with skepticism expressed regarding whether the 20/20 program should be given all the credit it has received for reducing loads during the 2001 crisis and that other factors probably had a larger impact than first realized. However, the 20/20 programs, as adapted for use in summer 2005, might have some promise, with an evaluation needed to validate the actual contributions of these newer 20/20 variants. That evaluation is expected to be completed in early 2006. These newer 20/20 variants are discussed in sections 3 and 4.

Also, it was acknowledged that these new 20/20 programs, particularly those targeted at the business sector, may have many fewer free riders and be much more cost-effective than the original 20/20 programs from 2001. The current business programs are all much more targeted at getting load reductions when needed, and not having to pay for energy reductions that occur during non-critical peak hours. This is done by requiring the 20% reduction to take place only on event days called by the utility due to peak system concerns, and the 20% reduction is not a monthly or seasonal reduction, but is calculated from an energy use baseline constructed from the 10 preceding weekdays for the on-peak hours designated as being within the called event on a day-ahead basis.

The 20/20 program has a catchy name and is easily remembered, but providing a matching 20% rebate for a 20% reduction in energy use may be a larger rebate than is needed to achieve the load reduction. Customers already benefit by paying less on their bills due to their 20% lower consumptions, and paying another 20% on top of that provides a sizeable incentive. Other program designs might achieve the same reductions at a lower rebate level, but not with the same catchy 20/20 name.

One other factor that should be considered is that California experienced rapidly rising prices during this timeframe. In the winter of 2000/2001, residential gas rates nearly doubled and electricity increased by 7 to 15%. Then in June 2001, the CPUC approved a 30% increase in average electricity rates; large C&I saw significantly higher prices, especially during peak demand periods. Some of the savings seen in 20/20 could be natural response to this dramatic price increase.

3. MORE RECENT AND CURRENT 20/20 PROGRAMS

California utilities continue to provide 20/20 programs along with other demand response programs. California, which deals with energy efficiency and demand response separately, identifies two general types of DR programs used to reduce demand when energy prices are high or when supplies are tight. These are: “*price-responsive*” programs in which customers choose how much load reduction they can provide based on either the electricity price or a per kW or kWh load reduction incentive; and “*reliability-triggered*” programs in which customers agree to reduce their load to some contractually-determined level in exchange for an incentive, often a commodity price discount.

In theory price responsive programs are called on before reliability programs, but increasingly the line between these two types of program has blurred. DR programs should result in a net reduction in demand. Participation is voluntary and does not generally carry penalties for not reducing demand when called. Currently there is no day-ahead market price established by CAISO, thus customers respond to an indirect price signal.

Day-ahead notification programs in 2004 included demand bidding (DBP), critical peak pricing (CPP), the demand reserves partnership (DRP), and 20/20 programs for customers with monthly demand over 200 kW. In demand bidding programs, participants submit bids for a proposed level of load reduction at an offered price for each curtailment event. Critical peak pricing (CPP) programs encourage participants to lower their electric bills by shifting or reducing electricity during critical peak summer afternoons (11 a.m. to 6 p.m.). Under the state-wide California Demand Reserves Partnership Program (DRP), a business or organization adjusts power usage when and where reductions are needed due to short supplies and/or price spikes. Participants are given a retainer for committed capability to reduce demand and a performance payment tied to actual demand reduction; there are penalties for non-compliance. Two variants of 20/20 programs were offered in California by PG&E and Southern California Edison (SCE):

- **Schedule 20/20 (SCE):** Participants were paid 20 ¢/kWh load reduction when the program was triggered, i.e., when the day-ahead market price was greater than 20 ¢/kWh for over 4 hours.
- **E-SAVE (PG&E):** Participants were given 20% credit on on-peak energy & demand charges for 4 summer months if average on-peak usage/day was 20% less usage for the same time period the year before. Only customers with interval meters and monthly demand greater than 200 kW were eligible, for a total potential of 11 MW enrolled.

In November 2004, after a submission by SDG&E of additional reliability programs for 2005, the CPUC ordered all the IOUs to propose additional reliability programs in the summer of 2005. These were to be: 1) a 20/20 load reduction to any customer with an interval meter, modeled after PG&E’s E-SAVE program or SCE’s 2004 20/20 program; and 2) a 20/20-style program for customers without time-of-use (TOU) or interval meters (primarily residential and small commercial) improving on the 2001/2002 residential and small commercial 20/20 program by addressing concerns such as cost-effectiveness, free-ridership, and baseline calculation.¹⁴

¹⁴ Ibid.

In January 2005, the CPUC approved plans and budgets for 2005 demand response programs.¹⁵ For the purposes of this decision, any demand response program designed to be triggered the day ahead is considered a day-ahead notification program and counts towards the price responsive demand goals, including the 20/20 programs. For 2005, \$216 million was approved for demand response programs to achieve 2,515 MW total potential. Day-of reliability programs were expected to provide over half (54%) of the potential response. Day-Ahead Notification programs account for most of the rest of the savings, with technical assistance expected to contribute 15 MW.

Figure 1 shows the distribution of MW potential for Day-Ahead Notification programs in summer 2005.

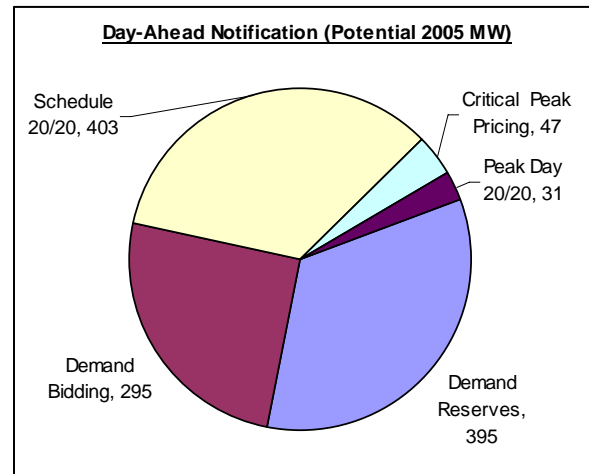


Figure 1: Summer 2005 DA Notification Programs¹⁶

The following 20/20 programs were approved for summer 2005:

- **Schedule 20/20:** 20% discount for 20%+ reduction in summer energy use (June through September) compared to the previous year. Offered by PG&E and SCE for customers with monthly demand less than 200 kW and by SDG&E for residential and small business consumers with monthly demand less than 20 kW.
- **SDG&E's Peak Day 20/20:** Earn 20% of monthly on-peak charges by reducing average of 20% on critical event days with several conditions: must have interval meter; must enroll, given access to KWickview; program triggered a maximum of 15 days. Offered to interval-metered customers with loads between 20 kW and 200 kW. (See appendix A for program details).

Table 2 shows the approved demand response programs for summer 2005, with associated costs and MW results.

¹⁵ Source: CPUC Approval Jan 27 2005

¹⁶ Source: CPUC Approval, Jan. 2005

Table 2. CPUC Approved Demand Response Programs in 2005

2005 PROGRAMS	Total \$ Millions				Summer 2005 MW Potential				\$/kW			
	SCE	PG&E	SDG&E	TOTAL	SCE	PG&E	SDG&E	TOTAL	SCE	PG&E	SDG&E	TOTAL
Reliability Day-Of	\$11.2	\$1.3	\$1.7	\$14.2	874	386	96	1,356	13	3	18	10
Day-Ahead Notification	\$2.8	\$7.8	\$1.8	\$12.4	237	410	63	710	12	19	29	17
Schedule 20/20	\$76.5	\$69.1	\$4.6	\$150.2	150	250	3	403	510	276	1,533	373
Peak Day 20/20	0	0	\$1.9	\$1.9	0	0	31	31	n/a	0	61	61
Technology Assistance	\$7.2	\$7.6	\$4.5	\$19.3	0	0	15	15	n/a	n/a	300	1,287
Awareness	\$5.2	\$8.6	\$3.6	\$17.4	0	0	0	0	n/a	n/a	n/a	n/a
Other	\$0.1	\$0.2	0	\$0.3	0	0	0	0	n/a	n/a	n/a	n/a
SUBTOTAL	\$103.0	\$94.6	\$18.1	\$215.7	1,231	1,046	208	2,515	82	90	86	86
Source: CPUC Opinion Approving Demand Response Goals, Programs & Budget, Jan. 2005												

No detailed evaluation has been done of any of the 20/20 programs; the summer 2005 programs will be evaluated when this summer's data is available. In 2004, there were too few events to provide adequate data for analysis. However, recent information filed with the CPUC by the California utilities does provide some data on the cost-effectiveness using forward looking planning assumptions for the various demand response initiatives for both PG&E and SDG&E.

PG&E calculated TRC ratios for several programs, including the Schedule 20/20 program offered in 2005, which had a TRC ratio of 0.5. As can be seen in Table 3, few of PG&E's programs are cost-effective until 2008. However, PG&E is not currently proposing to continue the Schedule 20/20 program beyond 2005. This will likely depend upon the outcome of the evaluation of the 2005 program.

Table 3. Pacific Gas & Electric Co. TRC Results¹⁷

TRC Ratios (Benefit Over Cost)						
Program	2003	2004	2005	2006	2007	2008
CPP	0.0	0.1	0.2	0.4	0.4	1.5
DBP	0.0	5.8	0.5	0.6	0.7	2.2
CPA	0.0	0.2	0.3	0.4	0.3	0.9
NF/BIP	0.3	0.2	0.6	0.6	0.6	1.7
Coalition			0.1	0.1	0.1	0.5
20/20			0.5			
Portfolio	0.2	0.2	0.5	0.3	0.3	0.6

SDG&E calculated a TRC ratio for the 2005 Schedule 20/20 at 0.47 and for the C&I 20/20 Peak Day 20/20 Program at 5.28 for 2005 and 4.70 for 2006. As seen in Table 4 below, this compares favourably to its other Day-Ahead Notification Programs. SDG&E is also not proposing to continue the Schedule 20/20 program.

Table 4. Cost-Benefit Test Results for SDG&E DR Programs¹⁸

DR Program	TRC 2005	TRC 2006	Breakeven ¹⁹
Critical Peak Pricing ²⁰	5.64	4.25	24%
Demand Bidding ²¹	2.24	4.96	20%
CRA-Demand Reserves Partnership	2.25	2.43	
Peak Day 20/20 (SDG&E)	5.28	4.70	21%

¹⁷ CPUC Filing: PG&E DR 2006-2008 Programs Supplemental Testimony, August 26, 2005.

¹⁸ CPUC Filing: SDG&E Testimony, August 26, 2005.

¹⁹ Breakeven means the percentage of customers needed to respond in order to achieve a TRC of 1.

²⁰ Response rates of 5-70% across all 3 utilities (limited data, few events).

²¹ Response rates between 20 to 60%.

The stark differences in the benefit cost ratios for PG&E (all DR programs with a TRC of less than 1) and the SDG&E results showing benefit-cost ratios greater than 1 for similar programs were due in large part to differences in assumptions about avoided costs. PG&E assumed no plant avoided costs until 2008 and conducted their analysis on a current year basis only. As a result, you see PG&E's benefit cost ratios jump up in 2008, when they begin using avoided costs that included deferred plant investment. SDG&E used a NPV approach for each year which examined the impacts over time rather than in just a single year, as a result some avoided plant costs were seen in 2005.

The results for SCE's cost effectiveness filing is not shown here since they did not include their 20/20 programs in the analysis, they are not planning to propose any 20/20 initiatives for 2006-2008²², and they did not use the TRC test, but showed that their portfolio of DR programs, on a planning basis, were cost-effective under the All Ratepayers Test and Participant Test. Evaluations of many of these programs still remain to be completed.

²² "Supplemental Testimony Supporting Southern California Edison's (U 338-E) Application for Approval of Demand Response Programs, Goals, and Budgets for 2006-2008 – Cost Effectiveness of Demand Response Programs and Overall Portfolio" Application No.: A.05-06-008, Before the Public Utilities Commission of the State of California, August 26, 2005. Witnesses – L. Ziegler, M. Whatley, S. Kiner, and D. Reed.

4. C&I 20/20 PROGRAMS FOR ONTARIO TO CONSIDER

The Ontario market is different than the California market in that interval-metering for smaller customers is not as advanced in Ontario, and even meter reading is often performed at less frequent intervals for residential and smaller customers in many parts of Ontario. For this practical reason, a program focused on C&I customers that have interval metering is probably the only near term program that has promise in Ontario.

The current 20/20 programs offered to business customers by the California utilities all are very similar. Taking one example as a starting point, PG&E's E-SAVE Voluntary Reduction Incentive Rate Schedule variant of the 20/20 program might offer some benefits in Ontario, however, a number of factors must be considered. PG&E has transformed their C&I 20/20 program into a rate called the "E-SAVE" rate which applies to customers with monthly loads greater than 200 kW.

This section focuses on PG&E's E-SAVE rate as a starting point concept for examining 20/20 options for C&I customers in Ontario. Section 5 develops the broader conclusions that stem from this discussion.

4.1 PG&E's Voluntary Reduction Incentive Program²³

PG&E turned its 2004 E-SAVE program—cited by the CPUC as an example for designing 20/20 programs—into a rate schedule. The schedule was in effect from June 1 through September 30, 2005 with an estimated potential of 56 MW. Customers are given incentives to voluntarily reduce energy consumption by a minimum of 20% when requested by PG&E to increase system reliability. The rate is optional for bundled service customers with a billed maximum demand of 200 kW or greater during any one of the past 12 billing months, i.e., customers are automatically enrolled but are not obligated to take action. Customers must receive service on a demand Time-of-Use electric rate schedule and must take service under the provisions of their otherwise applicable rate schedule. Customers must submit an Inter-Act Agreement to establish service under this rate schedule and must have the required metering (15 minute intervals, remote read) and notification equipment (Internet, email, pager) in place prior to participation in this program. If required, PG&E will provide and install the metering equipment at no cost to the customer. Customers that have multiple meters located at a single site (e.g., contiguous property, campus facilities, business parks) with individual meters that have less than 200 kW may also participate. Customers may achieve energy reductions by operating back-up or onsite generation, with the customer taking sole responsibility to meet all environmental and other regulatory requirements for the operation of such generation.

4.1.1 E-SAVE Event Notification

If an E-SAVE event occurs, PG&E will make best efforts to notify customers, but it is the customer's responsibility to receive such notice and to check the PG&E website to see if E-SAVE is activated. When a program event is issued, PG&E will communicate the following information on the program's website: 1) the date and the time period of the events; and 2) the customer specific baseline. PG&E will notify customers of such event, and will post the hours for which the event is being issued through the program's web site by 3:00 p.m. the day preceding the event. By 2:00 p.m. (Pacific Time), PG&E may implement an event for the following day when the forecasted Day-Ahead hourly market prices equal or exceed \$0.20/kWh for four consecutive hours within the six-hour period falling between 12:00 noon and

²³ PG&E website: http://www.pge.com/biz/demand_response/voluntary_reduction/.

6:00 p.m. the next day. Events will only be issued for weekdays excluding holidays. Participating customers do not have to acknowledge receipt of the event notice or bid load into the program.

4.1.2 Incentive Payments

Energy reduction is calculated as the difference between the sum of the customer's baseline usage during the corresponding hours of the event and the sum of the customer's actual energy usage during the hours of the event. If the customer achieves a minimum 20% reduction of load during the event period compared to the accumulative baseline load for the same time period, the customer is eligible for an incentive. No incentive is paid if the customer does not achieve the minimum 20% reduction. The incentive for qualifying load reduction is \$0.20/kWh of load reduction during the event time period. There are no penalties for failing to comply (reduce energy) with an E-SAVE event.

- The customer's *specific energy baseline* is based on the hourly average of the 3 highest energy usages between noon and 8:00 p.m. on the immediate past 10 similar days (include Monday through Friday; exclude holidays and days when the customer was paid to reduce load on an interruptible or other curtailment program or days when rotating outages are called).
- PG&E may activate an E-SAVE event with a *simulated test trigger* twice per year. The customer is responsible for curtailing load consistent with schedule terms.
- Customers will only be eligible for the E-SAVE incentive if, during a one-hour period starting two hours before the event, the load meets or exceeds at least 80% of hourly baseline usage for that same hour before the event. Customers who do not meet this requirement – an *event load check* – are not eligible for the event incentive.

4.1.3 Interaction with Other Programs and Charges

The program addresses attribution to other programs by exclusions.

- Customers who participate in a third-party sponsored interruptible load program must immediately notify PG&E of such activity.
- Participants shall not participate in the California Power Authority Demand Reserves Partnership program, the California ISO's Participating Load Program (Supplemental and Ancillary Services), PG&E's Demand Bidding Program, PG&E's Optional Binding Mandatory Curtailment Program, and PG&E's Pilot Optional Binding Mandatory Curtailment Program.
- Load can only be committed to one program for any given hour of a curtailment, and customers will be paid for performance under only one program for a given load reduction. With the limitations stated above, E-SAVE customers may participate in the Non-Firm Program, the Base Interruptible Program, and the Critical Peak Pricing Program.
- Customers enrolled in the Scheduled Load Reduction Program may participate in E-SAVE during the days when the customer's load is not scheduled for curtailment under the SLRP program.

4.2 The 20/20 C&I Program for Ontario

Ontario is pursuing several initiatives for the summer of 2006, placing particular importance on increasing the certainty of capacity and energy availability through day-ahead arrangements in the wholesale electricity market.²⁴ The current C&I 20/20 initiatives for C&I customers in California could provide the basis for the design of a similar program for Ontario. With very few existing demand response programs in the Ontario market, the potential for a 20/20 C&I program might be considerably larger than in California.

Table 5 shows some advantages and disadvantages of the current 20/20 programs as compared to original program for which the impact analyses have been conducted.

Table 5: 20/20 Comparative Design Advantages and Disadvantages

Design	Advantages	Disadvantages
Original 20/20	<ul style="list-style-type: none"> - Simple to administer - No enrollment required - Quick to market - Can serve as a marketing platform for a portfolio of synergistic DR programs due to the marketing advantage 	<ul style="list-style-type: none"> - Difficult to attribute results - High free riders - May not impact critical peak hour demands - Expensive due to the 20% rebate on all energy reduced (off-peak and peak).
Peak Day/E-SAVE	<ul style="list-style-type: none"> - Greatly reduced free ridership - More accurate estimates - MW savings where needed - Able to evaluate and attribute results. - Much lower cost since payments are made for load reductions only on called event days and hours. 	<ul style="list-style-type: none"> - Complex administration - Enrollment required - Marketing not as straightforward - Customer response is made more complex since they have to track the called event days, and be able to respond on a day's notice and during specific hours.

Table 5 above shows that there are some challenging trade-offs to consider in assessing 20/20 program variants.

²⁴ IESO, Sept., 2005. 18-Month Outlook.

5. SUMMARY FOR ONTARIO

The situation in California in 2001 is quite different from that facing Ontario and it is clear that the original 20/20 programs are probably not good options for Ontario due to the large number of free riders as a result of normal variability in energy use and the high cost of the rebates often paid for off-peak energy reductions.

Based on the information developed during the course of this review of 20/20 programs, there seems to be two variants that might provide benefits in Ontario; however, these should be evaluated as part of a portfolio of DR offers and there are synergies between offers that need to be taken into account.

In general, there seems to be two “framing” options. These are termed “DR market plays” as they are alternative ways of positioning a 20/20 type of DR program within the market. We understand that the Ontario Power Authority will need to assess this program in the context of all of its offerings. Two different positions with respect to a 20/20 program variant are outlined below.

5.1 Market Play #1 – Lead with 20/20 and Support with Synergistic DR Programs

This approach would take a broad 20/20 program targeted at C&I customers with interval meters. Key design factors would include:

1. No enrollment – All customers that are above a given size and have interval meters would automatically be enrolled. [Note: Meters could be installed for customers that wanted to participate but did not have interval meters.]
2. The 20% reduction to qualify for the rebate would be required to take place on week days between specified hours that represent “on-peak” demands, e.g. 11 a.m. to 5 p.m. from June through September.²⁵
3. Savings would be calculated by comparing the energy used during these hours for the entire summer (June – September) to the energy used in the same period in the previous year.
4. Synergistic DR programs would be offered that would enable the customers to take advantage of the 20/20 offer.
 - a. These related programs to facilitate a customer achieving a 20% reduction could include energy management systems and technologies that control equipment, as well as educational initiatives.
 - b. The 20/20 program would create an easily marketed umbrella program under which these more targeted DR offers can be provided to customers.
 - c. The 20/20 would provide considerable incentives for reducing load during the on-peak period, allowing other programs to have lower incentive levels.

²⁵ Navigant, 2005. Avoided Cost Analysis for the Evaluation of CDM Measures.

Reasons why the OPA might want to give Market Play #1 some consideration are:

1. The commercial/industrial sector has had fewer free riders in general, and having the calculated 20% savings be based on the on-peak hours across a season will further reduce free riders by pulling out the month-to-month variability.
2. While there has been disagreement in California about the level of awareness created by the 20/20 marketing effort, customers in California were bombarded with at least a dozen messages. Ontario is starting from a point where few DR programs are offered, which would allow for a more consolidated marketing message to customers and likely greater overall technical potential for the program.
3. The 20/20 program should provide adequate incentives that would encourage customers to seek out programs and technologies that would help them meet the 20% reduction.

A possible disadvantage (or advantage, depending on the point of view and market needs) is that the 20/20 program is meant to be a “one hit” program in that it can get a large impact in one year. It is impractical to expect customers to keep reducing energy consumption by 20% each year into the future. So, most customers that take action will achieve the reduction in one year, but then have difficulty in making another 20% (season over season). California set the target at the year 2000 levels and allowed customers to attain the reduction in 2001, and then they used the same year 2000 baseline for the 2002 program. After that, the baseline would be moved each year, i.e., it would be the preceding year. One approach would be to launch the program using one year, say 2005, as the baseline for measurement of 20% reductions in 2006 and also 2007, to jump-start the entire demand response market. After 2007, the baseline would move such that every year the baseline would be the same season from the preceding year.

This form of 20/20 program is expensive compared to a focused 20/20 program (see Market Play #2) and would only make sense if it is used to lead and jump start the DR market in Ontario and is supported with a portfolio of DR programs that include technology and education to attain the 20% reduction. It would also serve as support for other basic DR programs such as a large customer interruptible, demand-bid program, critical peak pricing program, and other programs; however, the incentives would have to be designed to be equitable, i.e., allow for some double dipping with the 20/20 rebate, but not too much.

5.2 Market Play #2 – Focused 20/20 C&I Program Targeted at Critical Peak Hour Reductions

This approach would take a targeted approach to achieving savings for critical peak events, and also be aimed at customers with interval meters. Compared to Market Play #1, it is more targeted at crucial peak hours and more complex, but it also could be a long lasting program in that the 20% reduction required is event day specific and the baseline calculation uses data from the 10 preceding work days. As a result, the customer can build this capability as part of a long lasting program. The 20/20 program in Market Play #1 is more of a lead-off program to develop the DR market and would need to be revised after three years.

Key design factors in Market Play #2 would include:

1. Customers would need to enroll and must have required metering and notification equipment in place.

2. An event would be based on the day-ahead forecast of the system load and customers would be notified via pager, email, etc.
3. Calculation of customer-specific energy baselines would be specified, e.g., based on the hourly average of similar hours in the immediate past 10 similar days.
4. Customer response would be tested regularly to ensure customers are able to respond to an event.
5. Savings would be calculated as the difference between the sum of the customer's baseline usage during the corresponding hours of the event and the sum of the customer's actual energy usage during the hours of the event. If the customer achieves a minimum 20% reduction of load during the event period compared to the accumulative baseline load for the same time period, the customer is eligible for an incentive.
6. A program website would be established to provide notification and access to information online about customers' current energy use and patterns.

Reasons why the OPA might view this approach as desirable include:

1. Free riders would be further reduced over Market Play #1.
2. It would be more cost-effective in terms of dollars paid for needed critical peak MW reductions, i.e., fewer payments are made for non-critical MWh as part of the rebate.
3. It has been implemented elsewhere and the protocols for implementation have been worked out for notification and response technologies.
4. While it can not be rolled out as fast as Market Play #1, it can still be rolled out in a matter of months.

The disadvantage as compared to Market Play #1 is that it is not as dramatic a program, i.e., all large customers with interval meters are automatically enrolled in the 20/20 program in Market Play #1. As a result, it would be a different concept and it would not be quite as good as serving as a lead marketing initiative with other DR offers supporting the overall Market Play #1 20/20 offer push.

Summit Blue sees value in either Market Play (#1 or #2) and is not recommending one over the other, or even recommending any 20/20 program. One reason is that there has not been a good impact evaluation conducted that shows what any 20/20 program really delivers. These studies of the 20/20 programs should be coming out over the next year, but that timing may not align with OPA's decision timeframe.

We believe that a 20/20 program variant is a viable concept that should be considered within the range of DR offers assessed by the OPA. We have presented two market plays involving 20/20 variants that we consider viable, but other variants could be developed. In addition, this option should be assessed within a portfolio of DR options to assess complementary offers and synergies, as well as to ensure that the program would really meet the needs of Ontario.

The Summit Blue team is very willing to discuss these options with the OPA.

6. REFERENCES

California Energy Action Plan (presentation), March 2005 Update: CPUC Actions to Ensure Summer 2005 Energy Supply, Energy Action Plan Public Meeting, Mar. 23, 2005.

California Energy Commission, December 2001. **CPUC 2001 Energy Efficiency And Conservation Programs**, Report to the Legislature.

California Measurement Advisory Council, **California Summary Study of 2001 Energy Efficiency Programs**, by Global Energy Partners, LLC; March, 2003.

California Public Utility Commission (CPUC) Order Directing 20 20, Nov 5, 2004. Assigned commissioner ruling directing utilities to file additional 2005 programs, budgets, and MW goals.

CPUC Opinion Approving 2005 Demand Response Goals, Programs and Budgets, Jan 27, 2005.

CPUC regulatory proceeding A-05-06-006, Aug. 26, 2005. **Supplemental Testimony of David T. Barker, SDG&E Co.**

CPUC regulatory proceeding A-05-06-006, Aug. 26, 2005. **Pacific Gas and Electric Company Demand Response 2006-2008 Programs Supplemental Testimony.**

CPUC regulatory proceeding A-05-06-006, Aug. 26, 2005. **Supplemental Testimony Supporting Southern California Edison Company's (U 338-E) Application for Approval of Demand Response Programs, Goals, and Budgets for 2006-2008: Cost Effectiveness of Demand Response Programs and Overall Portfolio.**

Flex Your Power Now, June 24, 2005. **California Demand Response Programs for 2005.**

Global Energy Partners LLC, March 13, 2003. **California Summary Study of 2001 Energy Efficiency Programs, Final Report submitted to Southern California Edison & the California Measurement Advisory Council.**

Goldman, C.A., Eto, J.H., and Barbose, G.L., May 2002. **California Customer Load Reductions during the Electricity Crisis: Did they Help to Keep the Lights On?** Ernest Orlando Lawrence Berkley National Laboratory.

Gunn, R., March 31, 2005. **North American Utility DR Survey Results**, prepared by the IEA DR Resource project.

Independent Electricity System Operator, Sept. 27, 2005. **18-Month Outlook: An Assessment of the Reliability of the Ontario Electricity System From October 2005 to March 2007.**

Lutzenhiser, Loren, March 2002. **An Exploratory Analysis of Residential Electricity Conservation Survey and Billing Data: Southern California Edison Summer 2001.**

Lutzenhiser, Loren, July 24, 2002. **California Energy Commission Report: Understanding The Response Of Commercial And Institutional Organizations To The California Energy Crisis**, Washington State University.

Lutzenhiser, Loren, June 8, 2004. **Conservation Behavior by Residential Consumers During and After the 2000-2001 California Energy Crisis**, Portland State University, CEC Evaluation Workshop.

Navigant Consulting, June 14, 2005. **Avoided Cost Analysis for the Evaluation of CDM Measures**. Prepared by Hydro One Networks, Inc.

Nelson, Laura, 2001. Presentation at ACEEE Reliability Conference, **Evaluating Residential Load Reduction Programs: Utah Summer 2001**, Utah Division of Public Utilities.

Press Release, May 23, 2002. **Governor Davis Signs Executive Order To Renew 20/20 Energy Conservation Program**.

Quantum Consulting Inc. and Summit Blue Consulting, LLC, December 2004. **Working Group 2 Demand Response Program Evaluation – Program Year 2004 Final Report**, Prepared for Working Group 2 Measurement and Evaluation Committee.