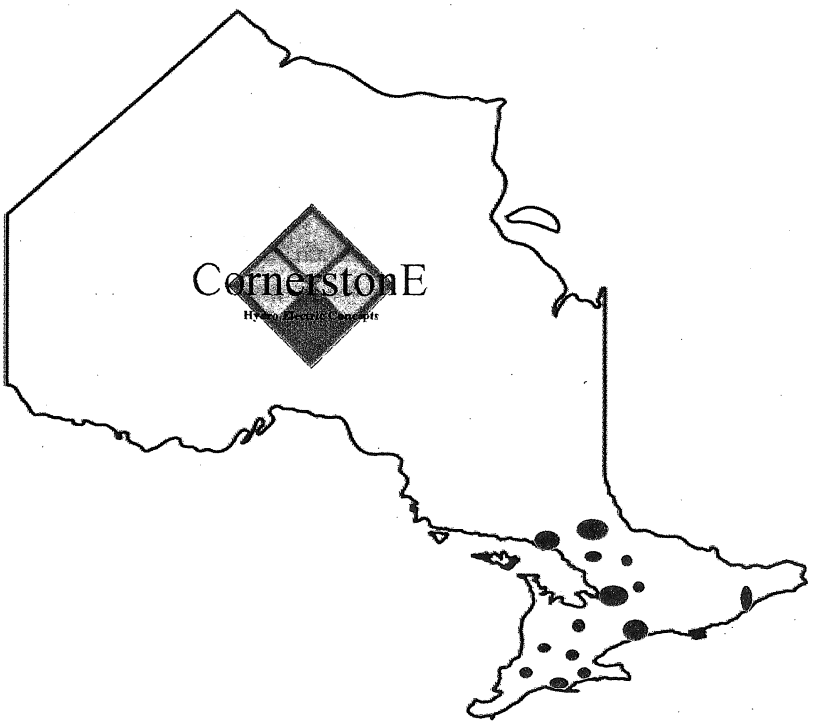
# Cornerstone Hydro Electric Concepts (CHEC)
# 2004 - 2007 Conservation and Demand Management Plan

## Final Submission to the Ontario Energy Board, File No. RP-2004-0203




CHEC Group members include: Centre Wellington Hydro Ltd., COLLUS Power Corp., Grand Valley Energy Inc., Orillia Power Distribution Corp., Lakeland Power Distribution Ltd., Woodstock Hydro Services, St. Thomas Energy Inc., Orangeville Hydro Ltd., Innisfil Hydro, Lakefront Utilities Inc. West Coast Huron Energy Inc., Gravenhurst Hydro Electric Inc., Rideau St. Lawrence, Wellington North Power Inc., Westario Power Inc, Wasaga Distribution Inc., Parry Sound Power Corp., and Midland Power Utility Corp.

**Prepared in conjunction with:**

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## Section One – Executive Summary

In November 2003, the Ontario provincial government released details outlining its plans to enable Local Distribution Companies (LDCs) to earn their full commercial return on capital, effective March 1, 2005, with a special proviso requiring re-investment of the equivalent of one year of these funds into conservation and demand management (C&DM) initiatives. Preliminary calculations suggest that province wide this energy conservation program will inject approximately $225 million into conservation and demand management measures.

Further to the November 2003 announcement, in April 2004 Minister of Energy, Dwight Duncan charged LDCs with the role of promoting energy conservation and suggested they be "...agents of change at the local level to promote conservation." The Minister invited LDCs to apply directly to the OEB to establish 'deferral accounts' to fund LDC investments in conservation and demand side management initiatives immediately.

While the LDCs are well positioned to deliver myriad programs to the communities they represent and in fact have resources and expertise in conservation and demand management measures, several LDCs recognized numerous challenges with the new mandate. Typical concerns included efficacy of measures, consistency of conservation message, communication, value for investment and economies of scale. In short, LDCs have applauded the conservation program and recognizing some of the inherent challenges decided to pool resources to take advantage of shared resources and expertise to deliver best value to the program.

### *Cornerstone Hydro Electric Concepts (CHEC)*

The CHEC Group is an association of eighteen electricity distribution utilities modeled after a cooperative to share resources and proficiencies as the Ontario electricity industry continues its transformation. Previously known as the Organized Power Group, the CHEC group has expanded its membership and subsequent customer base resulting in a diverse yet collective alliance focused on maximizing value for investment by combining resources and competencies while simultaneously maintaining the high standards of locally supplied service our customers have come to expect.

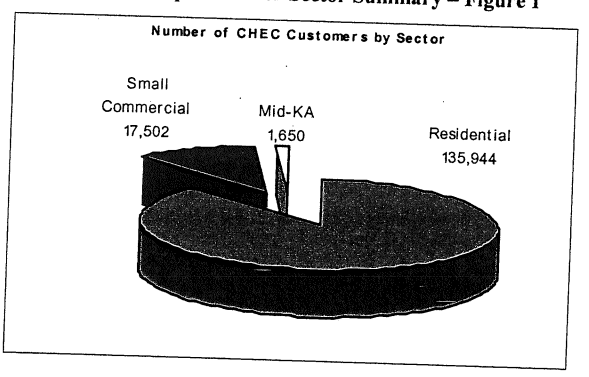
The mission of the CHEC Group is, ***"to be recognized as the premier LDC Cooperative in the province, by meeting or exceeding member expectations through the sharing of services, opportunities, knowledge and resources."***

The values of the CHEC Group include the sharing of resources, both intellectual and technical, enabling members to deliver value to their customers and shareholders ensuring competitiveness in the marketplace.

Together the mission and value statements represent lofty but attainable goals for the CHEC Group.

As shown in Figure 1, the CHEC Group represents approximately 160,000 customers with the majority

**CHEC Group Customer Sector Summary – Figure 1**



classified as residential sector (87%) and the remaining small commercial and mid-market/key accounts, representing 11% and 2% respectively. Annual energy consumption is approximately 3,000 GWh/yr with a monthly average peak demand of approximately 430 MW's. See Table 1.0 below for further detail

**CHEC Group Consumption & Demand Summary – Table 1**

| CHEC Group kWh/DR Summary | | | | |
|---|---|---|---|---|
| Description | Residential Sales | Small Comm. | Mid & KA Comm. | Total Sales |
| Annual kWh | 1,178,237,031 | 460,671,574 | 1,268,682,803 | 2,907,591,408 |
| Peak Demand (MW) | 133 | 98 | 199 | 430 |

Typically industrial and commercial customers require a 3-year or less simple payback for energy efficiency projects and funding levels dictated by the proposed C&DM funding program will not be sufficient by themselves to entice this customer group. However, leveraging this fund with other C&DM funding sources, e.g. (NRCan, Enbridge, etc.), will help increase penetration, C&DM yield and program success.

Assuming a hypothetical reduction of 5 % residential and 10 % commercial / industrial, the CHEC Group has a C&DM potential of 209 GWhr and a system peak savings of 35 MW's. If you assume a typical capital cost to implement C&DM projects using a range between $800-$1,200 per kilowatt, the CHEC Group customer base would have to invest approximately $35 million to achieve the hypothetical C&DM yield. See Table 2.0 below.

**CHEC Group Annual Peak Savings and C&DM Potential – Table 2**

| Sector | Peak Savings (MW) | C&DM Potential (GWh/yr) |
|---|---|---|
| Residential | 7.95 | 47.37 |
| Small - Mid Com. | 8.16 | 48.58 |
| Mid/KA Comm. | 19.03 | 113.36 |
| Total | 35.14 | 209.31 |

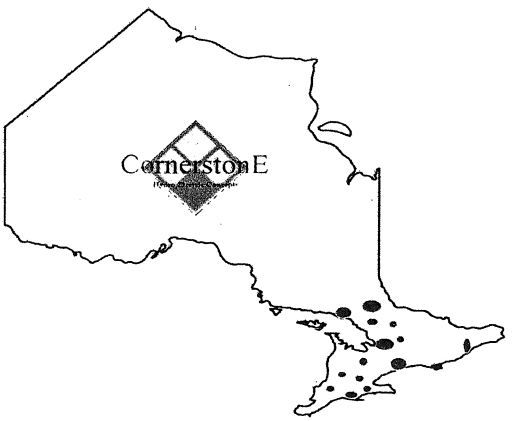
Notes: C&DM Potential (GWhr/yr) - Based on a 5% Residential and 10% Commercial-Industrial participation rate
Customer investment is based on a $/kW that typically represents a project investment with 3 yr payback

Comprised of LDCs from across southwestern, central and eastern Ontario the target audience of CHEC Group initiatives is wide ranging and fully represents the diversity in Ontario economically, geographically and culturally. See Figure 2 for geographic locations of members.

Diversity of the CHEC Group has been given full consideration in the development of the C&DM Program.

Funding levels or the 'third tranche' for the CHEC membership equates to approximately $3.5 million, which will be expended over the 3 years of the program. Economies of scale will be employed to ensure maximum impact and penetration for each LDC's customer and shareholder.

**Service Territories of CHEC Members**



The CHEC Group has divided initiatives under this plan into Tier One and Tier Two measures. Tier One measures will focus on common programs and activities to maximize economies of scale for key initiatives. Tier One measures include: customer survey, education initiatives e.g. billing stuffers, energy efficiency seminars, school conservation programs, as well as, common web page development and exploration of joint water and electricity conservation programs.

Tier Two measures have been developed with the aim to achieve a higher level of customization to address the multiplicity within the cooperative and attain the highest return on investment for the customer and shareholder. Tier Two measures include: System Optimization, Energy Audits and/or projects, Partnerships, Power Factor Audits, Demand Response Programs, Wind Power Studies, Signal and Street light efficiency, e.g. LED lighting, Metering, etc.

Member LDCs will benefit from this two-tiered approach through capitalization of shared costs and exploitation of collective resources. The diversity of measures covered by both tiers permits flexibility for each LDC to maximize C&DM results while simultaneously minimizing costs and risk of program inadequacy. Communal reporting and information distribution of both successes and failures is critical to the mandate of the CHEC Group.

Recognition of the need for a conservation and demand side management program within Ontario is an important first step by the Ministry of Energy and the CHEC Group wishes to emphasize the magnitude of long-term activities dependency upon C&DM program costs inclusion in rates moving forward.

This application represents a joint submission on the issue of conservation and demand management initiatives by the members of the CHEC Group in consideration of our collective responsibility to "...act as agents of change at the local level to promote conservation."

## Section 2 - Program Outlines - Tier One

### *2.1 Introduction of Tier One Programs*

Broad ranging concepts and commonality are key aspects of measures classified as Tier One efficiency programs. A primary objective of the Ministry of Energy's (MOE) agenda is to create an active conservation culture in Ontario and Tier One programs seek to achieve this principle. Education and awareness programs delivered through the Internet, bill inserts, and advertising are popular vehicles available to communicate messages supporting the creation of a conservation culture.

Energy savings may be measured through the initiative and/or the program up-take and may not necessarily be as easily quantified as many Tier Two measures. Engaging the community, as a whole and fostering the conservation culture through its infancy are the expected yield from these programs. Successful Tier One programs set the stage for greater penetration of Tier Two measures and other future conservation efforts.

By utilizing economies of scale, investment requirements for Tier One measures can be shared across the CHEC Group and the increased buying power of the group will leverage more value to customers and shareholders. Tier One program objectives are shared by all CHEC Group members.

### *2.2 Education and Promotion*

**Billing Stuffers and Flyers**

Advancing the importance of understanding conservation to customers in all market sectors and in turn facilitating the programs to permit customers acting on the energy saving opportunities requires significant effort and consistent marketing. Common messages and approaches will be implemented to achieve greatest possible penetration.

One of the fundamentals of the CHEC group's program is to create a conservation culture within each of the communities through common / shared marketing efforts, such as:

- Mass market campaigns
- Common stuffer printed with same messaging to keep cost low (advertising, marketing, etc.)
- Distribution through typical billing channels
- Discount and rebate coupon programs through hardware stores, suppliers and other retail chains
- Information media and communication vehicle – local newspapers, trade magazines, web sites, etc. Used to announce seminars, discount coupons, awards and recognition, local energy events.
- Distribution cycle and timing will vary depending on the programs launched in each community and seasonality messaging e.g. heating / cooling seasons.
- Savings potential is typically unverifiable however can be measured through the up-take and results of other programs such as number of redeemed coupons for light bulb discounts/rebates, etc.

**Energy Efficiency Seminars**

Energy Efficiency Seminars - customized to each market segment and sector

Residential Topics

- Educate on energy efficient appliances

- Energy efficient lighting for the home
- Occupancy sensors
- Water heating – Demand response controls, time of use rates, efficiency measures, etc.
- Water conservation – Low flow aerators, low flow toilets, showerheads, etc.
- Thermal envelope, windows / doors
- Heating and cooling systems, heat recovery systems, programmable thermostats, etc
- Time of use rates and load control timers / demand response
- Smart metering and pay as you go metering

Commercial/Industrial Topics

- Power Factor and power quality
- Energy efficiency lighting
- Energy efficient HVAC systems and applications
- Variable speed drive's
- Building automation controls and PLC's
- Energy Profiling Services - Energy tracking, targeting and monitoring
- Demand response opportunities
- Interval, sub and real-time metering
- Clean energy supply – Co-generation, Bio-fuel, Bi-fuel and Distributed Generation

Engage local contractors and industry experts to present technologies, ideas, methods and demonstrations of conservation in practice. Encourage local schools to get involved and support training/education vehicles to the next generation of energy consumers.

Seminar templates will be produced by the entire CHEC membership to reduce development costs and produce a consistent message. The seminars could be presented on a cyclical basis with one residential and one industrial/commercial date per year. Delivery and timing will be scheduled around special events and other C&DM activities supported with seasonal messaging.

Energy efficiency seminars are a low cost measure that creates considerable activity. Savings are measured through up-take of other programs or contractor's network. Exploiting and engaging the contractor network is an excellent way to qualify the number of projects completed as a result of this type of conservation effort.

**Schools Conservation / Safety Program**

Deliver a joint Conservation / Safety sessions with local schools. Currently, safety programs already exist; this program would see Conservation added to this. This could take many forms, including using students to collect and analyze localized market data for use in the development, implementation, monitoring and verification of programs. Initially the focus would be on creating awareness and action at home. Later, the focus could be on identifying impacts taken and rewarding leadership. By combining conservation with safety, overall LDC consumer education needs of system interaction and demand impacts are addressed. By creating better awareness and appreciation by the consumer of the electricity system's constraints and dangers will help ensure that all society acts more responsibly in their use of electricity.

**Joint Water and Electricity Conservation and Environmental Benefits Promotion Program**

Partner with local water utilities to share in the delivery of overall conservation and environmental benefits of energy and water conservation programs (double the message at reduced cost or pooled resources for increased impacts). Water conservation efforts currently focus on summer water usage. Times of peak water usage typically coincide with peak electricity usage and therefore reinforcement of the concept of conservation is a natural complimentary activity. Where possible, Federation of Canadian Municipalities (FCM) funding will be sought to support marketing, advertising promotions, and delivery.

**Staff C&DM Training**

Deliver staff training on C&DM activities and benefits. It is important that the staff understand how the various activities will help not only the consumer, but the LDC as well. The level of knowledge the staff has on the benefits of the various programs can significantly affect the success level of any program. Training will occur as required, with sessions offered to CHEC Group members in groups. This will ensure sufficient numbers to warrant course delivery, and encourage cross-pollination of ideas from the different members. Local consultants will be used for the development and delivery of specific courses. Courses will be delivered on an as needed basis and when warranted based on demand.

### *2.3 Customer Survey*

The importance of customer feedback and opinion cannot be underestimated. The CHEC Group recognizes the commentary provided by its customer base is invaluable. The opportunity of combining resources to produce one uniform survey greatly reduces costs and increases the depth and validity of the survey findings.

Survey success is often limited due to the rather small sample of potential customers, however the joint survey efforts of our group will maximize the value of the survey and provide the necessary background and baseline information to enable member LDCs to make better decisions on program design and targeting funds to programs of customer value. These surveys may also be used to establishing baselines for assessment of future program impacts.

### *2.4 Conservation Website*

A common conservation website is a significant avenue of opportunity to educate, inform, advertise and reach out to energy consumers. Development and maintenance costs would be shared as would contribution requirements resulting in a more robust and interactive website. Typical components of the site include:

- Links from local distribution company website
- Links (ministry, load profile services, municipal links, government web links, etc.)
- Broadcast information
- Calculators of energy savings concepts (input sheets on base case and pick a proposed measure to find out savings)
- Energy conservation articles
- Provide information and describe all energy efficiency measures (Power factor, generation, energy efficiency lighting, etc)
- Post all LDC rate structures and information
- Current and archived energy / industry news
- IMO links

- Advertise seminars, special events, awards
- Did you know? Tips, suggestions, experiences / testimonials from local people
- Q & A
- Case studies on various measures
- Contact information for local suppliers and contractors

Savings could be measured on up-take of programs, message penetration analysis, redemption of discount coupons and reports on the number of hits and website traffic.

Table 3.0 below provides a sample of typical energy efficiency C&DM measures for the residential and small commercial sector. They are presented for information only. The CHEC Group members will be considering these types of measures along with others when designing the C&DM program.

**Typical C&DM Measures - Estimated Energy Efficiency Yield – Table 3**

| Energy Efficiency Techniques | | | | | | | |
|---|---|---|---|---|---|---|---|
| **EE Measure** | **Assumption** | **Description** | **Typical Savings (%)** | **Typical Cost ($)** | **Demand Reduction (KW)** | **Annual Reduction (kWh)** | **Typical Payback (yrs)** |
| **Compact Fluorescent** | Based on 4 compacts to replace std. incandescents-6 hours/day | Replacing incandescent lighting with more efficient florescent units | 75% | $ 32.00 | 0.18 | 395 | 0.7-3 |
| **Heat pump and Geo Thermal** | Based on replacement of a 30 kW electric furnace | Replacing existing Heating and cooling units with ground source units | 35%-65% | $3000-$10000 | 10.0-20.0 | 3000-4500 | 10-20 |
| **Refrigerator switch out** | | Replace old inefficient refrigerators with new energy efficient ones | 30% | $ 1,200.00 | 0.2 | 300 | 40.00 |
| **Fridge Buy Back** | Refrigerator not to be replaced | Reduce number of old inefficient fridges (beer fridge) | 100% | | 0.8 | 1200 | |
| **Water Heater Controls** | Based on electric 60 gallon tank with a 1 kW over 3 kW elements | Use of time-of-use rates to defer usage at LDC peak demand times | | $ 200.00 | 1 | 50-marginal consumption savings | 3 years based on demand savings |
| **SLEDS** | Replace old inefficient holiday lights with new energy efficient ones-based on replacement of 5 strings of lights | Replace old inefficient holiday lights with new energy efficient ones | 84% | $ 40.00 | 1.15 | 400 seasonal | 10.00 |
| **Smart Meters** | Replacing standard electric meters with units that can monitor interval usage | Better knowledge of interval usage allows for better appliance usage in the home | 10% | $250-$400 | 0.2 | 1250 | 2-3.2 |

## Section 3 - Program Outlines – Tier Two

### *3.1 Introduction of Tier Two Programs*

Tier Two Programs generally refer to more capital-intensive measures and can be tailored to meet the demands of each LDC. Communication of successes and hurdles within the group will be integral to continued improvement in programs and efficiency gains. Each LDC has identified Tier two programs as a preliminary list with estimated budgets for each. However, each LDC may require / consider 3rd tranche allocation program adjustments based on customer survey results, further program analysis / design and local community needs.

### *3.2 System Optimization and Implementation*

System optimization is a general area targeted at reductions in distribution system losses. It will look at opportunities such as:

- ***Power system load balancing*** – Through load shifting within the grid to improve system efficiency it is estimated that between 5% -10% of system losses could be saved.
- ***Voltage profile management*** – At times of system peak constraints, strategic voltage reductions at the distribution station level can result in peak demand reductions and is in addition to and will not interfere with the IMO's voltage reduction program.
- ***Line loss reductions*** – This area will investigate the replacement of inefficient conductors and evaluate on an economic basis where opportunities exist for upgrading.
- ***Power Factor Correction*** – see section 3.4 below
- ***Transformer and other loss reductions*** – Through non invasive investigations of customer transformers (such as infrared scans), this initiative will identify overloaded equipment and investigate operational and equipment improvement opportunities.
- ***Voltage conversions*** – A study followed by implementation will investigate the locations and value of voltage upgrades associated with a feeder as higher voltages and lower current results in lower losses.

The overall benefits of this program will be to identify and implement projects that will improve / reduce distribution system and improve system efficiency. Supporting corrective action either by taking direct control over an upgrade or support customer action will result in system demand reductions and relieve network capacity, on both a local and system wide basis.

### *3.3 Energy Audits and/or Projects*

Energy audits will be provided through internal resources or partnerships with existing service providers. LDCs will promote energy audits as a mechanism for identifying conservation opportunities within homes, businesses and industries. Where applicable, coordination will be conducted with NRCan Office of Energy Efficiency (OEE) rebate programs and/or gas utility DSM programs to leverage available funding thereby reducing the impact on LDC C&DM costs and consumer costs. Program design will focus on mechanisms to collect and maintain audit data for future marketing and program purposes, possibly for financial assistance of longer payback technical options, which fail to result in consumer implementation due to unfavorable economic reasons.

From no- and low-cost options alone, experience from other audit programs in Canada and internationally have shown results of between 5% and 10% in total energy consumption savings. With effective follow-up and support of complimentary programs, it is believed that implementation rates of recommended measures can achieve in excess of 50%.

Program design will need to focus on unique local needs, LDC coordination requirements, and qualifying local audit service providers to name but a few issues.

### *3.4 Power Factor (PF) Correction*

Primarily targeted at the industrial consumer, a Power Factor Correction program will focus on identifying opportunities to improve reactive power at facilities that are demand billed. The program will focus on PF audits and PF correction where cost effective through suppliers and contractors. The PF audits could be performed as a discrete service or as part of a full scale audit (as identified in 3.3 above). Coordination of support funding from other sources will be undertaken. Benefits flow directly to the consumer in terms of reduced billing and to the LDC and the Ontario electricity system through reduced system losses. Program design considerations will include qualification of prospective consumers, subsidies for audits and potential financial support for corrective options that are economically unattractive to the consumer (i.e., greater than 3 year pay backs). Qualified auditors/suppliers will be a key consideration of this program.

### *3.5 Web Tools and Training*

Web tools to help customers with identifying and making C&DM decisions will be explored and possibly developed as web modules offered by some members. This will include interval data information analysis, what if calculators, etc as well as, individual on site training on how to use some of the web tools currently available to the larger customers. Note this is in addition to the Tier One Conservation Website identified in section 2.4.

### *3.6 Billing Practice Studies*

This initiative will be developed to study options for LDCs to improve billing practices and the relevancy and availability of billing data to improve its immediacy and applicability to customers' facilities operations. The studies will attempt to identify improvements in billing practices to improve customers' uptake on C&DM and reduce general waste through improved information. Options, among others that might be included, are: monthly from bi-monthly billing or possibly even weekly billing. Different options and approaches may be considered for different customer classes.

### *3.7 Demand Response Initiatives*

Demand Response Programs will focus on re-activating existing systems currently in place by some LDCs, expanding those systems, introducing new systems and funding customer incentives. LDCs that do not have existing systems could undertake studies to determine opportunities within their community. Data from Tier One Customer Surveys could be useful for this effort and will be leveraged to support these initiatives. Current systems are limited to hot water heater control. Additional opportunities potentially exist for control of air-conditioners, refrigerators, and pool pumps, among others. These initiatives will contribute to many benefits including system constraints experienced by LDCs in certain localized areas as well as system constraints experienced by the total Ontario electricity system.

Mechanisms for differing costs, such as bidding demand response load into the IMO administered markets at times of peak demand will be investigated. Also, the potential for supplying load into an aggregated bid such as that currently underway by the Ministry of Energy for 2500 MW of Clean Energy Supply and Demand Response.

### *3.8 Channel Support and Leveraged Programs*

Many opportunities will exist to develop partnerships and joint activities with Local suppliers and vendors. For example, many hardware stores have special (seasonal) promotions which an LDC could leverage and support uptake by consumers. This could take the form of possibly helping with advertising; attending in-store kick off campaigns; etc. These types of one off activities could be consolidated on an annual basis as a regional promotion activity over a one month period. This could also take the form of an Ally Support program, where channel partners are subscripted into an Ally Program and provided support through consistent promotion, advertising and recognition. Program development will need to look at target channels, qualifications for participation, participation fees (if any), reporting requirements, etc. Providing this type of support will assist consumers in identifying who, what and where they can obtain the products and services for the energy conservation needs.

### *3.9 Municipal Buildings Demonstration Conservation Projects*

This project will help with partial funding of a retrofit at a key municipal building to showcase and lead by example. The objective would be to achieve significant energy conservation reductions in the order of 25% from current consumption using currently available and proven technologies. By showing leadership and inviting the community and business leaders to witness the benefits obtained by implementing energy conservation measures it is expected that such a demonstration will encourage action by other businesses. "Leading by example" helps to demonstrate the conviction and beliefs of community leaders like municipalities and their LDCs to the constituents they serve.

### *3.10 Low Income Programs & Partnerships*

This area will include special programs for low-income families provided through strategic partnerships. Because electricity prices have the potential to impact on low-income consumers the most, special consideration must be considered for this group. Working with local community organizations, programs will be identified and developed to provide needed information and services to this group so that they can take actions that will have the most desirable outcome for them. Because community organizations already know the needs of this group, it is envisioned that these programs would be delivered through these organizations, with support by the LDCs.

### *3.11 Renewable Energy Projects*

A study or studies will be conducted to identify and determine the feasibility of one or more local renewable energy projects. These may be undertaken by one or more collaborating LDCs and may include projects such as solar PV, thermal solar, wind, biomass energy, or other forms of alternative and renewable energy projects. Each LDCs territory and customers may present unique opportunities, and these will be canvassed for a first pass of opportunities. From these, further study will be conducted to develop the concept until full implementation can be approved. Coordination will be conducted with generation opportunities with the OPA and connection to the IMO controlled grid if applicable.

Otherwise, these projects will contribute to local supply constraints as might be applicable. The focus will be on relieving local supply constraints and generating revenue where feasible.

### *3.12 Co-Generation Pilot Programs*

Participation and support of a local co-generation project to help kick-start uptake of this opportunity for others. Key market opportunities include industry with significant heat and electricity loads of equal capacity. Institutional opportunities may include larger hospitals with large laundry facilities. Co-generation plants can remove significant electricity loads from the electricity system, while also contributing to a significant improvement in energy conservation. They also address security of electricity supply where operations are of a critical nature. Co-generation plants have the potential to reduce total power and heat use by up to 40% on a case-by-case basis.

### *3.13 Wind Power Studies*

Renewable energy sources and in particular wind power, is a central focus in the supply diversity of the Ontario Government. This includes both larger wind farm types of generation station applications as well as more localized distributed generation applications. This latter approach is particularly applicable to the agricultural market. Studies will be conducted to determine appropriate areas for development as well as suitable hosts and system connection points. These distributed wind systems could be either on a net metering basis or behind the meter if host loads are sufficiently large and stable. Opportunities for providing green power to local consumers will be promoted and pursued where they fit local demographic needs.

### *3.14 Signal and Street Lighting Efficiency*

Through local municipalities within the service territories of the Group, customers will be encouraged and supported in the upgrading of incandescent traffic signals (red, green, yellow and pedestrian crossings) to energy-efficient light emitting diode (LED) traffic signals. These new lights continue to be part of the municipalities' energy efficiency programs, as customers will have committed to installing LEDs during all future lamp replacements.

Anticipated Results

- LED signal lights have proven to save between 80-90% of electricity consumption over conventional incandescent signal lights.
- Maintenance costs can be more than halved because LEDs are so economical and their life expectancy is up to 10 times that of conventional incandescent signal lights.

Activities for the project include:

- Surveying municipalities about their use of and opinions about LED traffic signals.
- Concise and objective information and tools for decision makers who are concerned about codes, standards, product performance, energy and economics.
- Regional demonstration(s) that shall be facilitated by the project team.
- A model product performance and purchasing specification that could be adopted by municipalities, energy service companies and procurement groups.
- Outreach activities that will emphasize interaction between mid-stream marketers and purchasers of traffic signal products.
- Efficient street lighting will also be considered

### 3.15 *Light Bulb Giveaway and Timers*

Compact fluorescent lamps (CFLs) have for the past 15 years been proven energy saving devices over their conventional incandescent light bulbs. This would be a residential consumer program targeting increased awareness and use of CFLs in this market. CFLs achieve up to 75% electricity savings over conventional incandescent bulbs and last up to 10 times longer. If used in applications where the light is required a minimum of 4 hours per day or more (porch and outdoor lights, kitchens, living room lamps, etc.), typical paybacks range from 0.7 to 3 years.

Program design will include lamp specifications, procurement, distribution, etc. Key considerations include lamp selection to ensure light quality and life expectance is achieved.

Although commercial markets (multi residential, hotels, etc.) also have opportunities for CFLs, these opportunities will be addressed through other means such as energy audits and broader conservation programs.

Timers - Appliance and end-use device timers can have many significant demand side effects that benefits both end-users and the electricity system, including:

- Scheduling of use to coincide with times of lower power prices and consequently off-peak demand periods (e.g., clothes washers and dryers, pool pumps, etc.)
- Limiting appliance use durations to ensure appliances are not operating beyond their requirements (e.g., outdoor lighting, Christmas lighting, car block heaters, etc.)
- Thermostat controls allow for setback (in heating mode) and set-forward (in cooling mode) of temperature control according to user needs, schedules, and time-of-use rates.

Savings for these depend on the needs and use of the appliances and the willingness of the user to limit use or alter comfort and convenience. However, typical savings in the order of between 20%-30% can be achieved with controllable thermostats (more if integrated with time-of-use rates) and significantly more with properly set up timers.

This initiative is targeted at residential consumers. Program details for consideration will include financial incentives, co-marketing with local retailers and service providers, and local government support.

### 3.16 *Pre-pay Metering*

Prepayments allow the consumer to better budget and manage their electricity use. Paying for electricity after use, the traditional way, can be compared to going to a grocery store that has no prices posted, taking any food you wish home, eating it, and then getting the bill for the food several weeks later.

Prepayment allows the consumer to monitor how much electricity an appliance is using. They will be able to see how much it is costing them to cool their home, or to use a particular appliance. If they are using more energy than they budgeted for, they can adjust their usage to stay within their budget.

Consumers can purchase utilities in amounts they can afford, and at times which are convenient. There are no surprises with unexpectedly high utility bills. In fact, they will never get a bill.

Pre-payment meters are usually rented for a small monthly fee. This is deducted from the consumers account on a daily basis, and is almost unnoticed. In fact, experience has shown that many prepaid power customers save the monthly fee amount every month through careful monitoring of their consumption. Studies conducted by electrical utilities in areas around the world where prepaid power is an option, indicate savings in energy consumption of 10% - 20%. This is done by empowering the user to control their energy use. This tendency only increases as energy prices increase.

Electricity (could also be combined with other utilities such as water) is purchased by taking the smart card, which is part of the prepaid power system, to a convenient outlet (e.g., Hydro head office or local convenience stores). There the consumer will credit their card with the amount of utility use that they want to purchase at the time. When they insert the card into the display unit at their home the system credits them with the amount of their purchase and allows them to use services to that value.

The pre-paid meters provides a number of useful user features and information feedback including:

- How much power remains
- Present rate of use (in dollars or kWh)
- Amount of power in dollars used yesterday
- Amount of power in dollars used in the last month
- Date and amount of the last transaction
- Current date and time
- Estimated number of days until card replenishment at current use levels
- Much more

Features on these meters are constantly evolving and this initiative will test current and new features to identify the best suite of options for use and which customer classes these types of meters are best suited for.

### *3.17 Conservation Market Research*

Survey customers on attitudes and current activities. This could be combined with surveys of customer satisfaction, conservation, existing energy sources used for various appliances, penetration of Air Conditioning – window/central, etc. Options for deployment includes rolling into school curriculum and having data collected and potentially analyzed by high school students as part of their community service hours. Consideration of combining with water conservation research and co-funding with water programs will be pursued where applicable.

The objective of this initiative would be two fold:

1. Engage the local communities as participants in the process of identifying local needs, understanding their attitudes towards energy use, and their propensity towards a cultural shift towards an energy conservation culture.
2. Obtain real data for input into program design, development, monitoring and evaluation (e.g., establishing baseline attitudes for comparison purposes during the program evaluation phases).

### *3.18 Metering Pilot*

Pilot studies will be conducted to investigate applicability and optimum introduction of interval, time-of-use, "smart", and pay-as-you-go meters.

Steps to be considered include:

- On-going evaluation of technologies appropriate for retrofit applications. This includes:
  - Literature and product reviews
  - Meetings with potential suppliers
  - Technical and economic assessment of options
- Development of an implementation plan. This will include:
  - Assessment of staff training needs and delivery of training
  - Equipment procurement
  - Scheduling rollout and deployment
  - Identification of target groups for applicable technologies

It is important that this initiative be limited to one or two carefully planned and coordinated Pilot projects involving smart metering deployment, as too many pilots would be seen as wasteful and uncoordinated. The objective would be to share the results for the benefit of all in the group.

The pilots will focus on the specific needs of the residential, commercial and industrial markets individually.

Residential pilots may include:

- Testing of alternative "smart" meters
- Trials of automatic metering reading devices and their applicability to urban and rural customers as well as their ability to interface with different metering products
- Pilots of different communication technologies such as wireless, powerline carrier, mesh networks, radio frequency, Internet protocol, etc.
- Trial introduction of pay-as-you-go (pre-paid) meters
- Piloting of web enabled electricity consumption profile data
- Pilots of interval data warehousing software and interfaces

Commercial and Industrial pilots may include:

- Roll out of interval or "smart" meters (depending on peak loads and meter regulations) to all customers in these classes
- Replacement of electromechanical meters with interval meters when they come due for recalibration
- Accelerated meter replacement initiatives

### *3.19 Measures – Efficiency Yield*

Table 4 below provides a sample of typical energy efficiency C&DM measures for the commercial and industrial market sector. They are presented for information only. The CHEC Group members will be considering these types of measures along others when designing the C&DM program.

## Typical Measures - Energy Efficiency Yield – Table 4

| Energy Efficiency Techniques | | | | | | | |
|---|---|---|---|---|---|---|---|
| **EE Measure** | **Assumption** | **Description** | **Typical Savings** | **Typical $ Cost** | **Demand Reduction - KW** | **Annual Reduction - kWh** | **Typical Payback - yrs** |
| **T-8 Fluorescent** | 2-4 ft. lamp fixture 4000 hours operation | Removal of Standard T-12 fluorescent lighting and upgrading to more efficient units | 25%-30% | $60 per 2 lamp fixture | 32 watts per fixture | 128 | 4.70 |
| **Compact Fluorescent** | 15 watt unit 8760 hours operation in hallways and entrances | Removal of std. incandescent lighting and upgrading to more efficient fluorescent units | 75% | $28 per lamp | 45 watts per lamp | 394 | 0.71 |
| **VFD & VSD's** | annual run time of 3500 hours | Control devices to control the speed of pumps and motors | 20% | $6,300 | 5 kW | 14000 | 4.50 |
| **HVAC Controls** | Improved HVAC ventilation & DDC controls-typical installation | HVAC controls to reduce hour of operation and temperature control | 5% of HVAC load | $41,600 | 25 kW potential | 130000 | 3.20 |
| **Lighting Controls** | Improved lighting controls such as motion sensors and automatic dimming-typical installation | Lighting controls to reduce hour of operation and temperature control | 10% of lighting load | $68,800 | 45 kW | 160000 | 4.30 |
| **Air Conditioning and Chillers** | replacing a 500 ton unit with a high efficiency system-calculation of premium only | Replacement of existing HVAC systems | 15% | $40,000 | 65 kW | 130000 | 3.08 |
| **Energy Audit** | standard feasibility study and equipment installation of a typical building | Analysis of the building operation and usage patterns to identify energy opportunities | 5%-10% of HVAC load | $37500-$150000 | 70-100 | 150000-300000 | 2.5-4.0 |
| **Compressors** | 15%-35% consumption reduction due to reduced leakage-typical audit of industrial facility | Repairing air leaks and resizing compressors | 15%-35% | $1000-$5000 | no substantial savings | 22000-51000 | 0.5-1 |
| **Traffic Signal Lighting** | based on an individual intersection traffic and hand signals | Replace of standard incandescent lamps with LED units | 84% | $185 | 110 watts | 965 | 1.92 |
| **LED Lighting** | based on replacement of 2-25 w lamps | Replace exit lighting with LED kits | 84% | $90 | 42 watts | 368 | 2.45 |
| **Power Factor Correction** | based on 0.05% line loss reduction to building-65% load factor and a 5% power factor improvement | Improvement of facility power factor will in turn reduce distribution system line losses | 5% | $20,000 | reduction in distribution and transmission charges | reduction in distribution and transmission charges | 2.00 |
| **Wind Power Generation & PV Cells** | based on Toronto Hydro example-PV cell | Use of renewal energy source to defer system peak demand | total load displacement | $300,000 | 35 kW | 41000 | 73.00 |
| **Building Envelope** | | Upgrade of building env. such as caulking, weather-stripping, insulation, doors, windows | 3%-5% of HVAC load | $35,700 | 10 kW with assumed coincidence of peak | 85000 | 4.20 |

## Section 4 - Proposed 2004 – 2007 Budget

**Tier 1 & 2 Measure Summary**

| Measures / Tier One | Centre Wellington | COLLUS Power Corp. | West Coast Huron Energy Inc. | Grand Valley | Gravenhurst | Innisfil Hydro | Lakefront | Lakeland | Midland | Orangeville | Orillia Power Corp. | Parry Sound | Rideau St. Lawrence | St. Thomas Energy | Wasaga Distribution | Wellington North | Westario Power | Woodstock Hydro Services | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Customer Survey | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 18000 |
| Conservation Website | 6000 | 13500 | 3500 | 2500 | 6000 | 13500 | 9000 | 9000 | 6100 | 10000 | | 10000 | 15000 | 5000 | 10000 | 3342 | 20000 | 14000 | 156442 |
| Education and Promotion | 7200 | 25000 | 5000 | 3926 | 6000 | 16500 | 10000 | 20000 | 12333 | 29000 | 7000 | 40000 | 19000 | 18000 | 29000 | 17942 | 10000 | 30000 | 305901 |
| **Tier Two** | | | | | | | | | | | | | | | | | | | |
| Energy Audits/Projects | 8000 | | | | 15000 | | | | | 100000 | 25000 | | 10000 | 50000 | | | | | 208000 |
| Partnerships/Sponsorship | 8000 | 15000 | | | | 27000 | | | 15000 | | 10000 | | 15000 | 15000 | | | 30000 | 25000 | 160000 |
| System Optimization | 10000 | 40500 | | 1500 | 25000 | 51000 | 105000 | 102000 | 65000 | 25000 | 99000 | 25000 | 60000 | 20000 | 20000 | 31908 | 235500 | 30000 | 946408 |
| Renewable Energy Study | | | | | | | 10000 | | 40000 | 25000 | | | | 25000 | | | | | 100000 |
| Renewable Energy Demonstration | | 35000 | | | | 51000 | | | | | | | - | | | | 40000 | | 126000 |
| Power Factor Audit/Support for Demand Billed Cust. | | 10000 | | | | | | | | | | | | | | 6387 | | 90000 | 106387 |
| Light bulb giveaway, timers | 4000 | | 16500 | 6800 | | | 20000 | 30000 | | | | 5000 | | | 30574 | | | | 112874 |
| Investigate/Implement DR Programs | | 176000 | | | | | 15000 | | | | | 40000 | | 20000 | 79000 | | 270000 | | 600000 |
| Smart, Interval, PAYG Meters | | | | | 15000 | 31000 | | | 75000 | 100000 | 50000 | 45000 | | | 69000 | | 50000 | 200000 | 635000 |
| Develop Co-gen Opportunities | | | 7000 | | 98000 | | | | | | | | | 15000 | | | | | 120000 |
| Web based customer Info. Tools | | | | | | | | | | | 15000 | | | | | | | | 15000 |
| Programs for Low Income | 5000 | 10000 | | | | | | | | | | 14000 | | | | | | | 29000 |
| Provide Ind. Cust. with Energy Tools | | | | | | | | | | | | | | 15000 | | | | | 15000 |
| Signal/Street Light Efficiency | 10000 | 50000 | | | 12000 | | | | 20000 | | | | | 20000 | | | | 30000 | 142000 |
| 3rd Tranche | $59,200 | $376,000 | $33,000 | $15,726 | $178,000 | $191,000 | $170,000 | $162,000 | $234,433 | $290,000 | $207,000 | $180,000 | $120,000 | $204,000 | $238,574 | $60,579 | $656,500 | $420,000 | $3,796,012 |

**Note:** 1) The third tranche value was based on best available information at the time of plan development. Values have been rounded and represent the maximum C&DM funding available. Third tranche values may require adjustment to reflect any variance following value confirmation by the OEB.
2) Values noted in the table are inclusive of program administration. LDCs reserve the right to re-allocate funding within the maximum 3rd tranche value to satisfy local requirements and/or unforeseen conditions at the time of plan development and implementation.
3) Funding allocations are for a 3-year period.

## Section 5 – Summary

The CHEC Group is excited by the opportunity of developing and implementing a C&DM program in our respective communities. We believe the plan described in this document will provide the desired Ministry of Energy results and will go a long way in helping our customers with their energy conservation needs.

We are confident our cooperative approach will provide the most cost effective way in achieving maximum C&DM results.

The CHEC Groups submission follows the guidelines outlined in Minister Duncan's letter and represents the collaborative efforts in response to the directive. We recognize the need for prudence in expenditure and are committed to that objective.

This plan represents the CHEC Group's final submission and collectively we seek plan approval from the Ontario Energy Board to proceed to final program design and implementation.

# Schedule A1 - LDC Authorization - Centre Wellington Hydro Ltd.

Centre Wellington Hydro Ltd.
730 Gartshore, Fergus, Ontario
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**Proposed Measures**

| Utility | 3rd Tranche | Tier | Measure |
|---|---|---|---|
| **Centre Wellington** | **$59,200** | Tier One | Customer Survey |
| | | Tier One | Conservation Website |
| | | Tier One | Education and Promotion |
| | | Tier Two | Energy Audits and/or Projects |
| | | Tier Two | Partnerships/Sponsorships |
| | | Tier Two | System Optimization |
| | | Tier Two | Light Bulb giveaway, timers |
| | | Tier Two | Program for Low Income |

Centre Wellington Hydro is pleased to submit an application to the OEB for a final order to implement a C&DM program. This application is in response to correspondence from the Honourable Dwight Duncan, granting LDCs the opportunity to proceed to the OEB with applications for deferral accounts to track investments in conservation and demand management initiatives.

Centre Wellington Hydro is committed to investing the equivalent of one year of our 'third tranche' funds, over the period of 2004 through September 2007, to developing and implementing C&DM programs in conjunction with the Ministry of Energy's energy conservation goals. Centre Wellington Hydro will focus their C&DM activities on the above noted programs. In an effort to ensure we obtain the maximum conservation benefit from the investment, we will be reviewing the effectiveness of our initiatives on an ongoing basis; substitutions may be made from other C&DM initiatives outlined in this document.

Signature

Nov 15/04
Date

PRESIDENT / SECRETARY
Name, Title


This report was prepared for the CHEC Group by Toronto Hydro Energy Services Inc. (THESI) (www.torontohydro.com) with the assistance of TheBEST Co. (www.bestco.ca). For additional information about this document, please contact:

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