



# 2005 - 2006 CDM Plan



**Kitchener-Wilmot Hydro Inc. 2005 - 2006  
Conservation and Demand Management Plan**



This document was prepared for Kitchener-Wilmot Hydro Inc. by IndEco Strategic Consulting Inc.

For additional information about this document, please contact:

IndEco Strategic Consulting Inc.  
2 Pardee Avenue, Suite 302  
Toronto, ON, Canada  
M6K 3H5

Tel: 416 532-4333  
Fax: 416 532-5485  
E-mail: **info@indeco.com**

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# 1 Introduction

Kitchener-Wilmot Hydro Inc. (KWHI) is a local distribution company that is responsible for distributing electricity to more than 77,000 homes and businesses within the City of Kitchener and the Township of Wilmot. A wholly owned subsidiary of Kitchener Power Corporation, Kitchener-Wilmot Hydro Inc. is focused on providing a safe and reliable supply of electricity to its customers.

## 1.1 Principles

The Conservation and Demand Management (CDM) program Kitchener-Wilmot Hydro Inc. is proposing is guided by several key principles:

- The plan should include a mix of utility-side and customer-side programs. The plan should have programs targeted at or which benefit all customer rate classes.
- The plan should address some or all of the other priorities identified by the Minister, such as addressing low income customers, promoting distributed or embedded generation, leveraging funding of other organizations, and helping to meet the Minister's target of a 5% reduction in peak demand by 2007.
- The plan should build on existing programs and leverage funding, where possible.
- The plan should allow for flexibility in expenditures to allow the LDC to avoid potential lost opportunities and respond to changing circumstances.

## Utility-side and customer-side programs

Distributor CDM activities should address both the efficiency with which its customers use electricity as well as the efficiency of the distribution system itself. Consequently, the CDM plan should include both utility-side programs and customer-side programs.

With respect to customer-side programs, it is desirable for the CDM plan to include programs which are targeted at or which benefit all customer classes, including residential, institutional and large and small commercial and industrial.

The CDM programs will address all customer classes. A large percentage of CDM investments will be in assets to improve the efficiency of the local distribution and the provincial transmission and generation systems, and to reduce distribution system losses. These expenditures will benefit all electricity customers, while simultaneously enhancing the LDC's rate base.

### **Provincial priorities**

The Province of Ontario has announced a number of goals and targets related to the provincial electricity system, including:

- A target to reduce peak demand by 5% by 2007, and by 10% by 2010
- A target to phase-out coal-fired generation by 2007
- Increase the capacity of renewable energy to 5% of total electricity capacity by 2007, 10% by 2010.

In addition, the Minister of Energy requested local distribution companies (LDCs) in a letter dated 31 May 2004: "to pursue a broad range of programs that support the more efficient use of electricity in Ontario, including those that were discontinued on the opening of the electricity market, to reduce customers' overall energy demand and/or demand for purchased energy."

The letter included a list of possible programs:

- Energy efficiency
- Behavioural and operational changes, including the application of benchmarking or 'smart' control systems
- Load management measures which facilitate interruptible and dispatchable loads, dual fuel applications, thermal storage and demand response
- Measures to encourage fuel switching which reduce the total system energy for a given end-use
- Programs and initiatives targeted to low income and other hard to reach consumers, and

- Distributed energy options behind a customer's meter such as tri-generation, co-generation, ground source heat pumps, solar, wind and biomass systems.

Kitchener-Wilmot-Hydro Inc. is committed to supporting and realizing these initiatives, where it is possible and appropriate.

### **Build on existing programs**

Kitchener-Wilmot Hydro does not intend to hire additional staff to develop a significant internal CDM unit for the delivery of its 2005-2006 CDM Plan, but rather intends to partner with existing programs and contract with experienced professionals for the design, delivery and evaluation of its CDM programs. This approach will ensure a rapid start-up and availability of programs to customers and will avoid 're-inventing the wheel', while keeping the option of developing in-house offerings in the future.

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## 2 Utility-side initiatives

Kitchener-Wilmot Hydro Inc. has identified two initiatives that will make up the 'utility-side' of its CDM portfolio. A description of each program including estimated costs and anticipated benefits is provided below. Because the costing is based on estimates and priorities may shift due to changing circumstances, it may be necessary as the CDM plan is implemented to shift dollars between utility-side programs.

### 2.1 *Distribution system improvements*

Kitchener-Wilmot Hydro is committed to improving the overall efficiency of its distribution system and will be taking steps to extract savings wherever possible. Through detailed analysis of its system, opportunities will be investigated for system optimization, improved phase balancing, and installation of capacitor banks. To undertake this load flow analysis, the system is now being modeled, and the study should be completed by April 2005.

The results of the investigations will place a priority on the most cost effective projects that would optimize the savings and overall benefits to the distribution system, from a budget allocation of up to \$1.15 million.

### 2.2 *Kitchener-Wilmot Hydro in-house retrofit program*

Kitchener-Wilmot Hydro wants to ensure that its own facilities use energy efficiently, and serve as a model for what it hopes its customers will emulate. To this end, an allocation has been provided for improving the efficiency of its own facilities. An initial audit will be undertaken to assess possible opportunities, which may include:

- Building energy management systems
- Lighting retrofits
- Improvements to the building shell
- Operating practices
- Procurement policies for new equipment



- Fuel switching – possibly from electricity to gas heating, and fuel switching for backup generators
- Using backup generators during peak pricing periods.

An initial allocation of \$150,000 has been made for these improvements.

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## **3 Customer-side initiatives**

### *3.1 Municipal programs*

#### **LED traffic lights**

There are substantial energy savings possible from converting traffic lights to LED bulbs, and Kitchener-Wilmot Hydro – in conjunction with Cambridge and North Dumfries Hydro and Waterloo North Hydro – has explored with the Regional Municipality of Waterloo assisting them in accelerating this program.

The Region operates approximately 371 intersections, of which 325 have not been converted to LEDs. Of these 172 are within Kitchener, and the cost of converting them is estimated at approximately \$1.3 million. Kitchener-Wilmot Hydro will contribute up to \$175,000 or about \$1000 per intersection, to this upgrade.

#### **Municipal building energy conservation**

The City of Kitchener has been actively improving the energy efficiency of municipal buildings over the last twenty years, and the City allocates a budget each year for improvements. Many of the buildings are new (since the 1990s) and are relatively efficient already, and the City is reviewing whether to keep or replace some of the older buildings.

Because of these on-going initiatives, it does not appear there is a need for partnering on major efficiency improvement opportunities, but Kitchener-Wilmot Hydro will continue to liaise with staff responsible for facilities at the City, and to explore opportunities to collaborate. Kitchener-Wilmot Hydro will also explore opportunities with the Township of Wilmot.

Kitchener-Wilmot Hydro has allocated \$75,000 to take advantage of opportunities that may arise from these explorations over the life of the CDM plan.

### 3.2 Residential programs

#### **EnerGuide for Houses**

The Residential Energy Efficiency Project (REEP) Waterloo Region currently delivers Natural Resources Canada's EnerGuide for Houses (EGH) program in the City of Kitchener. The EGH program provides homeowners with an assessment and rating (referred to as the 'A-label') of their home's pre-retrofit energy use characteristics and makes recommendations for energy efficiency upgrades. Following the completion of energy efficiency upgrades, EGH energy advisors perform another assessment to determine the post-retrofit energy rating (referred to as the 'B-label'). Homeowners that undertake a B-label assessment are eligible for a federal grant, which is based on the difference between the pre-retrofit and post-retrofit EGH rating. The maximum value of the grant is \$3,348. Since these grants were introduced in October 2003, over 1,200 Waterloo Region citizens have had an A-label rating. Four hundred have had a B-label rating and claimed grants totalling \$175,000. The average grant amount in Waterloo Region is approximately \$450.

The current EGH program deals primarily with space and water heating. The EGH software estimates potential savings in kWh for electrical space and water heating, as well as furnace motors, and ventilation fans. Approximately 5% of the participants in Kitchener that undertake an initial EGH evaluation have electrically heated homes.

Kitchener-Wilmot Hydro, in partnership with REEP and NRCan, proposes to encourage a greater uptake of the EnerGuide for Houses program amongst customers using electric heating. The objectives of the EGH program for electrically heating homes will be to:

- Increase the number of initial EGH assessments (A-label) performed in electrically heated homes in Kitchener.
- Increase the number of follow up EGH assessments (B-label) performed in electrically heated homes in Kitchener.
- Encourage a higher level of adoption of the recommended energy efficiency measures.

In order to achieve these objectives, the Enhanced EGH program will include:

- Increasing marketing efforts, targeted at electrically heated homes.

- Increasing the total grant monies available to homeowners of electrically heated homes, by offering to match the federal grant.

KWHI is currently exploring the feasibility of the Enhanced EnerGuide for Houses program with REEP. Up to \$100,000 has been allocated to this program. It is hoped that with this additional marketing push and enhanced incentives it will be possible to increase the number of homes performing the B-label assessment to 100 from about 25 over the life of the plan.

## **Fuel switching**

The City of Kitchener is the primary shareholder of the electric LDC (Kitchener-Wilmot Hydro Inc) and is the owner of the gas LDC (Kitchener Utilities) that serve Kitchener homes and businesses. This is a relatively unique situation in Ontario and consequently presents an opportunity for Kitchener-Wilmot Hydro Inc. to develop some innovative, collaborative programs with Kitchener Utilities. One such opportunity is a fuel switching program to encourage KWHI's residential customers to convert from electric to natural gas appliances and heating systems.

In general, using gas for water heating or space heating is more efficient (when taking into account the energy that is used to generate electricity), and less expensive for the customer than electric water or space heating. Despite these benefits, there are several existing barriers to the residential use of natural gas in these applications, including:

- Many homes do not have an appropriate natural gas hook-up already in place
- The upfront, capital cost for natural gas water heaters is higher than for electric ones
- Until recently, conversion of electric baseboard heaters was not considered feasible, and many customers are unaware that this is a cost-effective alternative over the life of the heating system.

Kitchener-Wilmot Hydro proposes to develop, in partnership with Kitchener Utilities, a program to encourage residential customers to convert from electric to natural gas water heaters. The feasibility of involving Union Gas, which services Kitchener-Wilmot Hydro customers in the Township of Wilmot will also be explored.

The program will consist of targeted and broadcast marketing, along with financial assistance with the up-front costs associated with acquiring a gas water heater to replace an electric heater. Without marketing,

Kitchener Utilities is currently performing about 200 conversions a year. With this new program, it is expected that 1000 conversions could be made over the life of the plan.

A budget of approximately \$230,000 has been allocated to this program.

### **Low income program**

The Minister has identified low income consumers as a key target for CDM programs. The Enhanced EnerGuide for Houses program and the fuel switching programs described above may be accessed directly by low income customers, possibly with minor modifications to address their unique circumstances. REEP advises that low income customers are already making use of the basic EnerGuide for Houses program. The enhanced program which focuses on electrically heated residences ought to further assist this customer group, which tends to have a higher use of electric heating. Similarly, the water heating fuel switching program allows customers to realize operating savings with minimal up-front costs.

In addition to these general programs, Kitchener-Wilmot Hydro proposes to introduce programs specifically targeted at low income customers.

Kitchener-Wilmot Hydro has already provided funding to a local community group, Worldwide Opportunities for Women (WWOW); for a pilot program to assist low income consumers and new immigrants to reduce the burden of their energy bills through audits, training and provision of simple equipment. KWHI's contribution is part of the overall funding for this project, which is also funded by the Region, Cambridge and North Dumfries Hydro and Waterloo North Hydro. The initial pilot will provide audits, education, and implementation of simple and inexpensive retrofit measures in 30 homes of Heat Bank recipients.

Recently, the Low Income Energy Network has designed a program for early delivery by LDCs that could involve more extensive assistance, particularly to low income homeowners and tenants who pay their electricity bills directly. The potential suitability of this program, and the means of delivering it are being explored with organizations in the community that work with these consumers.

KWHI has begun discussions with the Waterloo Regional Housing Authority on how the two organizations can work together to improve energy efficiency in social housing. Options under consideration include:

- Simple retrofits to electrically heated social housing units. These could include such things as motion sensor thermostats and retrofitting or replacing some appliances.
- Establishment of a low or no interest revolving loan fund that would leverage private money, and allow off-balance-sheet financing of efficiency improvements, paid for out of energy savings.

The specific programs to be adopted will be based on an assessment of opportunities and priorities, ability to access resources, and customer needs.

A budget of up to \$200,000 over two years has been allocated to programs for low income customers.

### *3.3 General service customer programs*

#### **Seminar series**

Kitchener-Wilmot Hydro Inc. will host a series of seminars for its industrial, commercial and institutional customers. The purpose of the seminars is to provide KWHI's general service customers with information, tools and resources that will help them to increase the energy efficiency and energy management practices of their own facilities. Possible seminar topics include:

- Update on recent and impending changes to the electricity market, such as the Regulated Price Plan, the provincial Smart Metering Implementation Plan and distributor conservation and demand management. An introduction to these initiatives and what it means for general service customers will be provided.
- Introduction and demonstration of the on-line electricity consumption analysis tool available to KWHI's interval metered customers.
- Introduction to federal programs available to assist ICI customers, including Natural Resources Canada's Energy Innovators program.

A budget of up to \$60,000 has been allocated to this program.

## **Energy management workshops**

Kitchener-Wilmot Hydro Inc. will co-sponsor and promote events that are focused on energy efficiency, demand response and/or demand management. For example, in the past KWHI has provided a small contribution to the annual Energy and Environmental Forum hosted by the Greater Kitchener Waterloo Chamber of Commerce. KWHI is exploring opportunities to increase its sponsorship and in-kind contributions to this and other energy events, in order to increase the success of these events in promoting energy efficiency within Kitchener and the Township of Wilmot.

Additionally, KWHI is exploring a partnership with Natural Resources Canada's *Dollars to \$ense* workshop series, which provides energy saving tips to representatives of organizations across Canada. There are three different workshops in the series – Spot the Energy Savings Opportunities, Energy Master Plan and Energy Monitoring & Tracking. The maximum number of participants per workshop is approximately 20. Currently, NRCan is planning to offer one of these workshops – Spot the Energy Savings – in Kitchener in 2005. The other workshops are offered in larger cities, such as Toronto, a few times per year.

Kitchener-Wilmot has approximately 6,000 general service customers, yet fewer than 50 organizations will likely attend a *Dollars to \$ense* workshop in Kitchener in 2005 under the current situation. Consequently, Kitchener-Wilmot Hydro sees an opportunity to increase the number of general service customers attending these workshops. There are a number of ways that KWHI could encourage attendance, including direct marketing to customers or offering to pay a portion of the regular registration fee. KWHI is exploring the feasibility of these and other options with Natural Resources Canada.

A budget of \$40,000 has been allocated to this program.

## **Cool Shops**

The Cool Shops program is targeted at small commercial businesses and is delivered by the Clean Air Foundation (CAF), with financial support from the federal government. The program targets a constituency that has not generally been well served by energy efficiency programs, and businesses that have showed little awareness of energy efficiency.

The program is currently available in Toronto and will soon be expanded to London, Niagara Region and Peterborough. Other LDCs are also in discussions with CAF to bring Cool Shops to their service areas, and together all will benefit from economies of scale in program design and development, and in marketing.

Certified Cool Shops Delivery Agents conduct energy audits to identify in-store energy management measures that encourage small commercial business owners to reduce energy use, saved on utility costs, and improve environmental health. Once recommendations have been adopted, the Clean Air Foundation markets and promotes the business as an energy efficient 'cool shop', through publicity door signs, in-store promotional materials to attract more customers, nominations for special business awards and advertisements in local media.

The Cool Shops program is not currently available in Kitchener or the Township of Wilmot. Kitchener-Wilmot Hydro Inc. is exploring with CAF the feasibility of bringing this program to the City of Kitchener and the Township of Wilmot.

The Kitchener-Wilmot program would go beyond the simple audits done in the Cool Shops program in the past, in part reflecting the discovery that these business owners need an extra push, financial incentives, or both to follow through on the advice in the audit. The focus of the expanded program will be on changing out T12 fluorescent lights with T8 fixtures, a very cost-effective measure that in most cases would have an expected payback of two years or less. The cost of the conversion will be shared between Kitchener-Wilmot Hydro and the customer.

The estimated budget for this program is \$100,000.



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## **4 Program administration and planning**

An allocation of resources is required for external assistance in developing the CDM plan, input related to CDM into relevant rates applications, design, and implementation of monitoring and evaluation and reporting systems over the course of the implementation of the plan.

KWHI anticipates that the conditions related to monitoring and reporting imposed by the OEB on the CDM plan approvals it granted on December 10, 2004 will also apply to its own CDM application. Those conditions included requiring quarterly reporting, annual cost benefit analyses of the CDM programs and annual hearings on the CDM program.

Total resources required for this work over two years are estimated at \$70,000.

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## 5 Program summary and anticipated results

Table 1 summarizes the proposed programs, their costs, and their expected results. It is anticipated that by December 2006, Kitchener-Wilmot Hydro Inc. will have invested \$2,340,264 in CDM, this being the amount of money associated with its third tranche. Kitchener-Wilmot Hydro anticipates spending 55% of its third tranche by the end of 2005 and 45% in 2006. The program costs in Table 1 add up to slightly more than \$2,340,264, as these costs are estimates which will be refined as the programs are further developed and implemented.

As these estimates are refined, or as new opportunities arise, it may be necessary to reallocate spending across programs or to create new programs. Kitchener-Wilmot Hydro requests that it be authorized to reallocate up to 20% of its total CDM budget without the need for notification or approval of the Ontario Energy Board. It undertakes to advise the Board should it be necessary or desirable to reallocate more than 20% of the total CDM budget.

**Table 1 – Programs and anticipated costs, benefits and results**

General program category	Program partner	Cost	Anticipated benefit
<b>Utility side investments</b>		<b>\$ 1 300 000</b>	
Capacitor banks, Line loss/load balancing optimization		\$ 1 150 000	More efficient use of electricity systems and reduced distribution losses
KWHI in-house retrofit program		\$ 150 000	More efficient internal use of energy, model to community
<b>Shareholder / community</b>		<b>\$ 250 000</b>	
LED traffic lights	Region of Waterloo	\$ 175 000	All 172 intersections in Kitchener converted to LED signals
Municipal buildings program	City of Kitchener, Township of Wilmot	\$ 75 000	Energy savings in municipal facilities
<b>Residential - general</b>		<b>\$ 230 000</b>	
Fuel switching -- elec to gas	Kitchener Utilities	\$ 230 000	Reduced electricity load, more efficient energy use, lower customer bills, 1000 water heaters converted to gas
<b>Residential - low income</b>		<b>\$ 200 000</b>	
Low income program with Region	Region of Waterloo	\$ 200 000	Energy savings
Audit/educate/retrofit pilot	WWOW	included in above	Energy savings in 30 pilot homes
Audit/educate/retrofit roll out		included in above	Energy savings for low income customers
<b>Residential - electrically heated homes</b>		<b>\$ 100 000</b>	
EGH increased incentive	REEP	\$ 100 000	B-label audits for 100 electric homes, incenting customers to make \$300,000 in cost-effective efficiency investments
<b>General service (ICI) programs</b>		<b>\$ 200 000</b>	
Key account seminars		\$ 60 000	Six seminars, increased awareness among customers
Energy management workshops	NRCan	\$ 40 000	Information, awareness and analytical tools for general service customers
Cool shops	CAF	\$ 100 000	Audits/retrofits of 50 small stores
<b>Administration and planning</b>		<b>\$ 70 000</b>	
Planning, reporting, hearings, monitoring & evaluation		\$ 70 000	Six quarterly & two annual reports and hearings, cost-benefit analysis for moving forward
<b>TOTAL</b>		<b>\$ 2 350 000</b>	