



WWF *for a living planet*

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BACKGROUND

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COMBINED HEAT & POWER: RECYCLED ENERGY

What is Combined Heat & Power

As the term suggests, Combined Heat & Power (CHP) plants use one fuel source to generate both heat (for industrial processes or space heating) and electricity (which can be used on-site and/or fed into the grid).

Most conventional power generation burns a fuel to produce steam, which turns turbines and generates electricity. This is an inherently inefficient process -- less than a third of the energy in the original fuel ends up as electricity, and two-thirds goes up the stack as waste heat. An additional eight per cent of electricity is typically lost in transmission to consumers. Many industrial facilities -- refineries, paper mills, other, other -- also use fuel to produce steam and heat for their processes and release waste heat into the environment.

Combined heat & power systems capture waste heat and re-use it, either as a source of heating for buildings, for use in industrial processes, or to produce electricity. By using absorption chillers, excess heat or steam can also be used to provide air conditioning or refrigeration. CHP also minimizes the distance electricity has to travel between generator and end-use, reducing transmission losses.

Multiple Benefits of Combined Heat & Power

High-efficiency power: CHP systems achieve upwards of 80 per cent efficiency in fuel use, compared to less than 30 per cent for conventional generating stations, so less fuel is needed to meet our energy needs.

Less pollution: By doing double-duty with a fuel, and displacing coal and/or nuclear generation, emissions of greenhouse gases and other pollutants reduced. Efficient CHP plants can have comparable or lower greenhouse gas emission than nuclear power, once the avoided use of fossil fuels for heating is taken into account. Most CHP systems use ultra-efficient gas turbines; by maximizing the efficiency of the cleanest fossil fuel, co-generation plants can immediately displace the far greater emissions from old, inefficient Ontario coal plants now supplying those industries and provide baseload power to replace nuclear plants as they reach the end of their useful lives.

High reliability: CHP plants have proven high reliability, with many of the industrial plants operating 24/7, and thus able to provide base-load power.

Peak supply: Industrial co-generation can displace or provide new power at critical peak summer and winter demand periods, while reducing the stress on the transmission system because power is produced near where it is used. This can cut dirty and expensive coal-based imports from the U.S.

Fast deployment: CHP plants can be designed and built in three years or less, long before any new nuclear plant could be built, and provide electricity when Ontario needs it to avoid power shortages. The technology is also versatile enough to provide power, heat, or even air conditioning or refrigeration through an absorption chiller unit.



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Economic benefits: CHP offers industries the ability to generate their own power, reducing energy bills, and potentially to sell surplus electricity into the Ontario grid. With rising natural gas and power prices, co-generation is an attractive way to reduce total energy costs, shield from future increases, maintain markets, and preserve existing jobs.

Combined Heat & Power Potential in Ontario

Driven by rising energy prices, and technical successes by sector competitors in the U.S., Europe and Asia, some of Ontario's major industries have already built or contracted for co-generation plants. Approximately 2,000 MW of electricity is produced at CHP facilities in Ontario currently (out of Ontario's total generating capacity of 30,000 MW). For instance, in Kingston, two Invista (formerly Du Pont) chemical refineries, two major hospitals, Queen's University, and two federal penitentiaries rely on CHP plants.

A government-commissioned report indicates technical potential for CHP is over 16,000 MW, and industry experts estimate at least 9,000 MW are cost-effective now. But uptake is stalled by a lack of official interest at Queen's Park and the Ontario Power Authority (OPA). The government's proposed Integrated Power Supply Plan limits CHP development between now and 2025 to 1,000 MW. The OPA's Request for Proposals for 1,000 MW of CHP closes August 17.

To fully realize the benefits of combined heat & power, WWF-Canada is calling on the McGuinty government to:

1. Eliminate the cap on CHP projects in the Integrated Power Supply Plan, so that all such cost-effective and efficient sources of energy can be utilized.
2. Pay a fair price for power generated from CHP plants, including recognition of the environmental benefits that flow from the increased efficiency of fuel use, the avoided costs for transmission and distribution from generating power on-site, and dispatch ability.
3. Remove policy barriers to CHP. These include costly grid connection charges or other barriers to accessing the grid, requirements for 24/7 staffing of sites, high prices for back-up power, and permitting processes that don't reward efficiency.

A Clean, Green Energy Strategy for Ontario

Combined heat and power plants, along with aggressively cutting energy waste and investing in green power sources such as wind and water power, are the quickest, cheapest and most reliable way to end Ontario's dependence on dirty coal and dangerous, debt-plagued nuclear plants. For more details, see the *Put Some Energy into a Smart, Green Strategy* report released in June by the David Suzuki Foundation, Greenpeace Canada, Ontario Clean Air Alliance, Pembina Institute, Sierra Club of Canada and WWF-Canada, available at:

<http://www.wwf.ca/AboutWWF/WhatWeDo/ConservationPrograms/GlobalWarming/reports>.

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