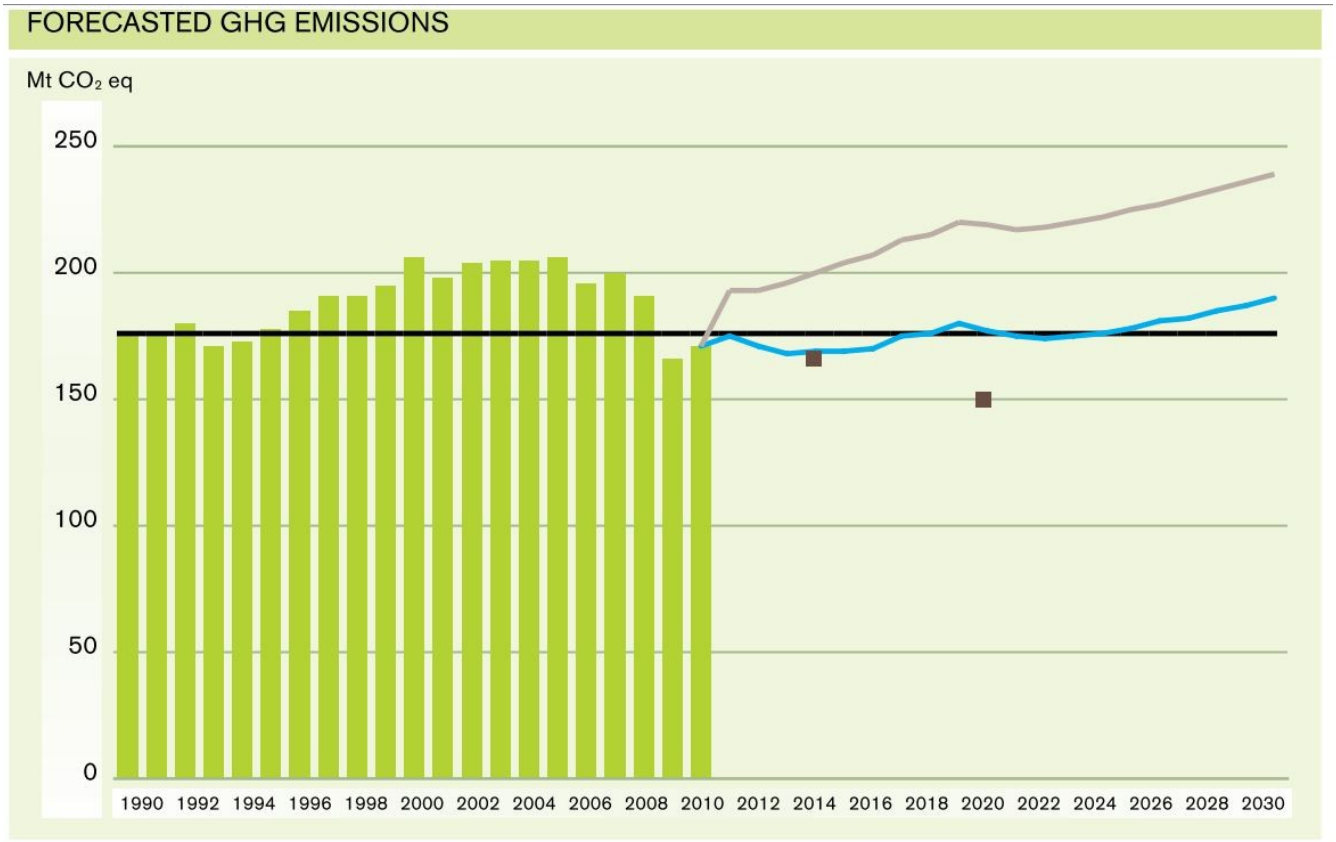
MOE - Climate change progress report

The Ontario Ministry of the Environment has issued a progress report that reviews the trends for greenhouse gas emissions in Ontario. Figure 5 from the Appendix summarizes the overall results as shown below, where the green bars indicate the estimated actual emissions, the grey line shows the projections for the near term (to 2030) on the basis of "Business As Usual" calculations, and the blue line shows the projections based on the Province's "Climate Change Action Plan".



The mid-term (to 2050) Provincial objective is to reduce the GHG to 20% of the 1990 value, which would bring it down to about 36 Mt CO_2 eq. However, the projections indicate that the GHG level will still be well above the 1990 value by 2050, reaching emission levels above 220 Mt for the CCAP trend and above 250 Mt for the BAU case. Most of the MOE report is devoted to arguments that other jurisdictions are faring even worse rather than to considering the need for corrective action. Amazingly, the report does not even mention the evidence that under the present plans Ontario will fail to meet its 2050 objective by a huge margin.

Failure is not an option The world has only one atmosphere that all nations must share. There is a mountain of evidence that shows that GHG effects have already been responsible for substantial changes in our environment and the preponderance of the expert advice is that the future environmental and economic damage will be extremely serious. The Ministry of the Environment may of course have contrary evidence, in which case this progress report should have presented that evidence and given the Ministry's reasons for choosing their alternative to the existing GHG reduction target.

Failure is not inevitable From a physical point of view there are several alternatives that we could use to heat our buildings, power our vehicles and run our industries but none of them can be implemented overnight and some of them would be beyond our economic means. The MOE progress report shows that the existing CCAP program is not working and that there is no chance that it would be capable of producing the desired reductions. We need to turn to one of those alternatives ASAP.

Ironically, the Ministry staff and in fact most of the Ontario government staff work in buildings that are already using one of those alternatives - they use seasonal storage to carry over heat or cold from one season to the opposite season, when it can be used to heat or cool the buildings. I have shown in http://sustainability-journal.ca how the four locally available energy sources could be used to provide nearly all of the energy that a city needs, based on installing a single energy store per city block. This concept has been partially applied for nearly a decade at numerous sites in Ontario, but in spite of that, and the fact that they actually use it themselves, the Ontario government stubbornly refuses to seriously consider that option. The capital costs of systems based on the storage of local sources of energy would be comparable to the costs of the existing buildings that use centralized energy sources. The operating costs would be much lower because all of the local energy sources are free. The GHG emissions would be zero. Since the MOE has not been able to show how any of the choices that they have considered could work the onus should be on the Ministry to evaluate any alternative that clearly has the physical capacity to handle Ontario's energy needs. Storage provides an alternative that would work for centuries to come and for which there are working examples that demonstrate the economic feasibility.

Competition Ontario presently has two primary energy distribution networks. The larger one distributes natural gas to heat most of our buildings and to drive Ontario's peak-demand generating stations. The smaller one generates and distributes electricity, and the major elements are owned by the provincial government itself and by the municipalities. Switching to a decentralized system where the energy and services would be provided locally would put the government agencies in competition with the private sector. Moreover, since it is these government agencies that develop Ontario's plans they are in a very direct conflict of interest. The government is itself is likely to be the biggest obstacle to switching to cheaper, clean energy. The technical and economic challenges of building a distributed source system are comparatively minor. This competition extends right up to the most senior financial levels because the governments depend on both the sales revenues and the taxes from the centralized energy systems. If buildings supply their own energy the governments will lose that revenue.

The existing capital costs The OPA says that the government will be spending 35 billion dollars in the near future on its centralized systems. On top of that the government is mandating "energy efficient" designs for homes and is persuading homeowners and businesses to spend large amounts of money on FIT projects (which would not be needed in a decentralized system). If those costs averaged $20,000 per home the total for 3 million homes would amount to 60 billion dollars for the residential sector alone. If the government is going to extract well over 100 billion dollars from Ontario's economy in order to support its CCAP program then there should be a lot of very convincing evidence that the program will at least meet its GHG reduction objective. The Progress Report provides no such evidence.

Future energy costs Energy drawn from the air, from the sun, from the ground, and the recovery of waste energy are all free. The equipment components have long lifetimes and comparatively low maintenance costs so the energy costs of the local energy sources are very low and extremely stable. At the moment natural gas is also quite cheap even though shale gas is more

expensive to extract than conventional natural gas. The reason for the low price is the supply glut that has resulted from the development of shale gas in the US. Once that temporary imbalance disappears and suitable environmental regulations are developed for shale gas the cost of natural gas will rise rapidly. In the meantime the price of electricity has already jumped in Ontario and the government has predicted substantial future increases, partly to cover the CCAP costs. The bottom line is that more billions of dollars will be drained out of the Ontario economy because of these increases in the price of energy using the existing models.

Why then is the Ontario government so unwilling to consider an approach that would certainly solve the GHG emissions problem and that would almost as surely reduce the costs for Ontario residents?

Emissions from power generation The Progress Report states that most of the recent 29 Mt reduction in emissions should be attributed to the switch from coal-fired power generators to ones that use natural gas. The problem with that claim is that the source of natural gas is itself rapidly switching from by-product gas from oil fields to natural gas recovered by fracturing shale rock. Since over time much of the natural gas escapes from the fractured rock it is adding to the GHG in the atmosphere. The US is so desperate to increase its domestic supplies that the US and state governments are not even enforcing the requirement that gas companies tell them about the existence of new wells, let alone monitor the escaping emissions. It is questionable whether natural gas is actually any cleaner to use than coal even though it emits less CO_2 than coal at the point of combustion. The upshot is that the near 29 Mt reduction is only temporary.

What's missing in the report Electricity generation accounts for only about one tenth of Ontario's GHG emissions, and it is a distant fourth among the listed sectors (behind transportation, industry and buildings), but it continues to receive the lion's share of the government's attention. The actual sources of the emissions in Ontario are all but ignored. Given the continental integration of the vehicle manufacturing industry Ontario has no choice other than to go along with the adoption of CAFE standards but apart from that little is being done to either limit the emissions or to report on the contribution from different modes of transportation, different fuels, etc. It is the citizens who need to make the relevant choices so it is crucially important that they be adequately informed on those issues in such government reports.

Most of the electric power generation is employed in our buildings so the Buildings numbers should therefore incorporate the electricity usage. Moreover industrial and agricultural buildings add two more components to the Buildings totals. That means that the Buildings sector is actually the biggest source of GHG's. Most of the energy is used for heating and cooling so providing a means of storing that energy for later use is crucially important. Note that the heat generated by industrial and IT operations within the buildings can also be stored and then put to good use. The amount of energy that is presently being wasted can be determined from the OEE (NRCan) energy use statistics. We are wasting enough heat to heat all of our buildings in the winter, but this topic is completely ignored in the report.

Emission discontinuity In the period from 2005 to 2009 the emissions dropped by about 30 Mt but the report made little effort to analyze that substantial discontinuity. There are presumably at least three reasons for it:
1) the exodus of Canadian manufacturing to China and other low wage countries
2) the reduction in energy demand resulting from the recession
3) the implementation of CCAP measures

An effort should have been made to independently quantify these contributions. Given the current economic uncertainties in both the US and Europe Canada could soon face another recession so reason 2) may recur. On a more positive note the Canadian economy and our manufacturing sector might recover, causing a bump in the opposite direction.

Fundamental changes The report should have assessed the potential consequences of the cancellation of the Green Energy Act and of the phaseout of the nuclear power stations, and of the abrupt termination of the latter in the event of an accident. Those are credible events that need to be considered. It should in future also consider the potential for Ontario to influence the energy programs in other jurisdictions. Ontario is an ideal location for the implementation of a distributed source/storage approach so it is a natural starting place. If the trend caught on in Quebec then there would potentially be a surplus of clean hydro power available. It it catches on in other countries then Ontario will reap the benefits in the form of cleaner air.

Conclusions Ontario's atmospheric environment is being put at risk by rising air pollution and GHG content but the province is not providing its commensurate share of the reductions that are urgently needed. The Province presently makes some use of seasonal heat/cold storage and it has an opportunity to use that technology on a much larger scale to achieve its own GHG reduction goals and to lead the way in the adoption of that technology in other provinces and countries, but that opportunity is being deliberately ignored.

Ontario continues to spend many tens of billions of dollars on GHG reductions in the power sector even though that sector accounts for only about one tenth of the emissions. One direct effect of those huge expenditures is a rapid and unnecessary rise in the cost of electricity. These policies are putting the provincial economy at risk.

Policies like the FIT programs, the Building Code provisions (designed to make homes with furnaces more efficient) and to promote fossil-fuelled CHP projects are all counter-productive. They make little or no contribution to the reductions, and in the case of the present solar panel installations they actually increase GHG emissions because of the need for backup. In the process the "free money" that is available from the government in support of those blunders has made it very difficult for better solutions to compete.

Above all the government needs to consider the suggestions of people and organizations that are developing viable solutions rather than acquiescing to the promoters of conventional technologies, including the fossil fuel industry, the OPA, OPG, etc. The Ontario government is on the wrong track.