



# A Plan to Build Climate Resilience in Manitoba

## - Recommendations

The overarching approach to climate change in Manitoba must be to **build local resilience while moving beyond fossil fuels**. To achieve the proper level of urgency, we need an appropriate new way of thinking. We need to approach this problem like this:

Within 30 years...

- ALL of our homes & **buildings** must be heated & cooled without natural gas.
- ALL goods and people must be **transported** without gasoline or diesel.
- ALL of our **food** must be provided without fossil fuel for fertilizers or tractors.

We need to plan for this reality now. To formulate that plan we need to ask tough, bold questions that need to be discussed and research conducted to answer. Here are some key ideas and research questions related to those three bullets above:

## Buildings

We need to design, build, and retrofit all of our buildings to minimize inherent heating/cooling demand. Concurrently, we need to switch fuels to geothermal, co-location (i.e. use waste heat), biomass, and electricity (in that order).

- **Building standards** - We must move toward making Passive House or R-2000 or other high performance approach the standard requirement for all new buildings.
- **Passive House education and display projects** - We need push from developers and pull from the market. Builders need to be educated in Passive House construction. The public needs to see how comfortable these buildings are.
- **Passive House education** - [Sustainable Building Manitoba](#) and [Passive House Canada](#) have been training professionals in Passive House principles. If this training was offered at the same time as the prospect for work that requires it, there will be good uptake from the professions.
- **Passive House display projects** - The more Passive House examples there are, the more likely the market will see the benefits and start demand. So far, the only examples in the province are residential. Why not a government building? Get Hydro and the developers involved in ensuring that the next development that would have needed natural gas will instead be built to Passive House standards. A 1,500 sq ft Passive House home requires no more than 1,500 watts to heat.

- **Building energy labelling** - Building energy performance is invisible. In order for the market to start demanding it, there needs to be increased visibility. All buildings should be labelled like the EnergyStar labels on appliances. The EU Energy Performance of Buildings Directive requires that buildings cannot be sold without such a certificate and label.
- **Financial analysis tools** - Jim Nostedt (CFB 17 Wing) and Wayne Cole have some very interesting analysis tools to show how this type of construction and deep energy retrofit is cost neutral immediately. (i.e. right at construction)
- **District heating for commercial buildings and rural towns** - Hydro (or other utility) should own district heating systems. These should include geothermal. Many municipalities have commercial and municipal buildings clustered in such a way that connecting them together on a district heating loop would make sense and would allow for biomass in the central heat plant.
- **Geothermal** - Individual homeowners and businesses should not bear the cost of geothermal installations. Hydro, or other utility, should be building geothermal loops and wells under public property. These include sport fields, roadways, and lanes. In rural and remote areas, the loops should be in lake or river. If *Efficiency Manitoba* had a broad-enough mandate, it could be the utility.

**Buildings research questions:**

- How much energy (petajoules) does our building stock currently require?
- How much alternative energy (biomass, geothermal, air source heat pump, electricity) does this translate to?
- If we can't realistically supply that much energy with renewables and the current level of building stock, what level of performance must our building stock achieve in order to lower the energy requirement to something achievable?
- When must we stop expanding the natural gas distribution system? This is inevitable and needs to be done very soon, if not immediately. But we need to have a plan in place for how to heat these new developments without gas. What alternatives exist? What projects can we initiate now to test the alternatives?
- What are the steps required to make Passive House the minimum standard for new construction? How quickly can this be achieved?
- What are the regulatory, legal, and financial barriers to a dramatic deployment of district heating?
- What are the regulatory, legal, and financial mechanisms necessary to have Hydro (or another utility) provide geothermal to a district heating system?
- What are the regulatory, legal, and financial mechanisms necessary to have municipalities or producer-owned coops supply biomass to municipal district heating systems?
- What opportunities for co-location exist? (i.e. locate heat generating facilities near heat-using facilities)
- What is the current state of straw-board as a local supply of building material? (I heard that the Elie OSSB strawboard process is starting up again in Alberta.)

- **Biomass for heat** - This could make sense for any institution with a central heating plant (e.g. jails, hospitals, universities) and for municipalities that could have a district heating loop installed. There are examples from Denmark of producer cooperatives that own the heat plant and supply the biomass themselves to the municipality. The municipality just pays for the heat. Local producers have another source of revenue.
- **Moratorium on new natural gas infrastructure** - This must be in concert with the other recommendations above so that there are alternatives to simple electric heat. We need to get off of fossil fuel but we are making the dependency worse by adding 25 to 30 new gas connections every day in this province. (There are about 7,000 new homes a year in Manitoba. At 200 business days a year, that's 35 houses a day. Not all of these are natural gas. So maybe 25 to 30 new gas-connected homes per day.)

## Transport

We need to reduce the need (i.e. more local production) and electrify.

- **Electrify transportation** - According to [a recent Stanford report](#), we are on the verge of a fundamental shift toward electric vehicles. In less than 10 years (maybe *much* less), there will be no fossil-fuel passenger vehicles sold. With [Tesla's announcement of the Tesla Semi](#), goods transportation may not be far behind. This means that the market will soon be driving this shift. Public policy effort should be anticipating this shift and be paving the way for it.
  - **Policy** - Government needs to focus on policy enablers and barriers to electrification. This includes shifting the focus of *Efficiency Manitoba* away from absolute electricity demand reduction and rather decreasing electricity demand in some areas (e.g. lighting) but enabling increasing demand in other areas (e.g. transportation and heating)
  - **Build electric vehicle charging systems** - Hydro, 3 levels of government, Winnipeg Transit, electric vehicle manufacturers, and the Manitoba Electric Vehicle Association (MEVA) should work together to build three recharging networks in the province:
    - Level 3 (quick charge) for passenger vehicles
    - "Mega-charger" network for transport trucks
    - Winnipeg Transit System charging network in concert with design of Frequent Service Transit Network
  - **Premium electricity rates for transportation** - Hydro should be able to charge a premium for electricity to help pay for the cost of recharging network.
- **Electrify Winnipeg Transit** - I recommend that the province should restore the 50/50 operations funding support for Transit and to also provide for ongoing acquisition of electric buses. Transit has estimated about \$6 million annually to enable Transit to add about 40 (or more) new buses per year.

- **Airships** - The province should take these more seriously. [The Airliner airship](#) will be commercially available starting in 2018. We should help foster a commercial enterprise to purchase at least one of these vehicles. This help may include examining and adjusting regulatory barriers, some promise of business, and perhaps financing. [Dr Barry Prentice](#) could provide advice.

### Transportation research questions:

#### Freight

- What freight gets moved within this province? How is it moved? How much of this freight is essential (e.g. food, building material)
- How much electricity would be required to electrify all of Manitoba's transportation?

#### People

- How many buses should Winnipeg have to properly serve our population?
- What's the state of self-driving bus research?
- How do we make all public (government and public utility) vehicles available through carshare?
- What would a viable electric charging network look like? How many level 3 charging stations are needed to ensure there is no more the xx Km between them? Where must these stations be located?

#### Demand/need for travel

- How can we ensure high-speed, reliable internet for all Manitobans? (and thereby reduce the need to travel) Especially for remote communities?
- Who is active in virtual presence technology? How do we make this universal and free?
- How do we stop sprawl completely? (Oregon State instituted [Urban Growth Boundaries](#).)

## Food

Manitoba agriculture is focused on and dependent upon export. To feed ourselves, we rely on a lot of imports. (<https://vimeo.com/5236966>) We need a complete system of local table food production, processing, storage, transportation, and distribution with local energy & nutrient inputs.

- **Require local food for institutions** - Support local table food production by requiring a percentage of food provided to provincial institutions be local. This will establish the supply chains that can be scaled up over time.
- **Local storage and distribution centres** - When small farmers bring produce into the city to sell at farmers markets, they need to bring everything in and handle their own storage. If there were properly equipped storage and distribution depots and year-round farmers' markets, this could be a more viable business. Contact and support Kalynn Spain and [Small Farms Manitoba](#).
- **Clarify and remove regulatory barriers to connect producers directly to consumers** - I understand that MAFRD already has an effort going on to support local agriculture in this. We should support this work and encourage its reaching a successful conclusion.

- **Reduce the beef herd** - Beef cattle production results in about 300 kg CO<sub>2</sub>e per kg protein vs about 50 for hogs and about 40 for chickens. Forage management for remaining beef herds should be moved toward rotational forage to enhance soil carbon sequestration.
- **Manage manure, straw, and other organics as a resource** - All organics should be treated as sources of soil nutrients, soil carbon, and energy. We should be diverting all organics out of landfills. All municipalities should be encouraging in-home composting and rotary drum composting systems for institutional use.

#### Food system research questions

- What strategy could we employ to encourage producer-owned biodiesel production co-ops for farm tractors?
- We need a strategy to replace synthetic fertilizers with local nutrient recycling and soil remediation.
- How can we use local agricultural waste (straw) as the heat source for municipal district heating systems? Which municipality will we start with? This is can be considered a utility. Who will provide and manage it? What about producer co-ops as they have in Denmark. Are there legal barriers? What assistance can be provided to facilitate creation of these?

## Energy system

We need to reduce our energy demand and shift to electricity

- **Efficiency Manitoba** - When Keeyask comes on-line in 2019, our oversupply of electricity will increase even further. We need to focus on making more use of electricity to meet our energy demands instead of fossil fuel. The mandate for this Efficiency Manitoba must include reducing energy demand from all sources and needs to focus on greenhouse gas emission reduction from our energy systems. This will mean encouraging more electrical demand in transportation and heating (when coupled with my recommendations in Buildings above.).
- **Distributed, small-scale generation** - If we eventually do need more generation, we should ensure we have completely tapped into DSM and small-scale generation before building more dams like Conawapa. This includes considering reopening the Hydro Act so that Hydro maintains its monopoly to distribute but takes away their monopoly to produce power. This would open up the possibility of community-owned and competing private generation.

#### Energy system research questions

- How much revenue is generated from the fossil fuel industry in Manitoba? (I.e. What revenue will be lost?)
- What direct and indirect subsidies and incentives does Manitoba's fossil fuel industry receive? (I.e. If we stop these subsidies, how much revenue might be available to support this transition?)

# Education

- **Educate adults** - I'm constantly shocked at how little the general public knows about climate change. The province is doing a really good job with school kids but adults, not so much. Most people confuse climate and weather. Many people think it has something to do with the hole in the ozone. Many think it's part of a natural cycle. Many don't see it as a problem. In order to get support for action, people need to understand at least the basics.