

# BIG MOVE 2

## Big Move Two: Clean Heating

Buildings can be decarbonized by fuel switching space-heating systems to electric heat pumps and water-heating systems to electric. Both actions are especially impactful when coupled with the use of renewable energy and building retrofits. In particular, building retrofits reduce the size of the heat pump required, because a well-insulated, efficient home requires less energy to stay warm or cool. Heat pumps for space heating are also highly efficient, as they generate the same heat as a natural gas heating system with one-half to one-third of the input energy.

In Saskatchewan, the electricity grid has a higher emissions factor than in most other provinces in Canada. As such, fuel switching to heat pumps increases emissions in the short term until the grid becomes cleaner and/or local renewable generation is built. Therefore, the strategy focuses on building efficiency first, and then recommends adding renewables and switching to electric space- and water-heating systems on a similar timeline. This enables deep emissions reductions in the medium term.



### Case Study: Ground-Source Heat Pumps and Electric Air-Source Heat Pumps in Edmonton

The Westmount Presbyterian Church and North Glenora social housing projects in Edmonton have completed a net-zero project that combines new and old buildings.<sup>1</sup> Key to the success of the project has been the use of a geothermal system for space heating and air-source heat pumps for water heating. The system is twice as efficient as a conventional heating system, and no backup energy source is required. The builders credit an efficient building envelope, also completed during the retrofit and building, with negating the need for a backup heating system. Edmonton has an average temperature low of  $-15.1^{\circ}\text{C}$  in February, which is comparable with Regina's average low of  $-16^{\circ}\text{C}$ .

<sup>1</sup> Green Energy Futures. January 29 2018. 186. Canada's first net-zero church and social housing project (Online Blog). <https://www.greenenergyfutures.ca/episode/canadas-first-net-zero-church>

# Big Move Two: Clean Heating Actions

ACTION	GREENHOUSE GAS (GHG) IMPACT	CO-BENEFITS	COST	IMPLEMENTATION MECHANISMS	TIMING
2.1 Switch to clean fuels in existing buildings: residential		Equity: Enabler (supports lower energy use and costs) Employment: Low Cost Effectiveness: Low	\$\$\$\$\$	Program: Develop fuel-switching programs for all buildings. Initiative: Educate community members about the benefits and feasibility of heat pumps in a cold climate.	Start: Immediately Completion: Ongoing (75% projected to be complete by 2035)
2.2 Switch to clean fuels in existing buildings: ICI buildings		Equity: Enabler Employment: Low Cost Effectiveness: Low	\$\$\$\$\$	Program: Develop fuel-switching programs for all buildings. Leading by example: Use heat pumps in City buildings and report on performance.	Start: Immediately Completion: Ongoing (75% projected to be complete by 2035)
2.3 Switch to clean fuels in all new construction: air-source heat pumps		Equity: Enabler Employment: Low Cost Effectiveness: Low	\$\$\$\$\$	Program: Develop fuel-switching programs for all buildings.	Start: Immediately Completion: Ongoing
2.4 Switch to clean fuels in all new construction: ground-source heat pumps		Equity: Enabler Employment: Low Cost Effectiveness: Low	\$\$\$\$\$	Initiative: Pilot incentives for the installation of ground-source heat pumps.	Start: Immediately Completion: Ongoing

## GHG IMPACT

- Low: <1,000 ktCO2e
- Medium: 1,000 – 2,000 ktCO2e
- High: >2,000 ktCO2e

## CO-BENEFITS

**EQUITY –**  
**Enabler:** No discernible direct effect, but positive outcomes may occur in concert with other actions  
**Low:** May favour certain groups or create greater disparity  
**Medium:** More likely to be implemented fairly, but existing powerful groups may still be at an advantage  
**High:** Contributes to enhanced equity

**EMPLOYMENT –**  
**Enabler:** Enables employment  
**Low:** 0 – 5 person years of employment per \$million invested  
**Medium:** 5 – 10 person years of employment per \$million invested  
**High:** >10 person years of employment per \$million invested

**COST EFFECTIVENESS –**  
**Low:** This action will have a net cost  
**Medium:** This action will break even  
**High:** This action will have a net return/benefit.

## COST

- \$\$\$\$\$ <\$1 million
- \$\$\$\$ \$1 million – \$100 million
- \$\$\$ \$100 million – \$500 million
- \$\$\$\$ \$500 million – \$1 billion
- \$\$\$\$\$ >\$1 billion