

# Assessing the achieved and missed benefits of Canada's Intended Nationally Determined Contribution (INDC)

NewClimate Institute

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For full methodologies and project background, see: *NewClimate (2015) Assessing the missed benefits of countries' national contributions*. Accessed via [newclimate.org/publications/](http://newclimate.org/publications/)

In May 2015, Canada announced a target of **30% aggregate national greenhouse gas emissions reductions below 2005 levels by 2030** (Government of Canada, 2015). Canada stated that it would use forestry accounting and international credits to partially meet the target of this intended nationally determined contribution (INDC) to the new global climate change agreement. In comparison to a current policies trajectory in 2030, according to our illustrative method, Canada's INDC would:

- Reduce fossil fuel dependency by at least 8 Mtoe.
- Prevent in the order of 100 premature deaths each year from air pollution.
- Create approximately 3,000 new jobs in the domestic renewable energy sector.

If Canada strengthened its INDC to meet a trajectory towards 100% renewables by 2050 (and thus in line with keeping global warming below 2°C and possibly even 1.5°C), it could, according to our illustrative method, achieve the following benefits:

- Reduce fossil fuel dependency by at least 21 Mtoe additional to the INDC reductions, in total 29 Mtoe from the current policies scenario.
- Prevent in the order of 700 premature deaths each year from air pollution additional to the INDC improvement, in total 800 deaths fewer than in the current policies scenario.
- Create approximately 5,000 jobs in the domestic renewable energy sector additional to the INDC scenario, in total 8,000 more jobs than in the current policies scenario.

## Cost savings from fossil fuel imports

Because of its significant domestic production of coal, oil and natural gas, Canada will not generate direct cost savings from reduced fossil fuel imports. However, reducing the dependence on these fuels carries multiple benefits for Canada, including improved long term energy security, and the creation of decent green jobs associated with a shift away from fossil fuels.

**Coal in the power sector:** Coal accounted for 10% of electricity generation in 2012 (IEA, 2014), but this figure is set to fall as Canada increases the share of natural gas and renewables, as indicated by demand reduction by 2030 in Figure 1. Policies and measures for electricity generation that are compatible with the reduction target in Canada's INDC would reduce coal demand further, by around 1 Mtoe per year. If Canada strengthened its INDC to meet a 100% renewable trajectory, a further 3 Mtoe reduction per year could be achieved, making a total of 4 Mtoe compared to current policies.

**Oil in the transport sector:** Oil demand for transport is projected to increase up to 2030 under current policies. Figure 2 shows that Canada's INDC could reduce oil demand from transport by 6 Mtoe in 2030. An additional reduction of 16 Mtoe could be realised if Canada strengthened its INDC to meet a 100% renewable trajectory, making a total reduction of 22 Mtoe in 2030 compared to the current policies scenario.

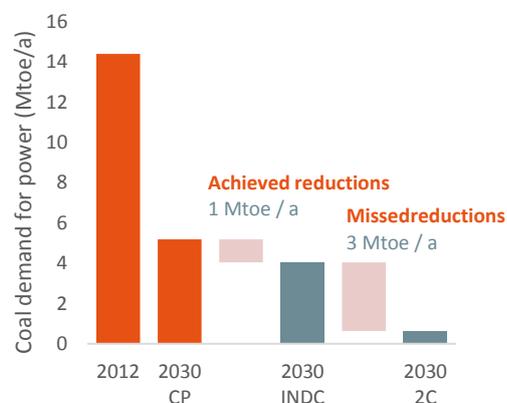


Figure 1: Reduced coal demand from the power sector



Figure 2: Reduced oil demand from the transport sector

**Natural gas:** Canada's consumption of natural gas is expected to remain fairly constant up to 2030, despite anticipated reductions in total national energy demand, due to the increasing share that gas is projected to take across several sectors, including electricity production, industrial energy, and residential heating (Government of Canada, 2014). Therefore, only very modest reductions are calculated for this fuel, as shown in Figure 3. Canada's INDC would reduce gas consumption by 1 Mtoe beyond the current policy scenario. A further reduction of approximately 2 Mtoe could be possible if Canada strengthened its INDC to meet a 100% renewable trajectory, making a total reduction of 3 Mtoe per year compared to current policies.

### Premature deaths from outdoor air pollution

According to the World Development Indicators (World Bank, 2013), and the Ambient Air Pollution Database (WHO, 2014), Canada has one of the world's lowest average concentrations of ambient particulate matter. Therefore, the number of annual premature deaths attributable to ambient air pollution, estimated at roughly 3,500 in 2012, is relatively low compared to other large industrialised countries.

Figure 4 shows that the number of premature adult deaths attributable to outdoor air pollution will decline slightly between 2012 and 2030, due to improving ambient air quality. The INDC improves further on this progression, preventing around 100 deaths per year by 2030, compared with the current policies scenario. Strengthening the INDC further to meet a 100% renewable trajectory could prevent an additional 700 premature deaths each year, or a total of 800 deaths in 2030 compared to a current policies scenario. This is approximately 1,000 fewer annual deaths than in 2012.

### Creation of green jobs in domestic renewable energy

Clean Energy Canada (2014) report a rapid growth in employment in the renewable energy sector in recent years: 37% more Canadians worked in renewable energy in 2013 than in 2009 largely due to provincial commitments, particularly in Ontario. The number of new direct clean energy jobs created in 2013 outstripped by 6% those generated by the oil sector, and the employment returns for investment in renewable energy were far greater than for investments in oil.

As shown in Figure 5, forecast investments in renewable energy would account for approximately 63,000 full-time equivalent jobs in Canada by 2030, under a current policies scenario. This would be a considerable development from 2012, which reflects the increasing rate of renewable energy capacity installation under current policies up to 2030, compared with the period between 2005 and 2012. Policies to implement the INDC would generate an additional 3,000 jobs per year. Strengthening the INDC to meet a 100% renewable trajectory could result in the creation of around 5,000 additional jobs, or a total of 8,000 additional jobs in 2030 compared to current policies.



Figure 3: Reduced natural gas demand

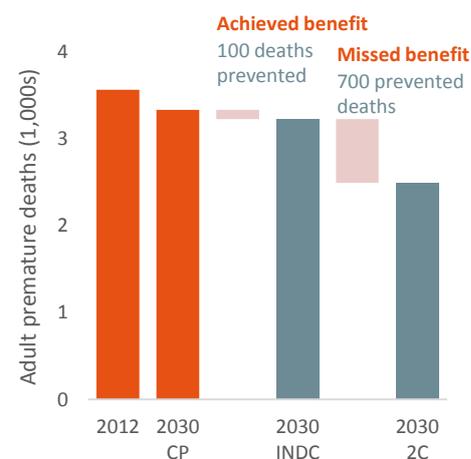


Figure 4: Premature deaths from air pollution

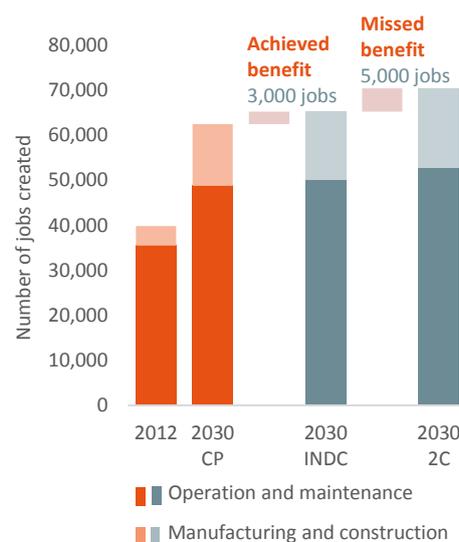


Figure 5: Job creation from renewable energy

## Supplementary information

See *NewClimate* (2015) for full methodology and cross country assumptions.

Mtoe: Million tonnes of oil equivalent. 1 Mtoe = ca 1.11 billion m<sup>3</sup> natural gas, 1.428 million tonnes coal equivalent.

### Assumptions for Canada:

Coal demand in 2C scenario: The share of coal for power from non-renewable sources remains constant according to the 2030 forecast for current policies. Its overall share is lowered due to the decreased share of non-renewable sources in power.

Oil and gas demand in 2C scenario: The 2C scenario for oil and gas is assumed to follow the trend for the United States according to the “450 scenario” of the 2014 World Energy Outlook, which leads to a CO<sub>2</sub> equivalent concentration of 450 ppm in 2100 and is consistent with limiting global temperature increase to 2°C.

INDC scenario: Canada stated that it would use forestry accounting and international credits to partially meet the INDC. For forestry accounting, we assume 63 MtCO<sub>2</sub>e in 2030 based on analysis from the Climate Action Tracker (Climate Action Tracker, 2015). For international credits we assume that these will account for 1/3 of the net reductions in the energy sector, i.e. 68 MtCO<sub>2</sub>e. As effect of both, the energy sector is assumed to reduce its emissions by less than 30%.

Determination of ambient air pollution: The background concentration of PM<sub>2.5</sub>, the concentration accountable to sources not associated with domestic human activities that can be reversed through domestic climate change mitigation, are assumed to match those of the US. This is in line with the fact that background PM<sub>2.5</sub> is accounted for mostly by regional emissions and geographical features.

Determination of energy related emissions in 2030 under 2C scenario: The trends in total energy demand, between 2012 and 2030, are assumed to follow the trend for the United States according to the 450 scenario of the 2014 World Energy Outlook.

Determination of air pollutant emissions: The relationship between the emissions of energy related CO<sub>2</sub> and the air pollutants SO<sub>2</sub> and NO<sub>x</sub>, are assumed to follow the trend for the United States, according to IASA 2012 (see main report).

Projections for future energy generation: The trends for total electricity generation, between 2012 and 2030, are assumed to follow the trend for the United States according to the 450 scenario of the 2014 World Energy Outlook.

The respective share of each renewable technology for total renewable power generation in 2050, is assumed to be constant with the share of each renewable envisaged by 6th National Communication for 2030.

## References and data sources

See *NewClimate* (2015) for cross country references and data sources.

### References and data sources for Canada:

Clean Energy Canada. (2014). Tracking the energy revolution. Retrieved from <http://cleanenergycanada.org/wp-content/uploads/2014/12/Tracking-the-Energy-Revolution-Canada-.pdf>

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