

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

NewClimate Institute

05 October 2015

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

Chile published its INDC in September 2015. Chile's INDC includes an unconditional target (shown in graphs as INDC B) to cut the greenhouse gas (GHG) intensity of its economy (that is, reduce the amount of GHG emissions per unit of Gross Domestic Product (GDP)) by 30% by 2030, compared to 2007. A further target, conditional to support (in graphs as INDC A), is to reduce GHG emissions intensity by up to 45%. In comparison to a current policies trajectory in 2030, according to our illustrative method, implementation of Chile's INDC would:

- Save between USD 0.8 billion (unconditional target) and USD 2.9 billion (conditional target) each year in reduced fossil fuel imports.
- Prevent between in the order of 200 (unconditional target) and 700 (conditional target) premature deaths each year from air pollution.
- Create between 1,000 (unconditional target) and 7,000 (conditional target) additional green jobs in domestic renewable energy

If Chile strengthened its INDC to a trajectory for 100% renewables by 2050 (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 in addition to those achieved by the more ambitious end of the conditional target:

- Save USD 2.4 billion annually in reduced fossil fuel imports.
- Prevent in the order of 800 premature deaths each year from air pollution.
- Create approximately 4,000 jobs in the domestic renewable energy.

Cost savings from fossil fuel imports

Chile is one of the major consumers of fossil fuels in the Americas, although, unlike its regional neighbours, Chile meets very little of this demand from domestic sources.

Coal in the power sector: Chile faced a complex energy situation in the past decade, including electricity rationing caused by severe drought in the late 1990s, unexpected restrictions in the supply of natural gas from Argentina since 2004, and the lower rainfall of recent years. As a result, the country has transitioned to power generation mainly based on coal and diesel (Chile, 2012). Figure 1 illustrates that Chile's INDC would reduce coal demand in 2030 by an estimated 0.6 Mtoe (unconditional) or 2.2 Mtoe (conditional), resulting in a cost saving of around USD 0.1 billion (unconditional) or USD 0.4 billion (conditional). A further 1.8 Mtoe reduction in coal consumption from the conditional INDC level would be possible through a 100% renewable scenario, equivalent to further potential cost savings of USD 0.3 billion a year. This would be a total reduction of 4 Mtoe of coal in 2030, corresponding to USD 0.7 billion in cost savings, compared to current policies scenario.

Oil in the transport sector: Domestic oil production, although increasing in the last 5 years, only accounted for 3% of total consumption in 2012. The transport sector represents the majority of the country's oil product demand (IEA, 2014a). Figure 2 illustrates that Chile's INDC would reduce oil demand for transport in 2030 by an

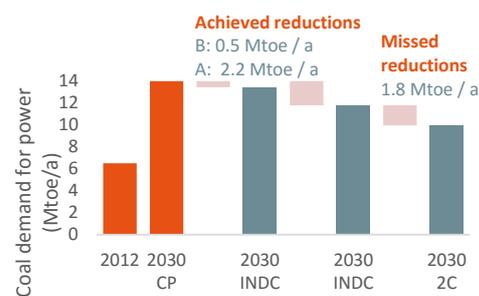


Figure 1: Coal demand from power sector

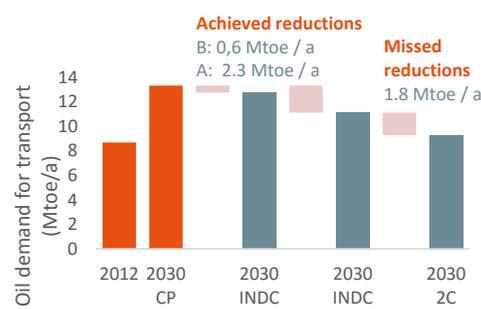


Figure 2: Oil demand from transport sector

estimated 0.6 Mtoe (unconditional) or 2.3 Mtoe (conditional), resulting in a cost saving of around USD 0.6 billion (unconditional) or USD 2.2 billion (conditional) in oil imports. A further 2 Mtoe reduction in oil consumption from the INDC level would be possible through a 100% renewable scenario with further savings of approximately USD 1.8 billion per year through oil imports for the transport sector. This would be a total saving of 4.1 Mtoe of oil in 2030, and roughly USD 4 billion, compared to current policies.

Natural gas: The northern and central regions of Chile are completely dependent on imports to meet their gas demand; and production in the southernmost region remains insufficient for the local demands (IEA, 2014). Additionally, natural gas demand has increased considerably in the last years and is projected to roughly double between 2012 and 2030, as shown in **Error! Reference source not found..** Under the scenarios implied by the INDC, Chile would save USD 0.1 billion (unconditional) or USD 0.3 billion (conditional) per year by 2030 through reducing gas imports by 0.3 Mtoe (unconditional) or 1.3 Mtoe (conditional). If Chile were to strengthen the INDC further to meet a 100% renewable trajectory, natural gas consumption could be reduced by an additional 1 Mtoe in 2030, corresponding to further potential cost savings of approximately USD 0.3 billion per year. This would be a total saving of 2.3 Mtoe of oil in 2030, and USD 0.6 billion, compared to current policies.

Premature deaths from outdoor air pollution

The health burden of air pollution is set to increase significantly in Chile up to 2030 under all scenarios analysed, due not only to growth of emissions but also demographic factors, such as population growth and the ageing of the population. Figure 4 shows that under current policies, the number of premature deaths will roughly double between 2012 and 2030 from 2,600 to 5,400. Under the INDC, approximately 200 (unconditional) or 700 (conditional) premature deaths could be prevented each year by 2030, compared to the current policies scenario. Strengthening this commitment to be in line with a 100% renewable trajectory could prevent around 800 additional premature deaths every year, or a total of approximately 1,500 compared to current policies.

Creation of green jobs in domestic renewable energy

Under current policies, employment opportunities in the renewable energy sector are projected to increase significantly up to 2030, as shown in Figure 5. Chile's INDC would create 1,000 (unconditional) or 7,000 (conditional) additional full time jobs by 2030, compared to current policies. However, if Chile were to strengthen the INDC to meet a 100% renewable scenario, the impact on job creation would be significant, with approximately 4,000 additional jobs created, compared to the INDC scenario, or a total of 11,000 compared to current policies. If no more large hydro power were to be installed, and Chile would meet its renewable electricity generation through other technologies, the employment benefit in each scenario would be greater still, with a further increase of approximately 500 additional jobs under either INDC scenario, and a further increase of approximately 4,000 additional jobs under the 100% renewable scenario; following a 100% renewable scenario with no new large hydro would therefore create a total of approximately 15,000 full-time equivalent jobs, compared to the current policies trajectory.

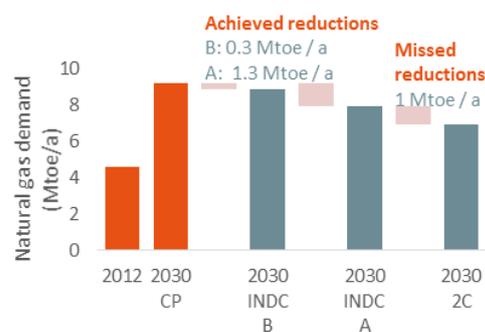


Figure 3: Reduced natural gas demand

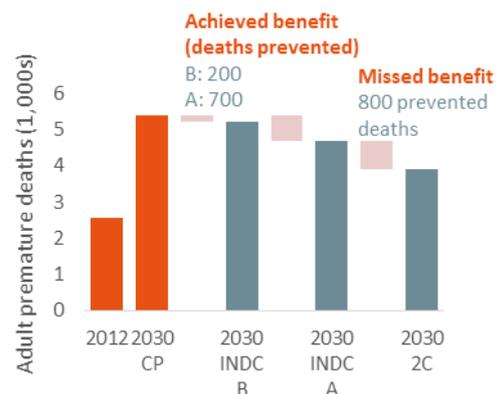


Figure 4: Premature adult deaths prevented

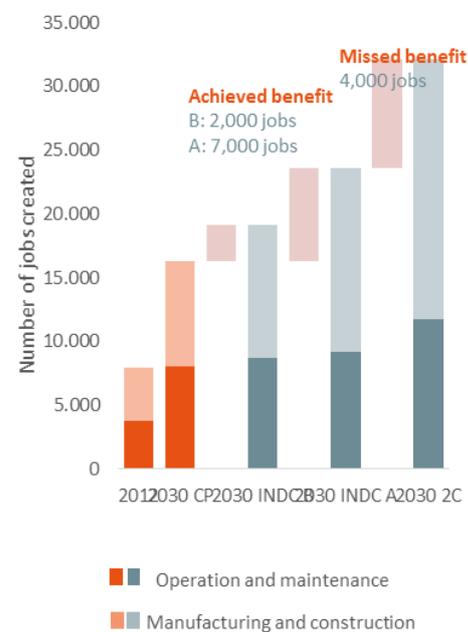


Figure 5: Job creation from renewables

Supplementary information

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

Assumptions for Chile:

INDC scenarios: We used the published INDC (Government of Chile, 2015) and the results of the MAPS analysis (Government of Chile, 2014) as a basis: the MAPS scenario “esfuerzo alta” is assumed the most likely construction for the upper limit of the conditional target of the INDC, given that the final emissions outcome is very similar. For the conditional target of the INDC, a scenario was constructed based on the “esfuerzo base” MAPS scenario.

Fossil fuel import scenarios: Projected growth rates under current policies according to APERC (2009) were applied to data from the official 2013 National Energy Balance. Projections for the 100% renewable scenario were elaborated in line with the anticipated trend from the region “Latin America excl. Brazil” according to the World Energy Outlook (IEA, 2014b).

Share of renewable technologies under a 2°C scenario in 2050: It is assumed that the respective share of each renewable energy technology for total renewable energy generation in 2050 will be the same as in the most ambitious scenario (conditional INDC – MAPS esfuerzo alto) for 2030, whilst the overall share of renewable energy in the total electricity mix rises to 100%.

Electricity generation projections: Projections for electricity demand in Chile were only available up to 2030. These were extrapolated to 2040, and again to 2050, based on trends for electricity demand in the Latin American region, according to the World Energy Outlook (IEA, 2014b).

It is assumed that the capacity load factor for renewable energy technologies is the same as the average load factors achieved in the region “Latin America excl. Brazil”, according to World Energy Outlook projections (IEA, 2014b).

Under the 100% renewable scenario, we assume that this scenario would be adopted by all countries worldwide, allowing technology to be used in Chile that is developed elsewhere. The 100% renewable scenario could be difficult to be achieved by a single country in isolation.

References and data sources

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

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