

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

NewClimate Institute

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

South Africa submitted its INDC to the UNFCCC in September 2015. The INDC gives an emission reduction range for 2025 and 2030; the INDC indicates that emissions for both these years will be in the range of 398 MtCO₂e and 614 MtCO₂e. The current policies trajectory would lead to emissions of 943 MtCO₂e in 2030 (CAT, 2015b). In comparison to a current policies trajectory in 2030, according to our illustrative method, implementation of South Africa's INDC would achieve the following co-benefits, given in a range from the least to the most ambitious ends of the target range:

- Save between USD 1.5 billion and USD 5 billion each year in reduced fossil fuel imports.
- Prevent in the order of between 300 and 1,500 premature deaths each year from air pollution.
- Create between 20,000 and 60,000 additional green jobs in domestic renewable energy

If South Africa 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 in addition to those achieved from the most ambitious end of the INDC target range:

- Save USD 2 billion annually in reduced fossil fuel imports additional to INDC reductions, corresponding to total annual saving of USD 7 billion compared to the current policies scenario.
- Prevent in the order of 1,200 premature deaths each year from air pollution additional to the INDC improvement, totalling 2,700 deaths fewer annually than in the current policies scenario.
- Create approximately 25,000 jobs in the domestic renewable energy sector additional to the INDC scenario, totalling 85,000 more jobs than in the current policies scenario.

Cost savings from fossil fuel imports

Because of the vast domestic production of coal in South Africa, and the unlikelihood of gas demand to be reduced considerably up to 2030 under any of the analysed scenarios due to the current development of major regional gas fields and the recent discoveries of significant offshore reserves, South Africa's cost savings from fossil fuel imports are limited mostly to potential reductions in oil consumption from transport.

Coal in the power sector: Due to South Africa's major production of coal, the fuel accounted for 94% of power generation in 2012. The total amount of coal for power generation is projected to increase up to 2030 under current policies, but its overall share will decrease slightly to 82% due to the increased installation of gas, nuclear and renewable energy capacities (IEA, 2014). Figure 1 illustrates that South Africa's INDC would reduce coal demand in 2030 by an estimated 6 Mtoe (lower-limit of target range) or 20 Mtoe (upper-limit of target range). Due to the domestic production of coal, these reductions will incur no direct cost savings from imports for South Africa. However, reducing dependence on coal multiple benefits for South Africa, including improved long term energy security, and the creation of decent green jobs associated with a shift away from fossil fuels. A further 8 Mtoe reduction in coal consumption would be possible through a 100% renewable scenario, a total of 28 Mtoe compared to current policies.



Figure 1: Coal demand from power sector

Oil in the transport sector: Oil accounted for 98% of energy demand from the transport sector in 2012 and this share is projected to stay constant under current policies up to 2030, whilst total demand increases by over 60% (IEA, 2014). Figure 2 illustrates that South Africa's draft INDC would reduce oil demand for transport in 2030 by between an estimated 1.5 Mtoe (lower-limit) and 5 Mtoe (upper-limit), resulting in a cost saving of between USD 1.5 billion and USD 5 billion 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 2 billion per year through oil imports for the transport sector. This would be a total saving of 7 Mtoe of oil in 2030, and roughly USD 7 billion, compared to current policies.

Natural gas: Demand for natural gas is expected to roughly double between 2012 and 2030 in South Africa, whilst its share in total primary energy demand increases from 3% to 4%. According to IEA projections, demand for natural gas is unlikely to be reduced up to 2030 under any scenarios. In the most ambitious mitigation scenarios, reductions in fossil fuel consumption are made from coal and oil. Under a 100% renewables by 2050 scenario, reductions in natural gas are projected to come at a later stage.

Premature deaths from outdoor air pollution

South Africa is an arid country with high naturally-occurring dust levels, compounded by industrial and vehicular pollution emissions. This makes the need to formally address air pollution and appropriate mitigation measures an emerging priority for the country (Department of Environmental Affairs, 2010). Figure 4 shows that under current policies, the air pollution burden will increase only slightly in South Africa up to 2030 under current policies, causing in the order of 7,500 premature deaths per year. This marginal increase, compared to a projected 56% increase in CO₂ emissions over this period, is due to expected technological improvements at the sources of pollution which will accelerate the reduced intensity of SO₂ and SO_x emissions (IIASA, 2012). Under the INDC, approximately 250 (lower-limit) or 1,500 (upper-limit) 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 1,200 additional premature deaths every year, or a total of approximately 2,700 compared to current policies.

Creation of green jobs in domestic renewable energy

Despite being heavy dependent on coal-fired power in the past, South Africa has recently developed what is arguably one of the most successful renewable energy programmes globally. It has hosted the fastest-growing clean energy market over the past 5 years, and is now an attractive RE investment destinations (WWF, 2014). Under current policies, employment opportunities in the renewable energy sector are projected to increase by more than six times, up to 2030, as shown in Figure 5. South Africa's draft INDC would create between 20,000 (lower-limit) and 60,000 (upper-limit) additional full time jobs by 2030, compared to current policies. If South Africa were to strengthen the INDC to meet a 100% renewable scenario, approximately 25,000 additional jobs would be created, compared to the upper-limit of the INDC scenario, or a total of 85,000 compared to current policies.

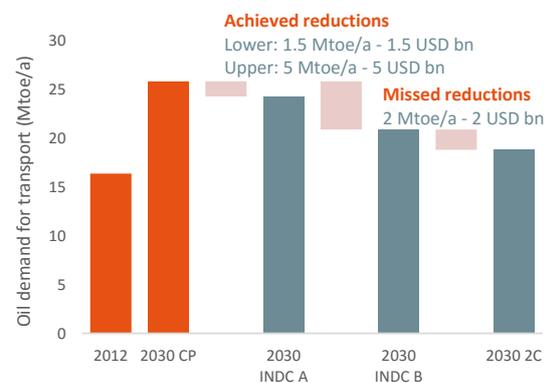


Figure 2: Oil demand from transport sector

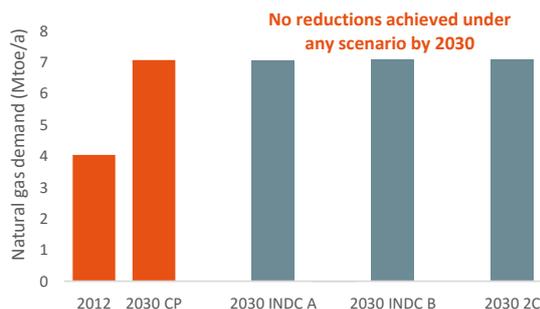


Figure 3: Reduced natural gas demand

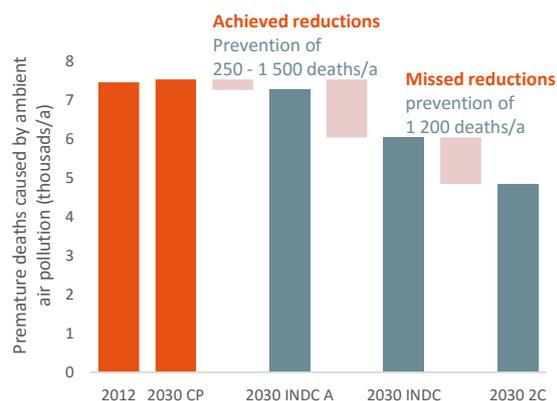


Figure 4: Premature adult deaths prevented

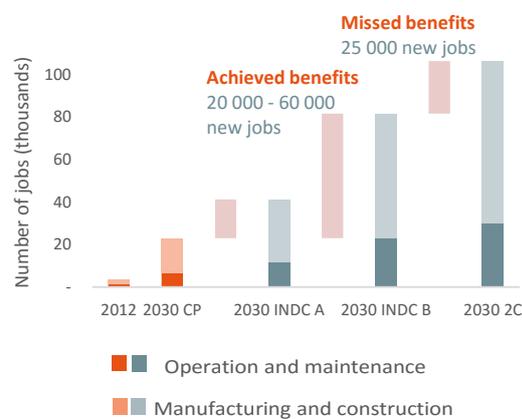


Figure 5: Job creation from renewables

Supplementary information

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

Assumptions for South Africa:

INDC scenarios: We used the submitted INDC (Government of South Africa, 2015) as a basis for calculating the emissions under the INDC scenario. For calculation of the INDC scenario, emissions from energy use were projected to decrease proportionally to the decrease in total emissions for all sectors, excluding LULUCF.

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 current policies plan for 2030, according to the 2010-2030 Integrated Resources Plan for Electricity (Ministry of Energy, 2011), whilst the overall share of renewable energy in the total electricity mix rises 100%.

Oil import prices: Based on the projections of the global oil import price in 2030 of the World Energy Outlook (IEA 2014).

Under the 100% renewable scenario, we assume that this scenario would be adopted by all countries worldwide, allowing technology to be used in South Africa 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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