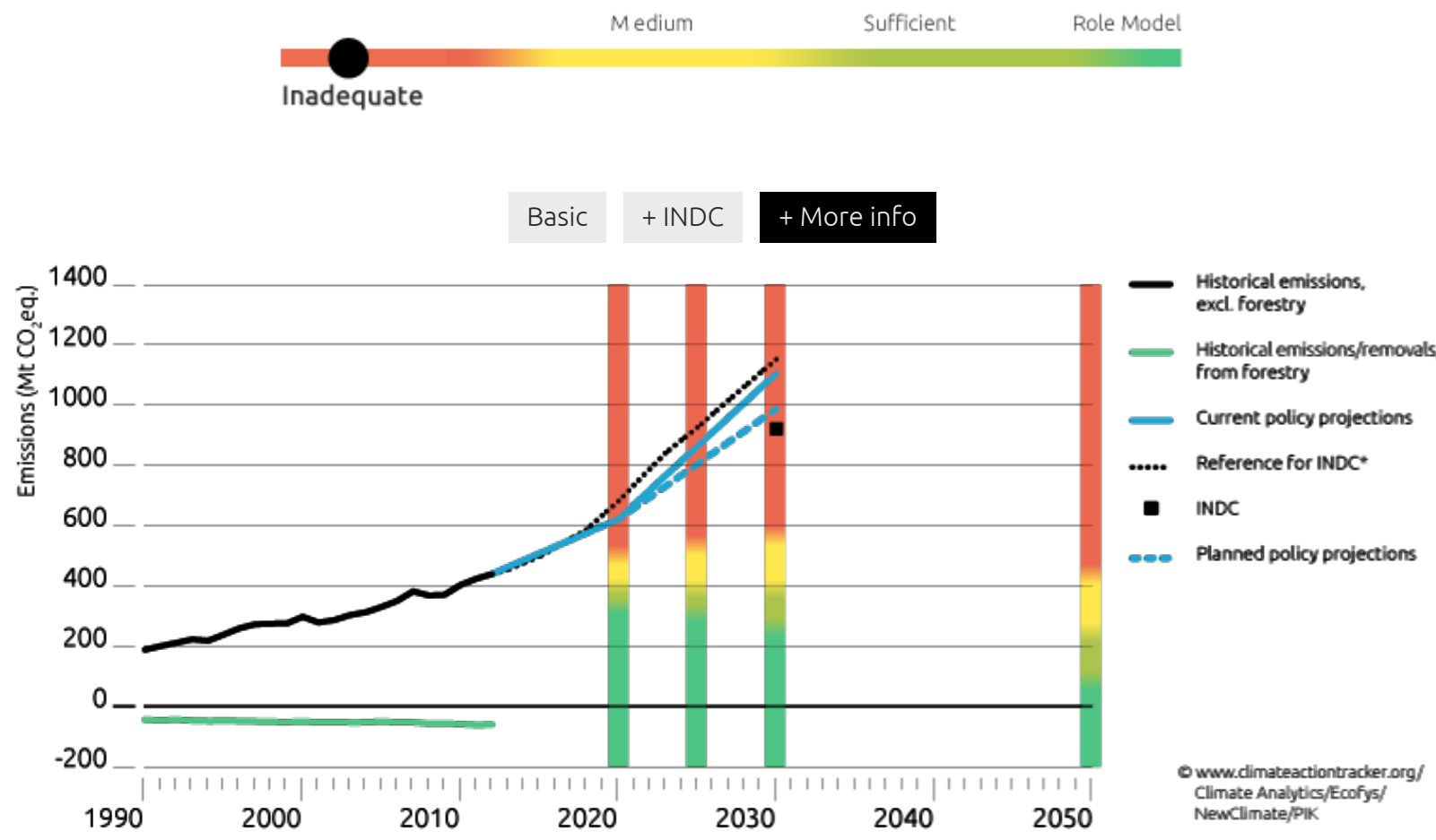


Rating



Note: Hover over the coloured bars for a pop-up with the fair emissions range per effort sharing category. More information [here](#).

* Converted from AR4 to SAR GWP

Assessment

On 30 September 2015, Turkey submitted its [Intended National Determined Contribution \(INDC\)](#), with a greenhouse gas reduction target (including land use, land use change and forestry (LULUCF)) of up to 21% below business as usual (BAU) in 2030. Excluding LULUCF emissions, this target is equivalent to a 389% increase on 1990 levels, or a 110% increase on 2012 levels. In comparison, under Turkey's BAU, emissions are expected to increase by 512% of 1990 levels, or 162% on 2012 levels. Through mitigation plans which target the whole economy, Turkey's INDC aims to abate up to 255 MtCO₂e in 2030 relative to BAU.

We rate this target "inadequate". Turkey's commitment is not in line with interpretations of a "fair" approach to reach a 2°C pathway. This means it is not consistent with limiting warming to below 2°C: if all countries adopted this level of ambition, global warming would likely exceed 3-4°C in the 21st century. To make a fair contribution to holding warming below 2°C, Turkey would need to double - or even triple - its post-2020 target.

According to our analysis, with the current policies it already has in place, we find that Turkey can achieve 28% of its proposed INDC target i.e. these policies are expected to abate 71 MtCO₂e excl. LULUCF in 2030. If the planned policies of the INDC related to the energy sector are implemented,^[1] Turkey will achieve 73% of its INDC target. The lion's share of emissions abatement in Turkey in 2030 depends on its capability to fully exploit its hydro potential. If realised, 39% of the INDC target will be achieved solely by the additional capacity of hydro power installed.^[2]

On the other hand, we found that Turkey's level of ambition in boosting wind and solar capacities seems to decrease after 2023. The wind energy target from the National Renewable Energy Action Plan (NREAP) has been reduced from 20 GW in 2023 to 16 GW in 2030 while the solar energy target only doubled to reach 10 GW in 2030. These targets do not reflect the potential of a country with a photovoltaic system performance 50% higher than in Germany^[3] (IEA, 2014) and a technical wind power potential of 275 GW^[4] (European Commission, 2013)

Our assessment shows that not only does Turkey need to boost its ambition in contributing to limiting global warming but it also needs to set out a plan with detailed measures to achieve its INDC target in 2030 as it did in its NREAP for the year 2023.

Moreover, it has been reported in the Press (ClimateWire, 2015) that Turkey is planning to quadruple its coal power plants by 2020 to reach 80 GW, when the projection of a business as usual scenario in the INDC was to reach 23 GW in 2020 and 38 GW in 2030 (CAT estimation). If it does this, Turkey would emit an estimated additional 340 MtCO₂e in 2020 and 250 MtCO₂e in 2030 relative to BAU.^[5] This added coal-fired capacity would cancel out all planned abatement measures mentioned in the INDC, and Turkey would not be able to meet its INDC goal.

Pledge

On 30 September 2015, Turkey submitted its INDC, with the aim to unconditionally reduce GHG emissions including LULUCF in 2030 by 21% below a BAU projection. The INDC submission provides the reference BAU projection and indicates that the target emissions level is 929 MtCO₂e (incl. LULUCF) in 2030.

Other more recent BAU projections (Bloomberg Energy Finance, 2014) indicate that the Turkish Government could have overestimated the 2030 power demand underlying the official BAU projections by 25%. Because the power sector is responsible for the largest share of emissions in Turkey, this means that BAU emissions in 2030 could be considerably lower and that the INDC target of 929MtCO₂e could be met without any additional policies.

Since we exclude LULUCF emissions in our rating methodology, we have adjusted the INDC target by subtracting in 2030 a LULUCF emission level of -55 MtCO₂e/year^[6]. The INDC target in 2030 becomes 984 MtCO₂e, excluding LULUCF emissions.

Turkey has revised its inventory GHG emissions in 2015, applying the Global Warming potential (GWP) defined in the IPCC's 4th Assessment Report. As the CAT methodology is based on the GWP of the 2nd Assessment Report, we converted the INDC values based on the average annual difference that is found in the revision report (Turkish Statistical Institute, 2015). Hence, we find that the equivalent INDC target is 922 MtCO₂e by 2030, excluding LULUCF.

A similar methodology was applied to the INDC's BAU reference level.

Copenhagen pledge	
2020 target	none
INDC	
2030 target	A reduction of 21% of emissions in 2030 compared to a BAU scenario (390% above 1990 levels by 2030 excl. LULUCF)
Coverage	economy-wide, excl. LULUCF
LULUCF	forest management credit likely
Emission peak target	none
Long term goal(s)	
Long-term goal(s)	none

Fair share

The "inadequate" rating indicates that Turkey's commitment is not in line with interpretations of a "fair" approach to reach a 2°C pathway. This means it is not consistent with limiting warming to below 2°C unless other countries make much deeper reductions and comparably greater effort. Turkey could strengthen its reduction target to reflect its higher capability.

According to our effort sharing scenarios, Turkey need to further reduce its emissions by at least 400 MtCO₂e by 2030 to reach a "medium" rating and by 600 MtCO₂e to reach a "sufficient" rating. In other words, Turkey needs to double or triple its post-2020 target to fairly contribute to limiting global warming by 2°C.

Current policy projections

With currently implemented policies, Turkey is expected to achieve emissions levels excluding LULUCF of 1,107 MtCO₂e in 2030. With no further action, Turkey will cover 28% of its INDC target.^[7]

In our current policy projection, Turkish emissions will grow annually at an average rate of 6.3% similarly to the reference scenario of the first National Communication. Emissions growth will be predominantly driven by increased emissions from electricity generation as the Turkish government is relying continuously on solid fuels for the future.

Nonetheless, the National Renewable Energy Action Plan (NREAP) targets 61GW of renewable capacity by 2023^[8] and has detailed over eight types of financial and legislative measures to promote renewable energy sources in Turkey. The most significant policy implemented is the feed-in-tariff law (FIT), which offers secure returns to investors and is setting Turkey as an attractive emerging market for the future. There is enough evidence that Turkey will achieve the renewable capacity targets from the National Renewable Energy Action Plan of Turkey (NREAP), hence we quantified its impact in our current policy projection. We estimate that the NREAP will abate 55 MtCO₂e by 2023 covering 22% of the mitigation target by the INDC.

In addition, in December 2014, the Turkish government awarded a contract to the Russian company Rosatom to commission 4.8 GW of nuclear power plants by 2020, and has ratified their guaranteed sales of energy. In a power purchase agreement, the Turkish government agreed to buy 70% of power generated from the first two units and 30% from the third and fourth units for 15 years. The electricity is planned to be purchased at a price of about 12.35 US cents per kWh. According to our calculation adding these 4.8 GW would abate 15 MtCO₂e per year and will cover 5% of the INDC target.

In our planned policy projection, we quantified the impact of Turkey's Energy Efficiency Strategy Document (2012-2023) which aims to reduce primary energy intensity by 20% in 2023, compared to the 2008 baseline (Ministry of Environment and Urbanisation, 2013).

The reason we do not include it in our current policy projection is because the completion of the measures needed to achieve this target are still under review or have not been yet legislated by the Turkish Parliament. Our estimation shows that the strategy, if implemented, would help abate 51 MtCO₂e by 2023, covering 20% of the INDC Target.

We also quantified the INDC plan of tapping Turkey's full hydroelectric potential by 2030, as well as increasing the capacities of solar and wind by an additional 1 GW compared to 2023. Our estimation shows that renewable energy will contribute in abating 123 MtCO₂e in 2030, covering 48% of the INDC target.

Assumptions

Historical emissions

Historical emissions in Turkey are still based on the Global Warming Potential of the second IPCC assessment report.

These are obtained for 1990–2012 from the most recent CRF data (2014).

Current policy projections

The BAU reference level used to evaluate the current policy projection (not displayed in the figure above) was derived by applying growth rates from Turkey's First National Communication on Climate Change (Ministry of Environment and Forestry, 2007) and the US EPA (2012) to the emissions levels for 2012. This BAU reference level is 2% higher than the BAU reference level provided in the INDC.

The current policy projections results from subtracting the abated emissions of the NREAP and commissioning of nuclear power plants in Turkey in 2023 from the BAU projection as well as the INDC renewable capacity forecast. The abated emissions are found by multiplying the weighted average emission factor of power generation in Turkey by the forecasted amount of clean energy generated. The emission factor is calculated for the year 2020, 2023 and 2030. The plant specific load factor of the NREAP are used to forecast the renewable energy generated in 2030.

The GHG emissions of the INDC mitigation scenario are converted from AR4 GWP to a SAR GWP by scaling down the values to the average yearly difference that is found in the revision of the inventory of GHG emissions in Turkey (Turkish Statistical Institute, 2015).

To calculate the emissions from the speculative 80 GW of coal power plants, we assumed a constant emission factor for coal power plants of 1025 gCO₂/kWh (IEA CO₂ emissions 2014) and multiplied the capacity by the average load factor of coal power plants in Turkey taken from the first National Communication.

LULUCF emissions are assumed to be constant after 2012, equal to -55 MtCO₂e. In the absence of further information we have assumed the average value over the period 2002 to 2012: LULUCF historical emissions have declined from -51 MtCO₂e to -59MtCO₂e over the period from 2002 to 2012 with an average value of -55 MtCO₂e.

Sources

UNFCCC. [Intended Nationally Determined Contribution](#).

CRF (2014). UNFCCC AWG-KP Submissions 2014. Common Reporting Format.

Ministry of Environment and Forestry (2007). [First National Communication of Turkey on Climate Change](#).

Ministry of Environment and Urbanisation (2012). [Climate Change Action Plan 2011 – 2023](#).

Ministry of Environment and Urbanisation (2013). [Turkey's Fifth National Communication Under the UNFCCC](#).

United States Environmental Protection Agency (US EPA) (2012). [Non-CO₂ Greenhouse Gases: International Emissions and Projections](#).

UNFCCC (2002) [Decision 26/CP.7](#).

UNFCCC (2012a) [Decision 1/CP.16](#).

UNFCCC (2012b) [Decision 2/CP.17](#).

Turkish Statistical Institute (2015). [The Methodological document related to main revision on greenhouse gas emissions inventory](#)

Official Gazette (2007). [Energy Efficiency Law No. 5627](#).

World Energy Council (2013) [World Energy Resources: Hydro](#)

Ministry of Energy (2014) [D2nya ve Ülkemiz Enerjisi Ve Tabii Kaynaklar Görünümü?](#)

IEA (2014) [Trends 2014 in Photovoltaic applications](#)

European Commission (2013) [Bringing Europe and Third countries closer together through renewable Energies](#)

Climate Wire (2015) [Turkey: Can a country planning 80 coal-fired power plants get serious about climate change?](#)

Bloomberg New Energy Finance (2014) [Turkey's renewable power Alternative power supply scenarios for Turkey](#)

Footnotes

[1] Commissioning of 4.8 MW of nuclear power in 2020, tapping the full economic potential of hydro by 2030 by adding 62 GW of hydro power (CAT calculation), and 10 GW and 16 GW of solar and wind power by 2030.

[2] According to World Energy Council, the economic potential of hydro power in Turkey in 2011 was 170 TWh. With an average load factor of 0.31 in Turkey, 62 GW of hydro power need to additionally be installed compared to the 2013 capacities.

[3] Turkey receives annually 1420 of full load hours from solar energy whereas Germany receives annually 936 hours.

[4] Not considering grid restrictions.

[5] Additional coal capacity is included in the BAU after 2020, therefore additional emissions in 2030 are lower compared to the additional emissions in 2020.

[6] Turkey is a net sink of LULUCF emissions. Turkey LULUCF historical emissions have declined from -51 MtCO₂e to -59.8 MtCO₂e over the period from 2002 to 2012 with an average value of -55 MtCO₂e.

[7] The difference between emissions in BAU and the INDC by 2030.

[8] 34 GW of hydro, 25 GW of wind and solar, 2 GW of geothermal and biomass capacities.