# Cost-effective renewables in 2030 - Decreasing role for bioenergy

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## Summary

CE Delft looked at the most cost efficient mix of renewables in 2030 using the most recent price developments of renewables. The projected most cost-efficient mix of renewables sees solar growing by a factor of five, and wind by a factor of 2.5, while bioenergy grows only by a factor of 0.35. In comparison, the Commission's own modelling shows much higher growth of bioenergy. The significantly decreasing prices for wind and solar taken into account in this report make them the cheapest renewables, meaning that from a purely cost-effective point of view, future renewables investments should be targeted to non-bioenergy options, in electricity production particularly.

## Introduction

Renewable energy already makes up 16.4% of all energy consumption in the EU[1], with bioenergy being the largest contributor. For 2030, the European Commission has proposed a target of at least 27% of renewables. CE Delft[2] looked into what is the most cost-efficient mix of renewables to meet this target from a societal point of view, by using a socially optimum interest rate[3] while assuming existing production of renewable energy remains and including most recent price developments. Other considerations than cost-effectiveness, such as employment effects or greenhouse gas (GHG) impacts, were not considered in the study. Understanding what is a cost-effective and sustainable mix of renewable energy is crucial information for the review of EU's renewable energy policies, to set the appropriate incentives for the right renewable options.

## Projected cost-efficient renewable energy mix in 2030

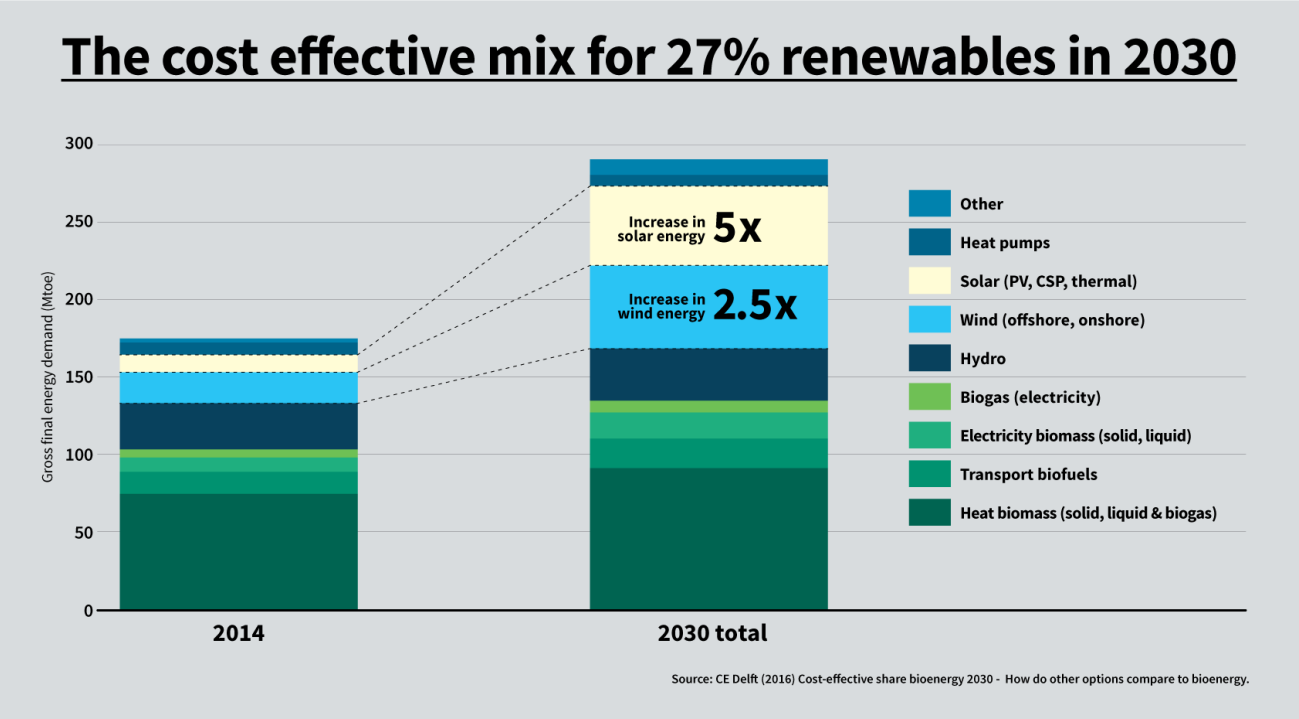
To achieve a cost effective combination of different renewable energies in the EU and to meet the 27% target by 2030, the majority of the growth needs to come from solar and wind. Wind energy should grow by a factor of 2.5, and solar by a factor of nearly 5 between 2014 and 2030. The share of bioenergy would decrease to 46% in the renewable energy mix, but the volume of bioenergy would still slightly increase from approximately 100 Mtoe in 2014[4] to 135 Mtoe in 2030. This decrease in share would be due to faster growth of other renewables with lower costs and higher potentials. The Commission's energy modelling (PRIMES) foresees much more development in bioenergy especially in the electricity sector compared to this study.

[1] Renewable energy progress report 2017

[2] CE Delft (2016). Cost-effective share of bioenergy 2030 - How do other options compare to bioenergy.

[3] A socially optimum interest rate "reflects the social view of how future benefits and costs are to be valued against present ones." From: European Commission (2014). Guide to Cost-benefit Analysis of investment projects. Economic appraisal tool for cohesion policy 2014-2020.

[4] According to Renewable energy progress report 2015




## Different renewables have different costs

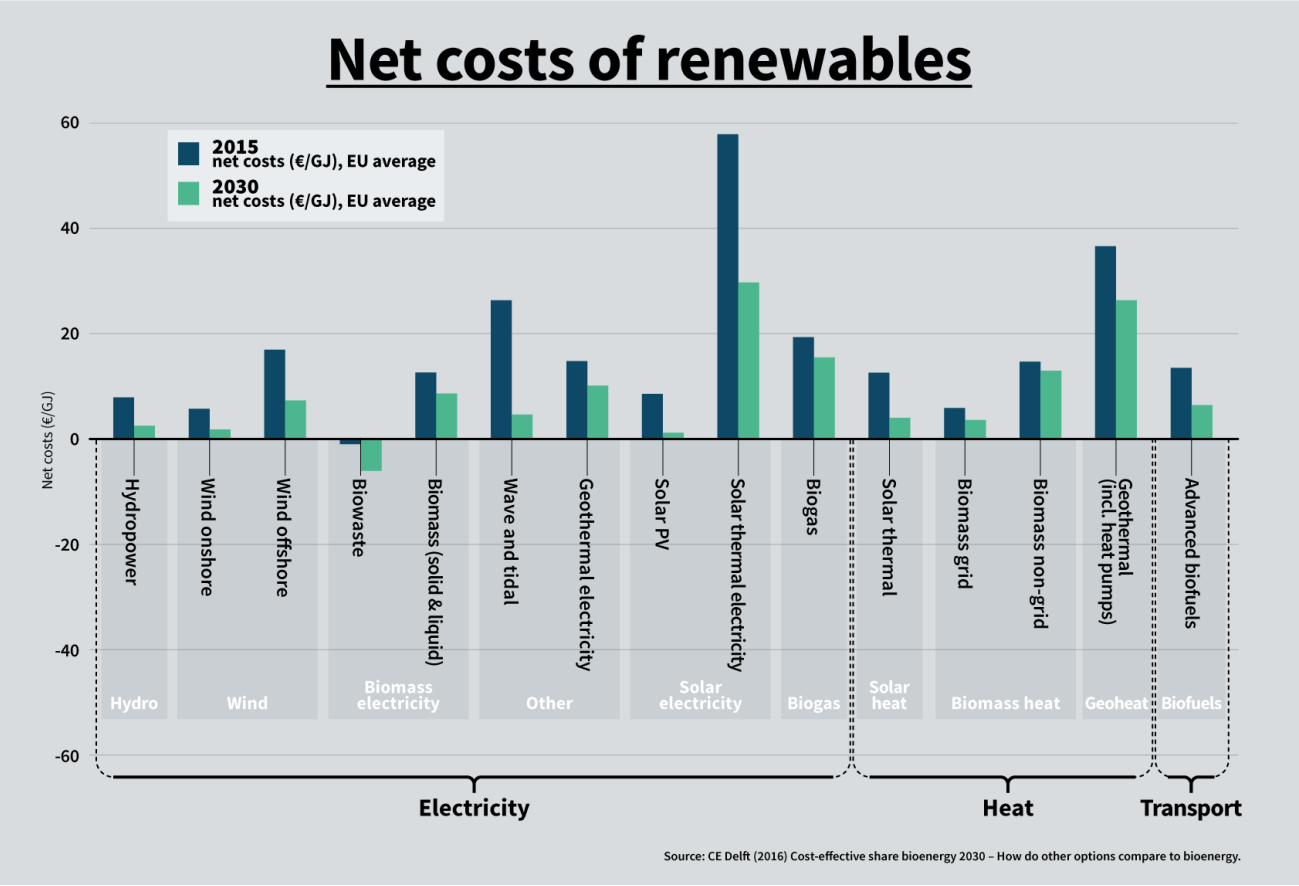
Bioenergy is a technology that requires relatively low investment costs but high operating costs throughout the lifetime of an installation, mainly due to the biomass fuel costs. Hence energy scenario modellings tend to overestimate the role of bioenergy, due to the low costs in the beginning, if the interest rate are assumed to be high, which is often the case. Variable renewables, such as wind and solar, with higher upfront costs and low operating costs, appear to be more expensive with high interest rates.

The study projects a lower share of bioenergy for 2030 because it uses a lower interest rate that favours less the low upfront cost of a technology. A lower interest rate was used in this study as it represents the optimum rate from a societal perspective, and is for instance often used in social cost benefit analyses.

For example, the European Commission's energy modelling (PRIMES) assumes almost all of the technical EU bioenergy potential will be used to reach the 2030 renewables target. This is far beyond the sustainable potential, and leaves much of the potential of other renewable energy technologies unexploited. In the power sector where other renewables are clearly more cost competitive, investments should already be oriented towards non-combustible renewables.

## Net costs of renewables

The study evaluated net costs of renewable energy technologies, as a basis for the projected cost-efficient mix. Net costs are based on the price projections for different renewable technologies compared with projected electricity and heat prices. Contrary to PRIMES that used 2012 data, the study used 2015 price data adjusted by member states. Renewable energy prices are expected to decrease significantly from 2015 to 2030 making some renewables cheaper than fossil fuels, while the overall price differences between technologies will still remain. In the electricity sector, bio-waste is the cheapest renewable, but it can only make a very limited contribution due to its low availability, followed by onshore wind and solar PV which are much more scalable.




## Conclusions and recommendations

The projections of the EU PRIMES model scenarios are used in policy making, but don't take into account the most recent price developments of renewable energy. It also assumes a free market interest rate, which benefits renewables with low investment costs such as bioenergy. **The Commission's PRIMES energy model should be updated with the most recent price information**, in order to have an up-to-date picture of the investment costs for different ambition levels of renewables.

Policy incentives and market interventions are still needed to ensure that the share of renewable energy keeps increasing, but they also need to ensure that the right kinds of renewables are deployed in the right sectors. The study shows that the projections of the European Commission have overestimated the role of bioenergy. It also concludes that a more cost-effective mix of renewable energy requires a stronger focus on non-combustible renewable energy, especially in the electricity sector. **Therefore, investments should be targeted to the most cost-efficient renewables: wind and solar together with energy efficiency measures.**

Particularly in the electricity sector, more cost-effective options exist, and bioenergy for electricity only is also inefficient from a resource-use perspective in most cases. **Public incentives and financial support for electricity-only bioenergy production should hence be drastically lowered to favour other renewables, and new bioelectricity-supporting schemes should not be adopted after 2020.**

## Further information

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