



# 10 SIGNALS

EVIDENCE THE GREEN ECONOMY IS UNDERWAY

**RISK OR OPPORTUNITY:**  
**THE STATE OF THE PLANET**  
**BRINGS SOCIETIES**  
**AT A CROSSROADS**

# 2019 WILL BE A WATERSHED MOMENT

Global warming is more than ever on the rise, with the last 4 years (2015 to 2018) being the hottest ever recorded. Biodiversity loss reaches unprecedented levels: WWF's Living Planet Report 2018 shows population sizes of wildlife decreased by 60% globally between 1970 and 2014. Yet nature underpins our economic activity, as the total annual ecosystem services are worth \$125 trillion of value. That dependency is part of the explanation why the 2019 WEF Global Risk Report finds that environmental risks account for 4 of the 5 most global risks. The green transition is not moving fast enough for our economies to remain out of danger.

Yet, this transition is undoubtedly moving forward. It takes the form of a green economy, an economy that improves human well-being and builds social equity while reducing environmental risks and scarcities. In an evergrowing variety of sectors, green economy develops and starts to take over the fossil based economy. As those signals show, the green economy creates more jobs, offers more investment opportunities, provides an alternative to stranded assets, and leads the way to a long-lasting development in which first movers will reap the benefits of this new prosperity.

While green economy always was the most viable option for the planet, it now appears as the best economic choice.

**Pascal Canfin**

*Chair of the WWF Green Economy Network  
& Director General of WWF France*

**Marco Lambertini**

*Director General of WWF International*

# THE BEGINNING OF THE END OF FOSSILS

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Many market signals show that the fossil fuel industry is experiencing the aftermath of COP21. While energy demand worldwide is still on the rise, the only major energy sources that show signs of decline are conventional oil and coal.

Discoveries of new conventional oil reserves hit a record low in 2017, with less than seven billion barrels discovered that year.

The coal sector is facing eroding profitability too. About half of all US coal is owned by companies that have declared bankruptcy. China has cancelled plans for 151 coal plants in 2017, and 40% of its coal power stations are already losing money.

This deep-rooted trend has repercussions on this industry's capacity to provide employment. While the fossil fuel sector provided jobs for 30 million people globally in 2017, it is set to lose 8.6 million jobs by 2050.

Rystad Energy: <https://www.rystadenergy.com/newsevents/news/press-releases/all-time-low-discovered-resources-2017>

SNL Energy Data: <https://www.snl.com/InteractiveX/Article.aspx?cdid=A-36118340-12086>

Chinese government: <https://unearthed.greenpeace.org/2017/10/11/china-halts-150-coal-fired-power-plants/>

Carbon Tracker <https://www.carbontracker.org/40-of-chinas-coal-power-stations-are-losing-money/>

IRENA, Renewable Energy and Jobs - Annual Review 2018

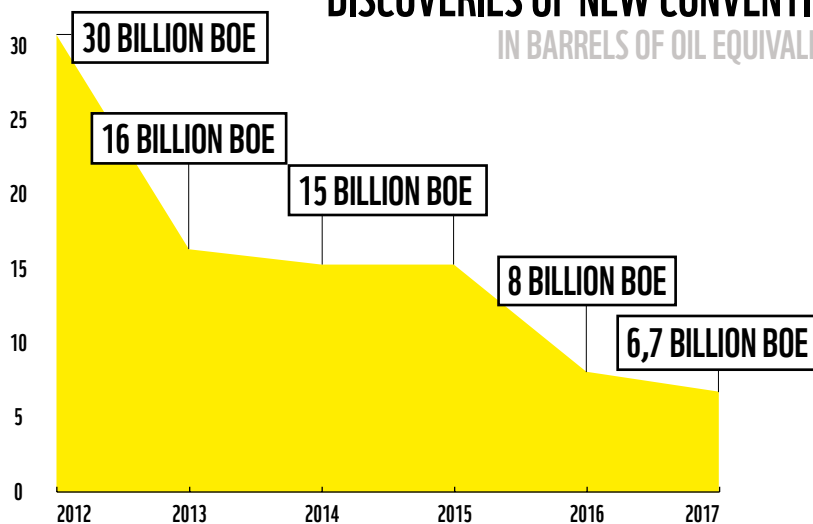


# 151

coal plants plans  
have been cancelled  
in China

## DISCOVERIES OF NEW CONVENTIONAL OIL RESERVES

IN BARRELS OF OIL EQUIVALENCE (BOE)



Discoveries of new conventional oil  
reserves hit a record low in 2017,  
with less than seven billion barrels

# GREEN ECONOMY SECTORS ARE OVERTAKING FOSSIL FUEL DRIVEN SECTORS

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Market capitalization is a crucial indicator to signal where shareholders see value, not tomorrow but today. What this indicator shows according to FTSE Russell's data is a progressive takeover of fossil fuel driven sectors by green economy sectors.

In stocks, the green economy sectors are now comparable to the Oil & Gas ones, both amounting to US\$4 trillion in market capitalization. In flows, there is a stark contrast, with green economy's share as a proportion of the total market in steady rise and the fossil fuel sector on the decline.

Investments reveal the same trend: approximately US\$280 billion was invested in new renewable energy generation in 2017, continuing a six-year trend of exceeding global fossil fuel generation investments.

FTSE Russell, Annual trends Report 2018, [http://www.ftserussell.com/sites/default/files/ftse\\_russell\\_investing\\_in\\_the\\_global\\_green\\_economy\\_busting\\_common\\_myths\\_may\\_2018.pdf](http://www.ftserussell.com/sites/default/files/ftse_russell_investing_in_the_global_green_economy_busting_common_myths_may_2018.pdf)

S-UNEP Centre and BNEF, 2018. Global Trends in Renewable Energy Investment 2018.

European Commission : [https://ec.europa.eu/epsc/sites/epsc/files/epsc\\_-\\_10\\_trends\\_transforming\\_climate\\_and\\_energy.pdf](https://ec.europa.eu/epsc/sites/epsc/files/epsc_-_10_trends_transforming_climate_and_energy.pdf)



**\$ 280 BILLION**

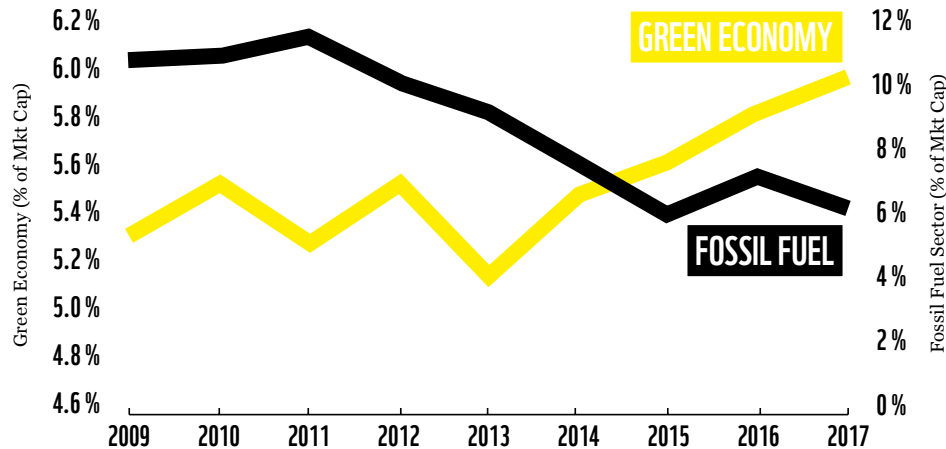
was invested in new  
renewable energy  
generation in 2017



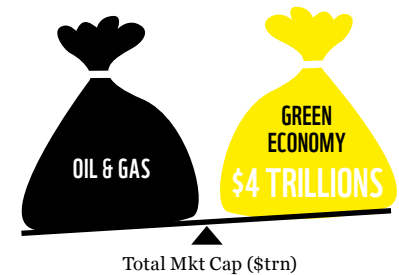
**\$ 103 BILLION**

was invested in  
fossil fueled power  
plants

## GROWTH OF THE GREEN ECONOMY VS FOSSIL FUEL SECTOR



## MARKET CAPITALIZATION



Green economy's market  
capitalization now goes head  
to head with oil and gas sectors.

# GREEN SECTORS CREATE MORE JOBS

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Green economy sectors nowadays provide more jobs, as they are both more job intensive and more dynamic, turning the green transition into the best investment to tackle unemployment.

In the United States, 1\$ invested in clean energy creates three times more jobs than 1\$ invested in the fossil sector. In the European Union, the growth rate of green jobs proved to be seven times higher than that of the rest of the economy from 2000 and 2015.

This dynamic will only accelerate, as climate change is not simply a threat but also a tremendous business opportunity for the years to come.

In that respect, ILO findings show that the benefits far outweigh the costs, since the green transition to fight climate change will result in a net creation of 18 million jobs by 2030. While 24 million jobs will be created, ILO estimates 6 million will be lost, highlighting the need for a just transition and training programs adapted to this changing world.

Center for american progress & Political Economy Research Institute (PERI), <https://cdn.americanprogress.org/wp-content/uploads/2014/09/PERI.pdf>

Eurostat, [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Environmental\\_economy\\_%E2%80%93\\_statistics\\_on\\_employment\\_and\\_growth](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Environmental_economy_%E2%80%93_statistics_on_employment_and_growth)

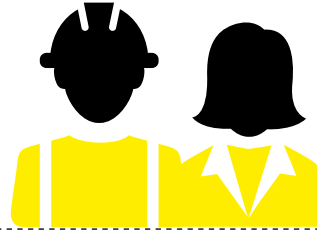
ILO, Greening with jobs, WESO Outlook 2018.



**JOB CREATION  
THROUGH  
\$1 MILLION  
IN SPENDING**

**CLEAN ENERGY INVESTMENTS**

**16.7 JOBS**



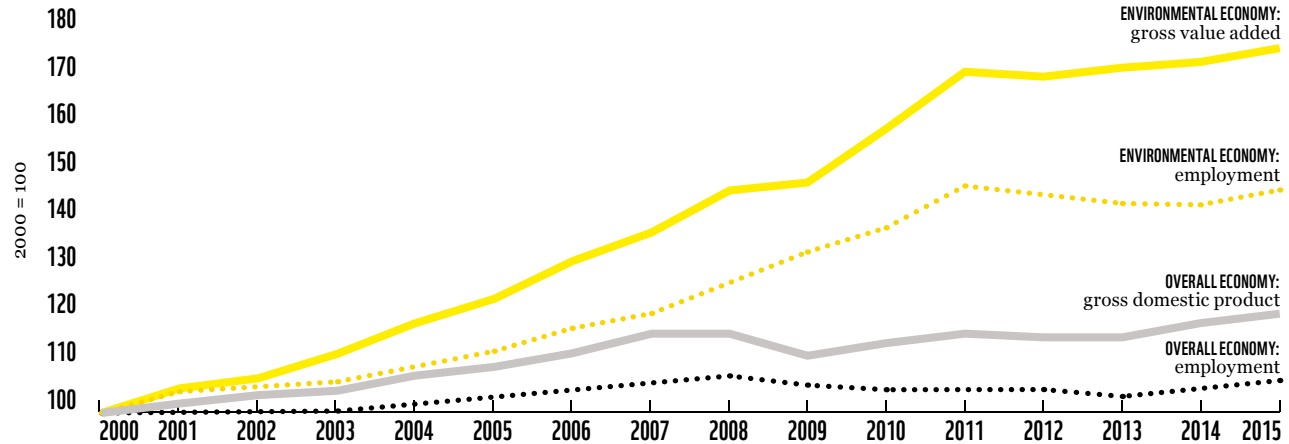
**OIL,  
NATURAL  
GAS & COAL**

**5.3 JOBS**



## DEVELOPMENT OF KEY INDICATORS FOR THE ENVIRONMENTAL ECONOMY AND THE OVERALL ECONOMY

EU-28, 2000-2015



# 4 THE LEVEL OF PUBLIC SUBSIDIES PROVIDED TO FOSSIL FUEL (& HAMPERING THE DEVELOPMENT OF GREEN SECTORS) HAS BEEN REDUCED

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The potential of green economy sectors has long been hindered by subsidies to fossil fuel sectors, distorting their real competitiveness.

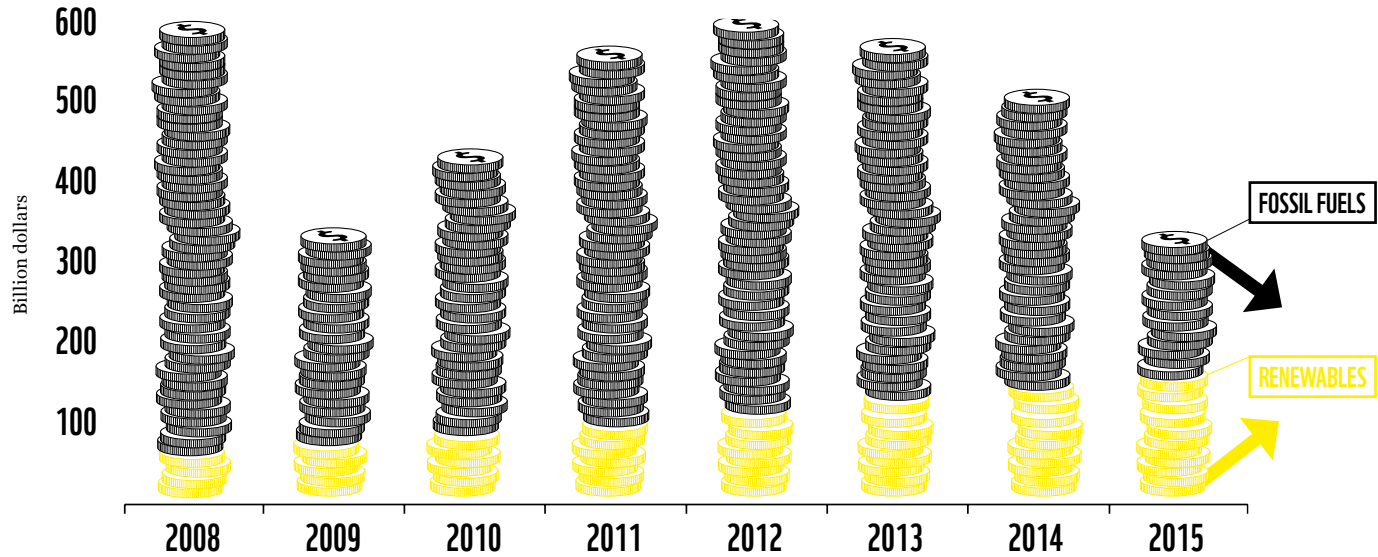
In 2013, the competition was distinctly uneven, for the subsidies amounted to US\$550 billion, which was four times more than those renewables benefited from. An IMF study showed that the public cost of those subsidies for fossil fuels worldwide amounted to US\$5300 billion per year, the equivalent of US\$10 million every minute.

In 2016 however, the subsidies gap was considerably reduced, demonstrating a priority shift in public policies' orientation. By that time, fossil fuel subsidies had been divided by more than two, at US\$270 billion, while support for renewables was steadily rising to US\$160 billion.

IMF 2015, How large are global energy subsidies ? <https://www.imf.org/en/Publications/WP/Issues/2016/12/31/How-Large-Are-Global-Energy-Subsidies-42940>

IEA, World energy outlook 2016 & 2017, <https://webstore.iea.org/download/summary/202?fileName=French-WEO-2016-ES.pdf> ; <https://www.iea.org/newsroom/energysnapshots/estimates-for-global-fossil-fuel-consumption-subsidies.html>

## GLOBAL SUBSIDIES FOR FOSSIL FUEL CONSUMPTION AND RENEWABLES



## US\$10 MILLION EVERY MINUTE

The public cost of subsidies to fossil fuels worldwide amounted to US\$5300 billion per year, the equivalent of US \$10 million every minute.

# FINANCE GOES GREENER AS MORE & MORE INVESTORS TAKE CLIMATE CHANGE INTO ACCOUNT AND SEE IT AS AN OPPORTUNITY

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A growing number of financial actors realize the foundations of their business models rely on a stable climate. Almost half of the global reinsurance market has divested from coal.

The Task force on Climate-related Financial Disclosure (TCFD) created a groundswell when it released its report in June 2017: by September 2018 it had already gathered 513 supporters, including 287 financial firms responsible for assets of nearly US\$100 trillion. Even actors as influential as central banks follow this trend. In December 2017 at the One Planet Summit, 8 central banks launched the Network for Greening the Financial System (NGFS). Today, this network includes 35 members.

Investors are aware that the road to a low-carbon economy also spurs the emergence of new markets. HSBC's State of the Market report identified in 2017 US\$895 billion of 'climate-aligned bonds' financing low carbon and climate resilient assets or projects. This is an increase of US\$201 billion in climate-aligned bonds since 2016. The IFC estimates that the nationally determined contributions of 21 emerging market economies alone represent US\$23 trillion by 2030 in investment opportunities.

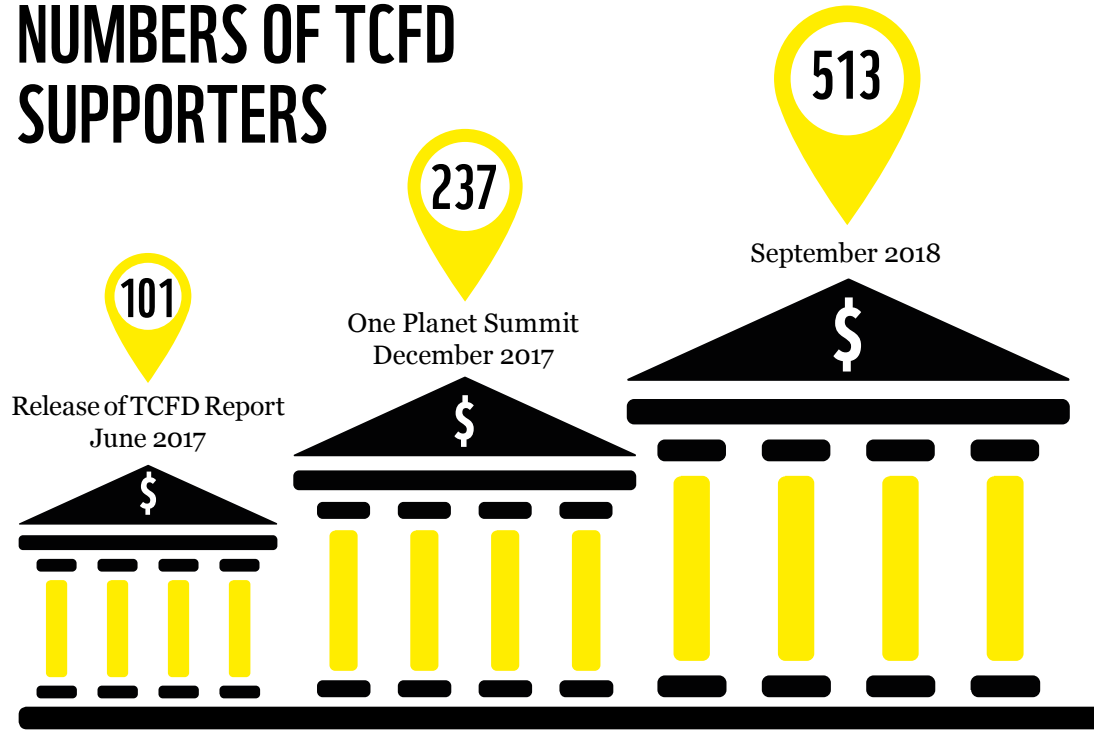
Unfriend coal, <https://unfriendcoal.com/close-to-half-global-reinsurance-market-divests-from-coal/>

HSBC, Bonds and Climate Change : the state of the market 2017, [https://www.climatebonds.net/files/files/CBI-SotM\\_2017-Bonds%26ClimateChange.pdf](https://www.climatebonds.net/files/files/CBI-SotM_2017-Bonds%26ClimateChange.pdf)

International Finance Corporation, Climate investment opportunities in emerging markets, [https://www.ifc.org/wps/wcm/connect/51183b2d-c82e-443e-bb9b-68d9572dd48d/3503-IFC-Climate\\_Investment\\_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES](https://www.ifc.org/wps/wcm/connect/51183b2d-c82e-443e-bb9b-68d9572dd48d/3503-IFC-Climate_Investment_Opportunity-Report-Dec-FINAL.pdf?MOD=AJPERES)

TCFD Status Report 2018, <http://www.fsb.org/wp-content/uploads/P260918.pdf>

# NUMBERS OF TCFD SUPPORTERS



**OVER 287  
FINANCIAL FIRMS**

responsible for assets of nearly \$100 trillion support the Task force on Climate-related Financial Disclosure



# SCIENCE BASED TARGETS SET TO BECOME THE NEW NORMAL FOR COMPANIES

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In the wake of the Paris agreement, numerous companies realized that it was in their own best interest to contribute to the mitigation of climate change. Others were encouraged by initiatives like the Climate Action 100+, a network of investors gathering more than US\$32 trillion in assets under management and which called for companies to take action to reduce GHG emissions across their value chain to be consistent with limiting global average temperature increase to well below 2 degrees Celsius.

From Pfizer to Procter & Gamble, L'Oréal, Swisscom or MacDonald's, companies from a wide range of sectors have committed to set science-based targets (SBTs). They grew from 33 in June 2015 to 507 by the end of 2018. This amounts to US\$10 trillion in market value, which is comparable to the value of the second largest stock exchange in the world, NASDAQ. They are directly responsible for 884 MT CO<sub>2</sub>e, roughly equal to Germany's annual emissions.

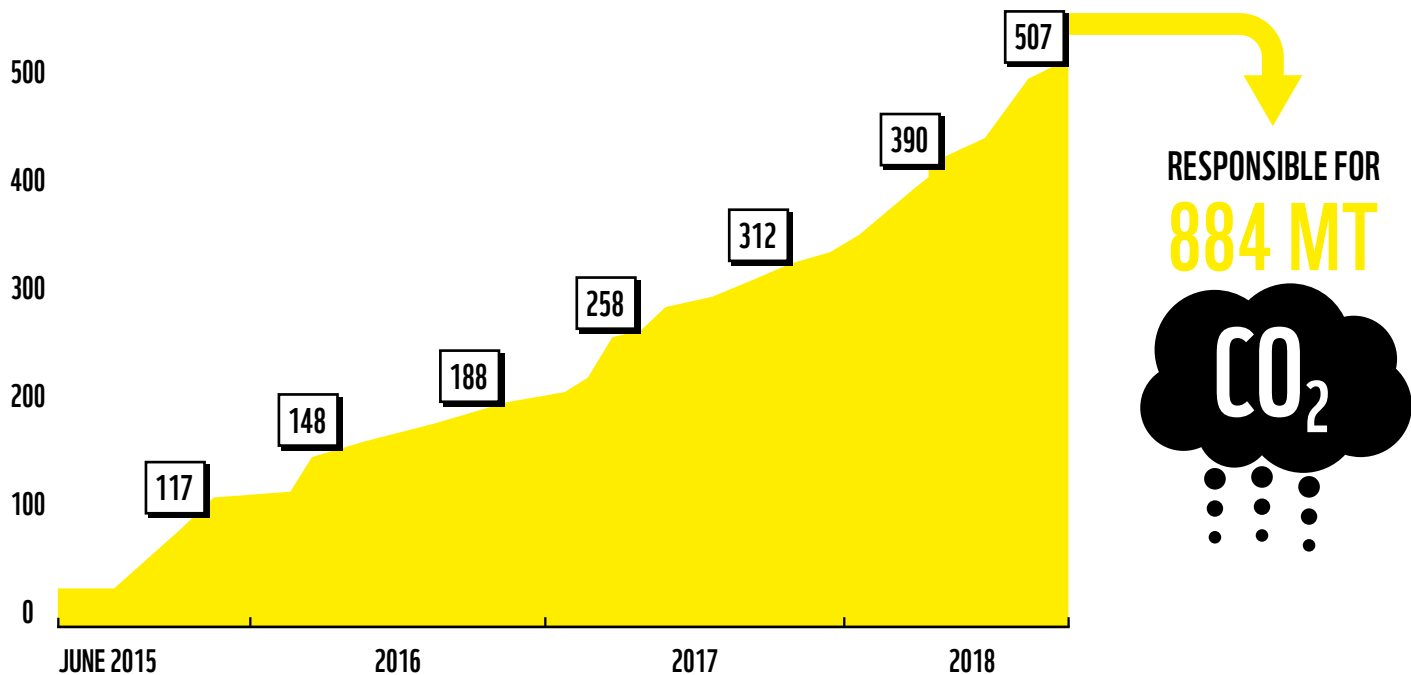
Climate Action 100+, <http://www.climateaction100.org/>

"Science based targets": <https://sciencebasedtargets.org/>



SCIENCE  
BASED  
TARGETS

## NUMBER OF COMPAGNIES THAT HAVE SET OR COMMITTED TO SET SBT SINCE JUNE 2015



# RENEWABLE ENERGY IS SOARING AT AN UNPRECEDENTED RATE

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The IPCC insists that two-thirds of fossil fuel reserves need to stay in the ground for global warming to remain under the 2°C threshold, leaving a wide energy supply gap to be covered by renewable energy. The rapid growth in renewables has systematically outpaced the predictions of the IEA.

The development of photovoltaics appears to be systematically underrated, as the price of solar electricity decreased 8-fold in 9 years. In Germany for instance, renewables are already cheaper than fossils. By 2040, intermittent renewables (solar and wind) could reach 45% of the global power mix capacity, with other zero-carbon power sources representing about 35%, and unabated fossil fuels the remaining 20%.

This is partly due to increasing investments (wind & solar attract 73% of total electricity investments) and to the dramatic fall in the price of batteries, as the cost of storage per kilowatt dropped by 70% between 2010 and 2016.

As a result, the industry created more than 500 000 new jobs globally in 2017, with the total number of people employed in renewables surpassing 10 million for the first time according to the IEA.

IRENA Renewable Energy & Jobs Annual Review 2018, <https://irena.org/publications/2018/May/Renewable-Energy-and-Jobs-Annual-Review-2018>

Energy transitions commission, [http://energy-transitions.org/sites/default/files/BetterEnergy\\_fullReport\\_DIGITAL.PDF](http://energy-transitions.org/sites/default/files/BetterEnergy_fullReport_DIGITAL.PDF)

Hoekstra 2017, Photovoltaic growth: reality versus projections of the International Energy Agency –the 2017 update <https://steinbuch.wordpress.com/2017/06/12/photovoltaic-growth-reality-versus-projections-of-the-international-energy-agency/>

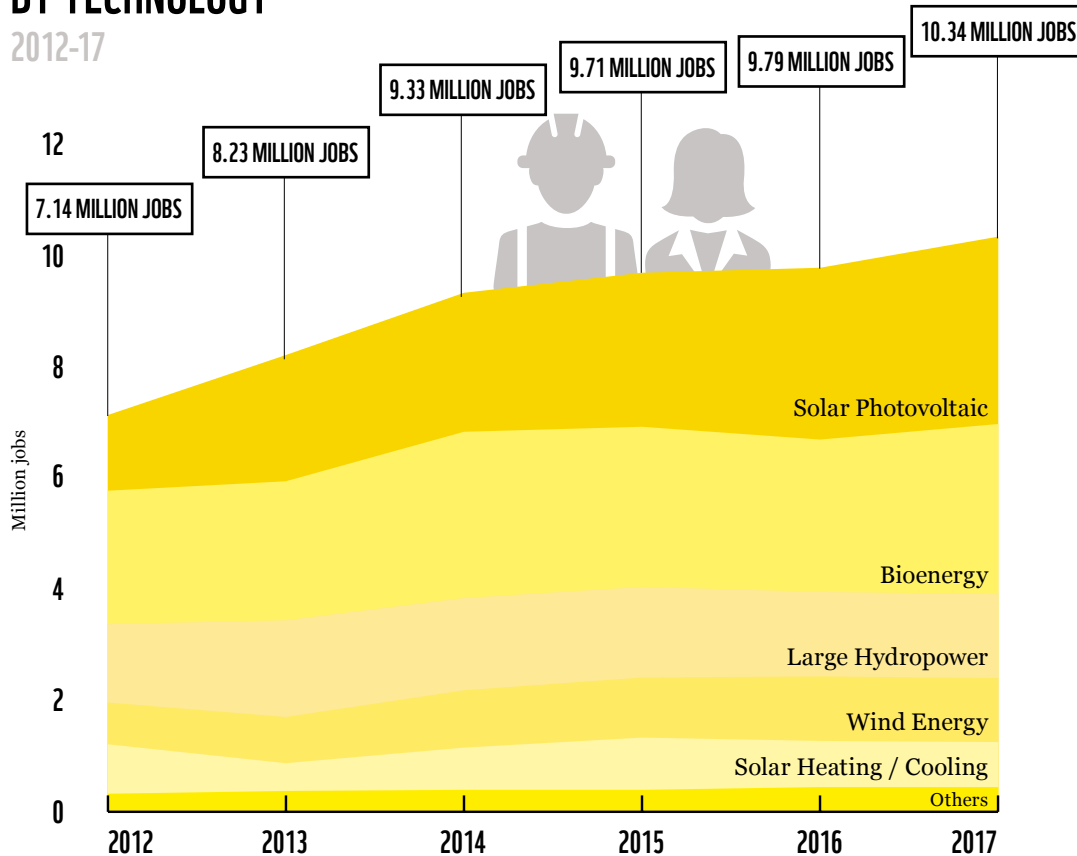
Lazare, <https://www.lazard.com/media/450773/lazards-levelized-cost-of-energy-version-120-vfinal.pdf>

Bloomberg, New Energy Finance 2017, [https://www.haee.gr/media/4051/elena-giannakopoulou\\_v2.pdf](https://www.haee.gr/media/4051/elena-giannakopoulou_v2.pdf)



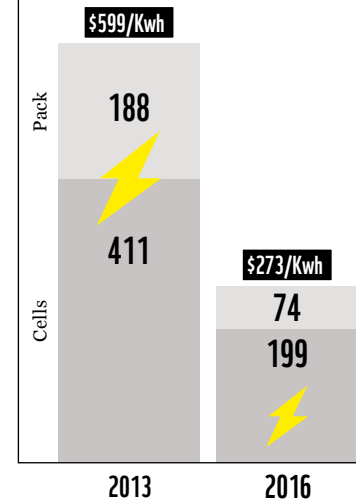
# GLOBAL RENEWABLE ENERGY EMPLOYMENT BY TECHNOLOGY

2012-17



## COST OF BATTERIES

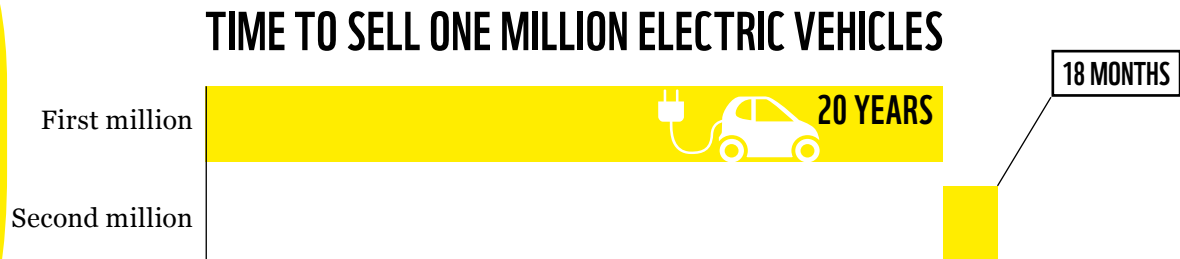
USD/kWh of storage



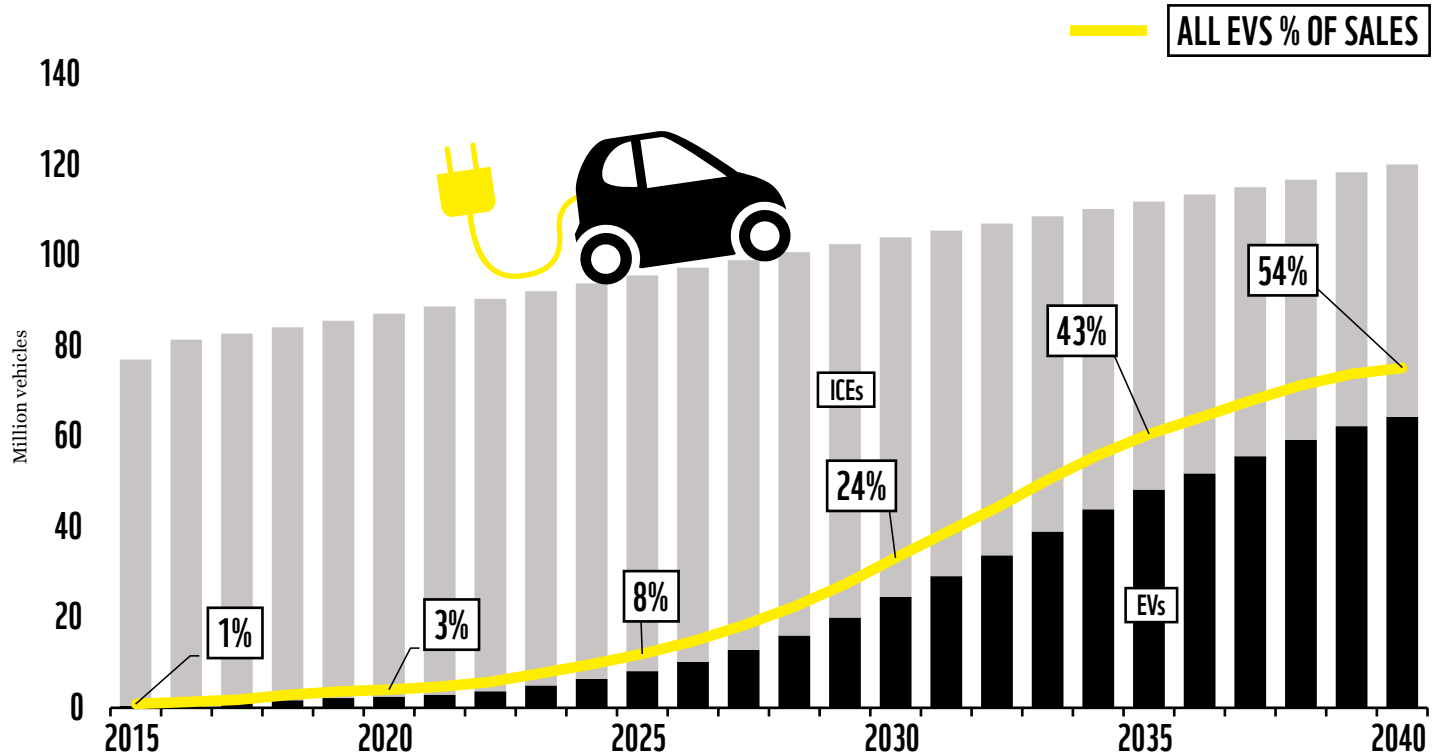
# ELECTRIC VEHICLE SALES ARE BOOMING

Figures show that the economic maturity of electric vehicles has entered a new era. While it took 20 years to sell the first million electric vehicles, it only took 18 months to sell the second million.

This technology is now one of the most dynamic, for electric vehicle sales increased by 66% between 2017 and 2018. This development is set to place electric vehicles as both a vital means of transport and a major industry for the decades to come, as it is estimated that by 2040, 55% of all new car sales and 33% of the global fleet will be electric.



# GLOBAL LIGHT DUTY VEHICLE SALES



# SUSTAINABLE AGRICULTURE OUTPERFORMS CONVENTIONAL AGRICULTURE IN CRITICAL ASPECTS

Sustainable Agriculture was always better than conventional for the planet: now it also creates more jobs and produces more food for people, equating to more revenue opportunities for farmers.

Indeed, employment is boosted because organic farming creates more jobs per hectare than conventional farming for the same production, as the former uses 2.4 annual work units and the latter only 1.5.

Food production is also enhanced. In Europe, organic farmland has more than doubled in the last decade and each year 500,000 hectares of land are converted into organic production, to the point that embracing more globally an agroecological approach could feed Europe by 2050.

Sustainable agriculture reconciles value for the producer and value for society. In the dairy industry it has been demonstrated that sustainable agriculture requires less input (pesticide use divided by three) and yet generates higher margins (+24%) for farmers than conventional one.

More generally, a study commissioned by the UN Foundation shows that new food models and land use could create US\$1300-2300 billion by 2030.

INRA, Vers des agricultures à haute performance, <http://inra-dam-front-resources-cdn.brainsonic.com/ressources/afile/243141-20890-resource-vers-des-agricultures-a-hautes-performances-synthese-1-agriculture-biologique.html> ; [http://www.agencebio.org/sites/default/files/upload/documents/4\\_Chiffres/BrochureCC/CC2013\\_chap4\\_France.pdf](http://www.agencebio.org/sites/default/files/upload/documents/4_Chiffres/BrochureCC/CC2013_chap4_France.pdf)

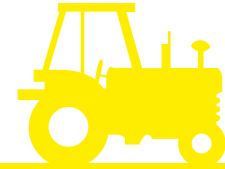
WWF-CIVAM Report, [https://www.wwf.fr/sites/default/files/doc-2018-10/20181015\\_etude\\_civam\\_wwf\\_2018-min.pdf](https://www.wwf.fr/sites/default/files/doc-2018-10/20181015_etude_civam_wwf_2018-min.pdf)

European Commission, [http://ec.europa.eu/agriculture/rica/pdf/Organic\\_2016\\_web\\_new.pdf](http://ec.europa.eu/agriculture/rica/pdf/Organic_2016_web_new.pdf) ; USDA Foreign Agriculture Service, [https://gain.fas.usda.gov/Recent%20GAIN%20Publications/EU%20Organic%20Boom%20Brings%20Opportunities%20for%20U.S.%20Exporters\\_Berlin\\_Germany\\_2-6-2018.pdf](https://gain.fas.usda.gov/Recent%20GAIN%20Publications/EU%20Organic%20Boom%20Brings%20Opportunities%20for%20U.S.%20Exporters_Berlin_Germany_2-6-2018.pdf)

IDDR, An agro-ecological Europe : a desirable, credible option to address food and environmental challenges, [https://www.iddri.org/sites/default/files/PDF/Publications/Catalogue%20Idddri/D%C3%A9cryptage/201809-IB1018-TYFAEN\\_0.pdf](https://www.iddri.org/sites/default/files/PDF/Publications/Catalogue%20Idddri/D%C3%A9cryptage/201809-IB1018-TYFAEN_0.pdf)

Business & Sustainable development commission, Valuing the SDG prize in food and agriculture <http://s3.amazonaws.com/aws-bsdc/Valuing-SDG-Food-Ag-Prize-Paper.pdf>

## AVERAGE FULL-TIME EQUIVALENT PER AGRICULTURAL HOLDING

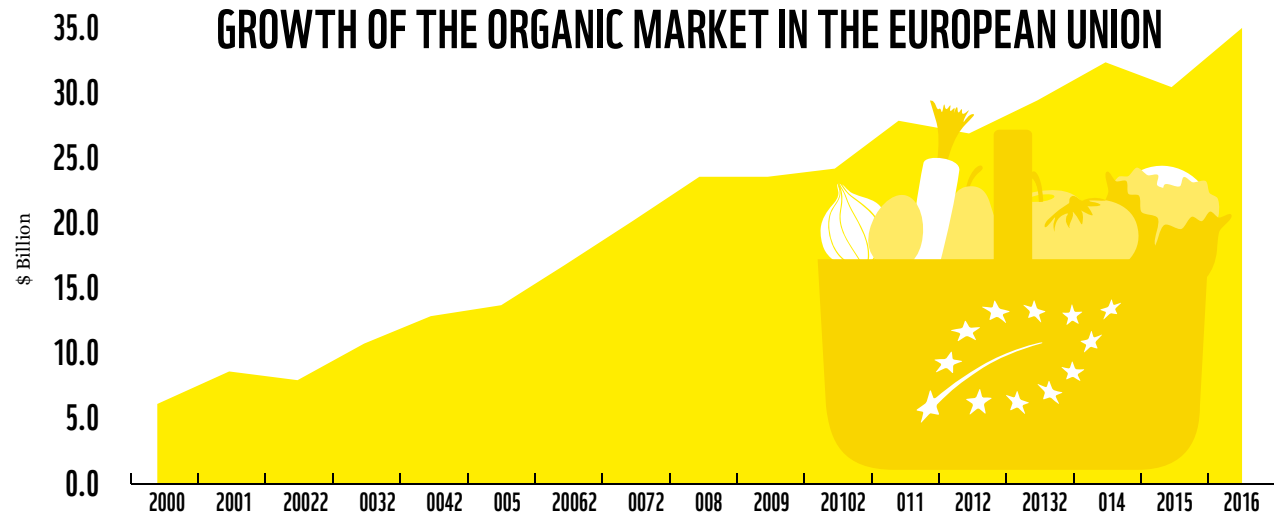


ORGANIC FARMS

2.4

NON-ORGANIC FARMS

1.5



# TOMORROW'S OPPORTUNITIES: SEIZING CIRCULAR ECONOMY'S DEVELOPMENT POTENTIAL

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In a world of increasing competition for limited resources, resource efficiency is economic development's new frontier. Some sectors are forced to adapt, as today a third of the world's energy consumption is covered by mandatory standards and regulations, compared with just 11% in 2000.

Yet a more proactive vision sees businesses recognizing a present opportunity instead of waiting for future legal constraints. In Europe for instance, circular economy could result in overall benefits of €1.8 trillion by 2030, twice the benefits seen on the current development path (€0.9 trillion). Similarly, it could increase average disposable income for EU households by €3,000, or 11% higher than the business as usual development path. This would further translate into an 11% GDP increase by 2030, compared with +4% for the current development path.

Studies show that a 30% improvement of resource productivity by 2030 could create over 2 million jobs, while every percentage point reduction in resource use leads to 100 000-200 000 new jobs.

Some sectors are already taking advantage of the business opportunities of protecting the planet. In the cement industry, for instance, the share of fossil wastes and biomass has gone from almost nothing in 1990 to 28% and 14.8%, respectively, in 2015.

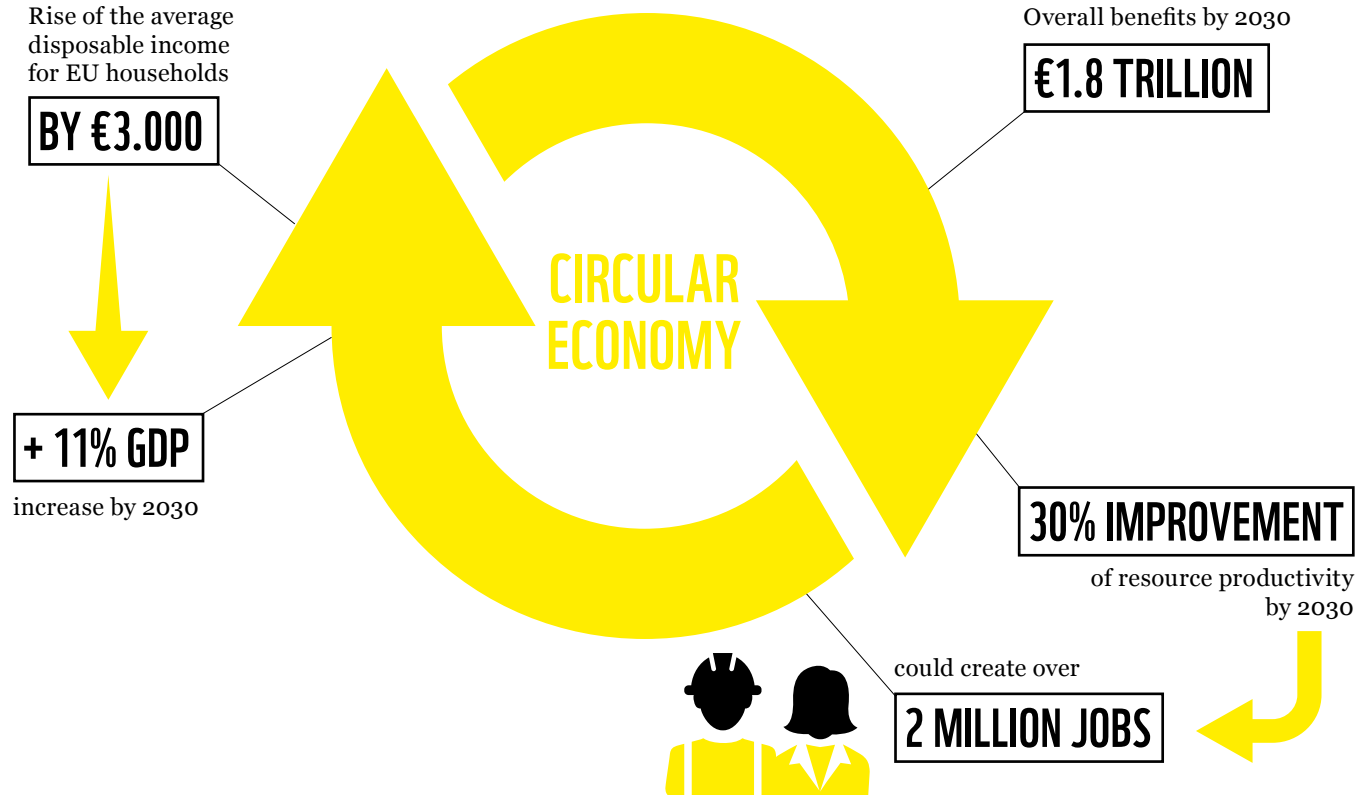
European Commission : [https://ec.europa.eu/epsc/sites/epsc/files/epsc\\_-\\_10\\_trends\\_transforming\\_climate\\_and\\_energy.pdf](https://ec.europa.eu/epsc/sites/epsc/files/epsc_-_10_trends_transforming_climate_and_energy.pdf)

Mc Kinsey Center for Business & environment, Ellen Macarthur Foundation, <https://www.ellenmacarthurfoundation.org/news/circular-economy-would-increase-european-competitiveness-and-deliver-better-societal-outcomes-new-study-reveals>

COWI, Ecorys, Cambridge Econometrics, for the European Commission (2011), The cost of not implementing the environmental acquis, Final report. 283 Ibid.

ILO, Greening with jobs, WESO Outlook 2018, [https://www.ilo.org/weso-greening/documents/WESO\\_Greening\\_EN\\_web2.pdf](https://www.ilo.org/weso-greening/documents/WESO_Greening_EN_web2.pdf)

# CIRCULAR ECONOMY'S DEVELOPMENT POTENTIAL



**AS CLIMATE-RELATED RISKS  
ARE A SOURCE OF FINANCIAL RISK  
WE AS CENTRAL BANKS  
AND SUPERVISORS SHARE  
WWF'S OBJECTIVES**



As climate-related risks are a source of financial risk, we as Central Banks and Supervisors share WWF's objectives. While the risks may be realized in the long run, they call for action now.

The Central Banks and Supervisors Network for Greening the Financial System (NGFS), launched one year ago by Banque de France and 7 other founding members, now gathers around 35 members and international organizations globally. This coalition of the willing seeks the development of climate related financial risk management and the mobilization of mainstream finance to support the transition toward a sustainable economy.

The work ahead is tremendous – sizing climate-related risks and their financial stability impact is complex with a number of analytical challenges. To help guide our work, regulators have a key role to play and the European Commission is paving the way with its ongoing Action Plan on financing sustainable growth (including a harmonized taxonomy, a disclosure framework and improved green asset standards).

The NGFS will reach an important milestone in April this year with the publication of its first report and will prolong its efforts in the years to come. We shall continue, all together with NGOs, our work to protect our common good.

**François Villeroy de Galhau**

*Governor of the Banque de France,*

*Secretariat of the Network for Greening the Financial System*

# NOTES

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# TOGETHER POSSIBLE

**1961**

WWF was founded  
in 1961

**+100**

WWF is active in  
nearly 100 countries,  
on 6 continents

**+30M**

WWF has over  
30 million followers  
on social media and  
messaging apps

**+5M**

WWF has  
over 5 million  
supporters



FSC

**100%**  
RECYCLED



## Why we are here

To stop the degradation of the planet's natural environment and  
to build a future in which humans live in harmony with nature.

[www.wwf.org](http://www.wwf.org)

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(Formerly World Wildlife Fund) ® "WWF" & "living planet" are WWF Registered Trademarks/

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