

Biomass:

An important pillar for the energy transition

and

Starting point for the biobased economy

CIEP Den Haag

7 June 2018



Powering. Reliable. Future.

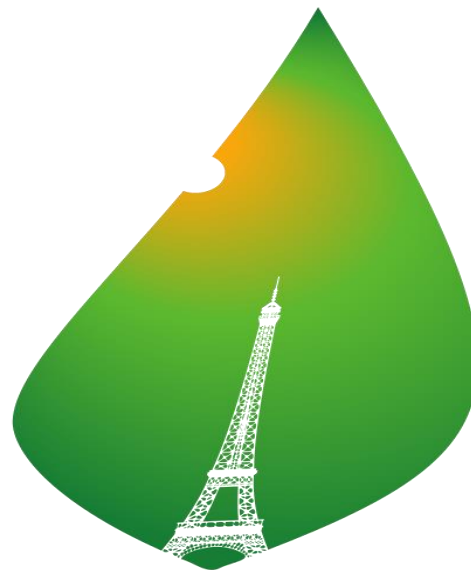
RWE

Climate change: our challenge

And our duty to work out a solution

We all agree
that we have to act now!

We discuss and have different ideas
about the route towards a sustainable future



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

The new NL Cabinet: challenging ambitions

supported by new, national measures

Target: CO₂ reduction of 49% in 2030 (versus 1990)

> Coalition agreement

- > Introduction CO₂ price floor for electricity sector
- > Phase out coal for energy production, latest by 2030
- > 20 Mton Capture and Storage CO₂ (CCS)

> New Climate Agreement in 2018

> Climate Law

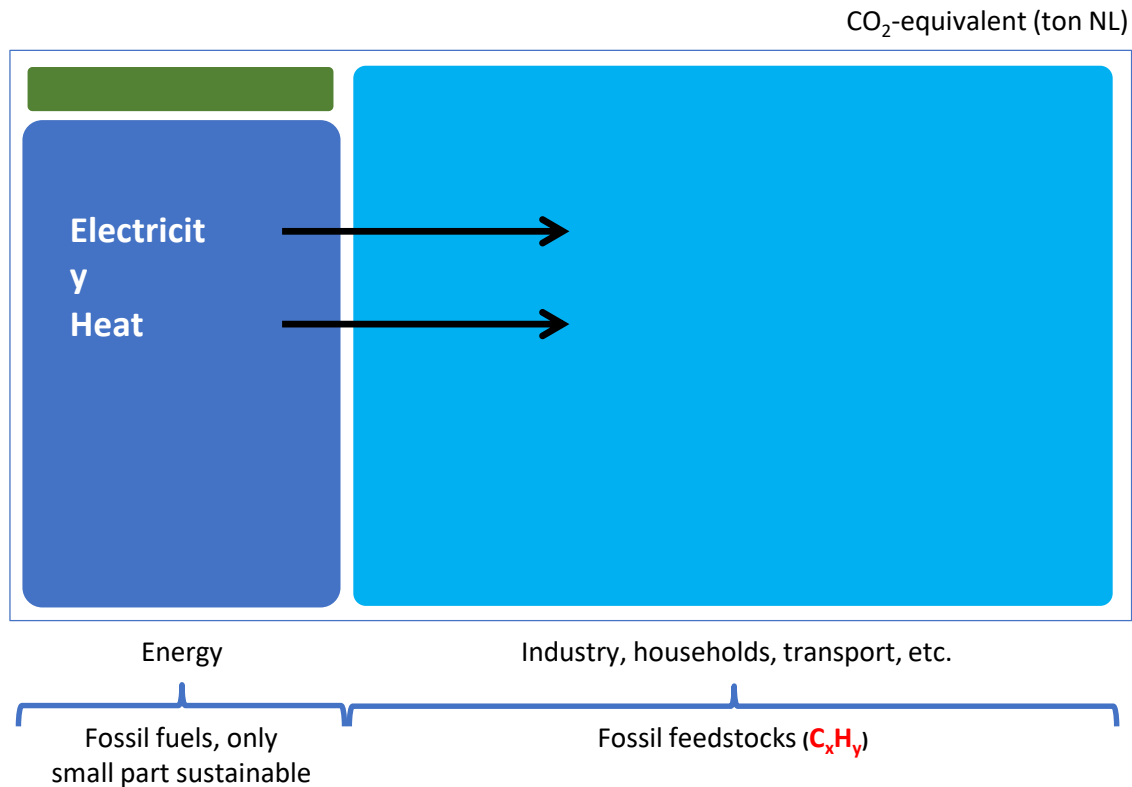


"I'm on a hunt to save Megatons of CO₂"

The world today

Based on a fossil hydrocarbon economy

- Electricity sector: responsible for 25% of equivalent greenhouse gasses
- 2017: 7% renewable
- Of which 60% biomass



CO₂ reduction

status of today?

- **1990-2017**

reduction 13% CO₂-eq
in GH gasses; size of
economy +73%

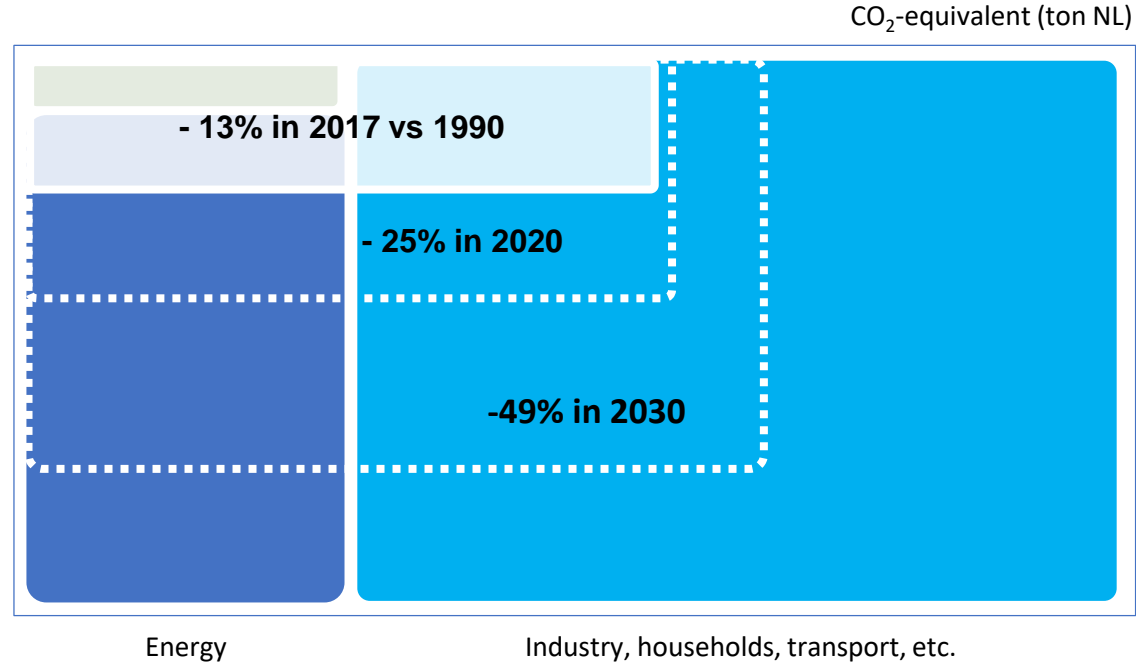
- **Target 2020**

25% CO₂-eq reduction
will be realised (?)

More than doubling
of renewables
(6% → 14%)

- **Co-Firing of biomass**

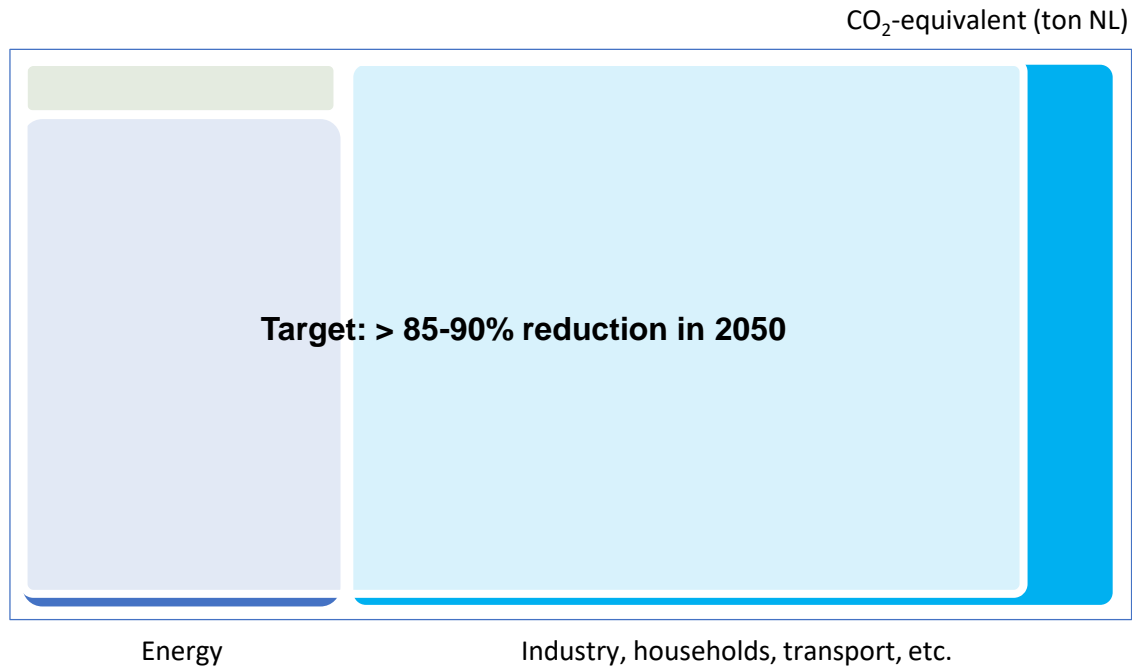
responsible for 15% of
required growth of
renewables till 2020



The Paris climate agreement

what does it mean for us?

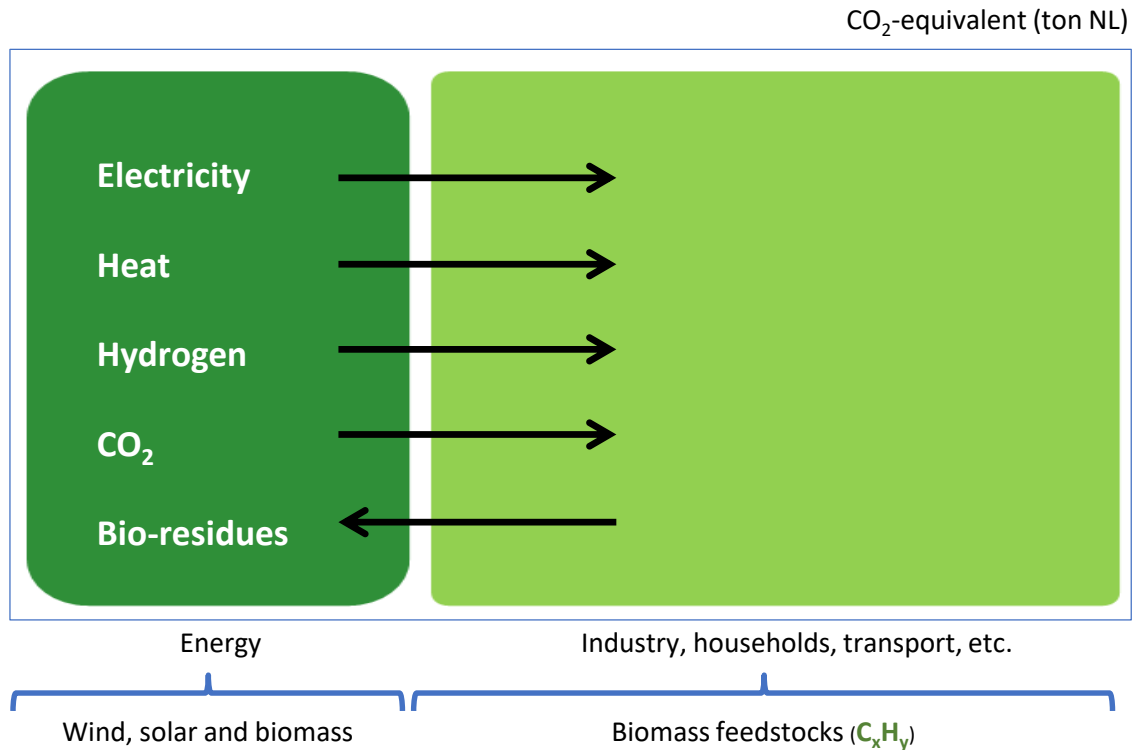
- **Much more than just an energy transition!**
- Making our energy supply fully sustainable, while keeping it reliable
- CO₂ reduction in other part economy through
 - Energy saving and recycling (circular economy)
 - Electrification
 - Transition fossil to hydrogen and 'bio-based'



A vision, our world of tomorrow

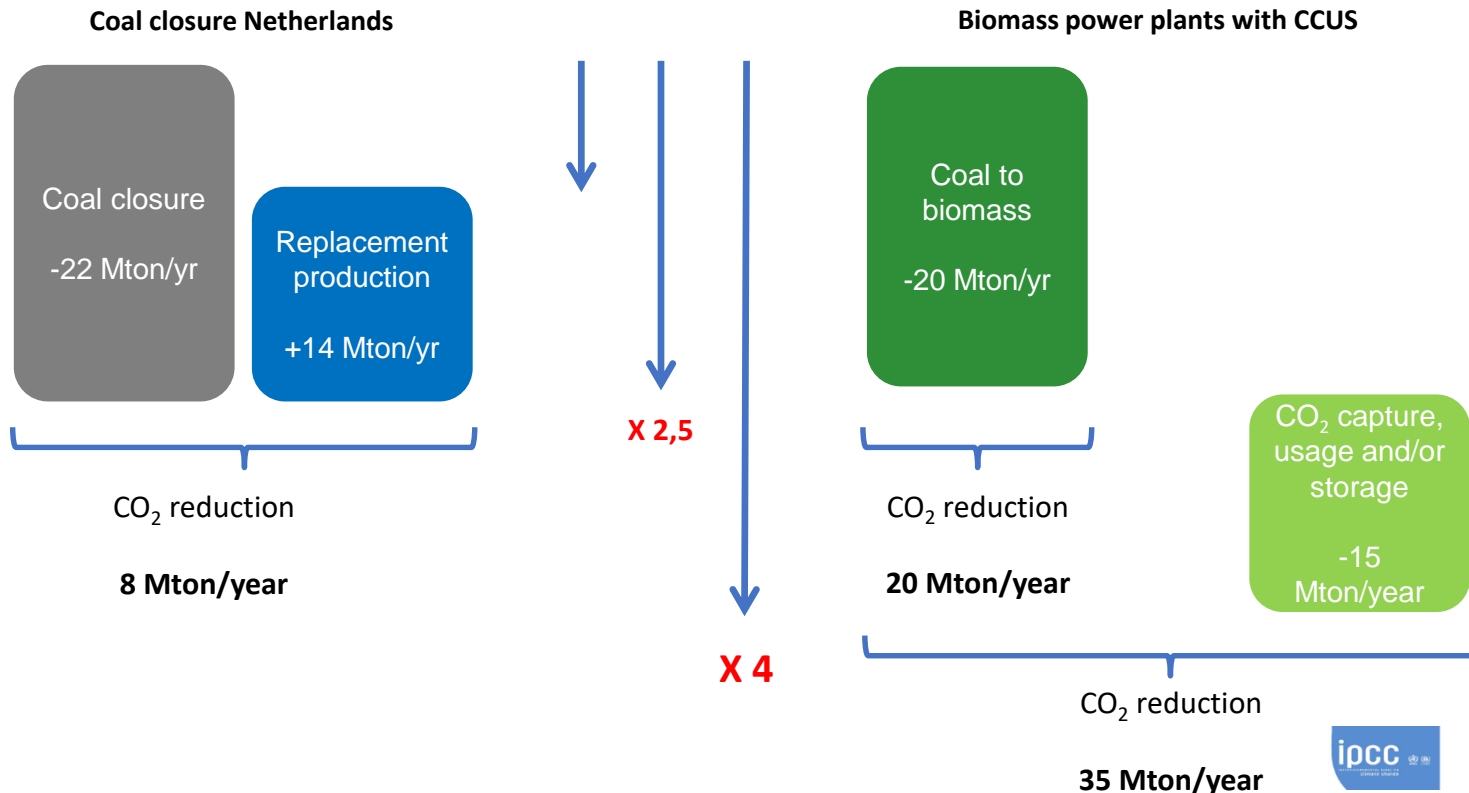
based on sustainable energy and biobased economy

- Fully sustainable energy supply , reliable through firm power (biomass, H₂)
- Further electrification of transport, heating, etc.
- Bio-fuels and feedstocks for the industry and heavy transport
- Hydrogen out of sustainable energy
- Carbon out of biomass (through refineries or carbon capture, usage and/or storage CCUS)



Power plants and CO₂ reduction?

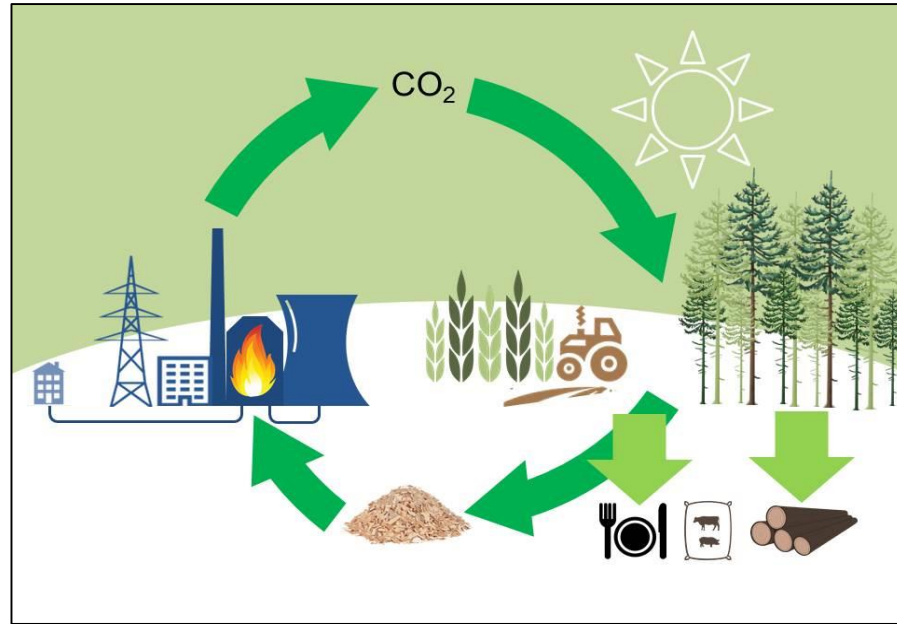
biomass with CCUS: much more effective than coal closure



Biomass, stored solar energy

a natural battery

- CO₂ neutral fuel and feedstock
- Biomass stores solar energy and carbon while it grows
- Currently based on woody biomass
- Development towards agro-residues
- Available in adequate quantities
- Based on stringent and agreed world class sustainability certification criteria



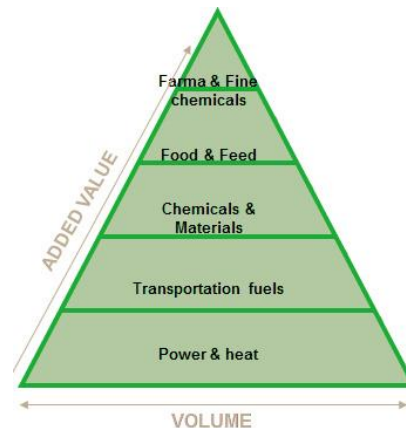
Towards a circular and biobased economy

partnerships between chemical and energy sector

- Cascading for better use of biomass and more environmental and financial value
- Agro, industry and energy to join forces
- Now is the time to set up new joint ventures, develop new feedstock streams and compose new biobased value chains
- RWE wants to be a partner in this biobased and circular economy
 - Supply of biomass
 - Processing of residues (e.g. waste-to-product)
- Biobased or green economy has a strong growth potential for the Dutch economy



7 March 2018: Presentation VNCI
Roadmap Chemistry for Climate



Zambezi: from idea to practice

Cascading for better use of biomass and more environmental and financial value

Biomass



Bio-
feedstock
(glucose)

Bio-
materials

Bio-fuel
(lignin)

Electricit
y
and heat



The Green Engine of the Dutch economy

- Without biomass we will not meet our 2030 and 2050 CO₂ reduction targets
- Energy transition asks for **and** more wind **and** more solar **and** more biomass
- Biomass will make our sustainable energy also reliable
- Biomass will be the only source for future sustainable fuels and materials
- 20 years ago we were the inventors of `Groene Stroom` (Green Electricity). Now we are fully committed to realise the biobased economy!



Thank you for your attention!



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