

Biomass:

An important pillar for
the energy transition

Starting point for the
biobased economy



Geertruidenberg

14 March 2018

Powering. Reliable. Future.

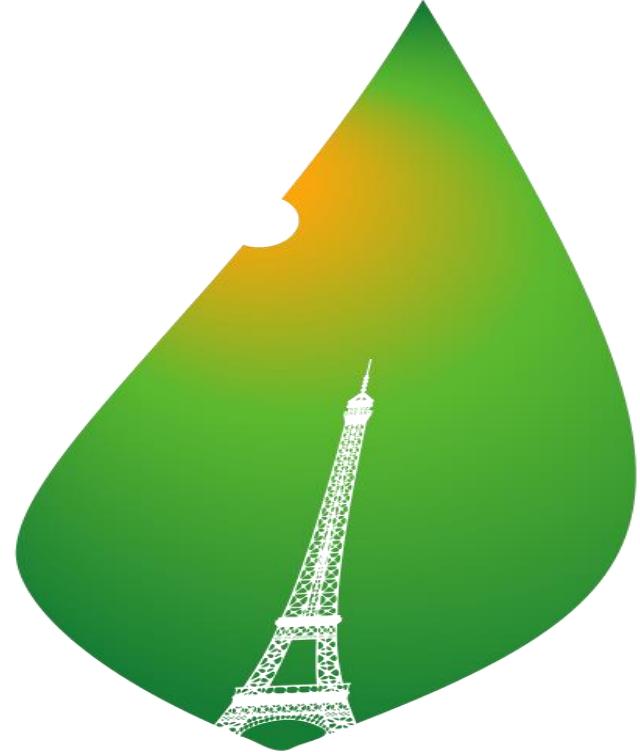
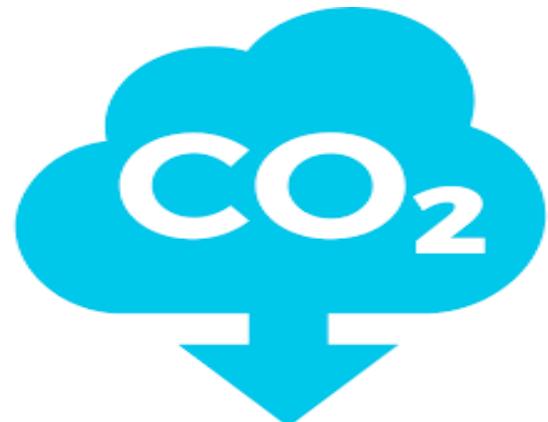
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Climate change: our challenge

And our duty to work out a solution

We all agree
that we have to act now!

We have different ideas
about the route to a sustainable future



PARIS2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

Circulair
Congres:
Agrifood, chemie
en energie samen
naar een
circulaire
economie

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The new NL Cabinet: challenging ambitions

New, national measures

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

- > Introduction CO₂ price floor for electricity sector
- > Phase out coal for energy production 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"

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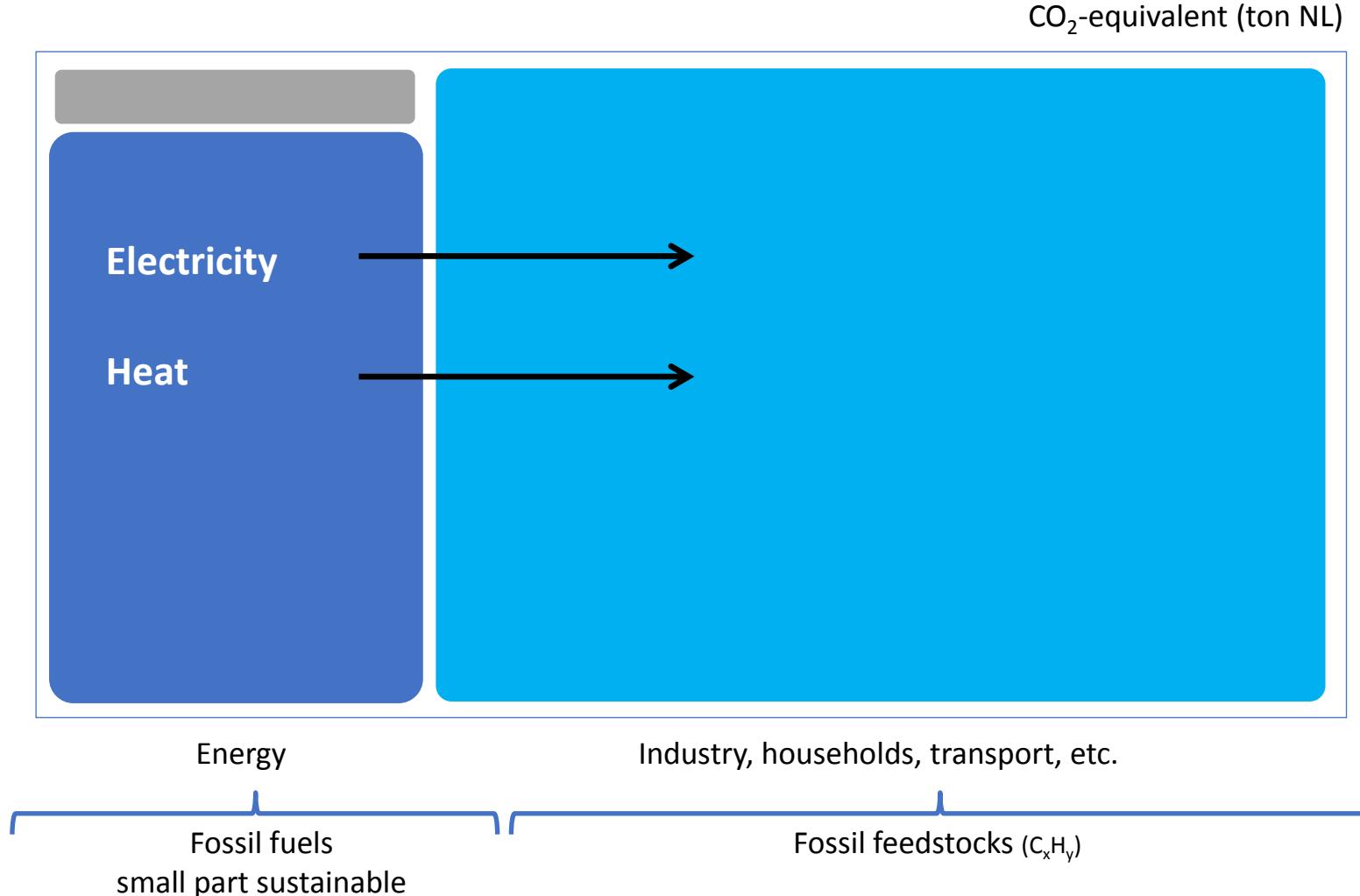
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The world today

Based on a fossil hydrocarbon economy

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- Electricity sector: responsible for 25% of equivalent greenhouse gasses
- 2016: 6% renewable
- Of which 2/3 biomass

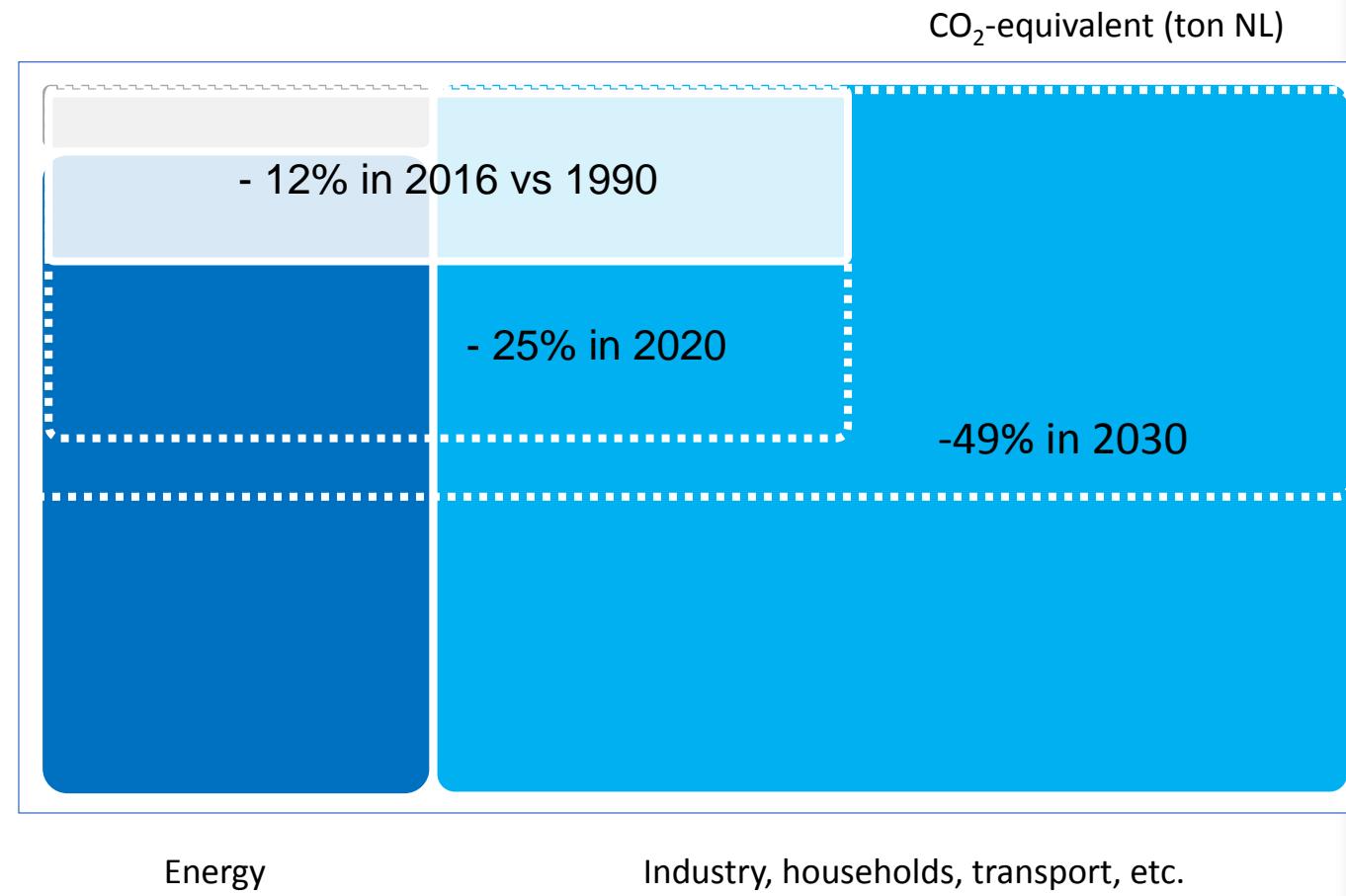


CO₂ reduction

status of today?

- **1990-2016**
reduction 12% CO₂-eq in GH gasses; size of economy +70%
- **Target 2020**
25% CO₂-eq reduction will be realised (?)

Large part further CO₂-eq reduction through doubling renewables (6% → 14%)
- **Co-Firing of biomass**
responsible for 15% of required growth of renewables till 2020

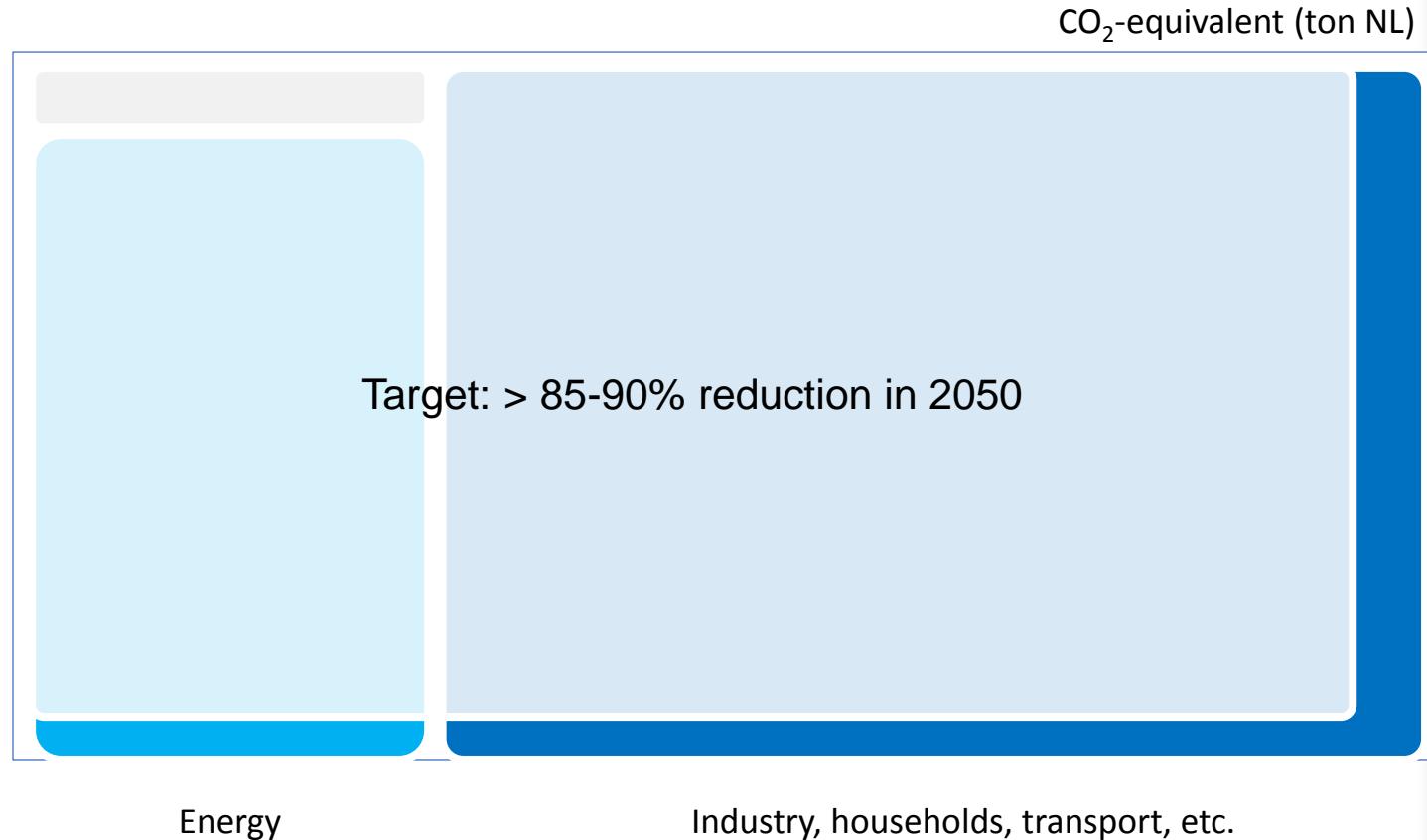


The Paris climate agreement

what does it mean to us?

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- Much more than just a energy transition!
- Making our energy supply fully sustainable
- CO₂ reduction in other part economy through
 - Energy saving
 - Electrification
 - Transition fossil to ‘bio-based’

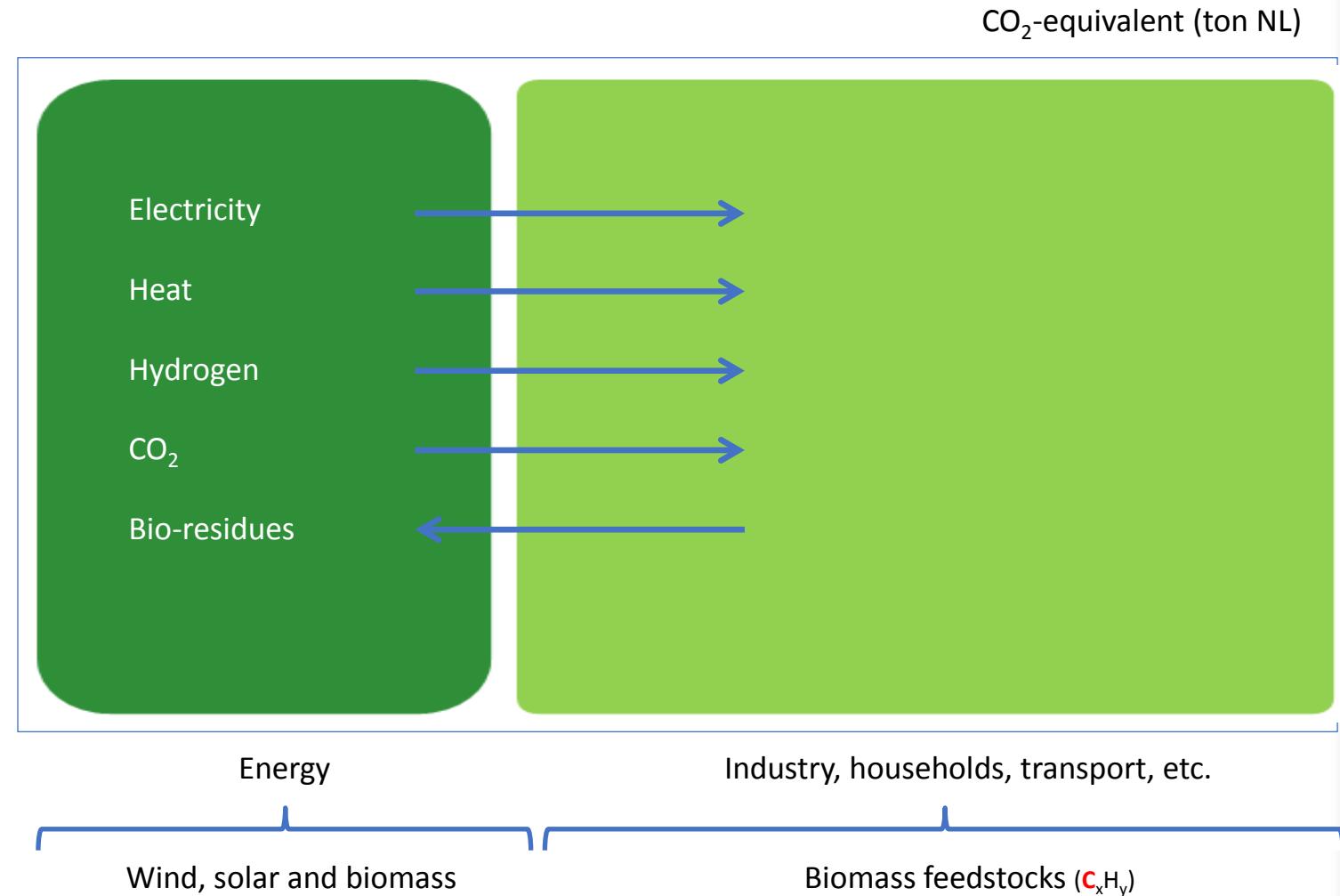


Our world of tomorrow

based on sustainable energy and biobased economy

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- Fully sustainable energy supply
- 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 (eventually through carbon capture and usage CCU)



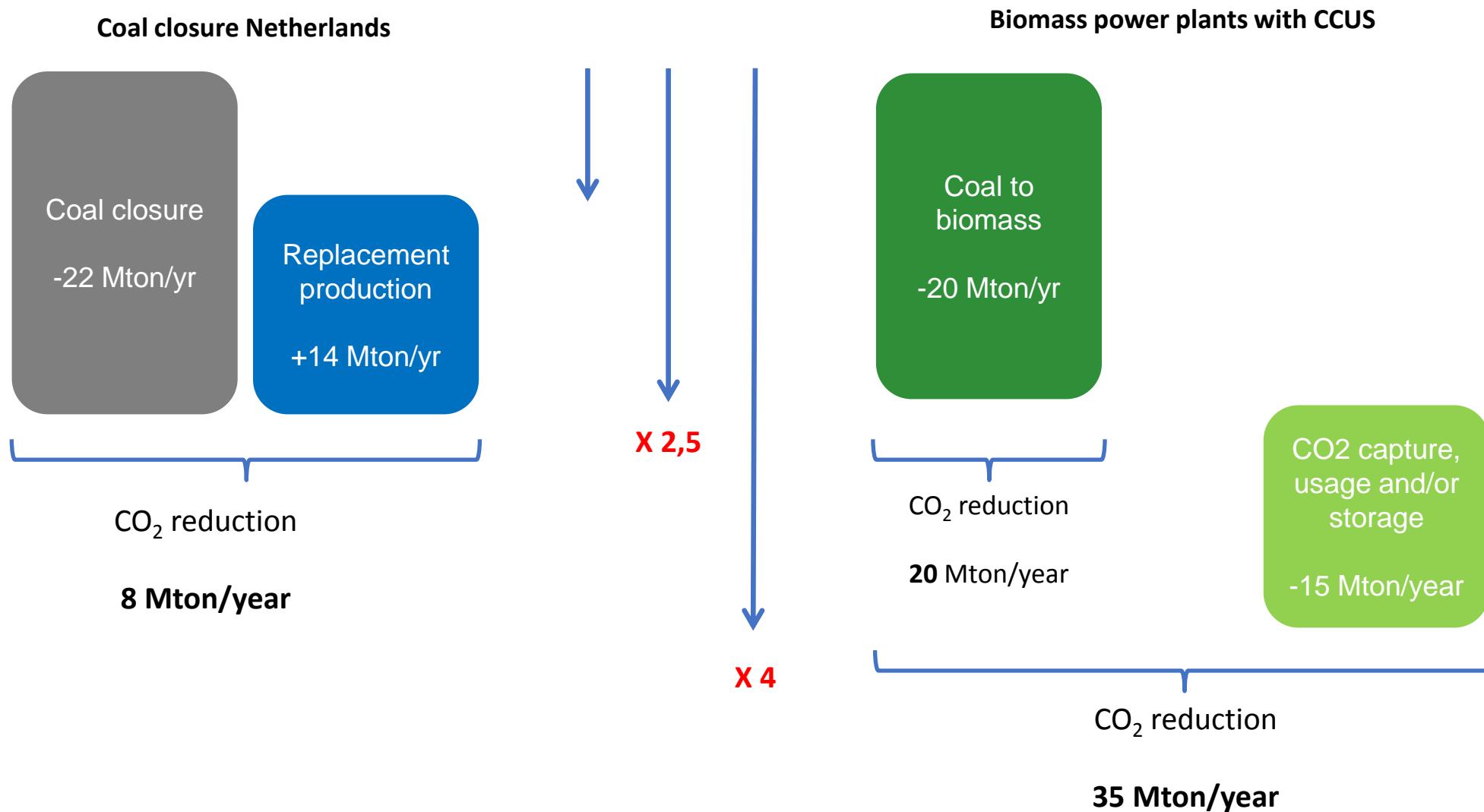
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Power plants and CO₂ reduction?

biomass with CCUS: much more effective than coal closure

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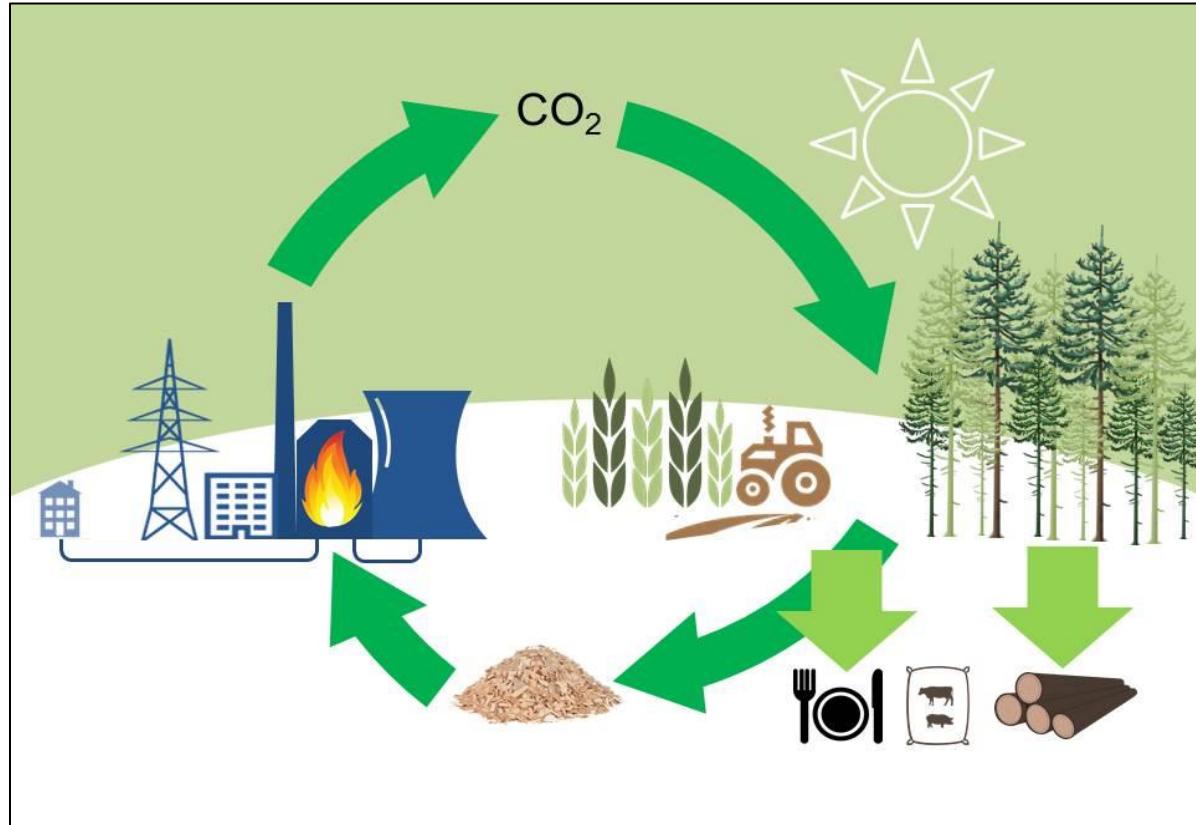
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Biomass, stored solar energy

a natural battery

- CO₂ neutral fuel and feedstock
- Currently based on woody biomass, development towards agro-residues
- Available in adequate quantities to supply all Dutch (and German) power plants
- Biomass stores solar energy and CO₂ while it grows
- Carbon out of biomass is crucial to supply the industry of feedstock for bio-fuels and bio-plastics



New feedstock for lower prices and diversification

Availability of wood and agro residues is no issue

- From wood to agro residues
- Availability is no issue, not for wood nor for agro residues
- For wood we have world class sustainability criteria in NL



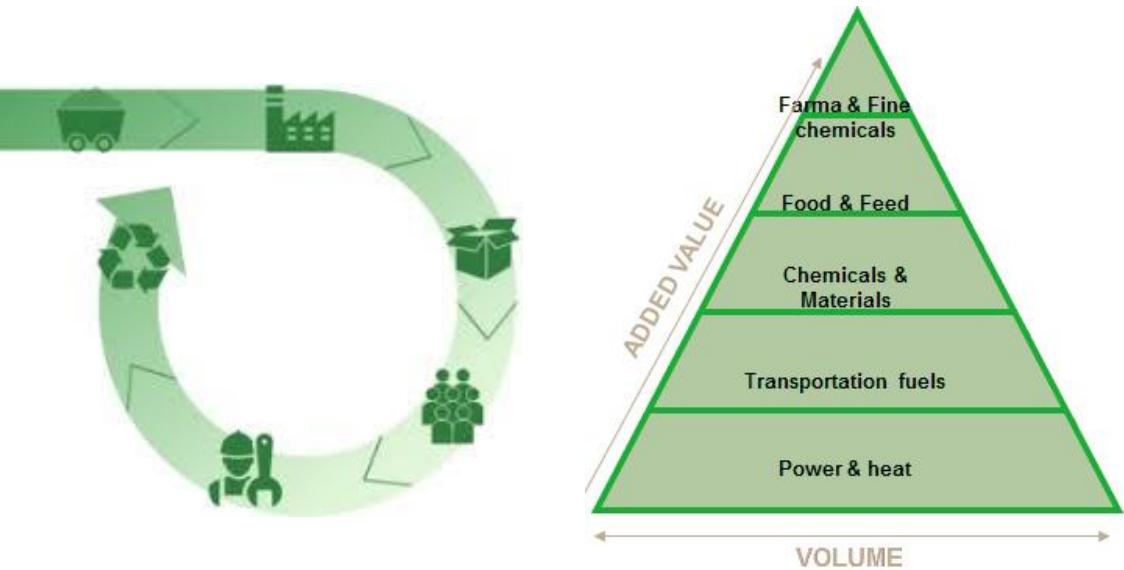
From biomass to biobased and circular: new pillar Dutch economy

partnerships chemical and energy sector

- Cascading for better use of biomass and more value
- Agro, industry and energy join forces
- Now is the time to set up new joint ventures, develop new feedstock and compose new biobased chains
- RWE partner in biobased and circular economy (e.g. waste to syngas)
- Biobased or green economy has a strong grow potential for the Dutch economy



7 March 2018: Presentation
Roadmap Chemistry for Climate



Zambezi: from good to better

Cascading leads to more efficiency better products

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Biomass



Bio-material
(glucose)

Bio-plastics

Bio-
brandstof
(lignine)

Electricity
and heat



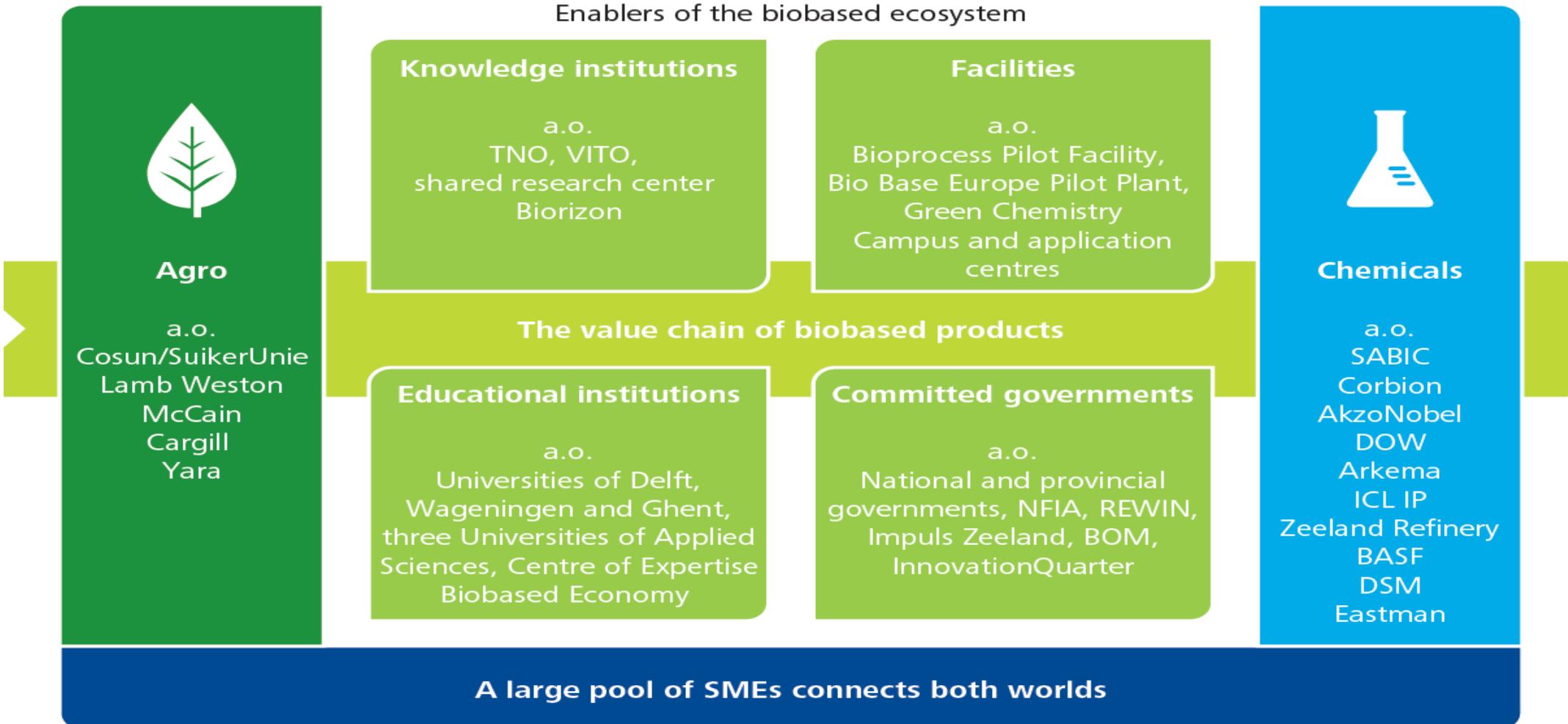
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CHEMPORT
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Enablers of the biobased ecosystem

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The Biobased Delta: **Where agro meets chemistry**

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Biobased economy, the Green of the Dutch economy

- Without biomass we will not meet the 2030 and 2050 CO2 reduction targets
- We need more solar and more wind and more biomass
- Only with biomass we can make more sustainable products
- Biobased economy will boost the Dutch economy
- RWE invented the name *Groene Stroom* (Green Electricity). We are also committed to make the biobased economy work



Thank you



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