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National energy outlook of the Netherlands 2014

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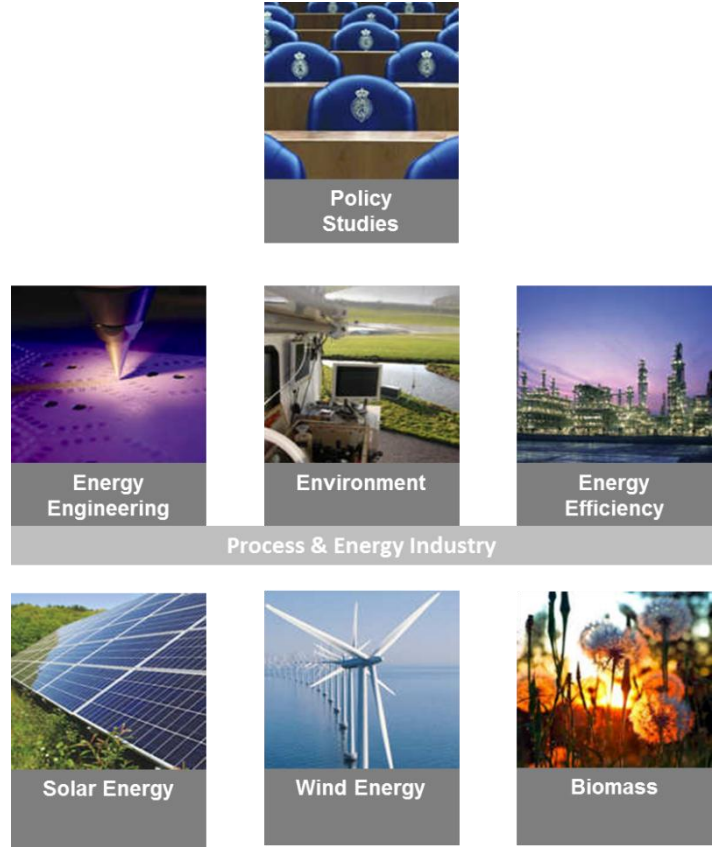
Energy research Centre of the Netherlands

- Strategic & Technological studies
  Creating insights in energy technology and policy
- Problem solving
  Using knowledge, technology, and facilities to solve our clients' issues
- Technology development
  Developing technology into prototypes and industrial application
- Not for profit organisation
  Tier-1-supplier for Dutch government on energy policy



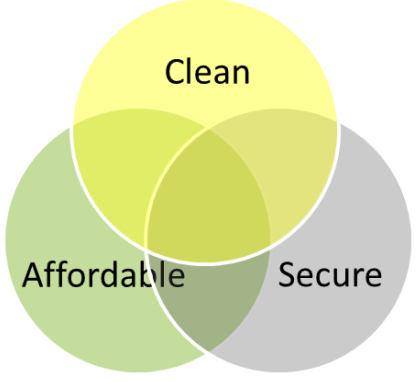
The Dutch energy context

- Fossil fuels dominant, gas exporting
- Energy ports and refineries
- Energy intensive industries & refineries make up 12,4% of GDP
- Densely populated; modest available area for renewable energy
- Small share renewable energy (2.3% in 2005, to 4.5% in 2013)
- Significant installed wind power capacity

Main principles of Dutch energy policy

- Clean, reliable and affordable energy supply
- Balanced mix of energy sources
- In the longer term: a sustainable energy supply
- Framed in the European Energy policy context
- EU 2030: 40% reduction GHG and 27% RES
- GHG emission reduction in 2050 : 80 - 95%

- 2013 Energy Agreement
  - 14% RES in 2020 and 16% in 2023
  - 100 PJ additional final energy efficiency
  - 15.000 Full time jobs
  - In 2030 a top-10 position in global Clean Tech Ranking



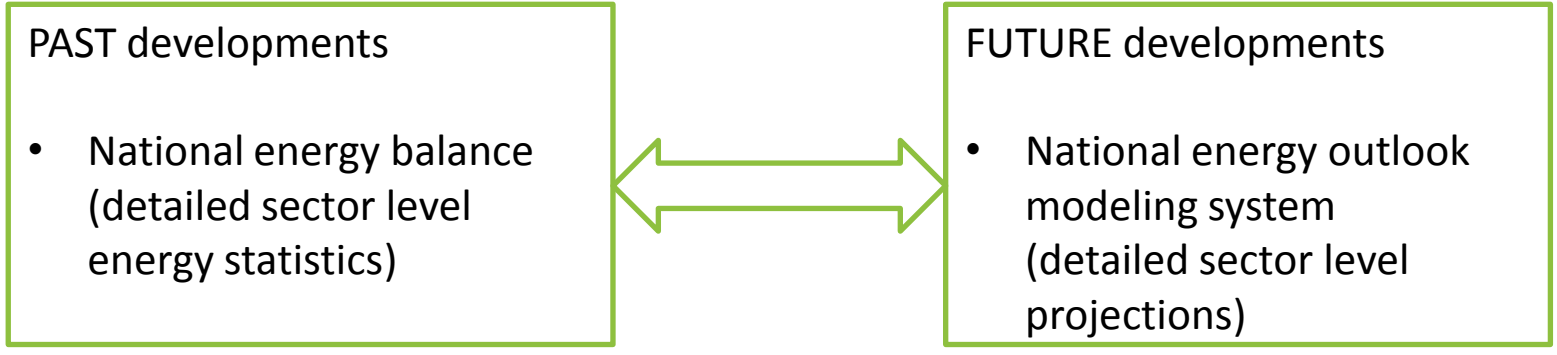
National Energy Outlook (NEO)

- Goal
  - Providing a factual, complete, integrally consistent, quantitative overview of the current state of affairs of and future expectations for the Dutch energy system, embedded in the developments in the surrounding world

- Use
  - Data for reporting obligations
  - Observed distances to targets mark areas for increased policy attention
  - Reference baseline for policy assessments

  - Set of up-to-date energy models available for additional analyses

Methodology



- Other statistics, other developments, analyses,
- interpretation, description

Methodology

- External developments
  - Energy prices
  - Economic development
  - Development and policy in neighbouring countries
- Two variants of policy and measures
  - Existing policies and measures
  - Intended policies and measures
- Uncertainties: margins

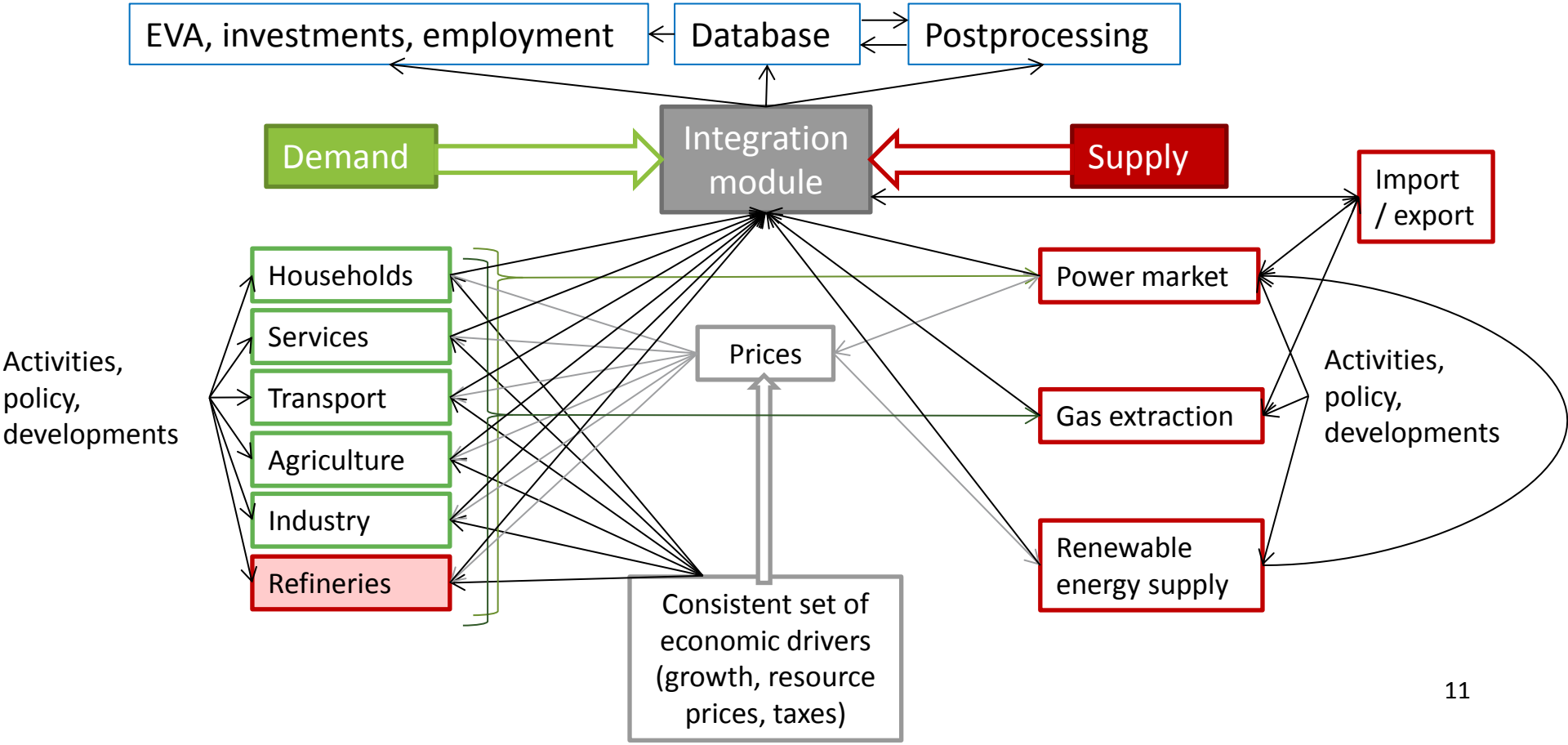
Data and cooperation

- Statistics Netherlands (CBS)
  - Detailed energy statistics, economic statistics
- Netherlands Enterprise agency (RVO.nl)
  - Interface of private sector activities and policy
- Netherlands environmental assessment agency (PBL)
  - Strategic policy analysis, interpretation, modeling
- Energy research Centre of the Netherlands (ECN)
  - Strategic policy analysis, interpretation, modeling, NEOMS

NEO modeling system

- Integrated modeling system with balanced supply and demand throughout the economy
- Long standing history, first component since 1982
  - In integrated form since mid 1990's
  - 'Living' model – continuously evolving
- Set of ~15 interconnected models for sectoral developments
  - Each model simulates developments in part of the energy system
  - Interconnections lead to internally consistent energy balance
- Consistent set of economic driving forces
  - (demography, economic growth, resource prices)

NEO modeling system



Submodels: simulating investment decisions

- Submodels are also used stand alone for sectoral policy assessments

E.g. Energy use in Households

- 'Micro data' on dwelling types, energy bills, household types and historic investments
- Allows modeling investment decisions for future investments
  - Existing dwellings: replacement decisions for boilers, windows, etc. following costs and observed investment behaviour
  - New dwellings: building code mandates energy efficiency measures – package dependent on investment costs

- Similar detail for other sectors

Submodels: simulating power market

E.g. Power market model

- Covers entire NW-European power market
- Data on technical and economic performance of individual plants
- CHP in industry and agriculture
- Renewable energy production from various sources

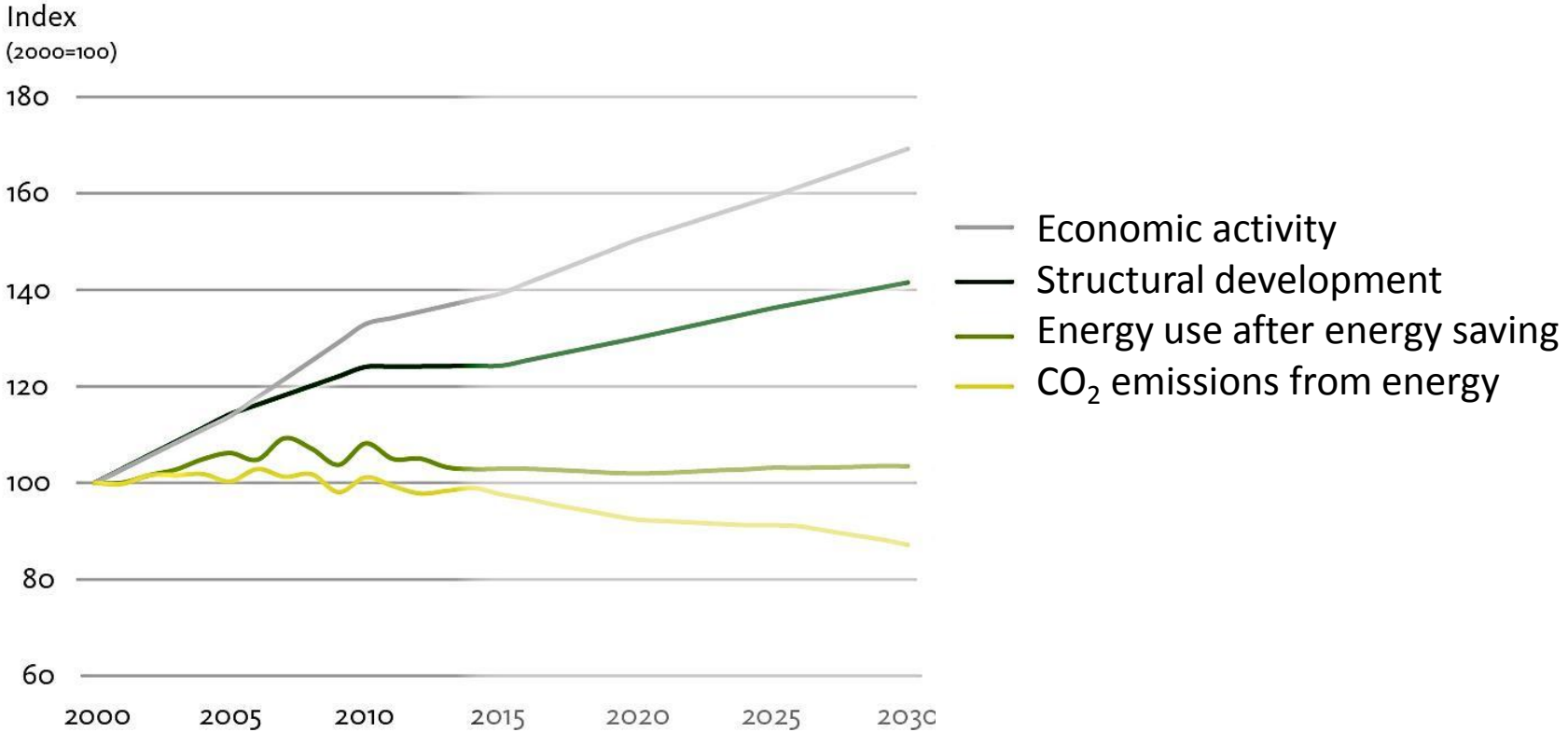
- Hourly match of demand and supply

- Resulting power mix and hourly commodity trading price

Results:

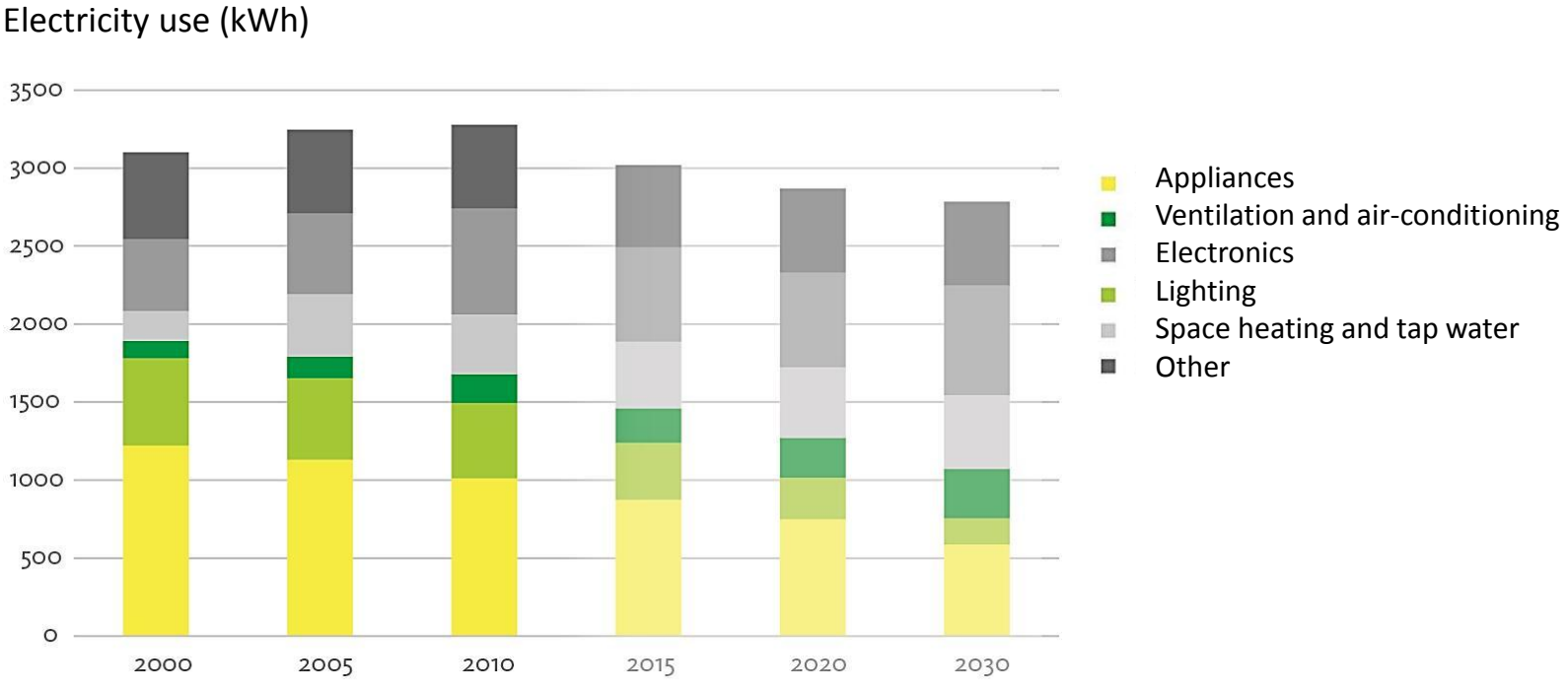
Energy transition in NL becomes visible

Energy use, CO_2-emissions and economy show ´decoupling´



Regulations work!

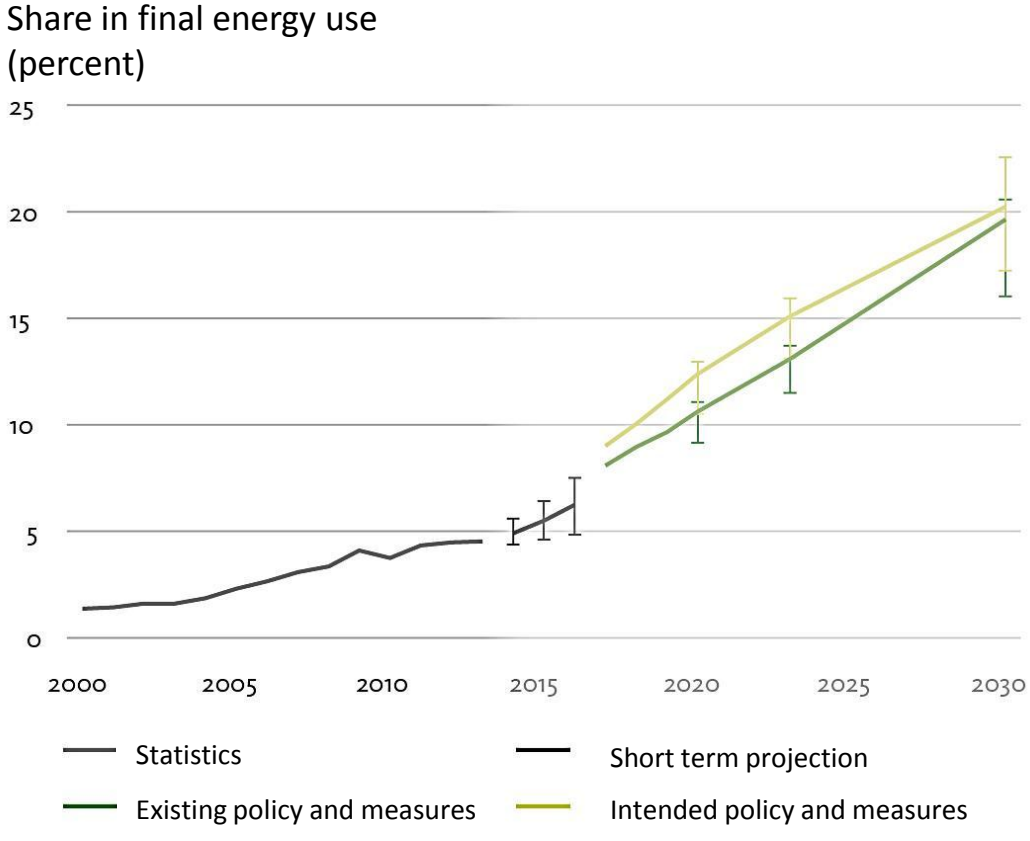
Average electricity use of households declines



Energy efficiency: Not all goals within reach (yet)

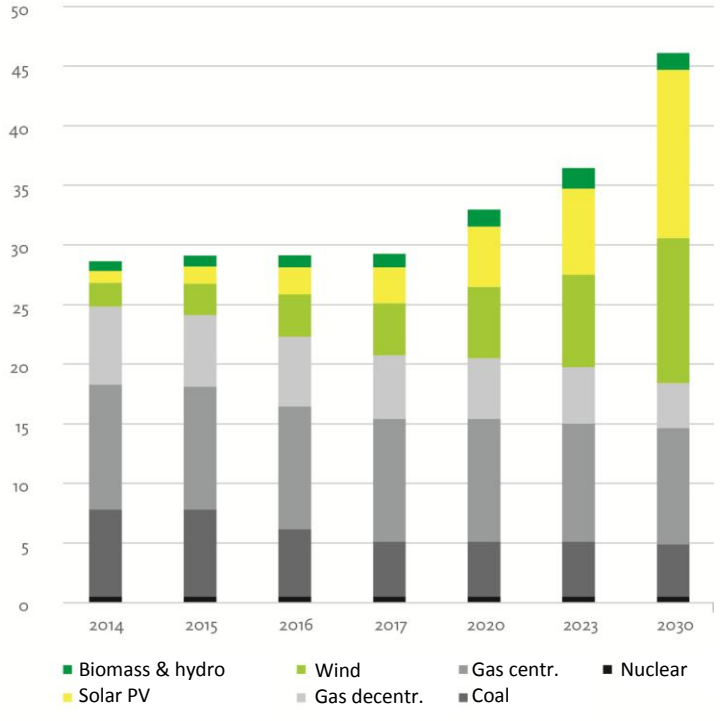
- Energy savings pace 2010-2020
  - Existing policy 1,0% p.a (0,7 – 1,2%)
  - Intented policiy 1.2% p.a. (1,0 – 1,4%)
  - After 2020 drop to 0,7% p.a.
- EU Energy efficiency directive
  - Existing policy: probably uncompliant
  - Intented policy: probably compliant
- Energy agreement 100 PJ additional
  - Out of reach yet

Substantial growth of renewable energy, big uncertainties

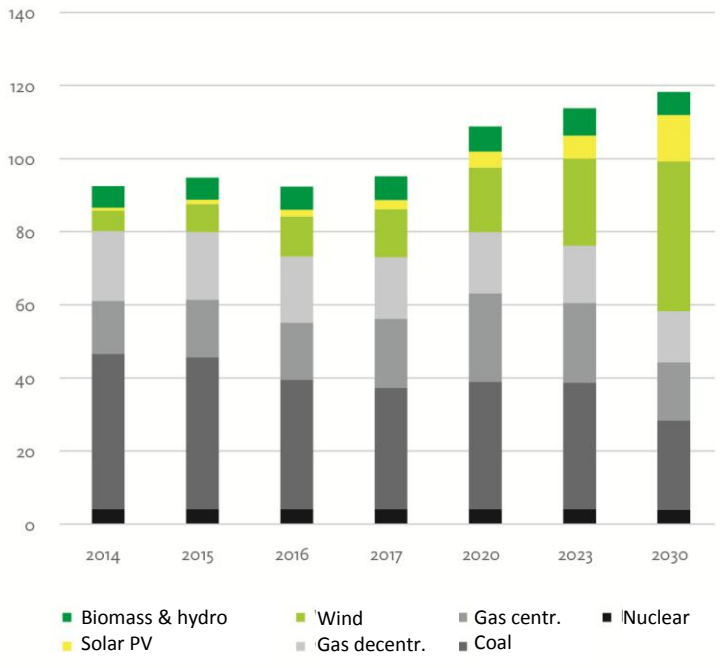


Electricity production

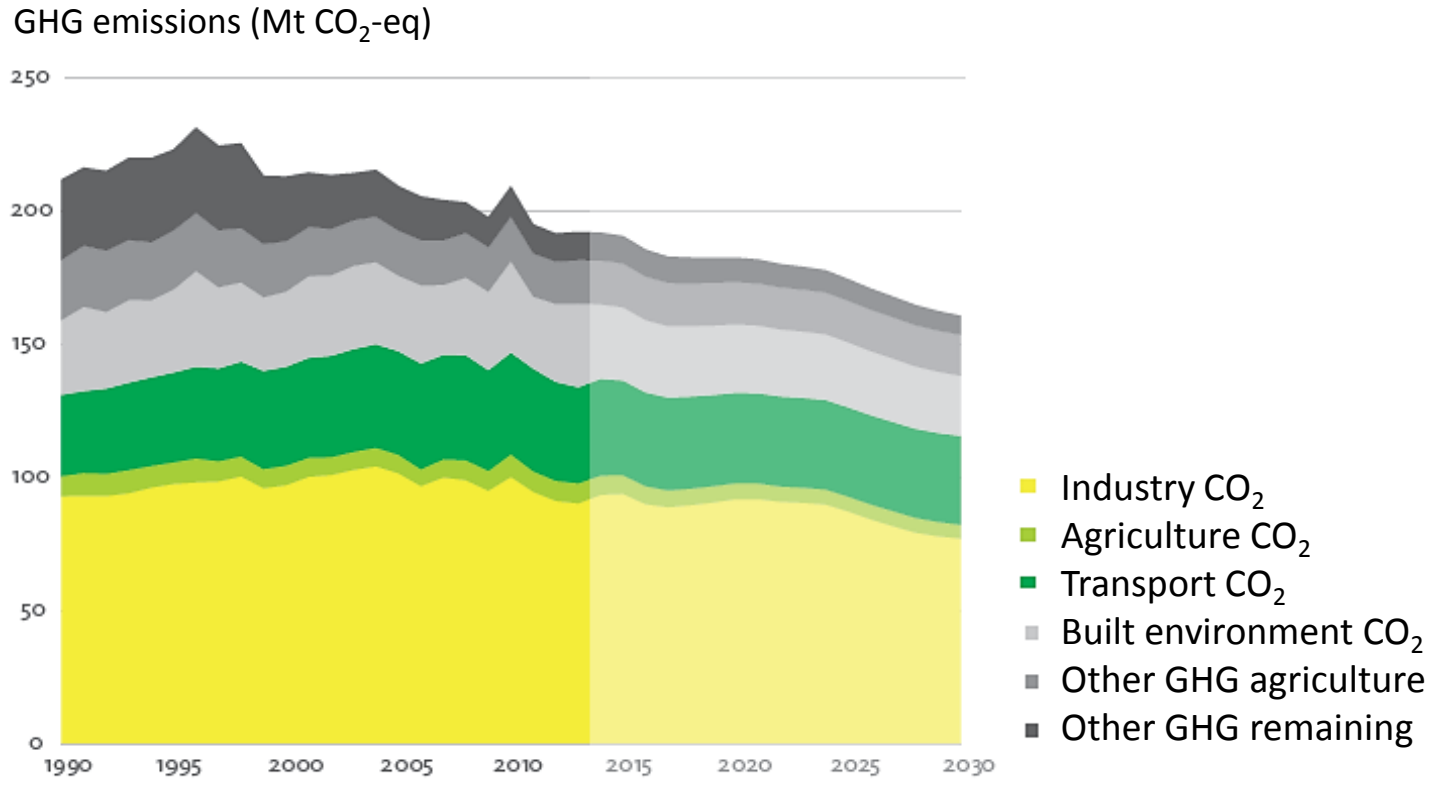
Capacity (GW)



Production (TWh)

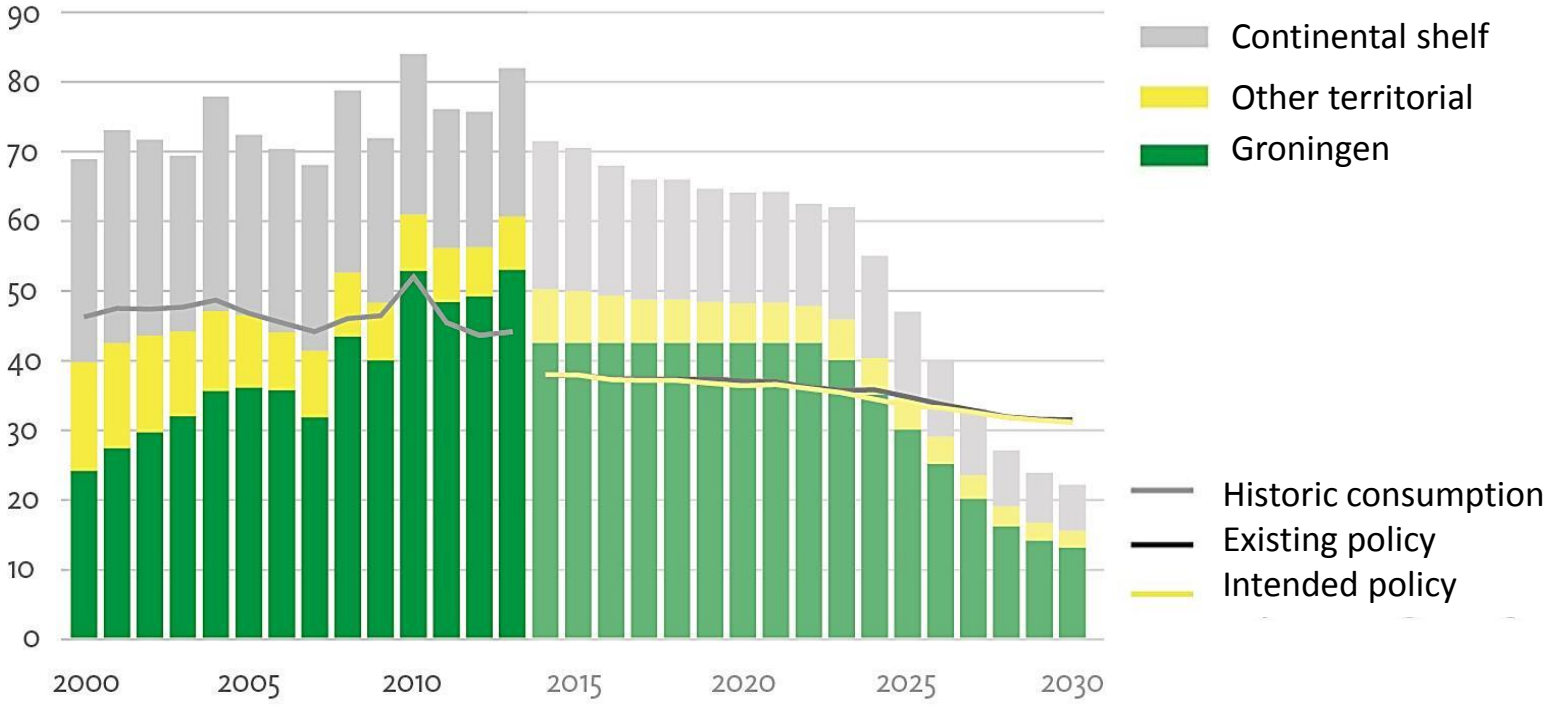


Greenhouse gas emissions declining

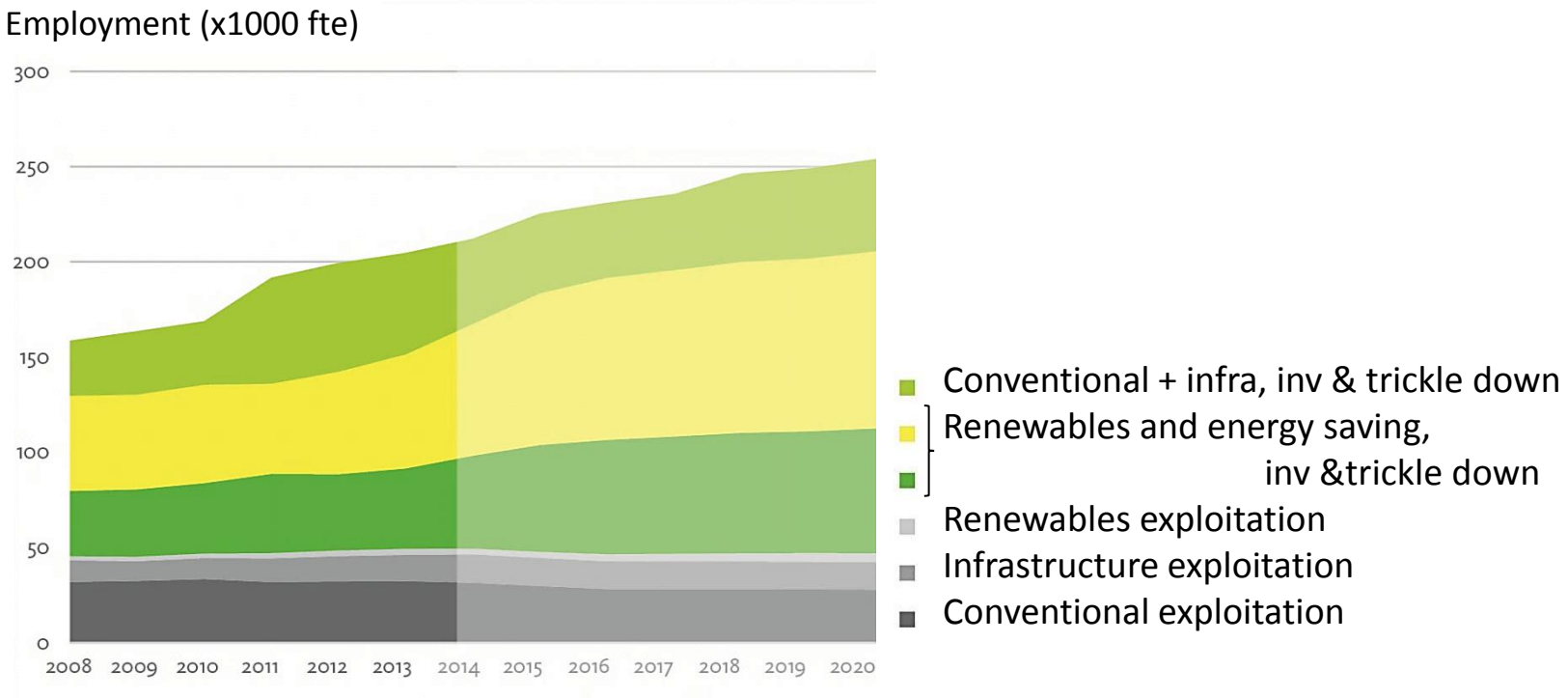


The Netherlands becomes gas importing country

Gas production and consumption (bln m^3 Geq)



Investments generate substantial employment



Conclusion

- Energy transition in the Netherlands becomes visible
  - Decoupling economic growth – energy use – greenhouse gas emission
  - Greenhouse gas target within easy reach
  - Renewable energy: substantial growth, big uncertainties
  - Energy savings: point of attention
  - Concept of ‘the Netherlands gasland’ under pressure
  - Growth energy related employment through investments

Inspirations, suggestions, questions?

Thank you for your attention

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