



Energy research challenges towards a sustainable energy system

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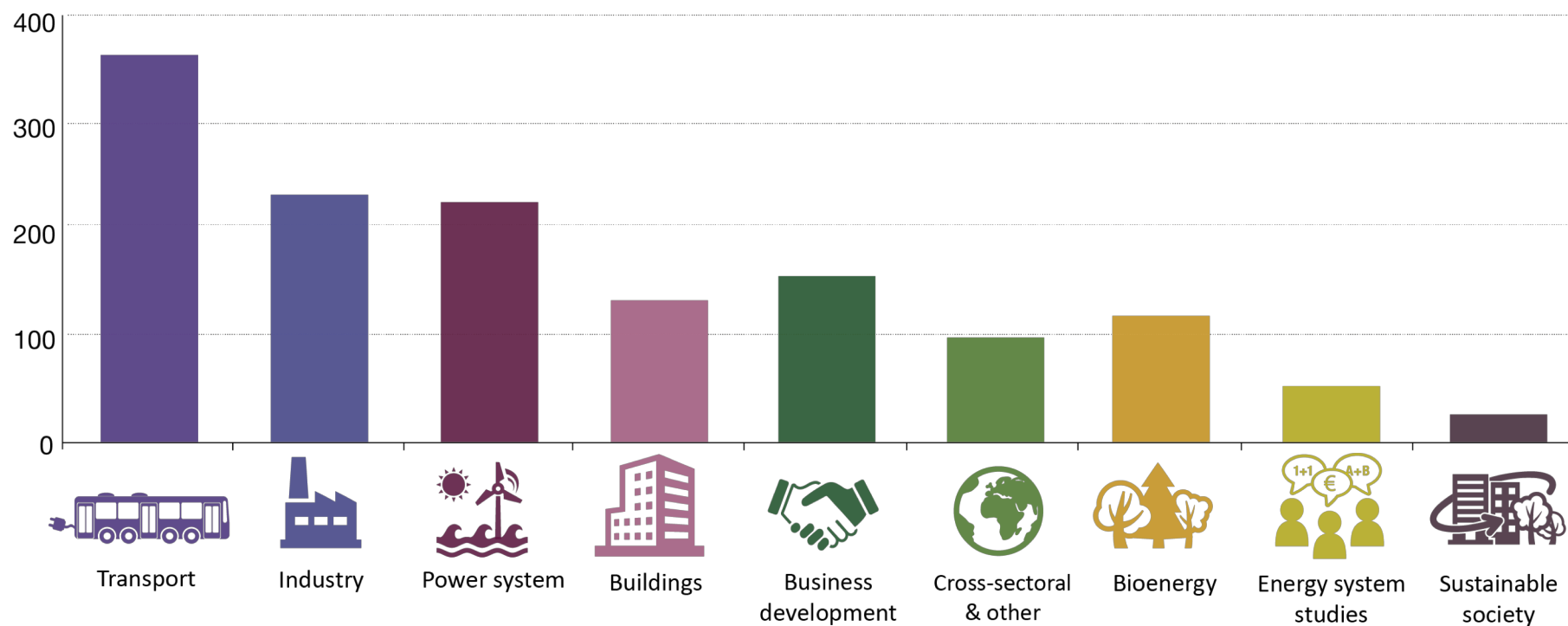
Dept. of Science and Innovation

About SwEA - Research and innovation

- Around 60 employees out of 430 total at SwEA
- From basic research to demonstration and implementation
- Annual budget approximately 160 million €
- Doubled through industrial co-funding
- Some 90 programmes and 1200 projects running
- In-house priority settings and evaluation of proposals



Research funding per theme area, 2018, million SEK



Energy policy targets for Sweden

100 percent renewable
electricity production by
2040

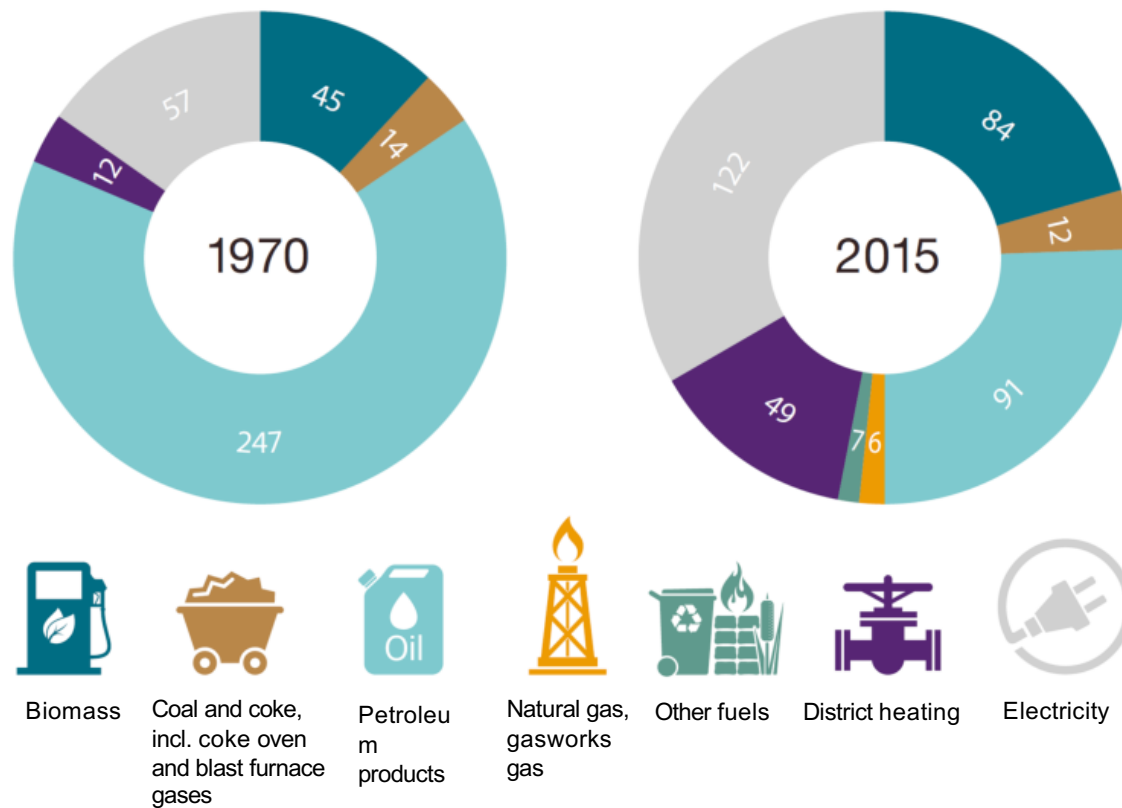
No emissions of
greenhouse gases
by 2045

50 percent more efficient
use of energy in 2030,
compared to 2005

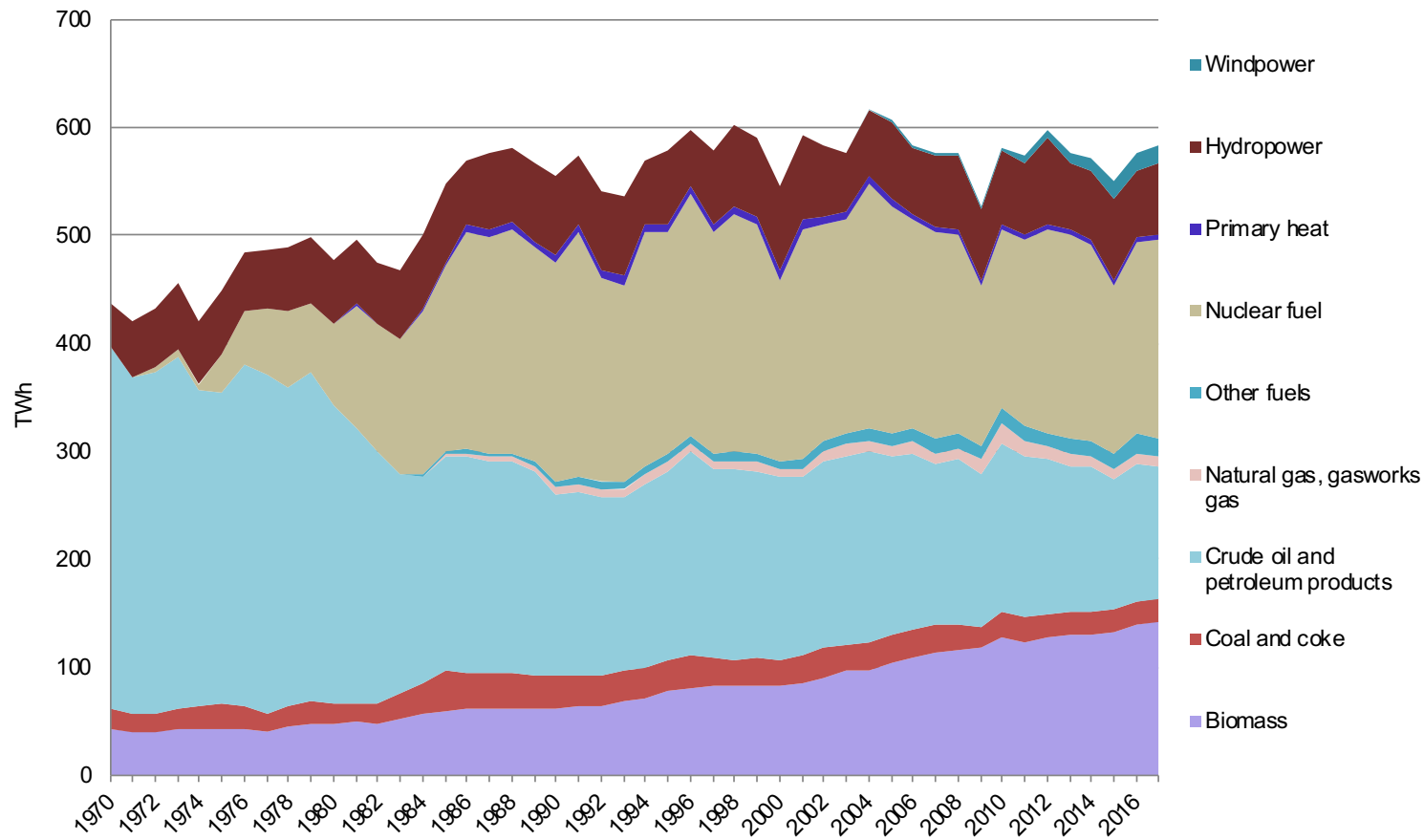


Three pillars for Sweden's energy policy

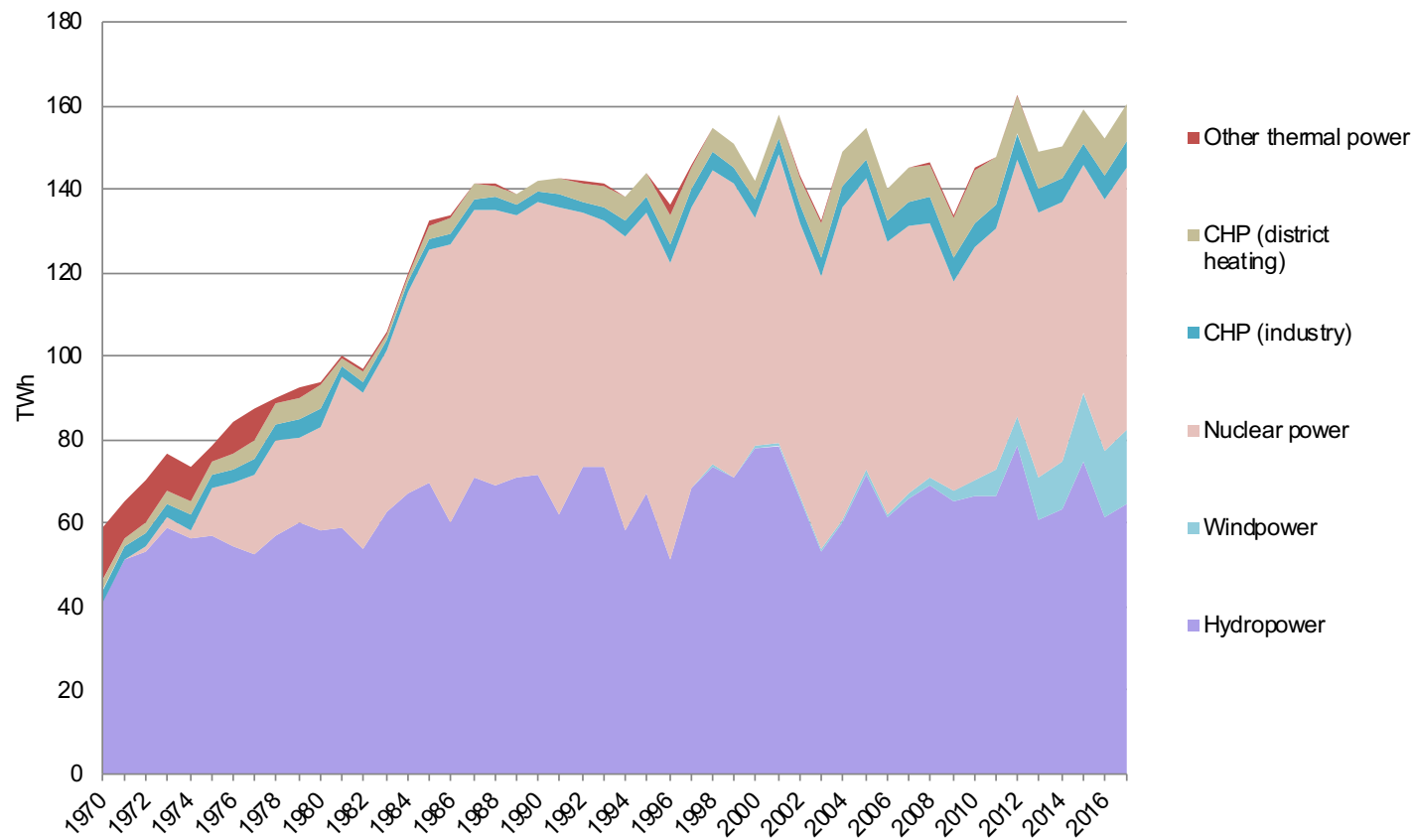
History of energy use, 1970 and 2015



Energy supply by energy commodity, 1970–2017, TWh

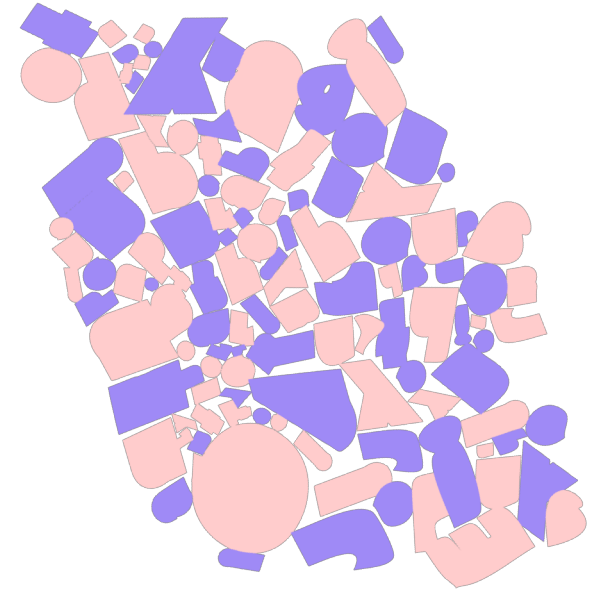


Electricity production by type of power, 1970-2017



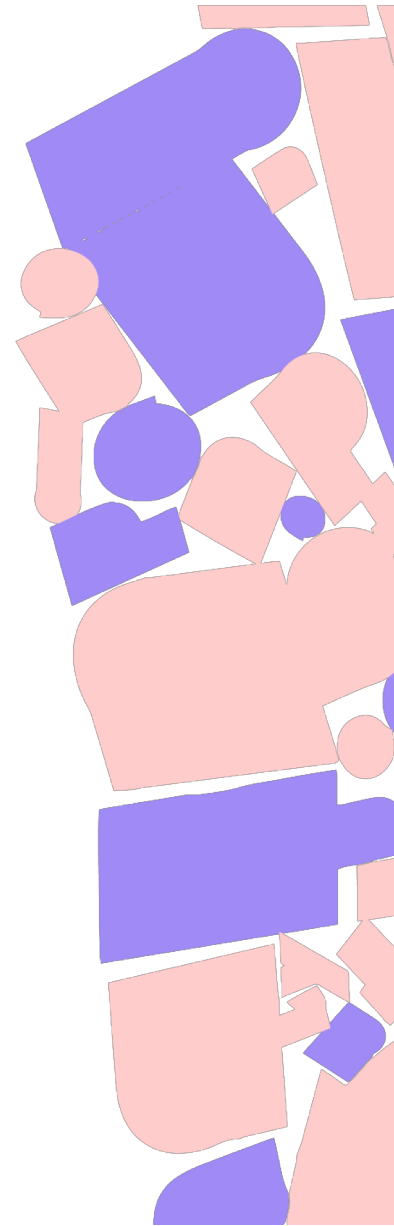
Sweden today

- Almost fossil-free electricity production
- Almost fossil-free heat production
- Low CO₂ emissions per capita
- Energy intensive industry, energy use per value has decreased



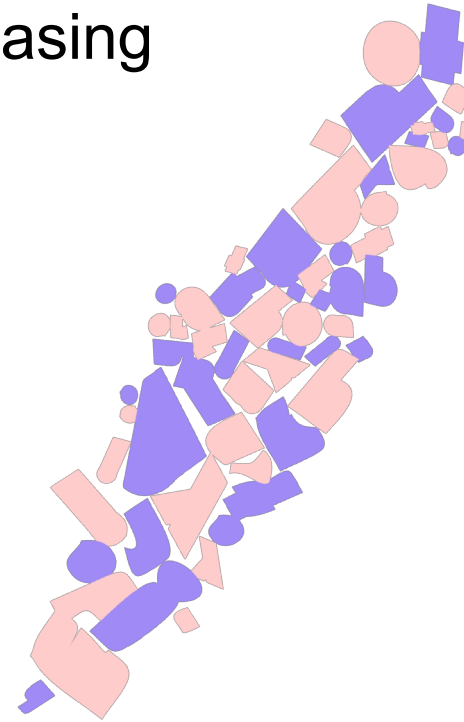
Future challenges for Sweden

1. 2050 vision: No net GHG emissions
2. Fossil independent vehicle fleet 2030
3. Energy efficiency 2030
4. Secure energy supply
5. Decommissioning of nuclear power plants



Sweden's energy consumption will have decreased by 2050

- Energy consumption for transport increases to 2020, uncertain development after that
- Energy consumption for housing and services is decreasing somewhat
- Energy consumption in industry increases somewhat



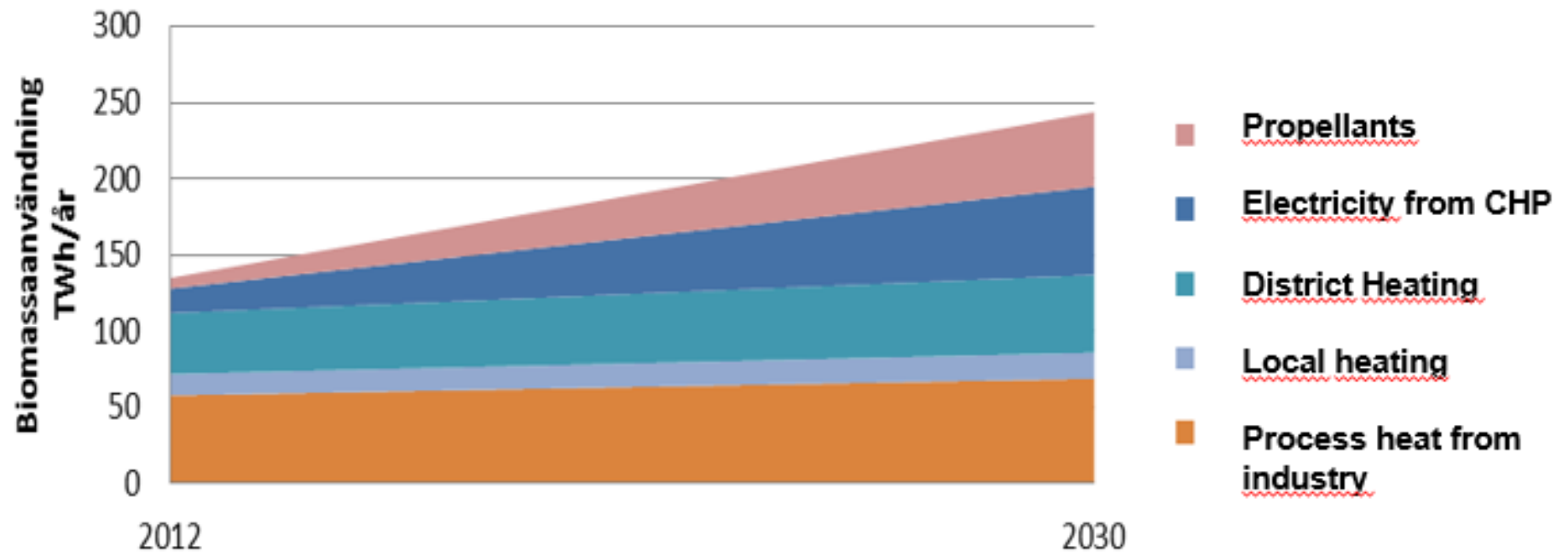
The future role of Bioenergy

More total Biomass utilization

- Base load power
- Local small scale CHP
- Important complement to variable electricity sources



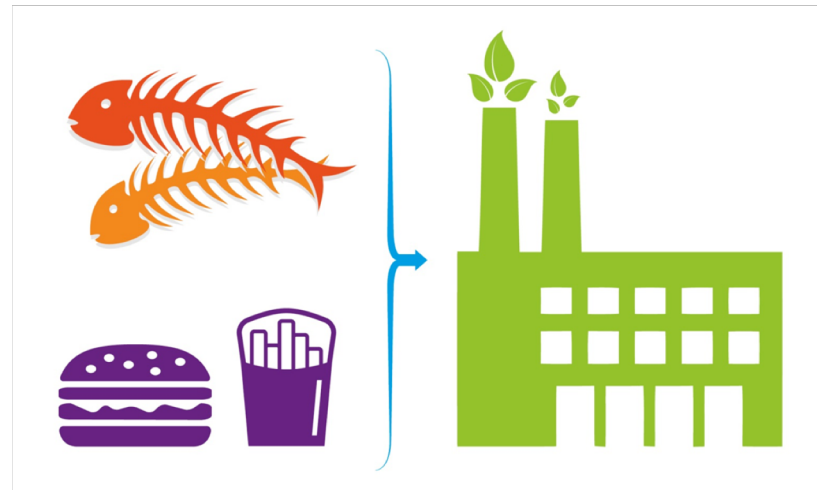
Possible increase in biomass utilisation 2030



Source: Profu report "Biobränslescenarier – hur mycket biobränsle kan vi använda i det svenska energisystemet år 2030?"

The future of Biofuelled CHP-plants

- Higher alpha-value
- Combined CHP processes with propellants, industrial products, district cooling etc.
- New operating conditions to support intermittent electricity sources
- BECCS?



Upcoming Call

- Suggestion: Biokraft-programme and Turbines for future energy systems (earlier Turbokraft) are integrated
- A call is planned for the end of 2019, closes beginning of 2020

Thank you for your attention!

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