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Energy Sufficiency and Energy Transition in Denmark and EU

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Presentation is part of Proceedings at: https://www.inforse.org/europe/seminar_2021_INFORSE-Europe_DK.htm

Definitions of Energy Sufficiency

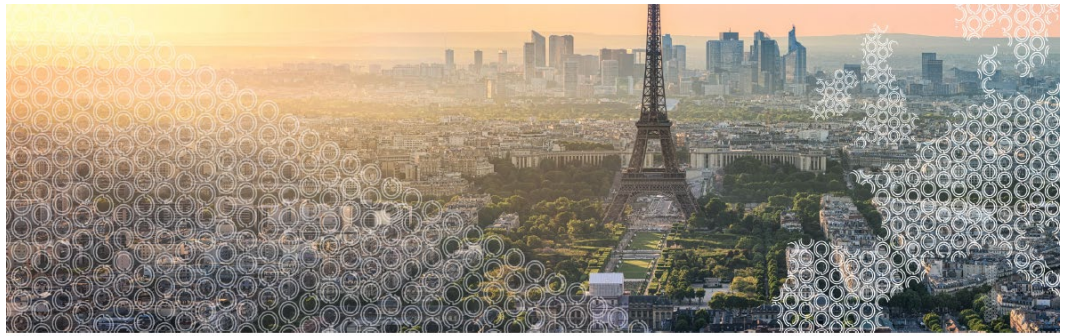
1. “Energy sufficiency refers to changes in individual behaviours that lead to lower demand for energy services” (Moser et al. 2015)

Energy demand = Human needs/wants * energy sufficiency * energy eff.

2. Energy sufficiency is “a state in which people’s basic needs for energy services are met equitably and ecological limits are respected” (Darby and Fawcett 2018 / ECEEE theme)

Recent Transition Scenarios for Europe

- Paris Agreement Compatible (PAC) Scenario with CAN-Europe, EEB, combined version 2019, 65% reduction 2030, climate neutral 2040



Paris Agreement Compatible (PAC) scenario

- negaWatt Scenario, coming 2022

Découvrez le
scénario négaWatt
2017-2050

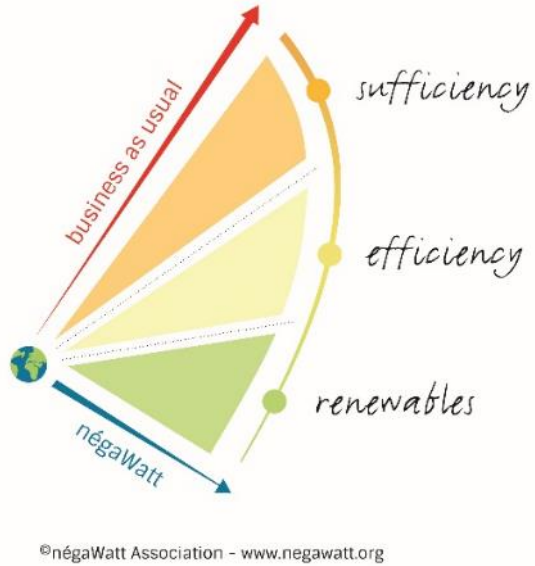
- Energy Wattch Group / Lappeenranta University of Tech., 2019+updates

100%
Renewable Europe
How To Make Europe's Energy System Climate-Neutral Before 2050

LUT University

negaWatt scenario: Development of Bottom-up Scenarios, Combining Energy Efficiency, Energy Sufficiency and Renewable Energy

- ´Development of detailed statistics and forecast for each country (Dashboard)
- Story lines for sectors: cement, steel, glass, alu, paper, chemicals & plastic
- Joint agreement on assumptions and sufficiency
- Combine national scenarios into EU-wide scenario
- EU-wide results in mid 2022



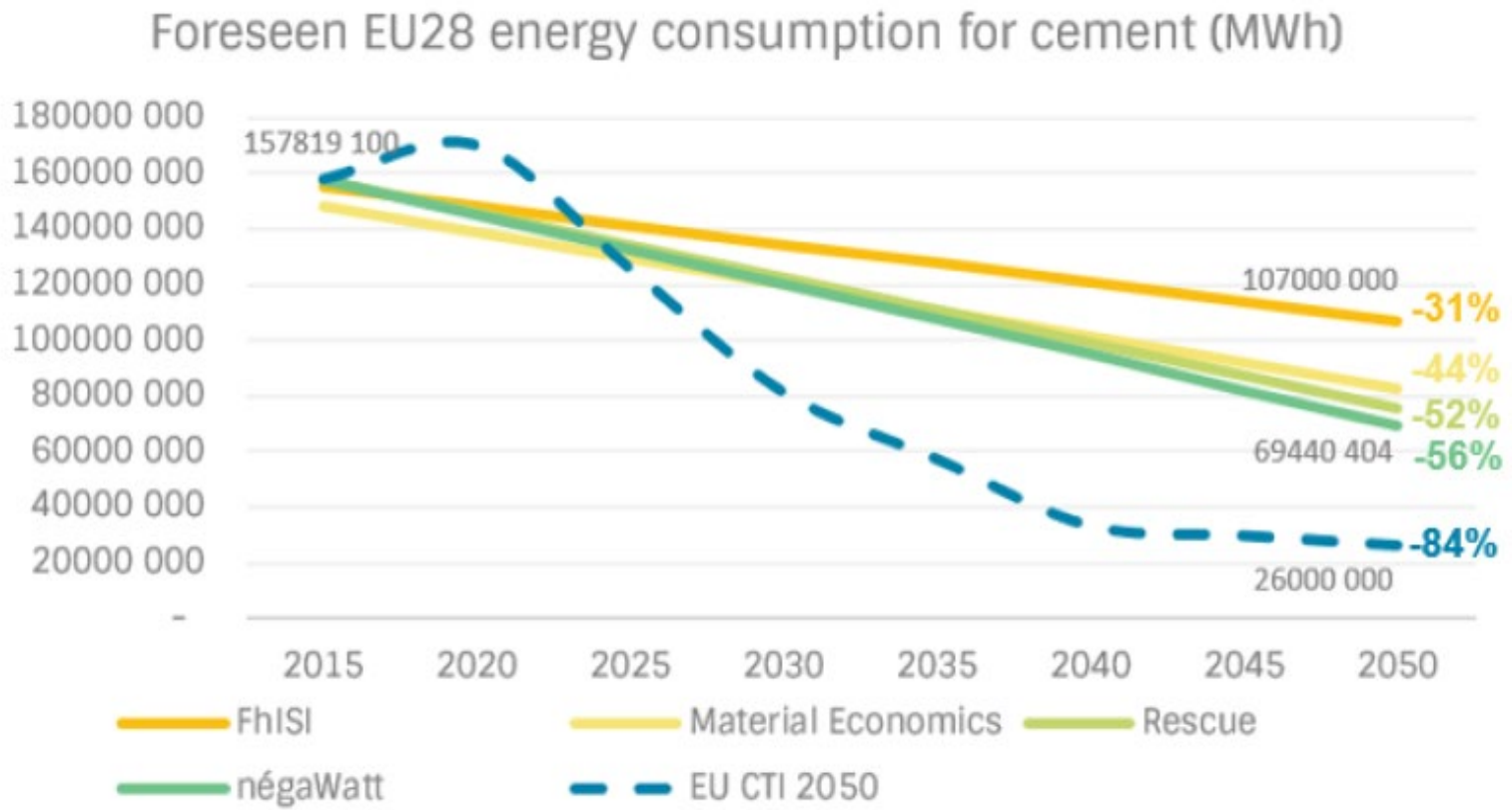
The suggested energy consumption corridor for cement

DRAFT

negaWatt scenario:

Basis for consumption corridor:

- Higher efficiency
- Lower demand
- Recycling



Danish Sufficiency Scenario
INFORSE-Europe + Aalborg University:
Integrating Energy Sufficiency in Danish Plans

AALBORG UNIVERSITY
DENMARK

INFORSE EUROPE
International Network for Sustainable Energy

- Basis is ”Ida Klimasvar” an alternative scenario with 70% emission reductions from energy in 2030 and 100% in 2045.
- We propose energy sufficiency above existing scenario for
  - space & water heating,
  - domestic electricity use,
  - personal transport
- We use the definition of energy sufficiency: changes in individual behaviours that lead to lower demand for energy services (without harming well-being)

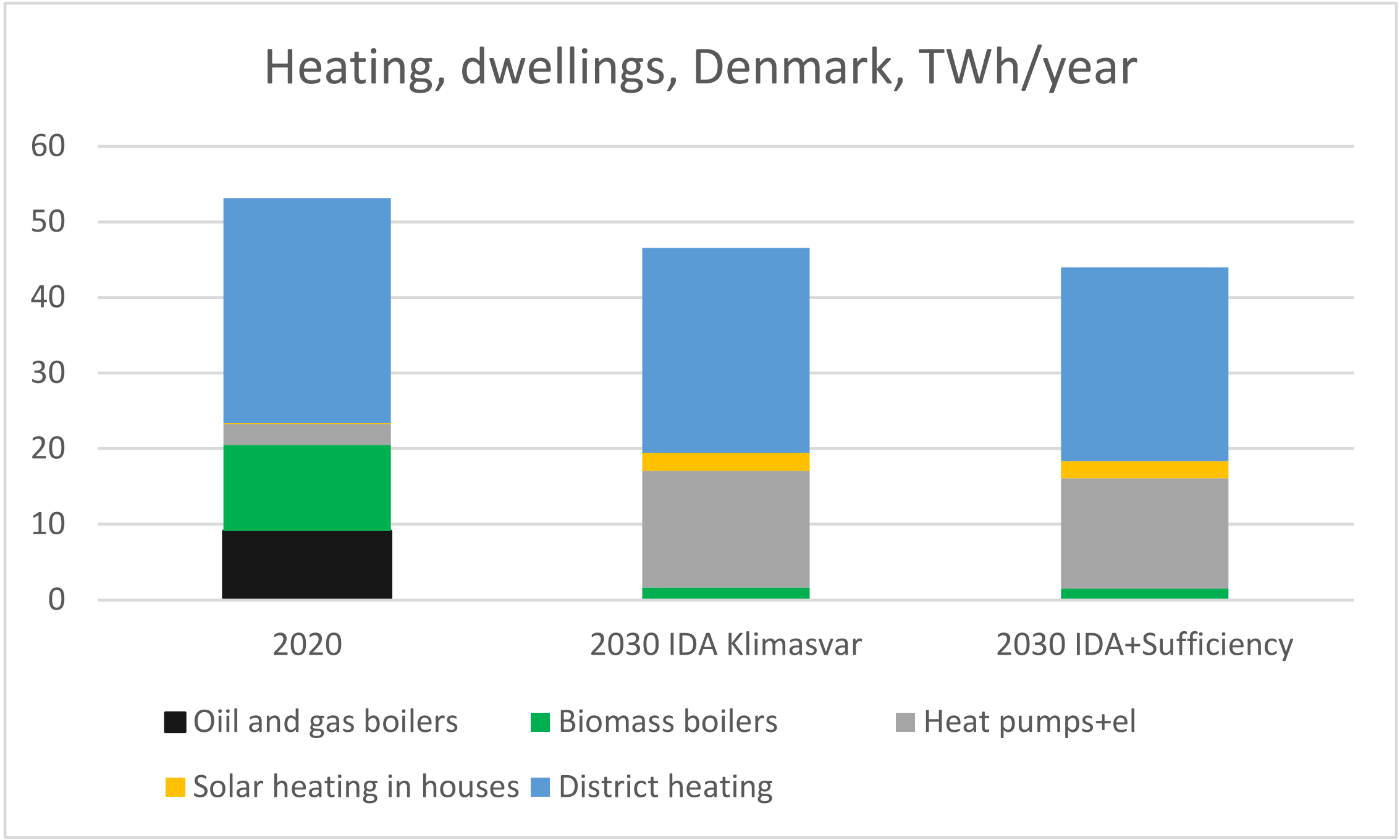
Project lead by Aalborg University, supported by Nordforsk

NordForsk

Housing, Heating Sufficiency Measures

- Better use of existing buildings instead of increasing building area with construction of new buildings and extension existing buildings
- Lower indoor temperatures and other heat saving practices, (reducing over-ventilation, etc.)
- Water saving with showers, taps etc. that use less water
- Water saving practices (water saving customs as shorter/fewer showers, lifestyle changes)

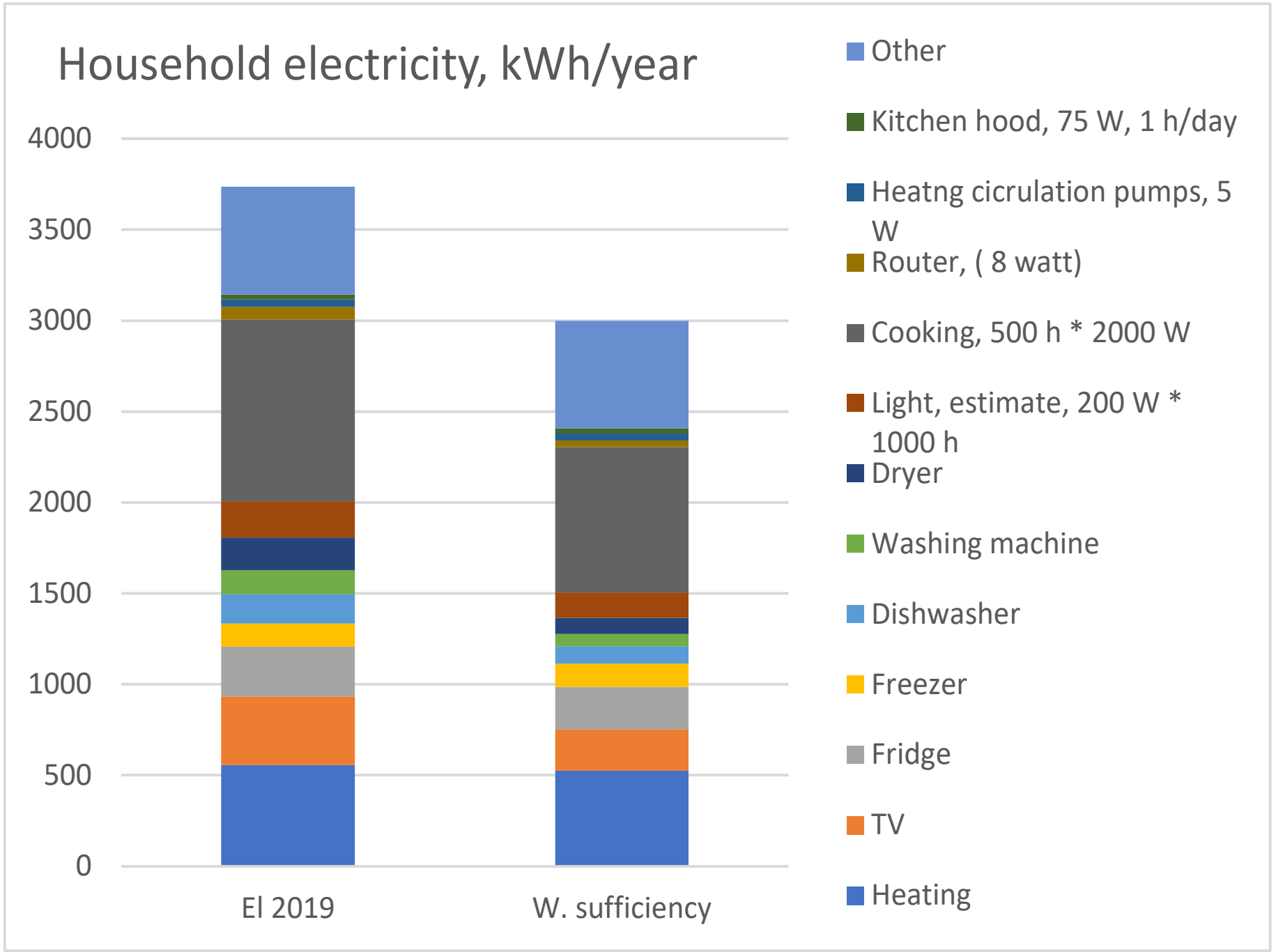
Expected reduction: 6% of total heat demand beyond IDA Klimasvar


Heating, dwellings, Denmark, TWh/year
60
50
40
30
20
10
0
2020
2030 IDA Klimasvar
2030 IDA+Sufficiency
Oiil and gas boilers
Biomass boilers
Heat pumps+el
Solar heating in houses
District heating

Housing, electricity sufficiency measures

- See TV more together in family (-40%)
- Less families with two fridges (-14%)
- Fill dishwasher and washing machine more often (-40-50%)
- Dry cloth on line instead of dryer every second time (-50%)
- Turn off light when no needed (-30%)
- Optimise cooking (-20%)
- Turn off router at night (-50%)

Electricity in dwellings: 20% reduction with sufficiency



Personal Mobility, (sufficiency) Measures

- More passengers into trains with:
  - Improved railways with frequent trains on most lines,
  - Develop railway stations into mobility centres with good opportunities to change
  - Better opportunities to carry bicycles in trains and buses
- Urban planning with:
  - less space and less parking for cars in cities, ,
  - with the principle of having most functions available within 15 min by bicycle and
  - with “traffic islands” in cities, with only one car entrance
- Super bicycle paths for distances 4-20 km (popular for users of electric bicycles).
- General reduction of road speed, motorway speed 100 km/h urban speed to 30 km/h
- More expensive parking
- Increase use of car sharing, support of car-sharing associations etc.
- Reform of ticket prices on public transport to reduce prices on longer distances,
- Reduce state subsidies for commuting,
- Roadpricing for cars.
- Employers should be allowed to give bicycles to workers without taxation

(developed by Society for Green Technology and other groups in IDA)

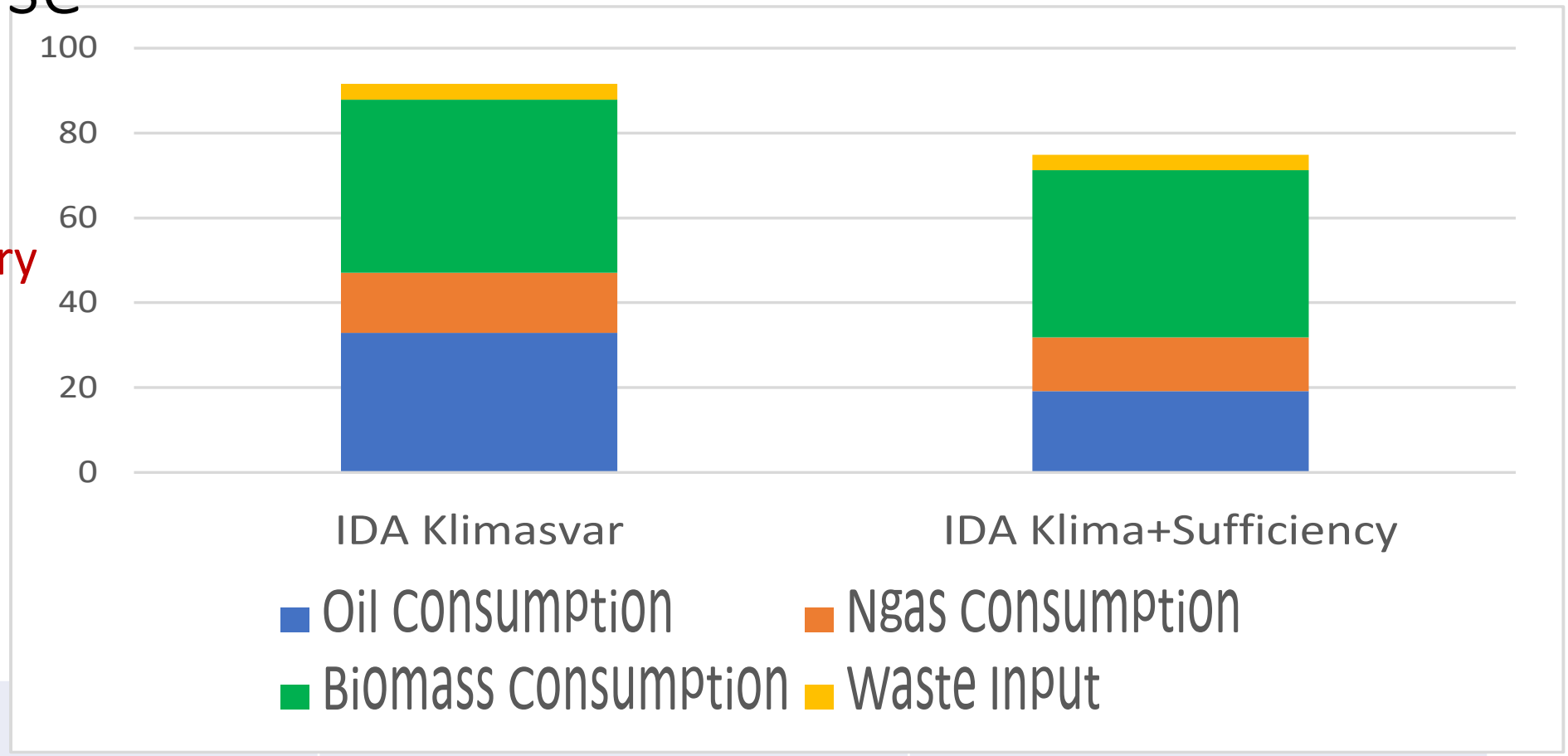
Effects of Mobility Sufficiency Measures

- Reduce car traffic in average 43%, varying from 90% for trips below 2 km to 25% for trips 50 - 100 km (30% for longer distances >100 km)
- Reduce CO_2 emissions from cars with 70% including electric cars
- Co-benefits from more cycling, more equal access to mobility, less CO_2 from new road construction, less CO_2 from less demand of cars

Integrating all Sufficiency in EnergyPlan
Fuel use

TWh/year

Preliminary results



	IDA Klimasvar	IDA Klima+Sufficiency
CO_2, fossils (mio tons)	11,99	8,02
Cost (mill. €)	21963	20924

Possible Additional Sufficiency Actions:

Housing:

- Tiny house development

Transport:

- More work from home
- Land-use planning for workplaces and dwellings to reduce commuting

Read More:

INFORSE-Europe's web site www.inforse.org/europe

Integrating Energy Sufficiency into Modelling of Sustainable Energy Scenarios
https://www.inforse.org/europe/Energy-Sufficiency-Project.htm
https://vbn.aau.dk/en/projects/integrating-energy-sufficiency-into-modelling-of-sustainable-ener

INFORSE-Europe Seminar Proceedings:
www.inforse.org/europe/seminar_2021_INFORSE-Europe_DK.htm