

Together towards the bioeconomy – “Bioenergy done right”

Åsa Forsum

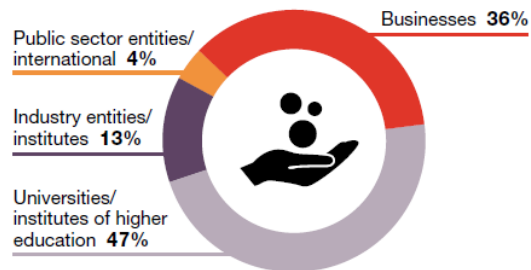
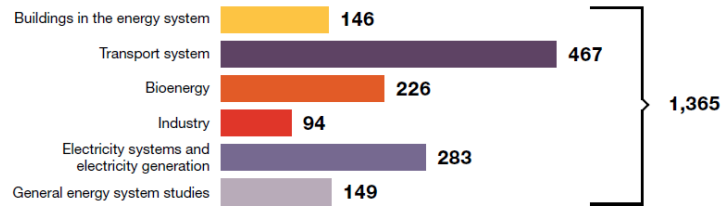
Head of unit Sustainable bioenergy

Swedish Energy Agency

Swedish Energy Agency in 1 minute

- National authority for energy policy issues
- Sorts under Ministry of the Environment and Energy
- The Director-General is appointed by the Government
- Government funded
- Around 370 employees, Eskilstuna
- Vision *“a sustainable energy system, combining ecological sustainability, competitiveness and security of supply”*

Facts & Figures – Energy R&I Funding



Support across the whole innovation chain

- From early research to demonstration, commercialization and market uptake

Annual budget of approximately 150 million €

Doubled through private sector co-funding

> 50 R&I programs and > 2 000 projects running

In-house priority settings and strategy for public R&DD fundings

Energy - and climate goals

Sektorsstrategier för
energieffektivisering

18 TWh Electricity Certificate till
2030

2030: 63 % reduction in GHG
emissions outside the European
tradesystem compared to 1990.

70 % cut of emissions in the
domestic transport sector by
2030

50 % more effective energy-use
2030 compared to 2005.

75 % lower emissions in 2040
compared to 1990.

100 % renewable electricity
production 2040

2040: 85 % lower GHG
emissions from activities in
Sweden than 1990

Net zero emissions to the
atmosphere by 2045. Thereafter
negative emissions.

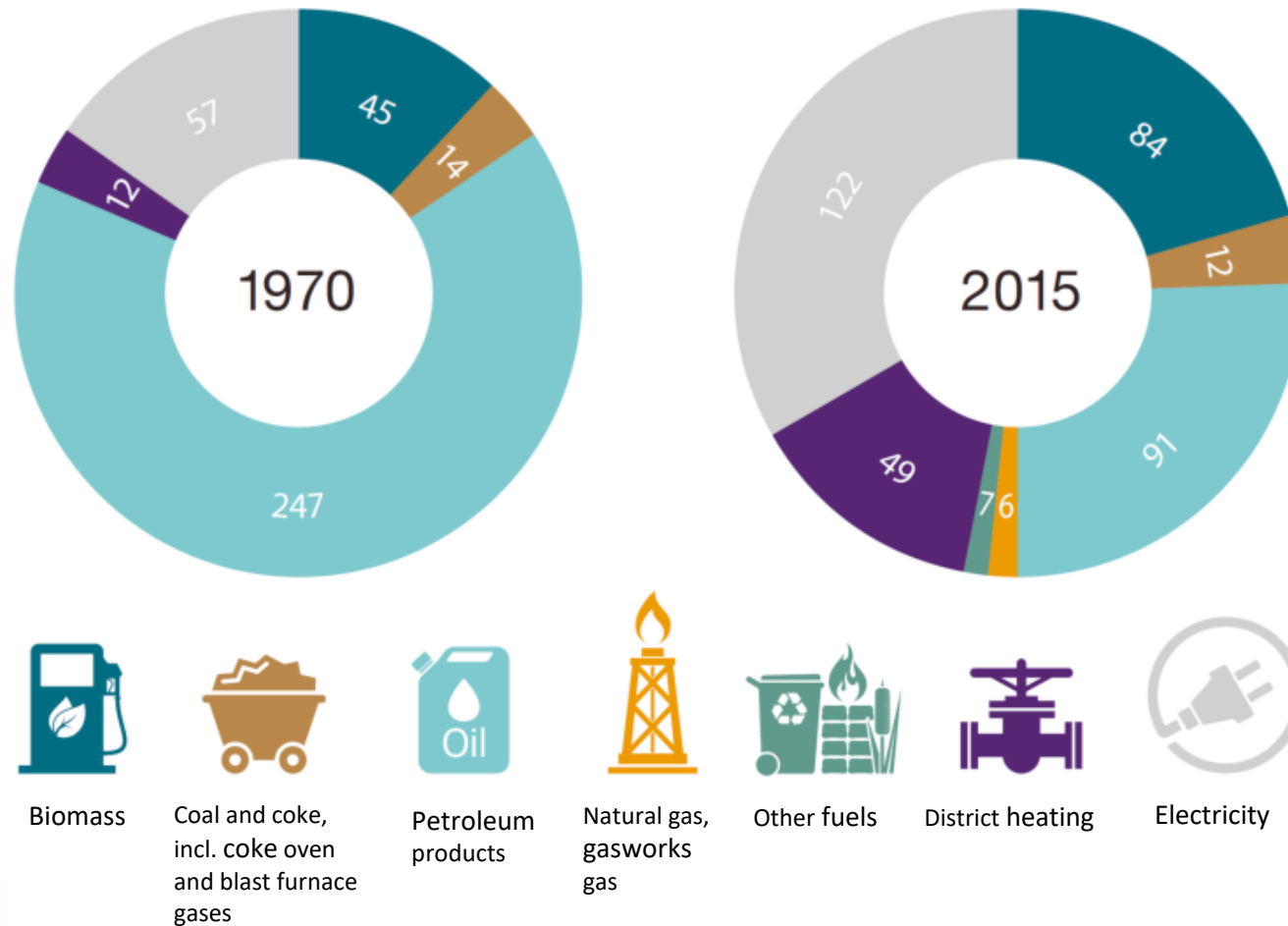
2030

2040

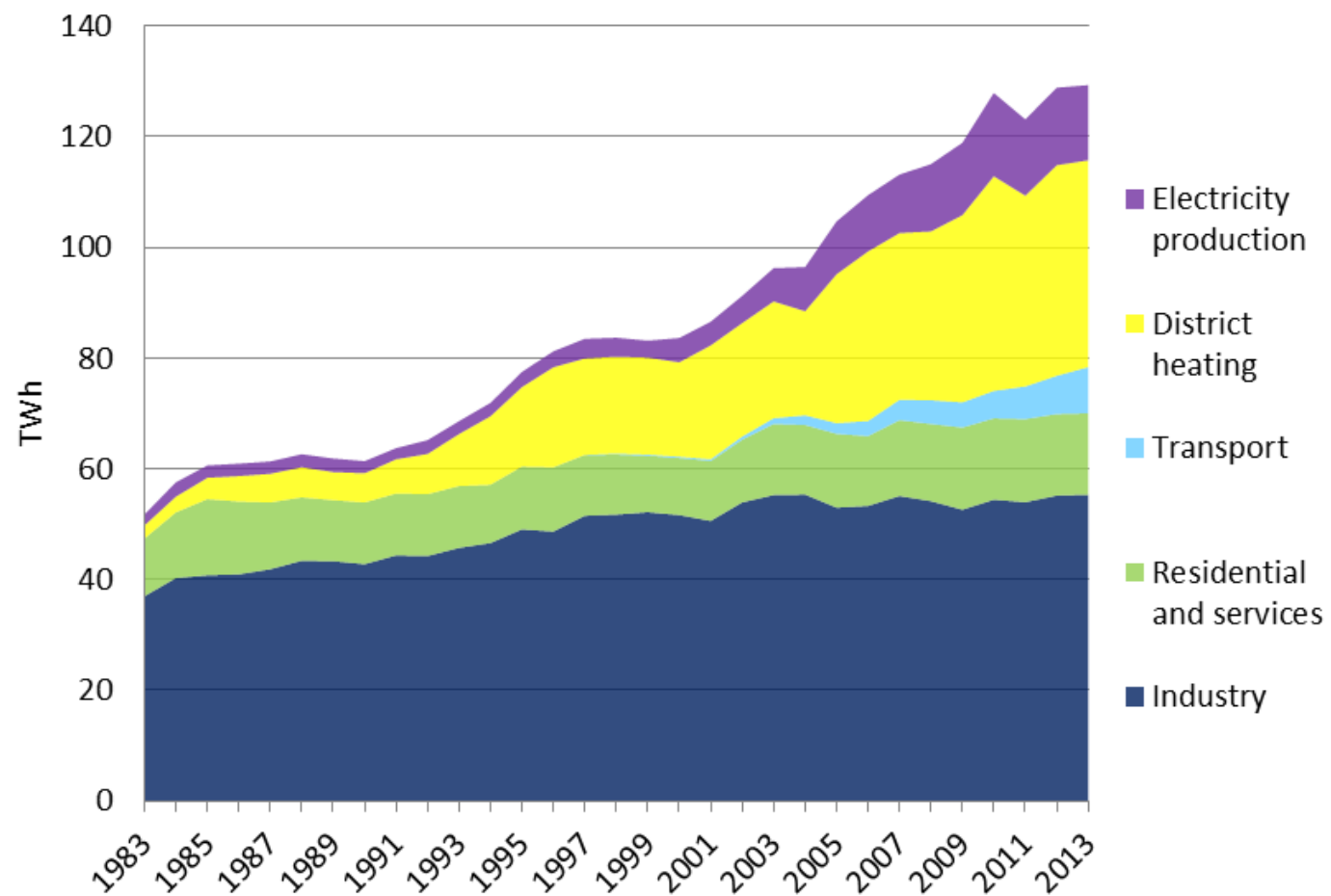
2045

2050

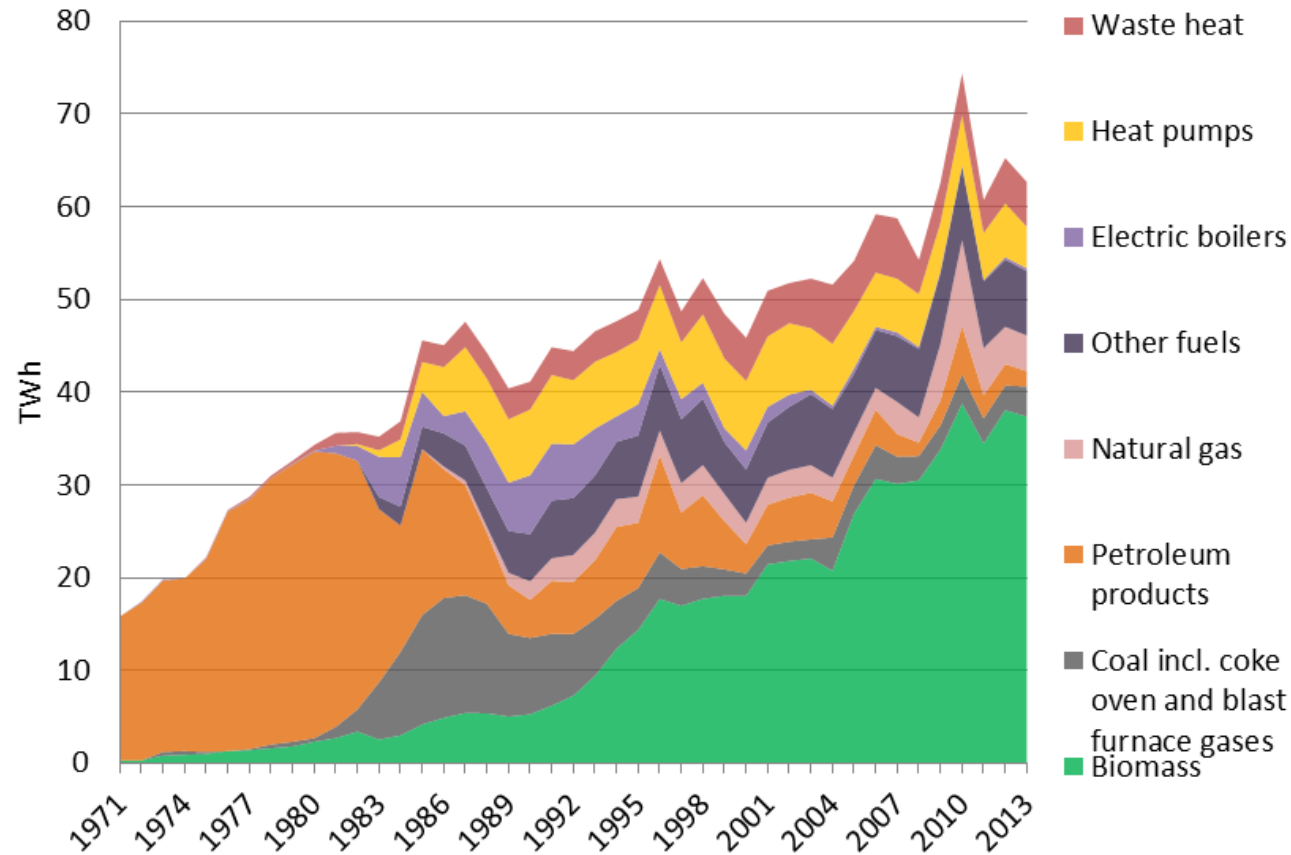
Comparison of energy use, 1970 and 2015



Use of biomass, per sector 1983–2013, TWh



Input energy used in the production of district heating



Transport sector – biggest challenge?

70 % reduction to 2030

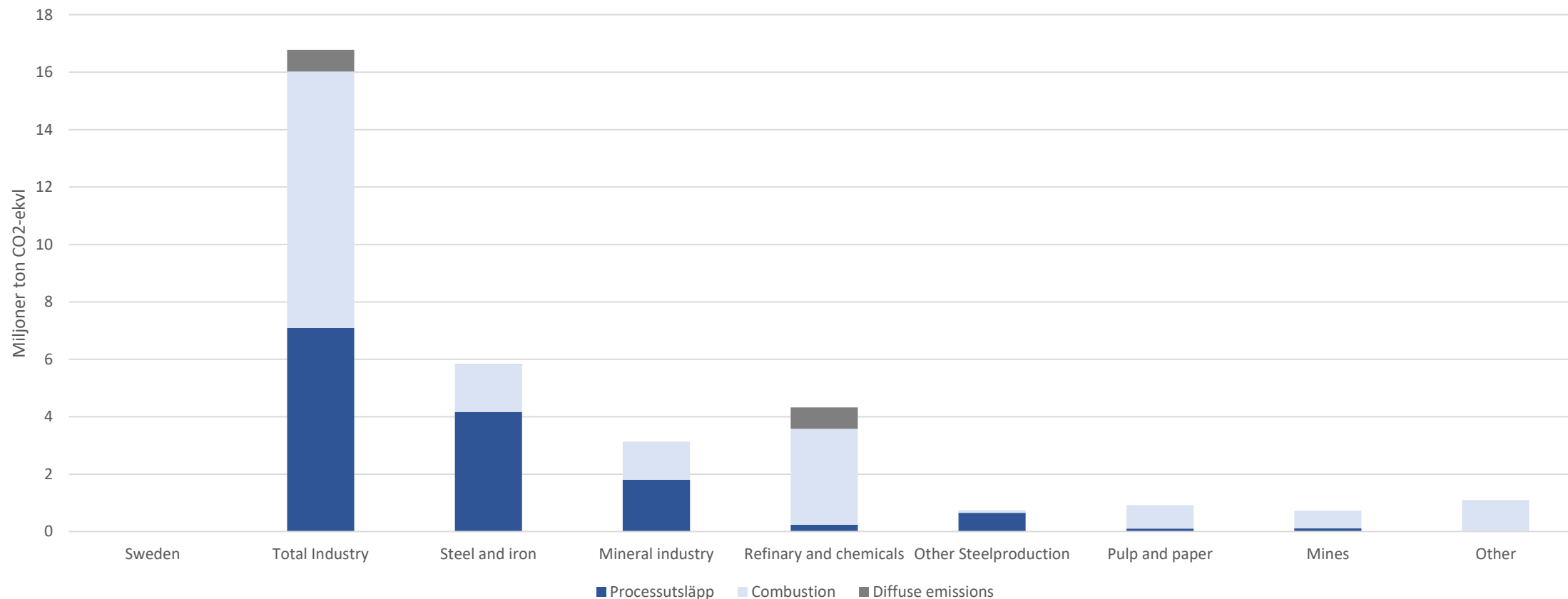
1. Resource efficiency, city planning
2. Biofuels
3. Electrification

Share of biofuels in 2015

- 24 % biofuel according to EU
- 18 % without "double accounting"

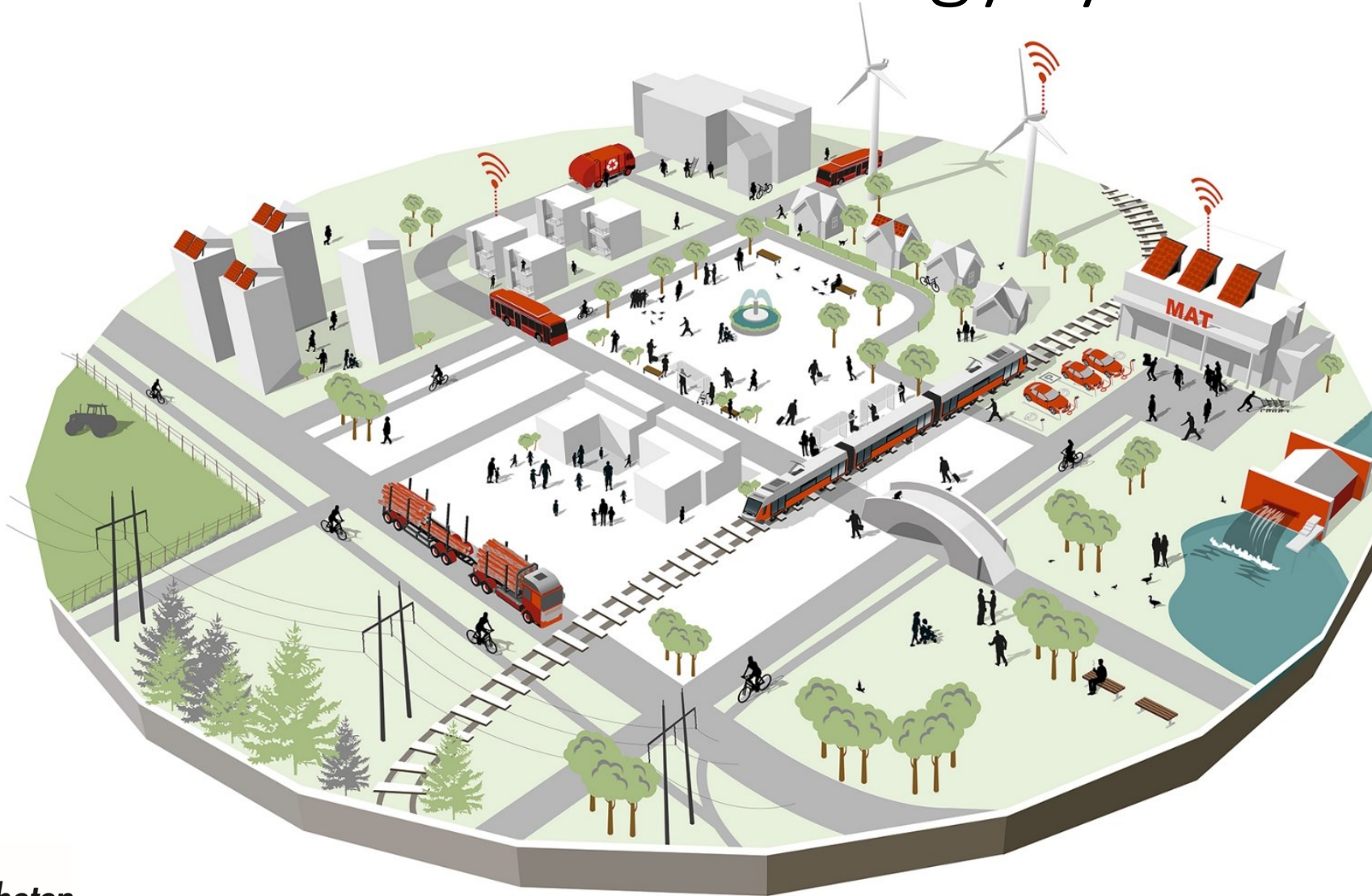


GHG emissions from Industry in total per branch. (2014)



Källa: Naturvårdsverket, Klimatrapportering. Energimyndigheten, Nulägesanalys ER 2017:4

Our vision: a sustainable energy system



Priorities for energy

Competitiveness for
existing industry

Secure energy supply

Future industry and
new businesses

Climate action

Ecological sustainability
Global justice

Consumer in focus

Our scenarios - Four Futures

FORTE

MEANS
FORCEFUL

In Forte energy is like a fuel for growth and well-being. The focus of energy policy is on a secure supply of energy at low and stable prices for the Swedish industry and efficient transport of industrial goods.

Energi use
375 TWh
2050

Legato

MEANS
TIED TOGETHER

In Legato energy is seen as a globally limited resource. It is essential to have an even and fair distribution of resources globally. The focus of energy policy is on ecological sustainability and global justice.

Energi use
243 TWh
2050

ESPRESSIVO

MEANS
EXPRESSIVE

In Espresso energy is a means of expression. Consumers wish to manage their energy needs by purchasing services and increasing their own production – solutions that are perceived as efficient and foresighted. Energy policy is focused on promoting self-sufficiency, trade of services and new energy markets.

Energi use
323 TWh
2050

Vivace

MEANS
LIVELY

In Vivace energy is a springboard for growth on the climate's terms. Sweden aspires to be a global forerunner in climate solutions and environmental technology for a sustainable global energy system. The focus of energy policy is on climate-smart research and innovation, demonstration and commercialisation on a broad front.

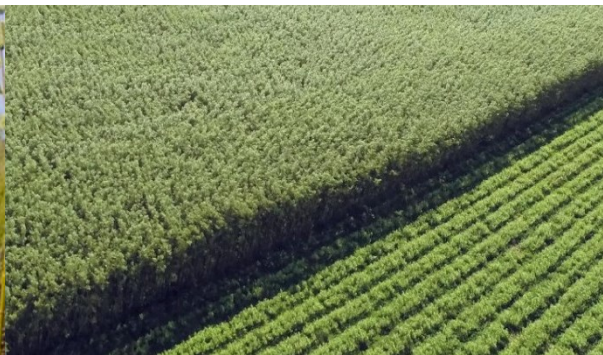
Energi use
326 TWh
2050

Table of comparisons

	Forte	Legato	Espressivo	Vivace
Main priority	Energy works as a fuel for growth and well-being	Energy is a globally limited resource to be justly shared	Energy is a means to express individuals' lifestyles	Energy is a trampoline for growth on terms dictated by the climate
State's focus	Needs of the industrial and commercial sectors	Fast climate adjustment	Individual solutions	Research and innovation
Energy system	Centralised	Renewable	Decentralised	High-tech
Share of renewables in the energy system	50 percent	Nearly 100 percent	75 percent	Nearly 100 percent
Demand-side flexibility	Limited	Medium to high	High in the own system	High and entirely automated
Solution to peak-load effects	Strategic effect reserves	Centralised governance of effect distribution	Individual/local responsibility for effect supply	The market solves effect situations

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Consequences of an increased extraction of forest biofuel

A synthesis from the bioenergy feedstock research programme 2007–2011, supported by Swedish Energy Agency
Summary of the synthesis report

ER 2014:09

Miljöpåverkan av skogsbränsleuttag

En syntes av forskningsläget baserat på Bränsleprogrammet hållbarhet 2011–2016

ER 2018:02

Bioenergy done right

- Bioenergy will be needed in order to reach a sustainable energy system
- An increased production of sustainable biomass fuels can be beneficial for biodiversity as well as society
- Locally adapted measures
- Sweden has vast possibilities to use bioenergy for energy purposes

Bioenergi på rätt sätt

Om hållbar bioenergi i Sverige
och andra länder

En översikt initierad av Miljömålsrådet



- **Bioenergy supply-chain emissions** and the **forest carbon losses** within a certain region (typically a country) over a longer time-perspective << **carbon content** in the **fossil fuels replaced**
- Production and use of bioenergy should not lead to other negative impact on, for example, biodiversity or social aspects.
- Changes in biospheric carbon stock are taken into account when territorial emissions and removals of greenhouse gases are reported under the UN Climate Convention, the Kyoto Protocol and EU regulations.



Future possibilities

- Through adequate measures and policy instruments, the production and use of biomass fuels can meet relevant criteria for sustainability.
- Incentives for land use management must be clear, adequate and promote efficiency
- Through an efficient and sustainable land use, new technologies and an increased use of by-products, it is possible to integrate the production of biomass fuels in agriculture and forestry – high yields of bioenergy
- High sustainability standards must apply for all biomass products, all raw materials and all energy carriers, including fossil fuels.







Thank you

Links to the reports.

Bioenergy the right way

- <https://skogsstyrelsen.se/globalassets/om-oss/publikationer/2017/rapport-201710-bioenergi-pa-ratt-satt.pdf>

Consequence of increased extraction of forest residues

- <https://energimyndigheten.a-w2m.se/Home.mvc/View?view=c&folderId=18&siteId=3&pageSize=25&offset=0>

Miljökonsekvenser av skogsbränsleuttag

- <https://energimyndigheten.a-w2m.se/ResourceComment.mvc?resourceId=5723>

Four Futures – Scenario report

- <https://energimyndigheten.a-w2m.se/Home.mvc?ResourceId=5603>