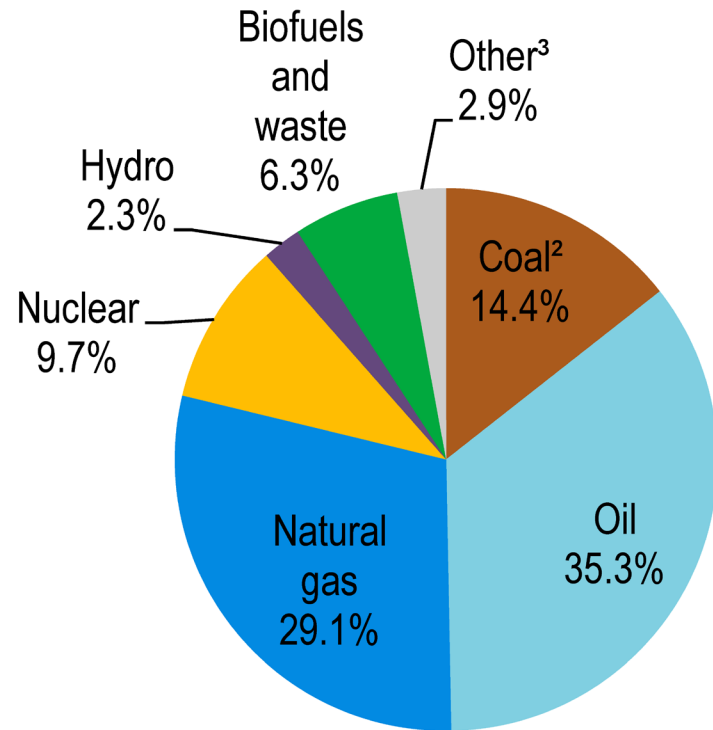


The Swedish Energy System

SHREC Project 20-11-22
Olof Björkqvist

Sweden's energy balance differs from OECD's

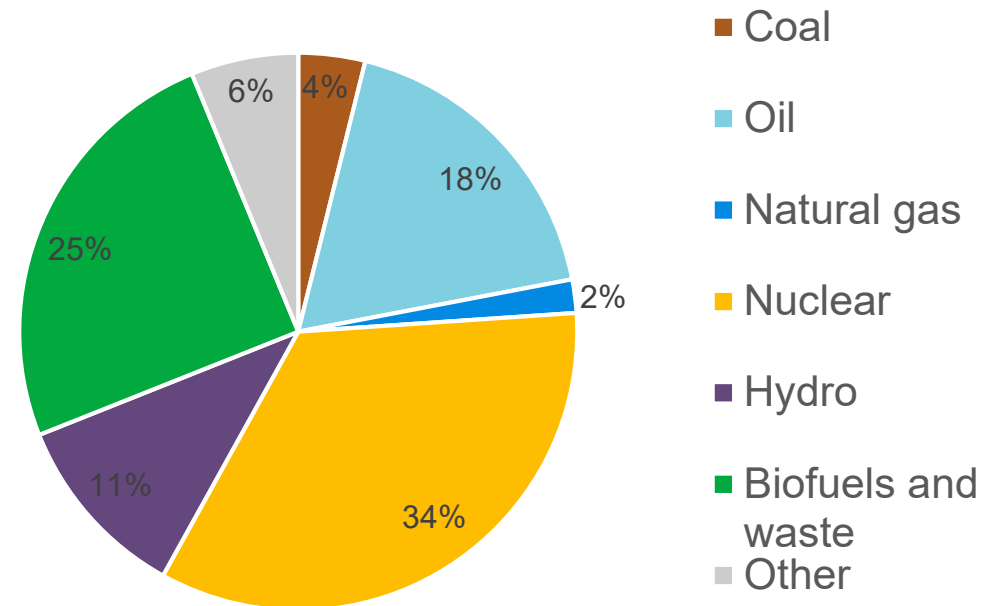
2019



OECD

Source: IEA Key Word Energy Statistics 2020

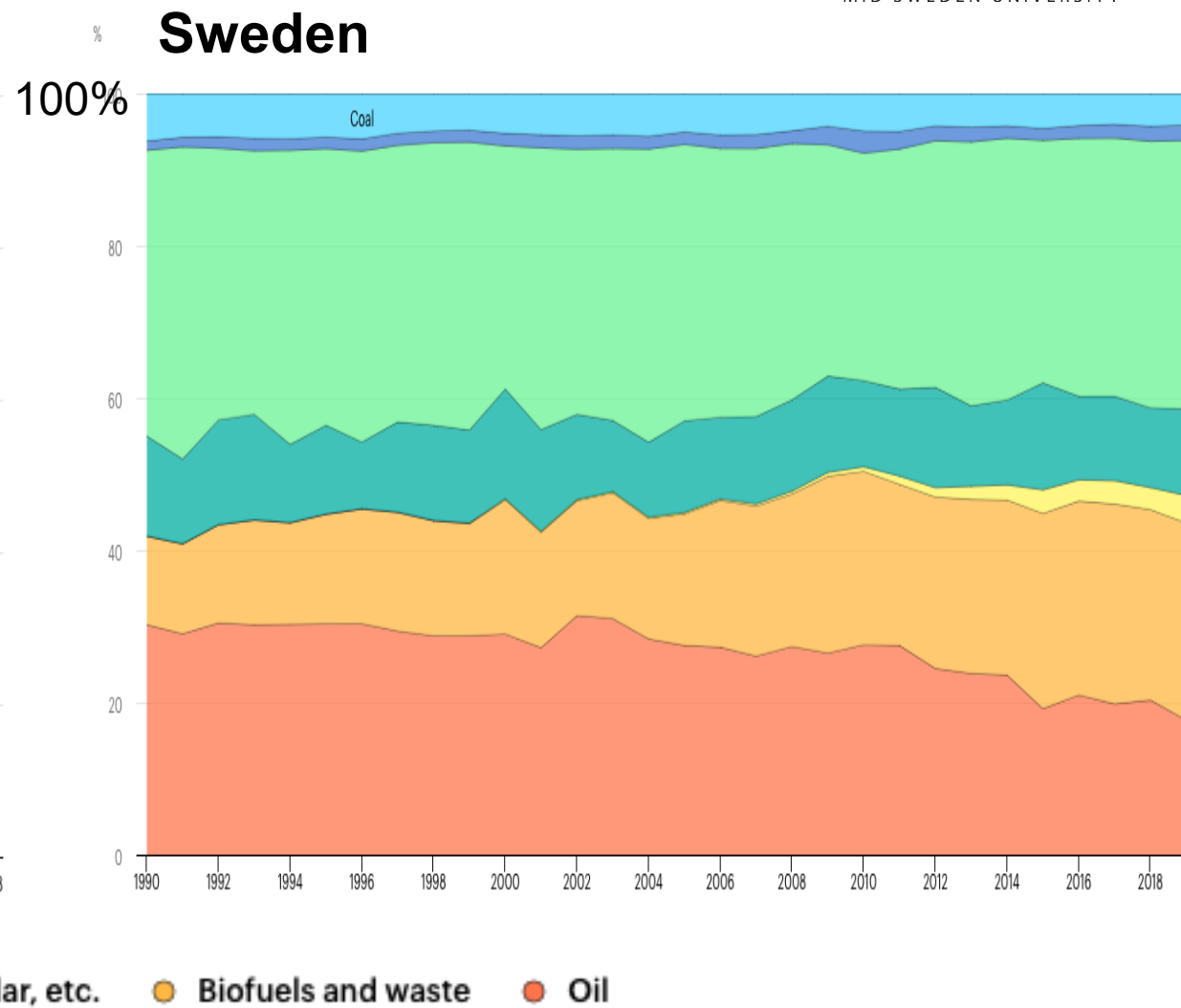
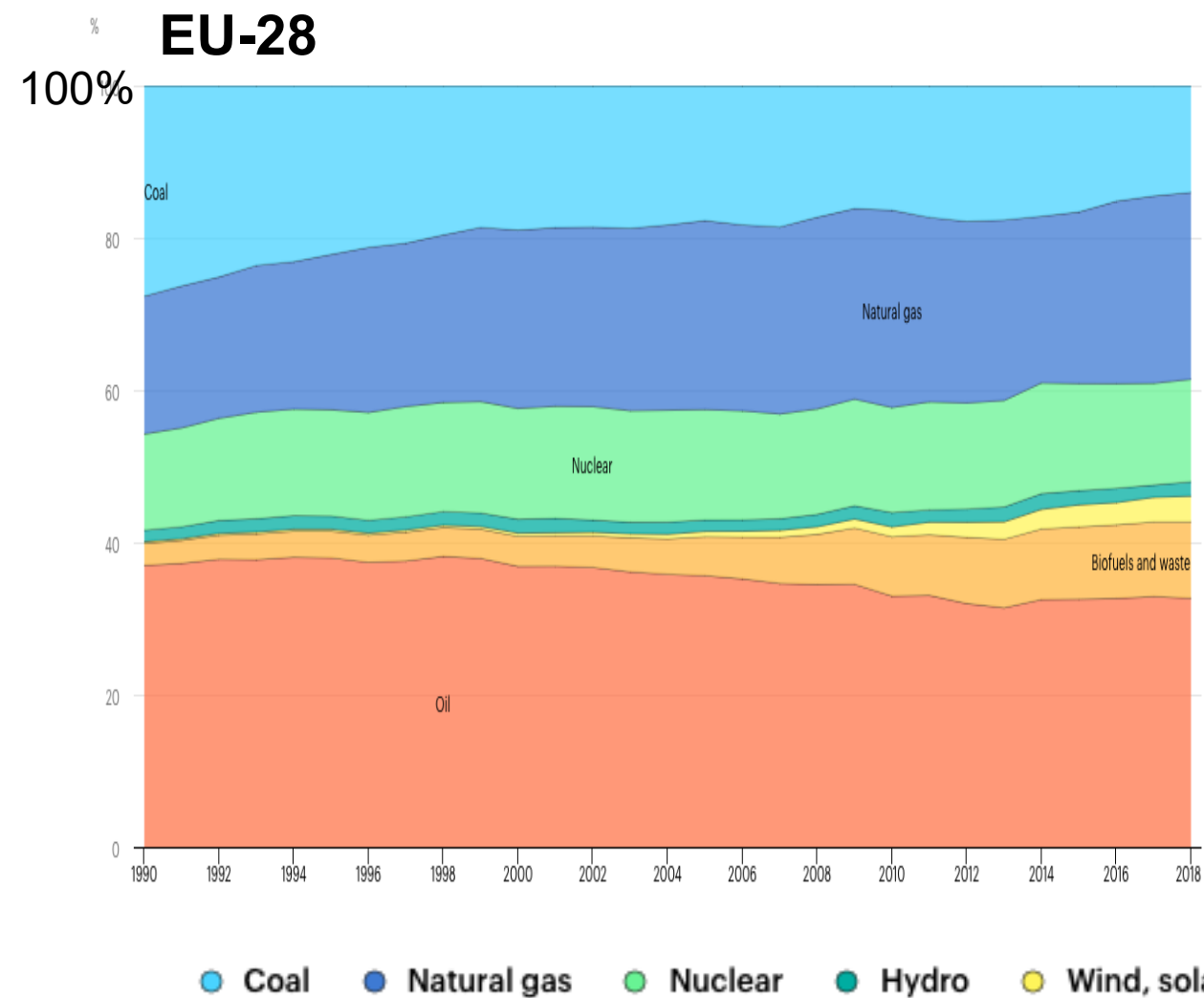
2018



Sweden

Source: Swedish Energy Agency, Energy in Sweden 2020

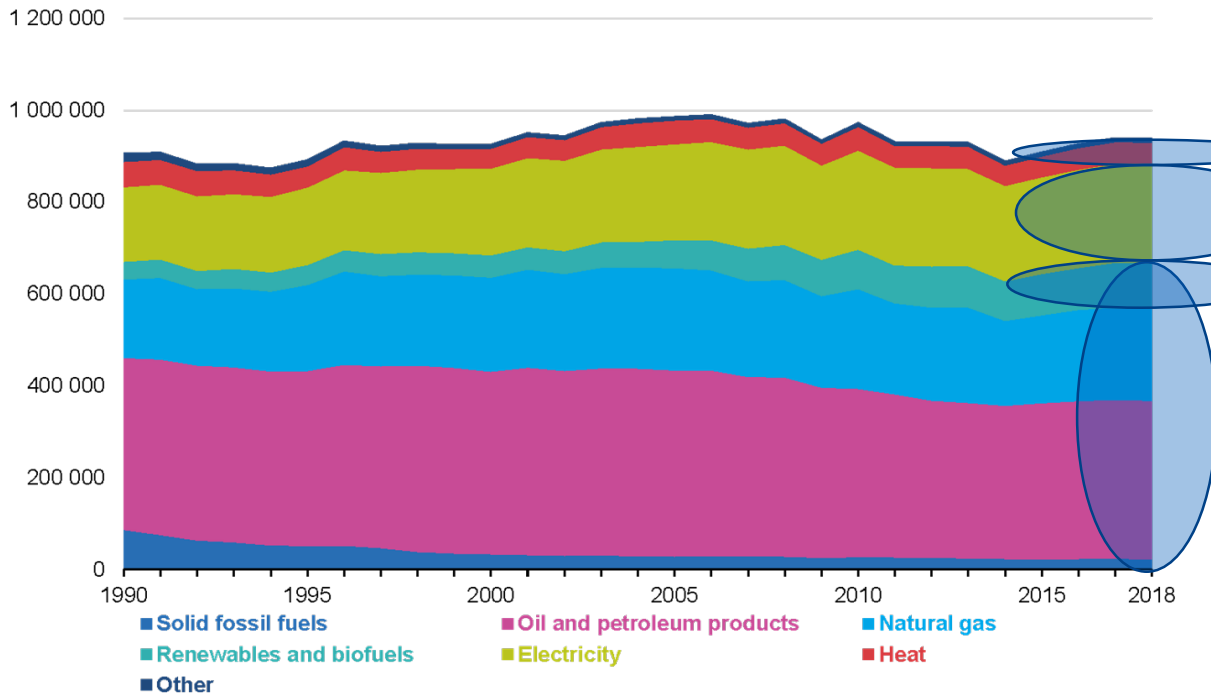
Total primary energy supply 1990 - 2018



Final energy use by fuel, electricity and heat

European Union (27 countries)

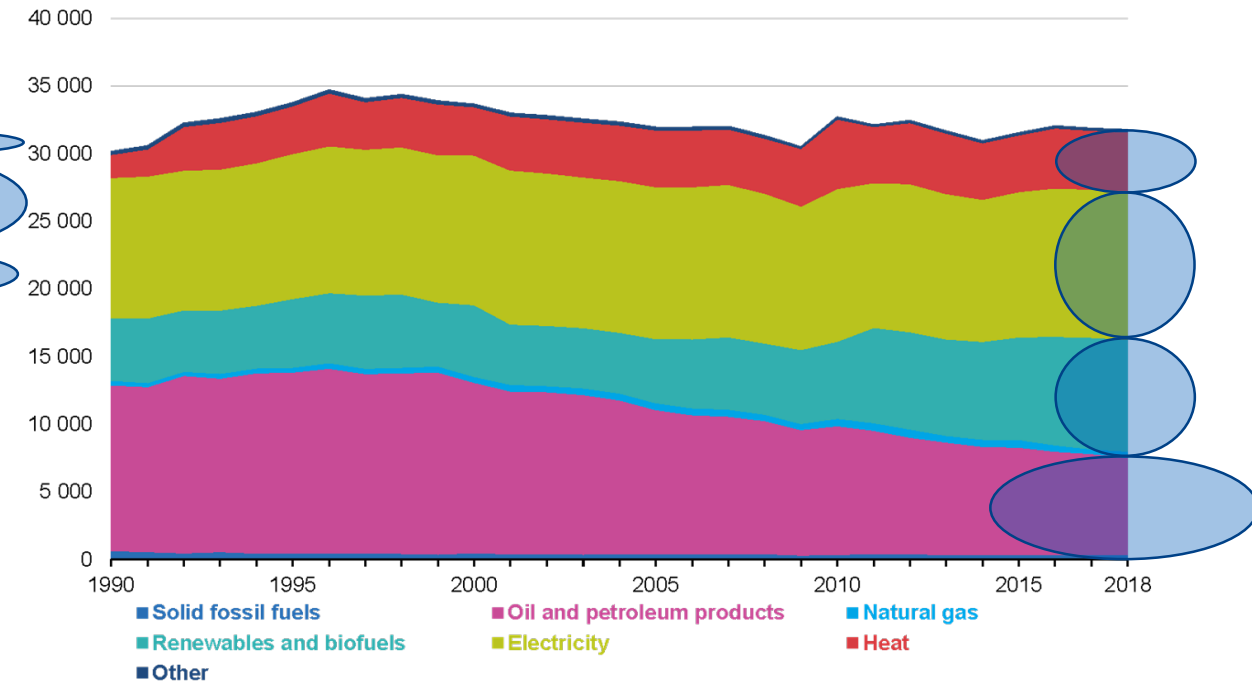
Final energy consumption by fuel, ktoe



Source: Eurostat (nrg_bal_c)

Sweden

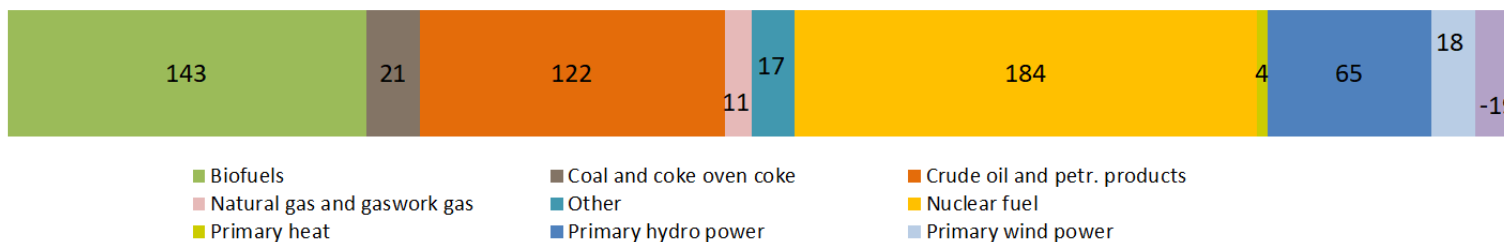
Final energy consumption by fuel, ktoe



Source: Eurostat (nrg_bal_c)

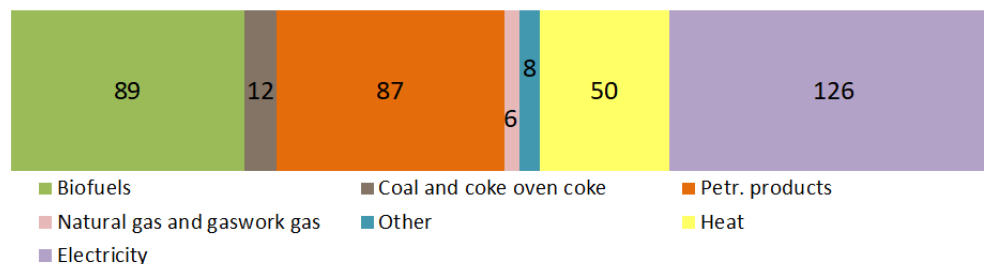
Energy supply and energy consumption in Sweden 2017, TWh

Total supply by energy commodity, 565 TWh

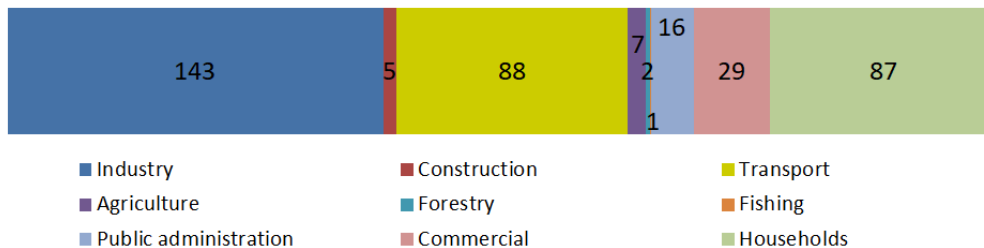


Transformations in power plants, heat plants, gas works, coke-oven plants and refineries. Distribution of electricity, heat and gas and non energy use, e.g. feedstocks in chemical industries.

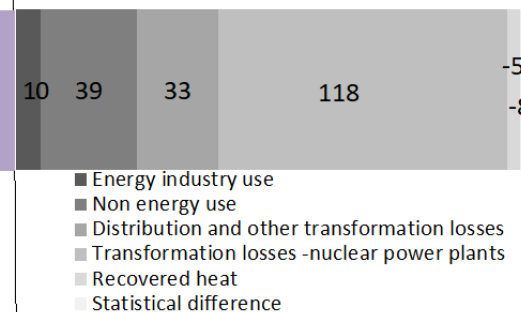
Total final energy consumption by energy commodity, 378 TWh



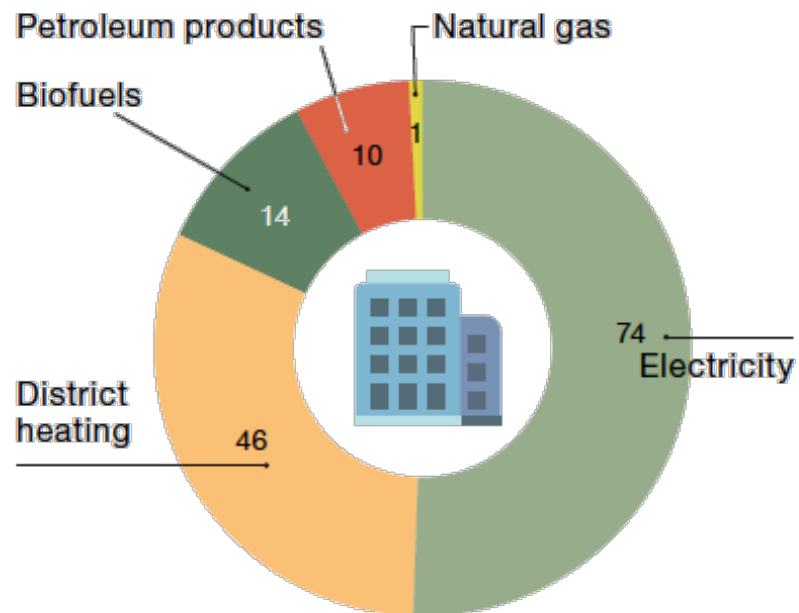
Total final energy consumption by sector, 378 TWh



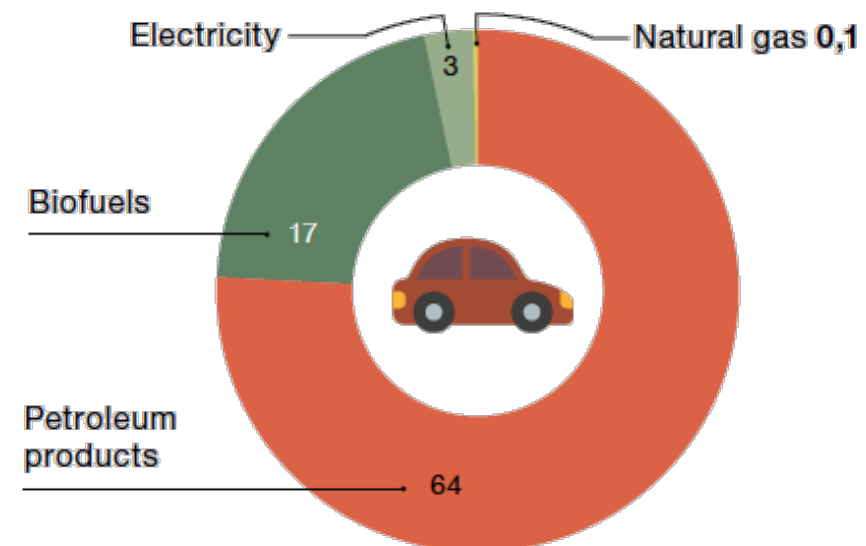
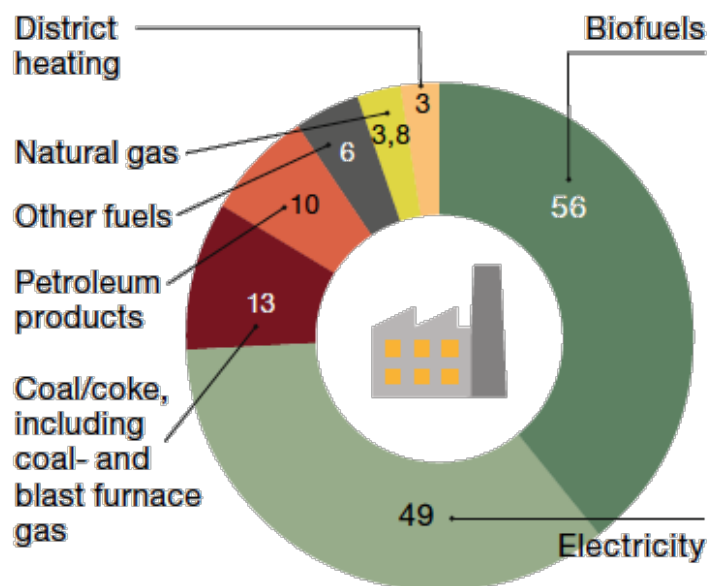
Losses and other consumption, 187 TWh



Final energy use in the residential and service sector 2018, TWh

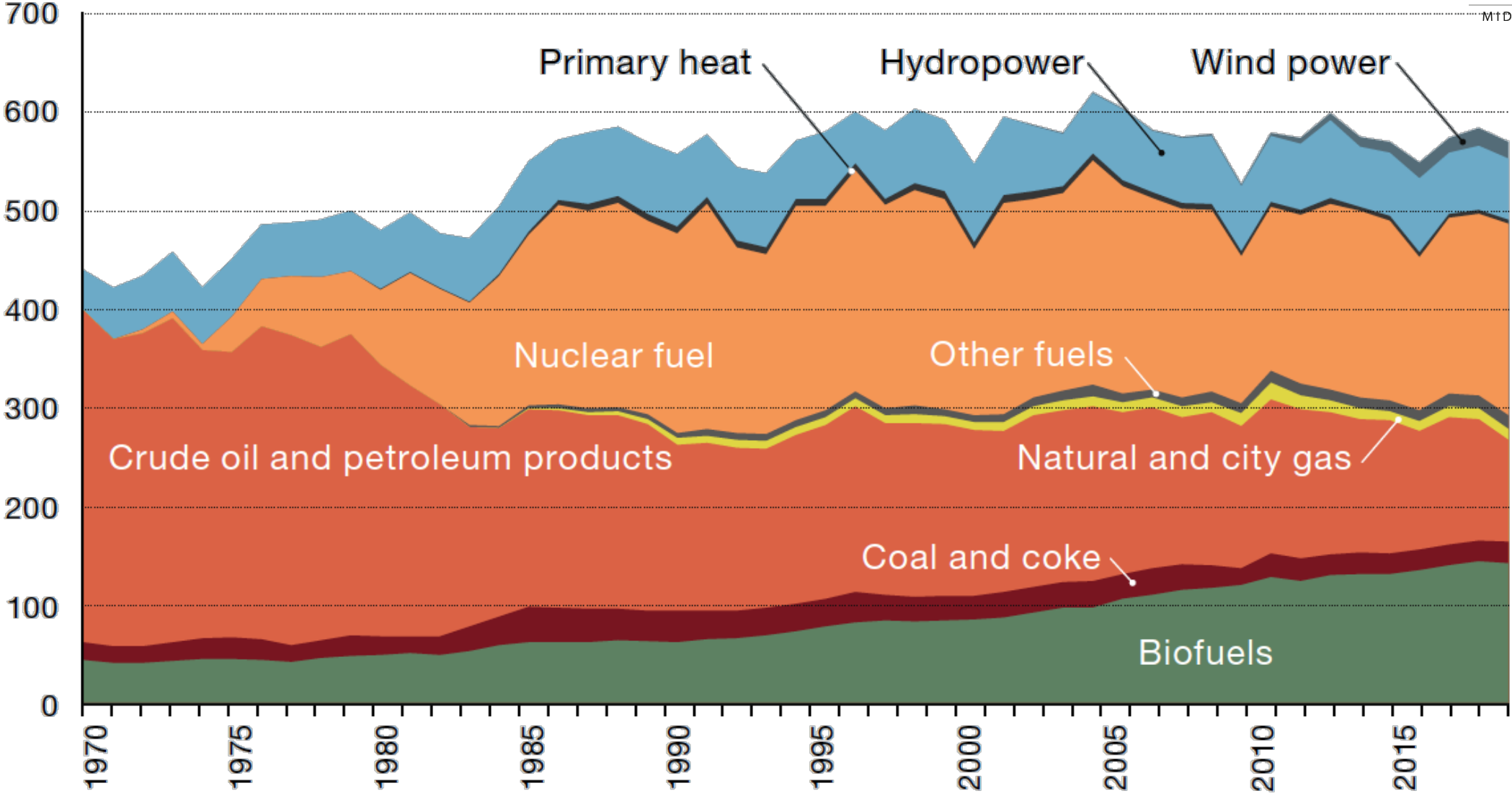


Final energy use in the industrial sector 2018, TWh



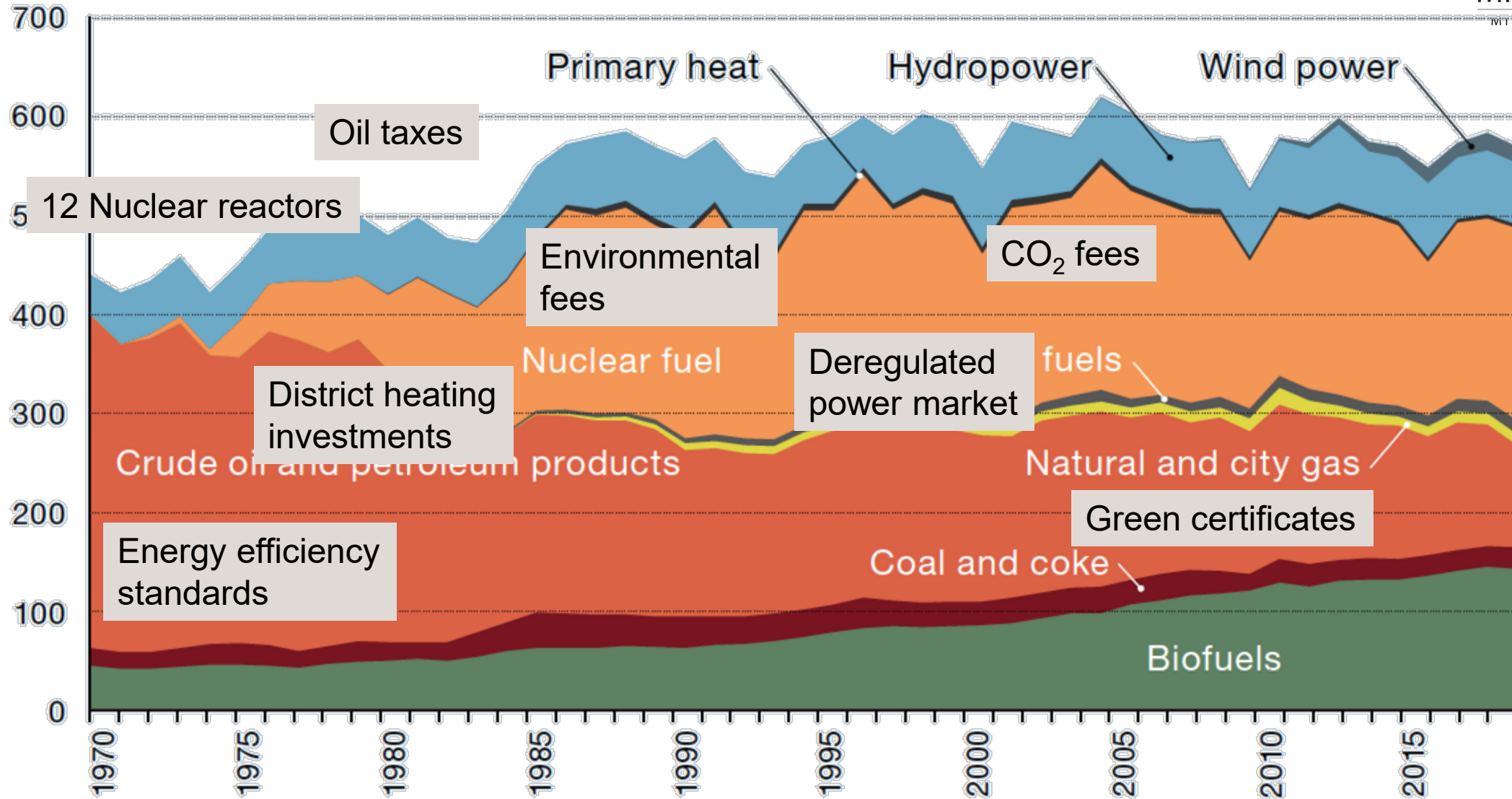
Source: Swedish Energy Agency, Energy in Sweden 2020

Total supplied energy 1970–2018, TWh



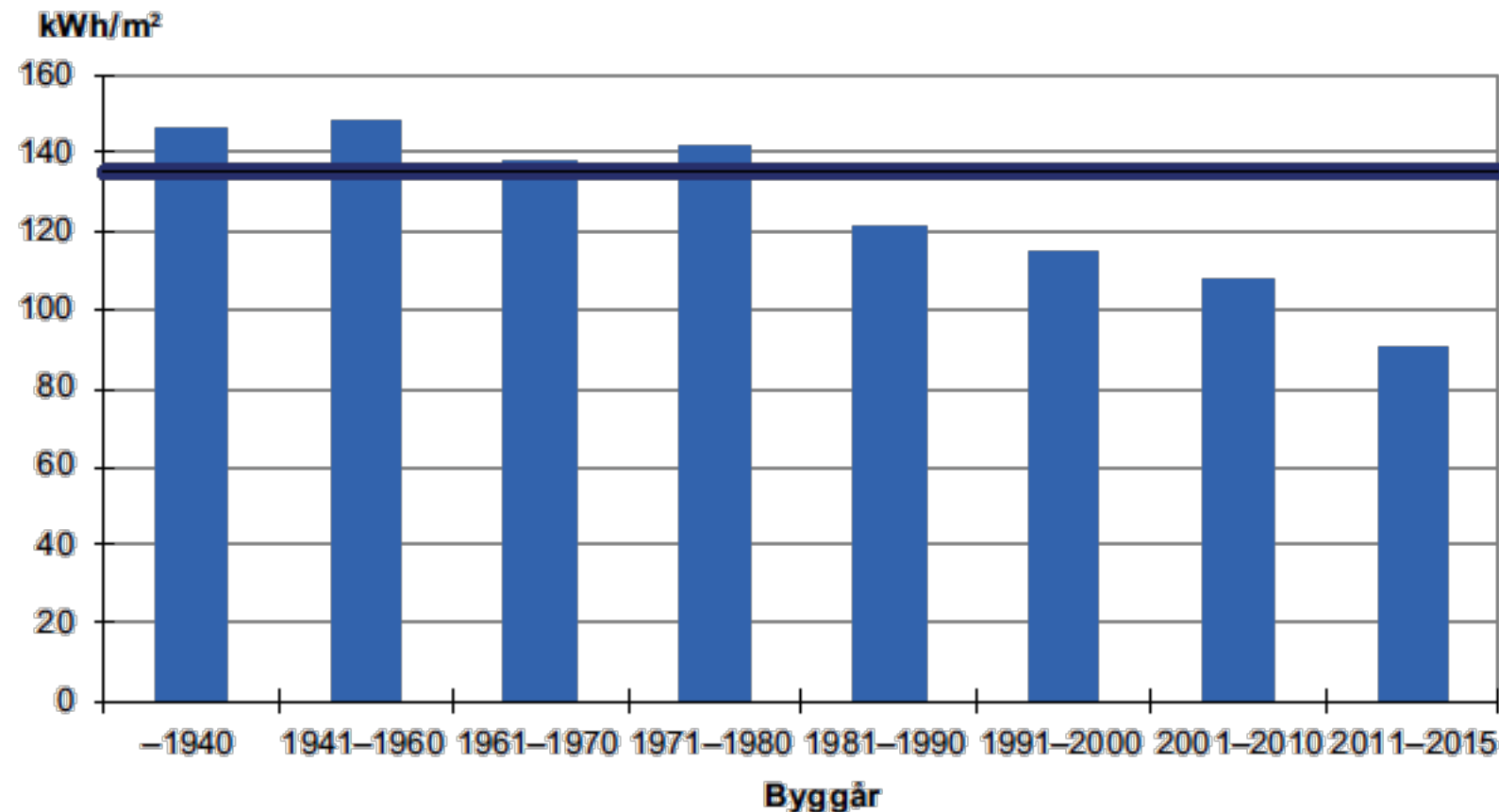
Sources: The Swedish Energy Agency and SCB (Statistics Sweden).

Important Swedish political initiatives

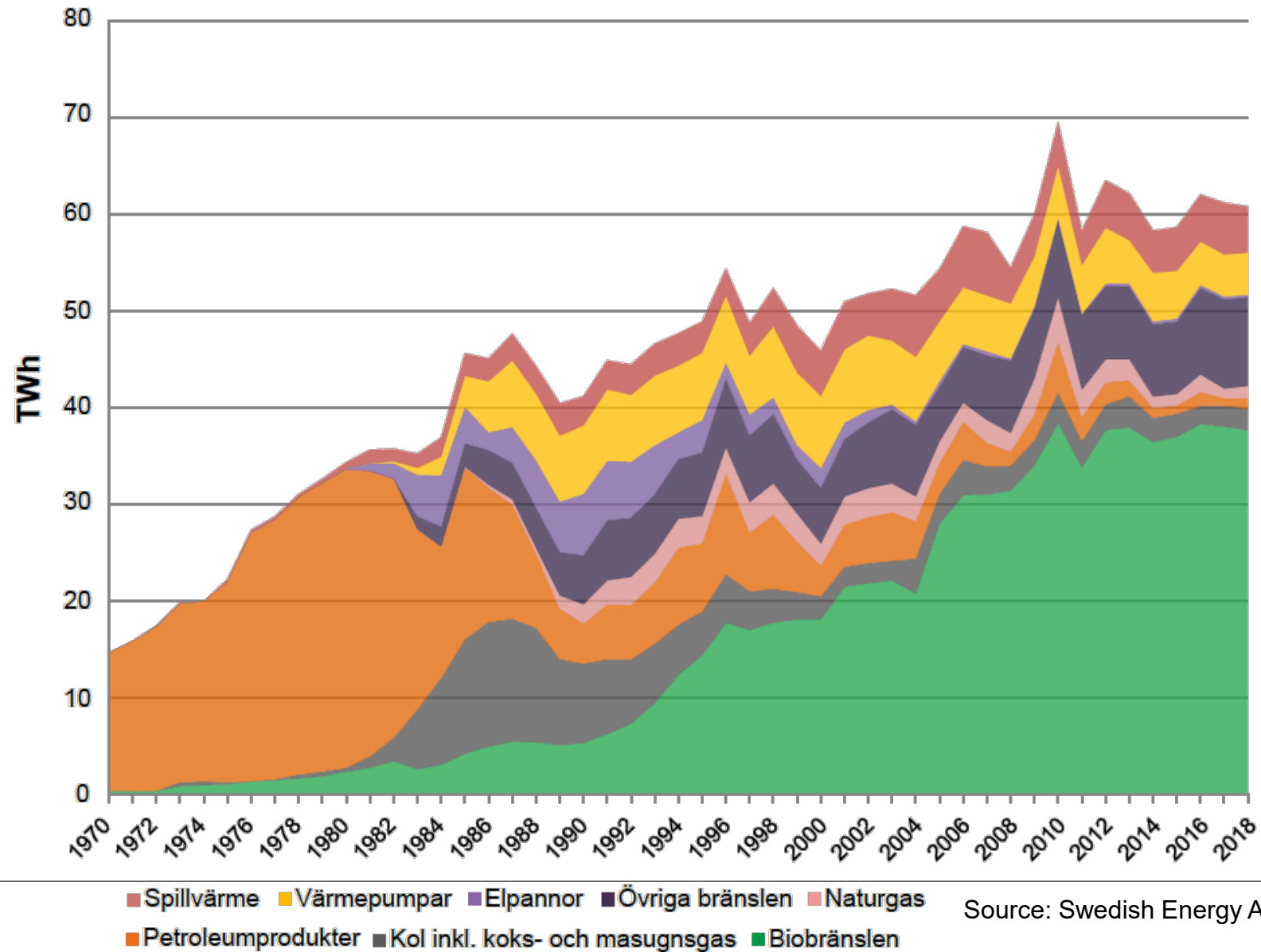


Heat demand in Swedish multi-dwelling buildings 1940-2015

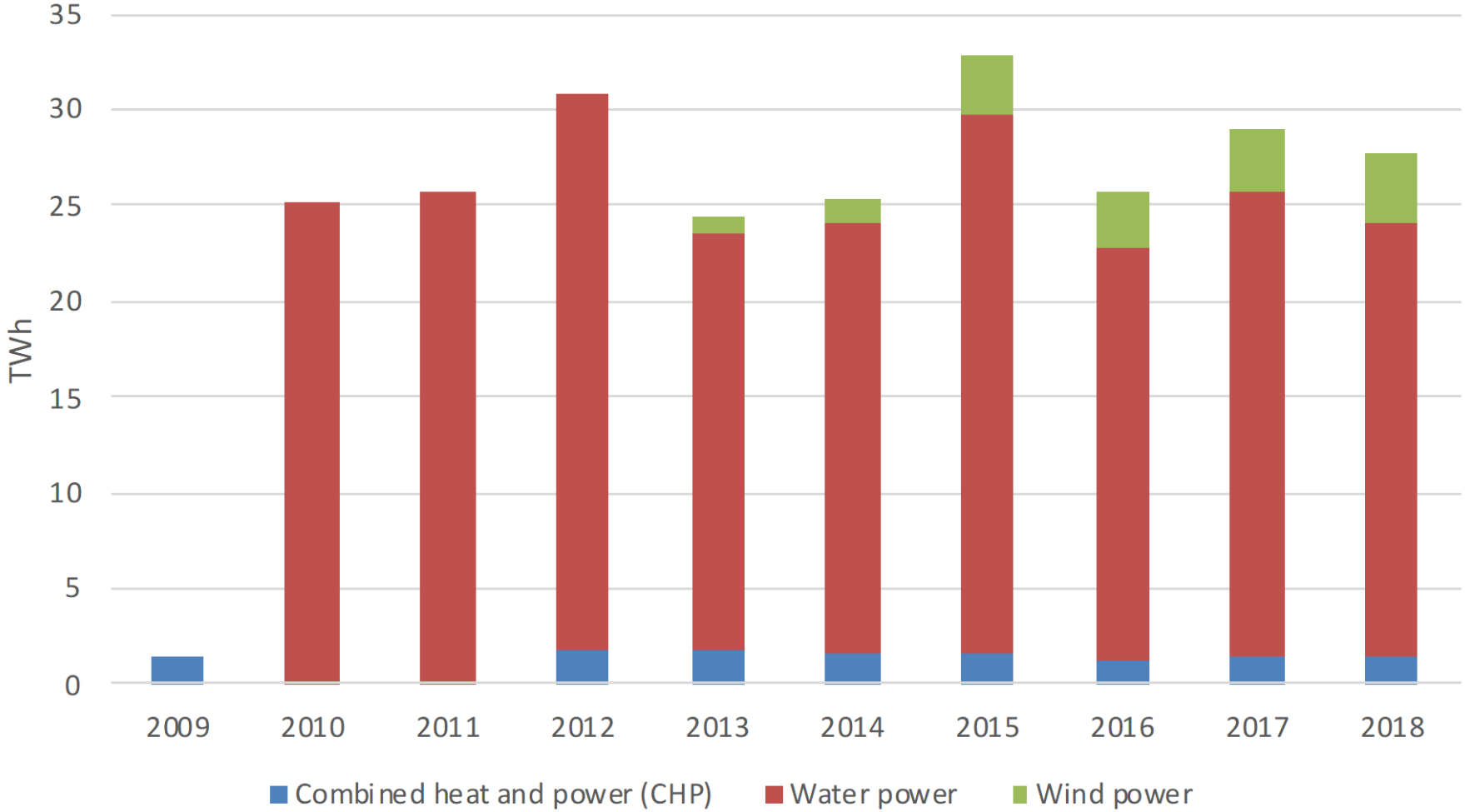
Figur 1. Energianvändning per kvadratmeter för uppvärmning och varmvatten i flerbostadshus år 2016, fördelad efter byggår, kWh/m².



Energy use in district heating sector



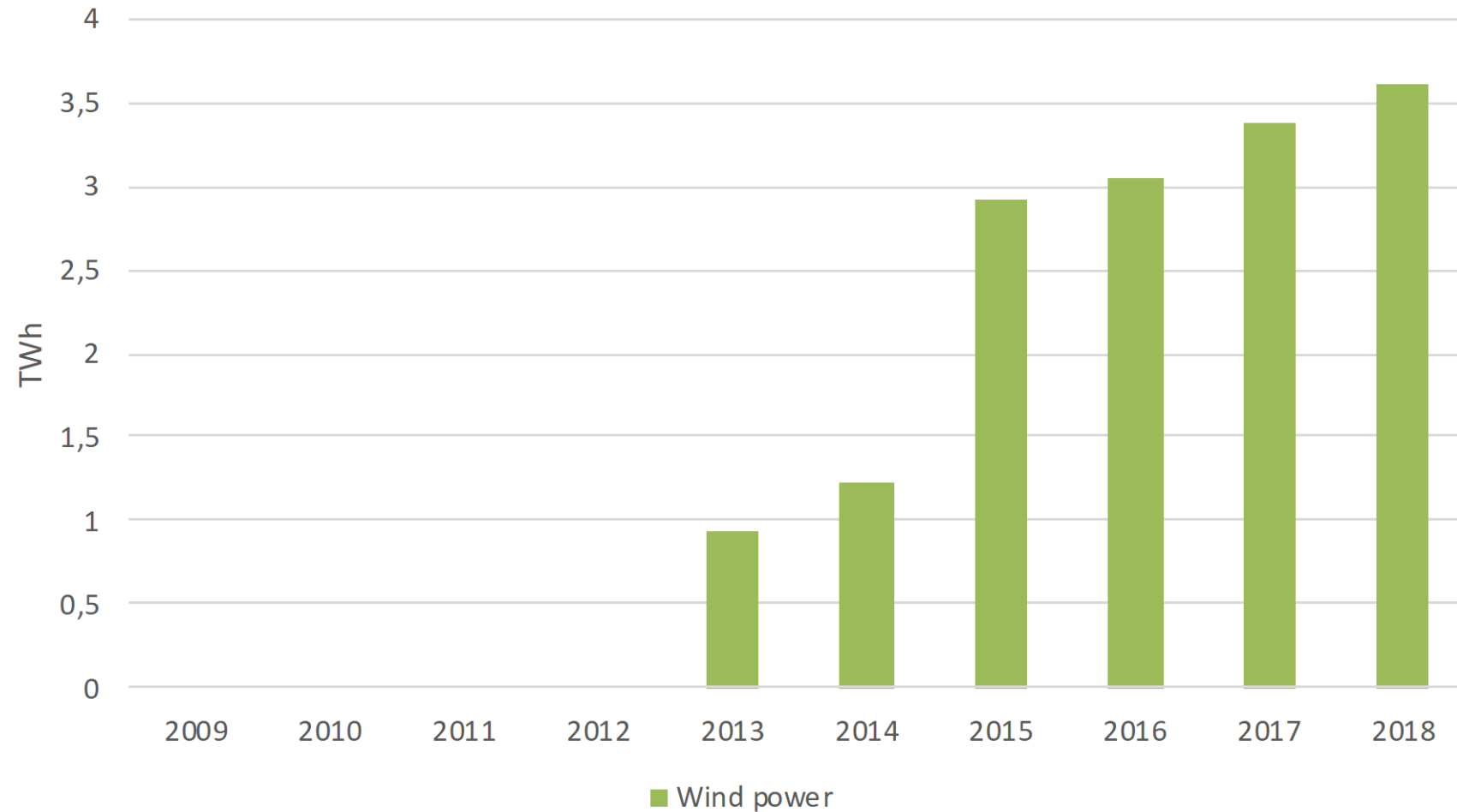
Power production in Jämtland and Västernorrland



Source: SCB



Wind power production in Jämtland and Västernorrland



Source: SCB

Tabell 1.10 Virkesförrådet levande träd fördelat på trädslag inom diameterklasser. Alla ägoslag¹. 2015–2019.

Growing stock for different tree species by diameter class.
All land use classes¹. 2015–2019.



Län/landsdel County/region	Trädslag Species	Diameter (cm) i bröst höjd Diameter (cm) at breast height									Träd- slags- andel Species comp.
		0-9	10-14	15-19	20-24	25-29	30-34	35-44	45-	Alla All	
		milj. m ³ sk mill. m ³ sk									%
N Norrland	Tall Scots pine	26,5	58,4	93,7	93,5	61,7	35,6	27,0	8,1	40,4	49,8
	Gran Norway spruce	26,6	42,0	52,7	48,2	35,7	22,5	21,2	7,3	25,6	31,6
	Contorta Lodgepole pine	1,3	5,2	4,7	1,3	0,2				12,8	1,6
	Lärk Larch	0,0	0,0		0,0					0,1	0,0
	Björk Birch	41,4	34,2	25,9	14,0	6,4	2,4	1,4	0,1	12,6	15,5
	Asp Aspen	0,3	0,6	1,2	0,8	0,8	0,9	0,6	0,5	5,8	0,7
	Al Alder	1,0	0,5	0,2	0,1	0,0				1,9	0,2
	Sälg Goat willow	0,7	0,6	0,6	0,6	0,3	0,2	0,2	0,4	3,7	0,5
	Rönn Mountain ash	0,3	0,1	0,1	0,0	0,0				0,5	0,1
	Övr. lövträd Other broadl.	0,1	0,1	0,0						0,2	0,0
	Summa Total	98,2	142	179	159	105	61,7	50,4	16,5	811	100,0
	S Norrland	Tall Scots pine	13,7	32,0	55,6	71,5	64,5	41,8	33,4	10,4	32,3
Gran Norway spruce		32,1	51,4	71,0	69,3	55,4	37,0	36,0	13,9	36,6	42,5
Contorta Lodgepole pine		2,2	9,2	10,9	5,2	1,2	0,1	0,2		29,1	3,4
Lärk Larch		0,0		0,0	0,0					0,1	0,0
Björk Birch		28,6	28,5	22,9	15,4	8,9	4,2	3,8	1,7	11,4	13,3
Asp Aspen		0,4	0,6	0,8	1,1	1,6	1,3	1,6	0,5	7,8	0,9
Al Alder		3,6	3,5	2,6	1,4	0,7	0,3	0,0	0,1	12,3	1,4
Sälg Goat willow		0,9	0,8	0,9	0,8	0,7	0,5	0,4	0,5	5,6	0,7
Rönn Mountain ash		0,9	0,3	0,3	0,1	0,1				1,6	0,2
Övr. lövträd Other broadl.		0,3	0,1	0,1	0,0	0,0				0,6	0,1
Lönn Norway maple		0,0	0,0	0,0	0,0		0,0	0,0		0,1	0,0
Ask European ash		0,0	0,0	0,0		0,0				0,1	0,0
Fågelbär Wild cherry											
Summa Total		82,9	126	165	165	133	85,2	75,5	27,1	860	100,0



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Tabell 1.10 Virkesförrådet levande träd fördelat på trädslag inom diameterklasser. Alla ägoslag¹. 2015–2019.

Growing stock for different tree species by diameter class.
All land use classes¹. 2015–2019.



Län/landsdel County/region	Trädslag Species	Diameter (cm) i bröst höjd Diameter (cm) at breast height									Träd- slags- andel Species comp.
		0-9	10-14	15-19	20-24	25-29	30-34	35-44	45-	Alla All	
		milj. m ³ sk mill. m ³ sk									%
Hela landet	Tall Scots pine	60,0	136	232	282	250	183	188	62,5	1394	39,3
Whole country	Gran Norway spruce	103	173	245	261	232	170	176	71,9	1431	40,3
	Contorta Lodgepole pine	3,8	15,8	17,3	7,6	1,9	0,2	0,2		46,8	1,3
	Lärk Larch	0,1	0,3	0,4	0,3	0,2	0,2	0,3	0,5	2,4	0,1
	Björk Birch	102	96,8	86,2	61,7	39,8	23,7	22,1	9,2	441	12,4
	Asp Aspen	2,2	3,5	5,5	6,7	8,4	10,0	14,2	10,0	60,6	1,7
	Al Alder	8,2	9,0	9,8	8,7	8,7	6,7	7,1	2,6	60,7	1,7
	Sälg Goat willow	2,5	2,5	2,9	2,7	2,2	1,6	1,8	1,7	18,0	0,5
	Rönn Mountain ash	3,2	1,4	1,2	0,6	0,3	0,2	0,0		7,0	0,2
	Övr. lövträd Other broadl.	1,8	1,0	0,8	0,4	0,3	0,1	0,3	0,3	5,0	0,1
	Ek Oak	1,1	2,1	2,6	3,3	4,1	4,1	9,4	19,9	46,6	1,3
	Bok Beech	0,5	0,6	0,8	1,1	1,5	2,0	4,0	11,0	21,5	0,6
	Lönn Norway maple	0,2	0,3	0,3	0,4	0,4	0,5	0,4	0,6	3,0	0,1
	Alm Dutch elm	0,1	0,1	0,1	0,1	0,1	0,1	0,2	0,6	1,5	0,0
	Ask European ash	0,3	0,3	0,4	0,5	0,5	0,6	1,0	1,8	5,4	0,2
	Lind Linden	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,2	1,1	0,0
	Avenbok Hornbeam	0,1	0,1	0,2	0,1	0,2	0,0	0,1		0,8	0,0
	Fågelbär Wild cherry	0,1	0,1	0,2	0,2	0,2	0,1	0,2	0,1	1,3	0,0
	Summa Total	289	443	606	638	551	403	426	193	3549	100,0

¹ Exklusive ägoslagen fjäll och bebyggd mark
Excluding alpine and urban land

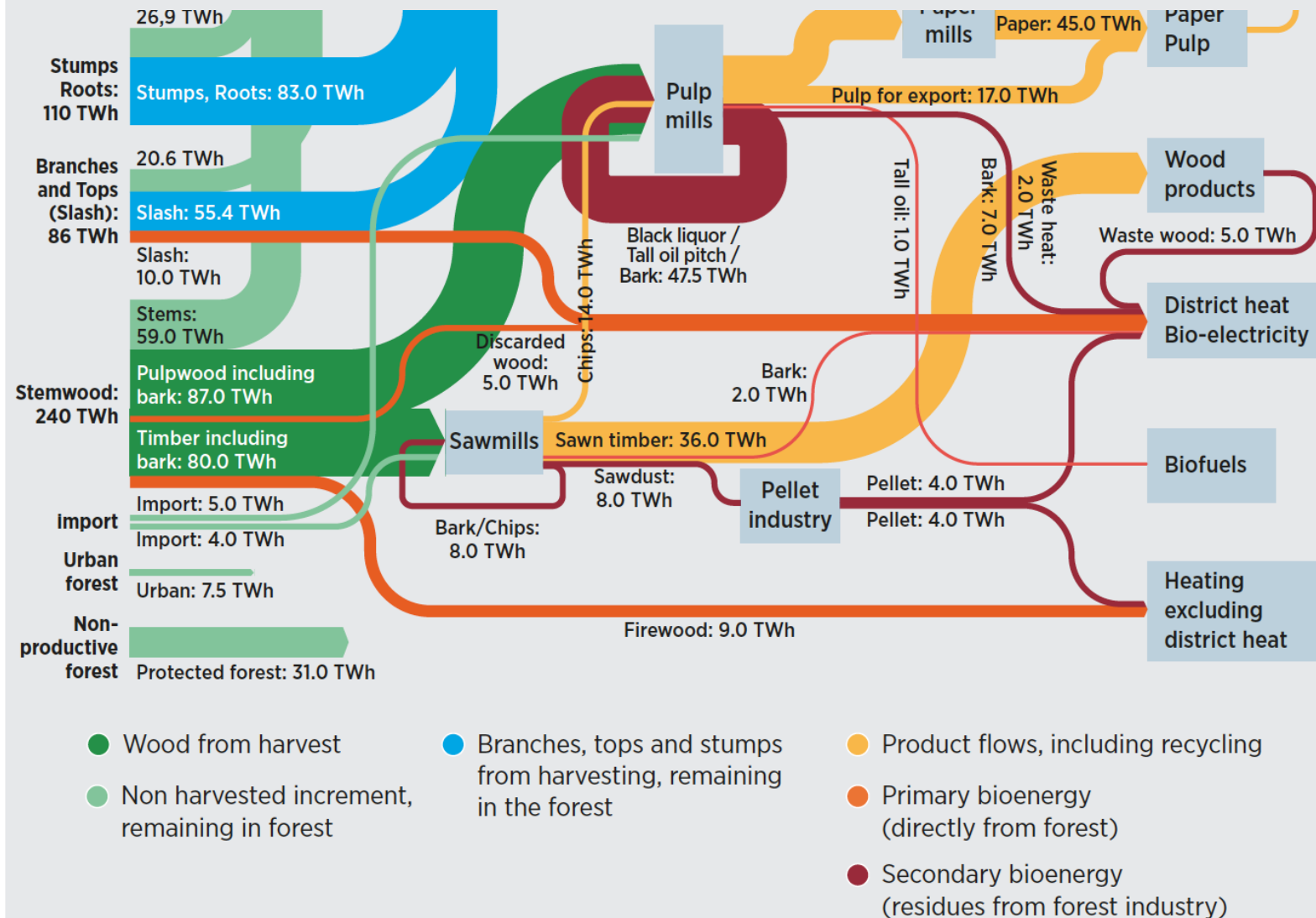


Tabell 4.1 Årlig avverkning fördelad på landsdelar.
Alla ägoslag¹. 05/06–09/10 till 14/15–18/19.
Annual felling by region.
All land use classes¹. 05/06–09/10 to 14/15–18/19.

Avverkningssäsong Felling season	Landsdel Region				
	Norra Norrland	Södra Norrland	Svealand	Götaland	Hela landet Whole country
	milj. m ³ sk mill. m ³ sk				
05/06-09/10	12,0	20,2	20,1	30,8	83,1
06/07-10/11	11,6	20,9	20,5	30,7	83,7
07/08-11/12	11,2	19,8	21,7	30,5	83,2
08/09-12/13	11,2	19,9	23,2	29,4	83,7
09/10-13/14	11,6	19,4	24,3	29,9	85,2
10/11-14/15	11,8	21,4	25,1	29,3	87,5
11/12-15/16	11,6	20,7	24,0	29,7	85,9
12/13-16/17	10,5	19,5	22,1	28,6	80,7
13/14-17/18	11,0	16,9	23,1	30,5	81,4
14/15-18/19	11,1	17,5	25,7	31,3	85,6

¹ Exklusive ägoslagen fjäll och bebyggd mark
Excluding alpine and urban land

Swedish forest material balance in energy terms



25% of the wood harvesting comes from the Mid Sweden region

Conclusion and question?

What are the main similarities and differences between the Swedish situation and your regions?

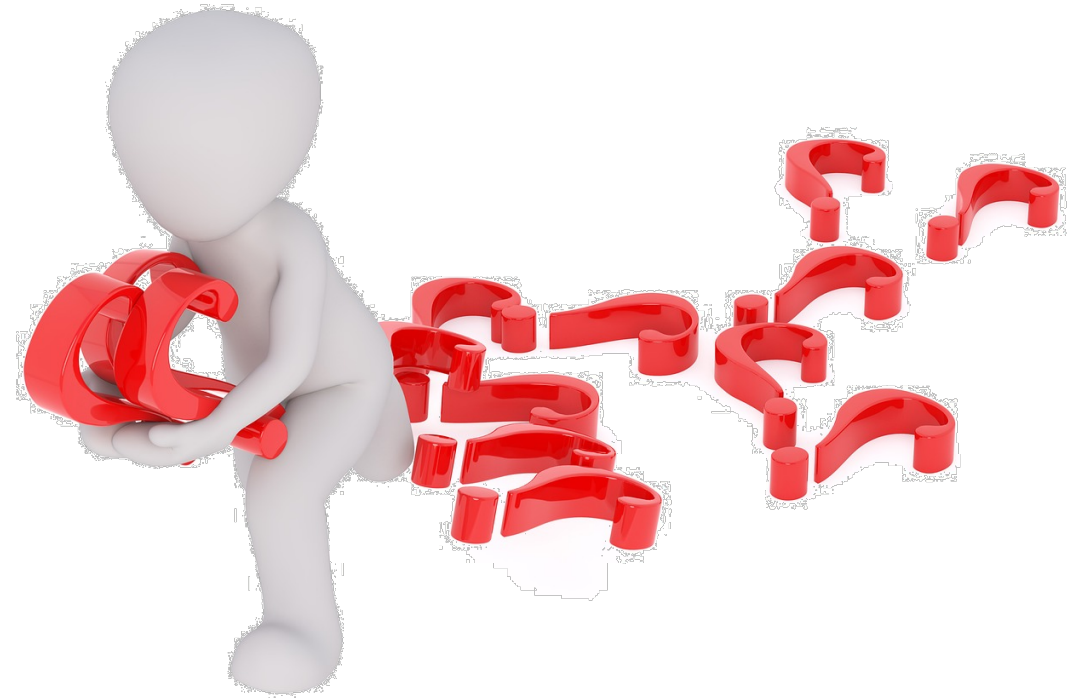


Image by [Peggy und Marco Lachmann-Anke](#) from [Pixabay](#)