

Energiepolitische Ziele und Planungsrechtliche Unterschiede Deutschland - Dänemark

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Vita

- Studium Maschinenbau/Energietechnik Flensburg
- Von 1995 – 2021 in Dänemark tätig
- Forschung und Lehre im Bereich der Energieplanung, insbesondere räumlich-geografische Methoden
- Promotion an der Universität Aalborg 2003
- 2001 – 2013: Assistant und Associate Professor
- Seit 2013 Professur für Nachhaltiges Energiemanagement, EUF
- Stellv. Direktor, Centre for Research in Sustainability and Transformation



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Dänische Energiepolitik

- Ölkrise 1973
- Erster Energieplan eines OECD-Landes 1976
- Fokus: Versorgungssicherheit und Energiepreise
- Seit den 1980ern zunehmend Umweltfokus
- Klimaagenda bestimmend spätestens seit COP 15 in Kopenhagen
- Ambitionierte Ziele: 70% weniger CO₂ in 2030, Unabhängigkeit von fossiler Energie in 2050

Wirkmittel dänischer Energiepolitik

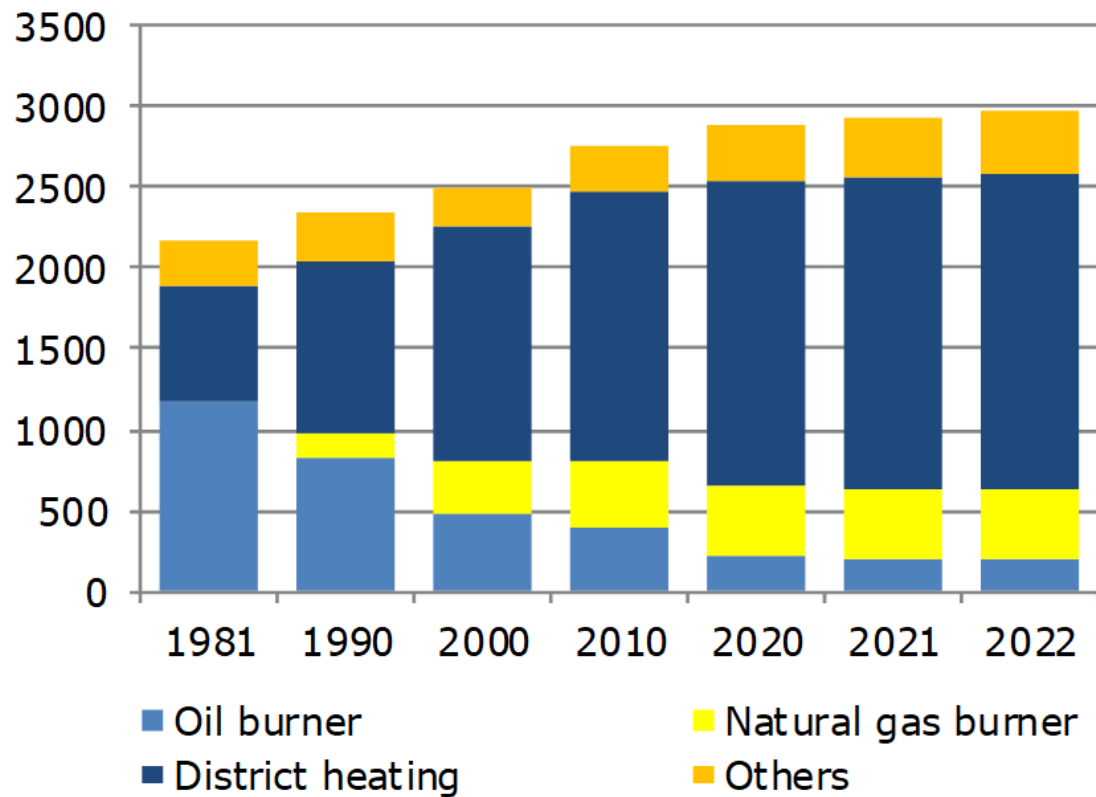
- Zielgerichtete, kosteneffektive Subventionen, regelmäßig evaluiert
- Substantielle Energiesteuern auf fossile Energieträger
- Geeignete legislative und planerische Rahmen fördern Planbarkeit
- Kombination von „starkem Staat“ und Marktkräften

Wirkungen dänischer Energiepolitik

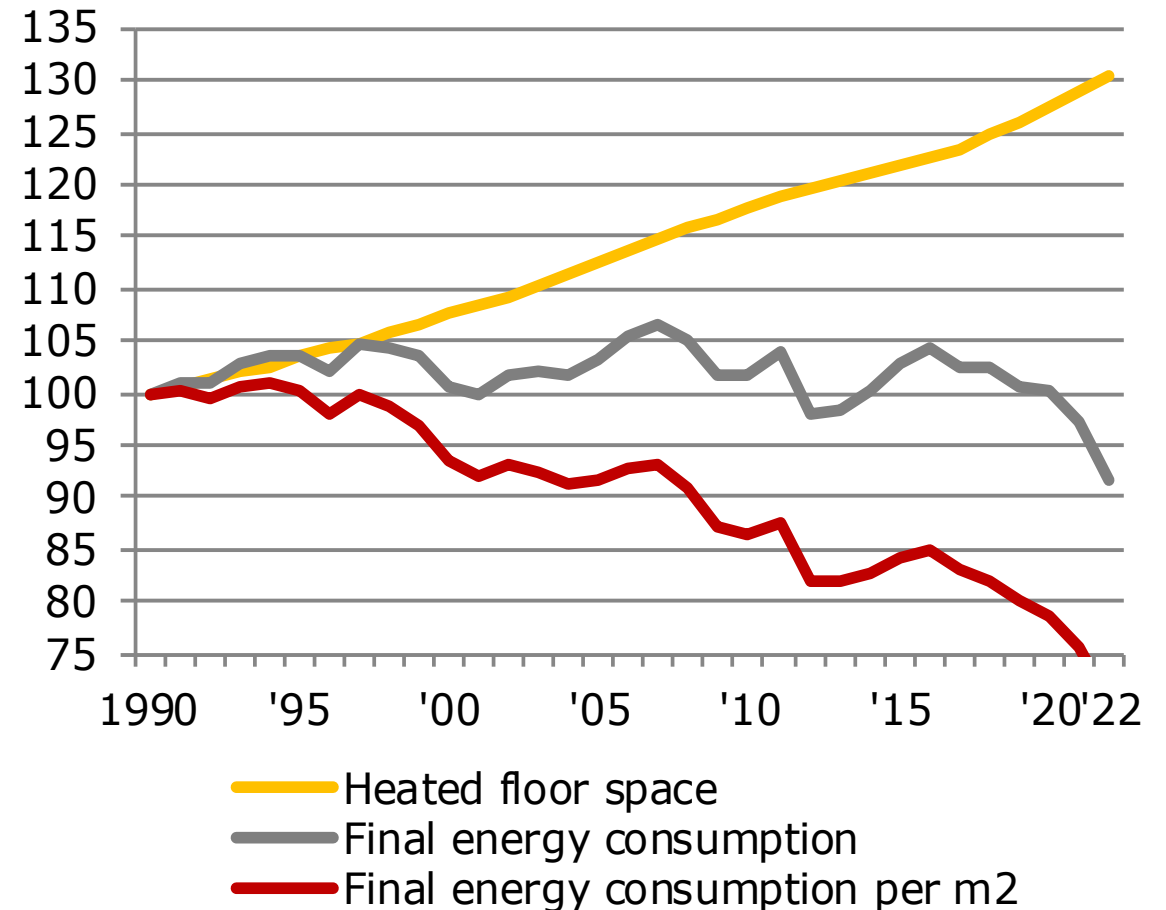
- Unabhängigkeiten vermindert
- Anteil erneuerbarer Energie gesteigert
- Reduktion des Wärmebedarfs
- Dekarbonisierung der Wärmeversorgung
- Export und Wertschöpfung
- Demokratisierung der Energieversorgung
- Weltweit führende Forschung und Entwicklung

Erfolge im Wärmesektor

Anzahl (1000) Heizungssysteme in Gebäuden



Gebäudefläche und Wärmebedarf (Index)



Was macht die dänische Energiepolitik besonders?

- Verhandlungen über energiepolitische Ziele sind ungeheuer wichtig
- Über Jahrzehnte gelang ein energiepolitischer Konsens
- Die Wichtigkeit von Energiepolitik für Wirtschaft und Gesellschaft wurde früh erkannt
- Der Nutzen für die Volkswirtschaft (Beschäftigung, Export, Unabhängigkeit und Preise) ist immer im Fokus gewesen
- Die Parteien sind sich einig beim Ziel, bis 2050 fossilfrei zu werden, aber uneinig darüber, wie und wie schnell dies erreicht werden soll

Akteure und Institutionen

- Genossenschaftlich organisierte, dezentrale Energieerzeugung
- Ein Stromsektor in öffentlicher Hand (bis 1999)
- Ein Wärmeversorgungsgesetz, das zur Wärmeplanung zwingt (seit 1977) und welches Profite mit dem Verkauf von Wärme verbietet
- Eine Tradition langfristiger Energiepläne (bis 2001) und parteiübergreifender Konsens in der Energiepolitik

Wärmeplanung

- Kommunen sind verantwortlich für die Wärmeplanung
- Seit 1979: Zonierung von Siedlungsbereichen in Fernwärme und Erdgas, ländliche Räume ausgenommen.
- Projektbasierte Fortschreibung, sozio-ökonomische Bewertung
- 2006: Projekt „Varmeplan Danmark“ zeigt, dass bislang erdgasversorgte Gebiete mit Fernwärme versorgt werden können
- 2010-2022: Strategische Wärmeplanung in den Kommunen
- 2022: Fernwärme verstärkt in erdgasversorgte Gebiete
- Wärmeplanung wird zunehmend dynamisch verstanden.

Kommunale strategische Energieplanung

- Auftakt
 - Politische Unterstützung
 - Verankerung in der Kommune
 - Kooperationsmöglichkeiten
- Kartierung
 - Status Bedarf und Versorgung
 - Referenzscenario
 - Potentiale und Herausforderungen
- Analyse
 - Energiebilanz
 - Handlungsspielräume
 - Szenarien
- Plan und Implementierung
 - Ausarbeitung eines Planes
 - Durchführung von Projekten



Strategisk energiplanlægning i
kommunerne, Energistyrelsen, 2013

<https://projectzero.dk/initiativ/groennere-varme-til-alle-borgere/>

Highlights

- Energieplanung als Disziplin seit 1976
- Vertrauensverhältnis zwischen Staat, Bürgern und Wirtschaft
- Digitalisierung schafft Datengrundlage für die Energieplanung
- Langfristige Energiepläne und starke Wirkmittel
- Starkes politisches Engagement und starke Institutionen



Sønderborg
 **Varme**



Erik Wolff

CEO

- Mechanical engineer B.Sc.
- Experience from the power plant at district heating business since 1989
- CEO for Sønderborg Fjernvarme since 2013



About Sønderborg Varme

Sønderborg District Heating, "A cooperative owned by the consumers"

Sønderborg Varme A/S. 100% of the shares are held by the A.m.b.a. All operation activities and assets are placed here

Sønderborg Kraftvarme. 100% of the shares are held by Sønderborg Varme A/S. Waste incineration powerplant.

Sønderborg Lokalvarme A/S. 100% of the shares are held by Sønderborg Varme A/S. Development of heat solutions for smaller cities

The board of Sønderborg Fjernvarme A.m.b.a. is elected at the regular general assembly, comprising 7 members; minimum off 4 must be consumers

In addition to that there are 2 board members elected among the employees

Sønderborg Fjernvarme A.m.b.a.

Sønderborg Varme A/S

Sønderborg Kraftvarme A/S

Sønderborg Lokalvarme A/S

Key figures for 2023

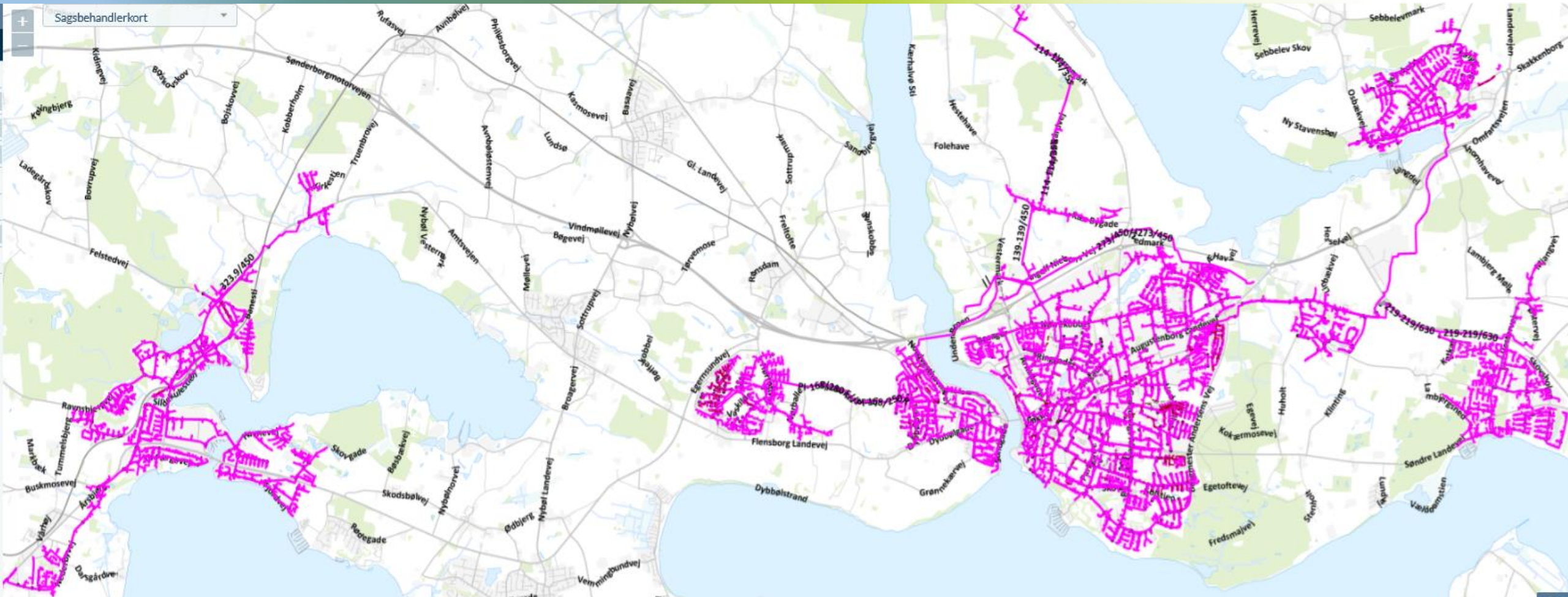
- Heat production: 414 GWh
- Heat sales: 320 GWh (22%)
- Consumers: Approximately 16.200 meters
- Heated area: Approximately 3.7 million square meters
- Revenue: 300 million DKK
- Balance: 829 million DKK
- Employees: 53
- Price for a standard house: 14.037 DKK/Y (1,887 €)



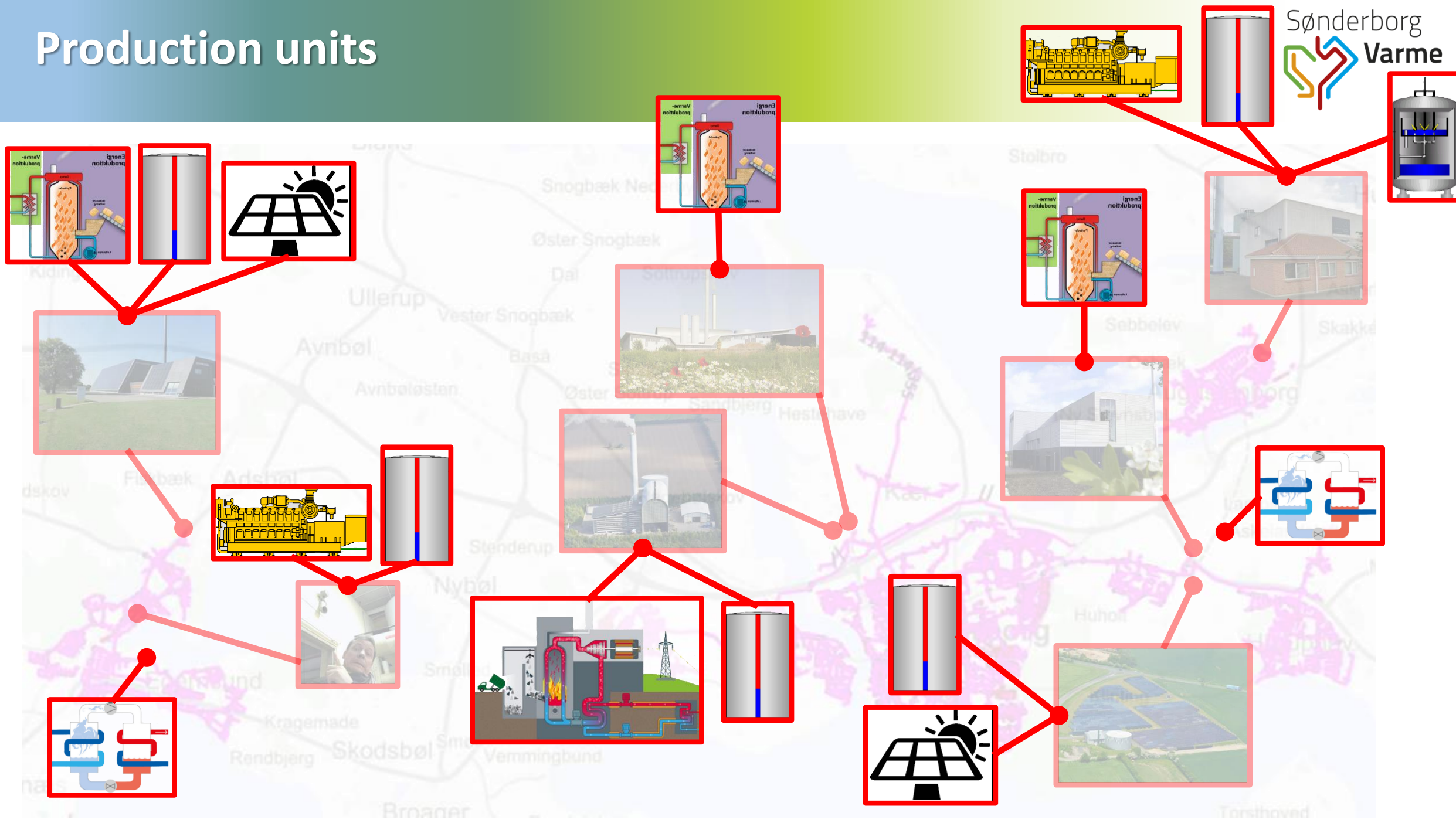
Definition of a standard house:

- 130 m²
- 18,1 MWh (65.15 GJ) annual heat consumption

Sønderborg
Varme

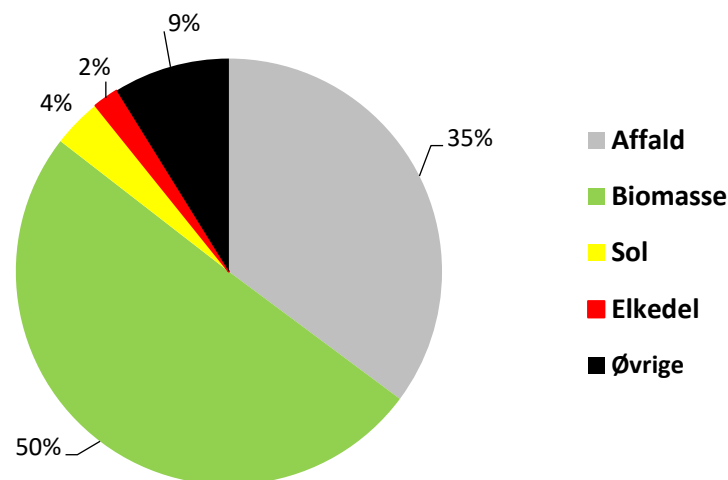


Production units



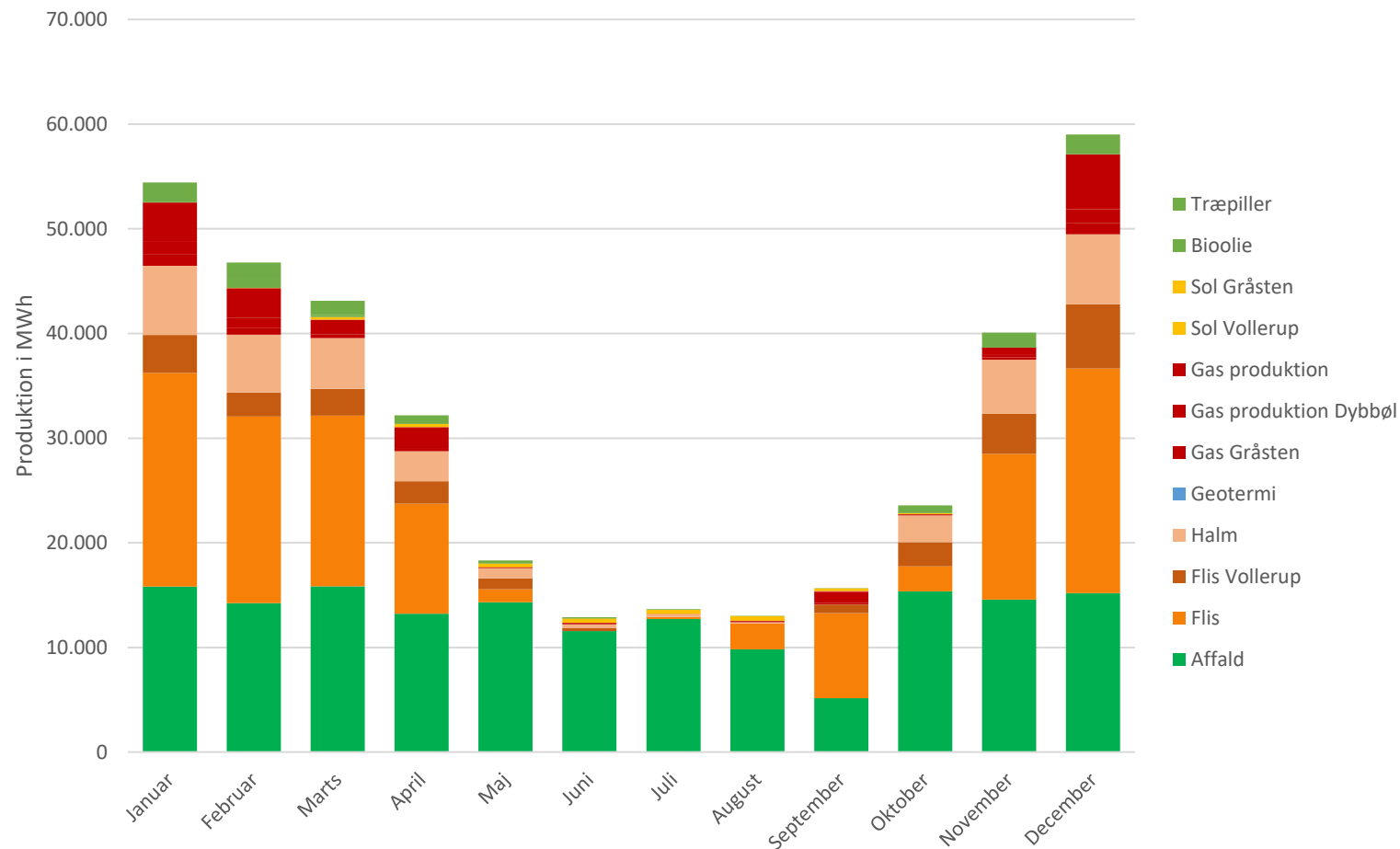
Heat composition

Fordeling Produktion 2023



The wide array of technologies and energy sources ensures stable, environmentally friendly district heating at a competitive price

Produktion - Samlet



Fuel composition 2023



Vedvarende energi

Andel vedvarende energi

74,66%

Rangering - CO₂-udledning

Sammenligning med alternative energikilder

Grøn

Mindre CO₂-udledning end en luft til vand varmepumpe

Gul

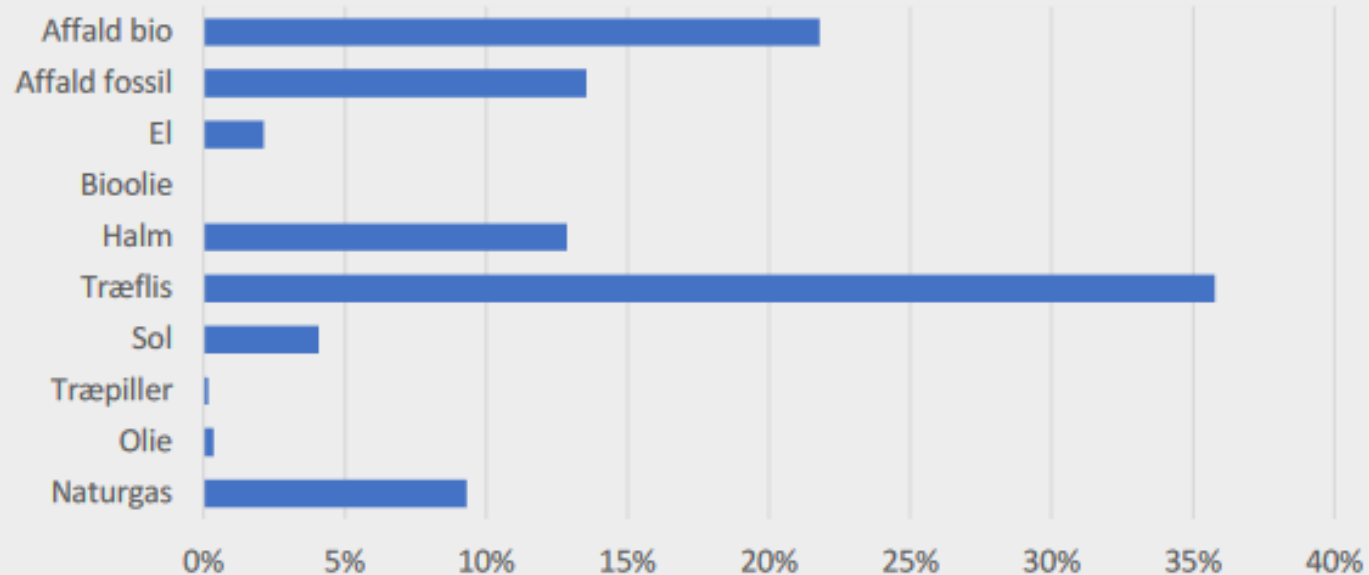
Mindre CO₂ udledning end et gasfyr

Rød

Større CO₂-udledning end et gasfyr



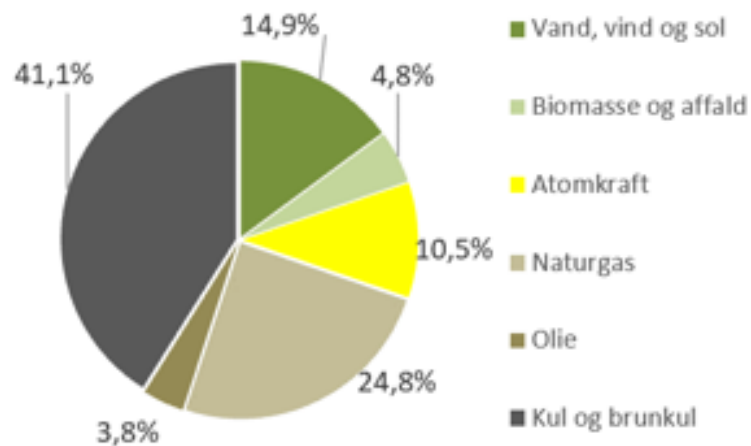
Brændselsfordeling i procent (100% i alt)



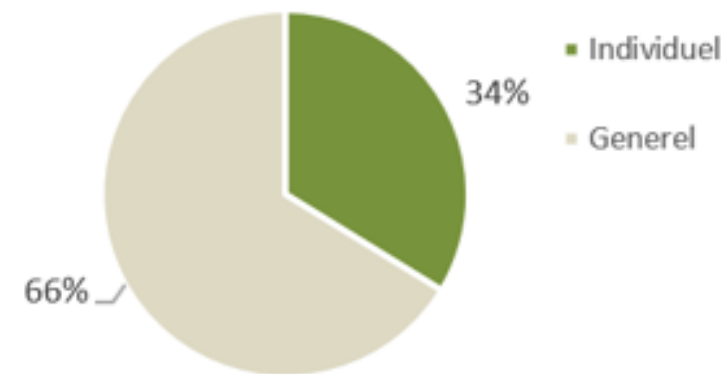
Power declaration 2022



Power distribution 2022



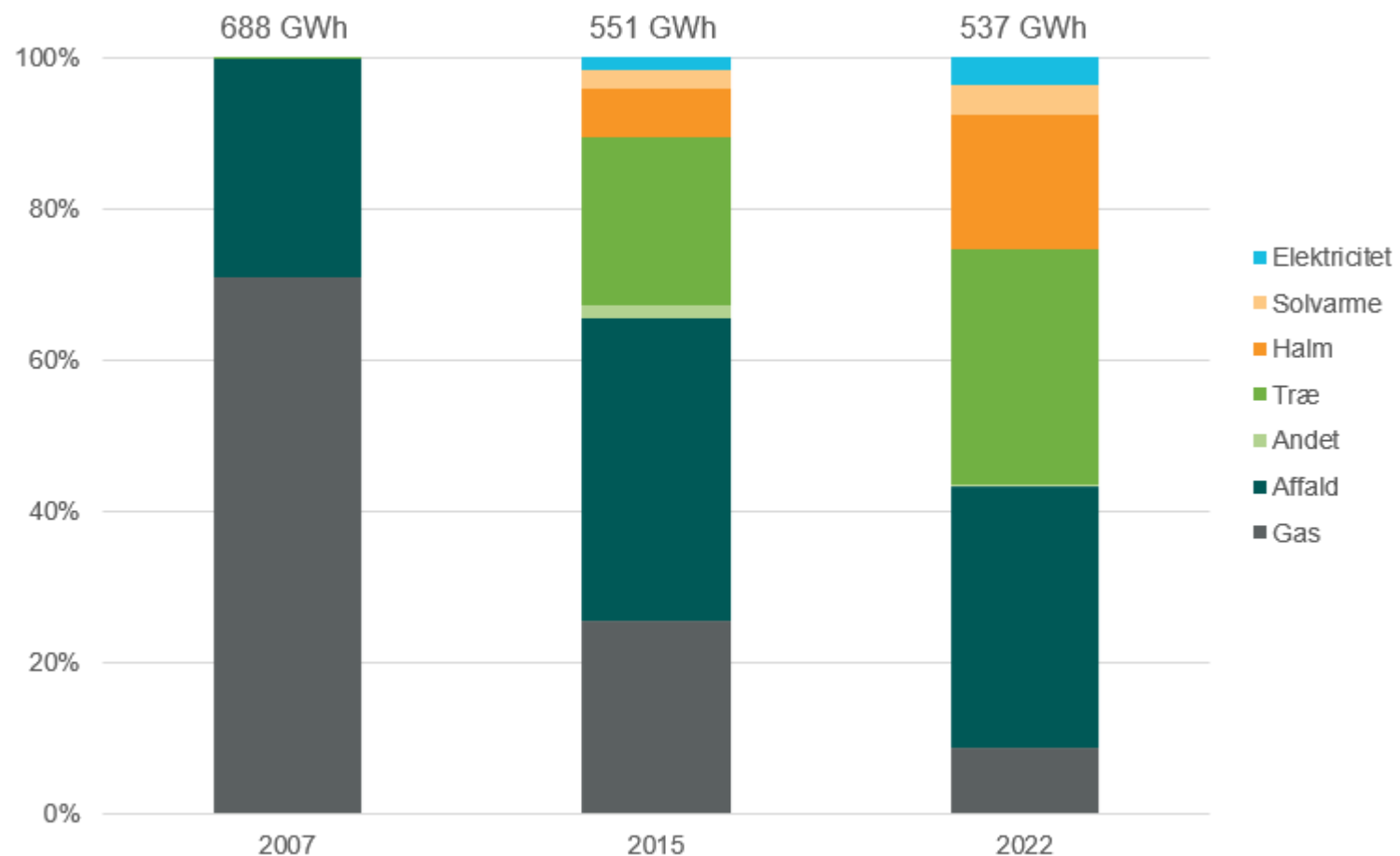
Power sold with certificate of origin 2022



District heating in the municipally of Sønderborg



Development in fuel composition in Sønderborg



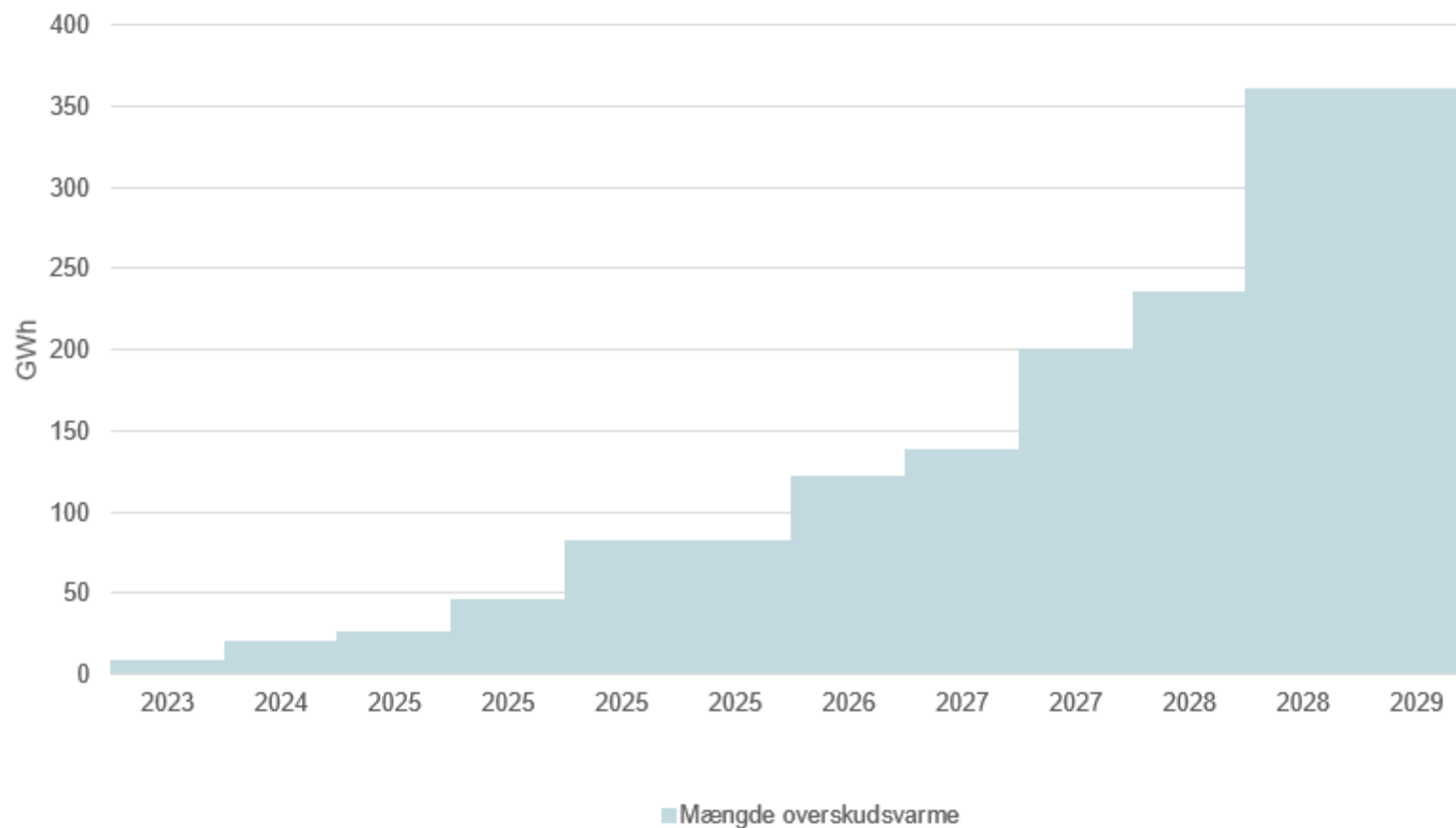
Power includes heatpumps, surplus heat from industries and electrical boilers

Wood includes wood chips and biomass waste

Gas includes natural gas and gasoil

Other includes biological oil og geothermal heat

Surplus heat potential in Sønderborg



Ambition/estimate based on identified project possibilities, if they are all fully utilized

New areas and closer integration



Exchange of heat production to ensure stable prices and security

Surplus heat from brickworks

New areas totaling approximately 1,000 houses

Slaughterhouse, an annual consumption equivalent to 1,000 houses



Cost estimate to establish the district heating grid

- A tool as Danfoss Leanheat network is used to generate a piping solution with dimensions
- The estimated consumption for each consumer is used as an input based on the Building and Dwelling Register (BBR) or the gas consumption information provided by the gas distribution company
- Experience values for the installation of district heating pipes are used to calculate the project cost

The municipality is the planning authority

Heating supply plans in Denmark

It is voluntary for a municipality whether they want to make a heating supply plan.

Heating supply plans:

- Determines the development for the local heating supply
- Facilitates cooperation between the municipality, the heating supply company, and other actors key stake holders
- Increases transparency for the citizens regarding to their heating supply

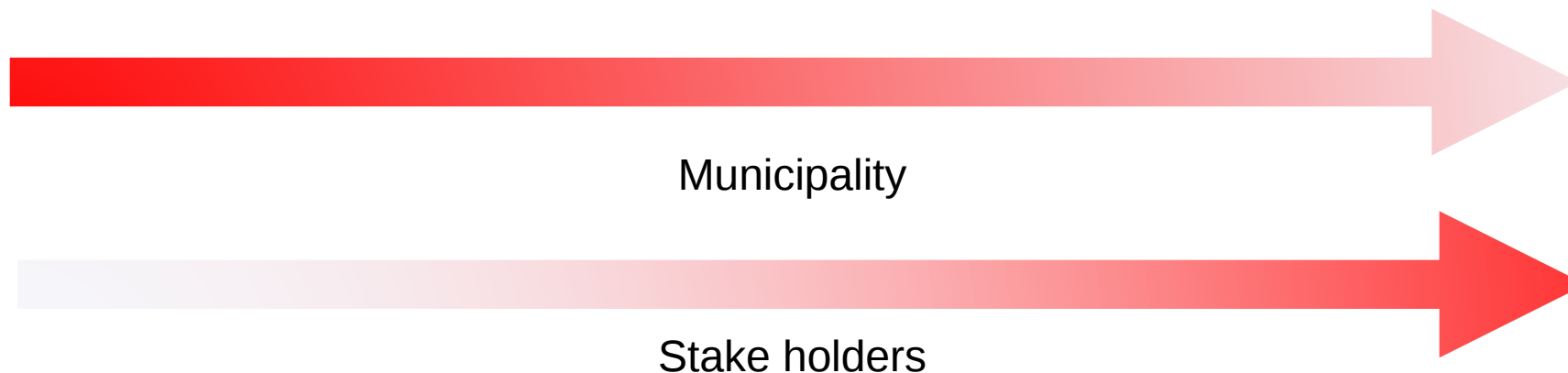


Heating plans

A heating plan is not legally binding, but it is an important tool to tell in which direction the municipality wants the development of the heating supply to go

The cooperation between key stake holders is essential to achieve the goal:

To offer private households and industries a sustainable energy alternative, helping to phase out fossil fuels as an energy at a competitive and affordable prices.



Stake holdes

Municipality

- Responsible for the heating supply plan
- and the approval of new projects regarding common local heating supply

Citizens

- Demand affordable effective heating supply.

ProjectZero

- Partnership between municipality and corporations.
- Facilitates the green transition to more sustainable alternatives.

District heating companies

- Responsible for developing project proposals for new areas
- Once a Project is approved by the municipality, there is a obligation to supply

Evida

- Evida is a gas distributor and responsible for the gas supply grid
- Evida is obligated to supply gas to the areas depending on gas heating.

N1

- N1 is responsible for the power grid/electricity network.
- N1 is obligated to ensure the capacity in the power grid.



The process

After the heating plan is developed:

- The heating supply plants files an application to establish local district heating in a specific area
- The municipality determines whether to approve the application
- Criteria for acceptance is a positive economic impact on:
 - The society
 - The company
 - The households



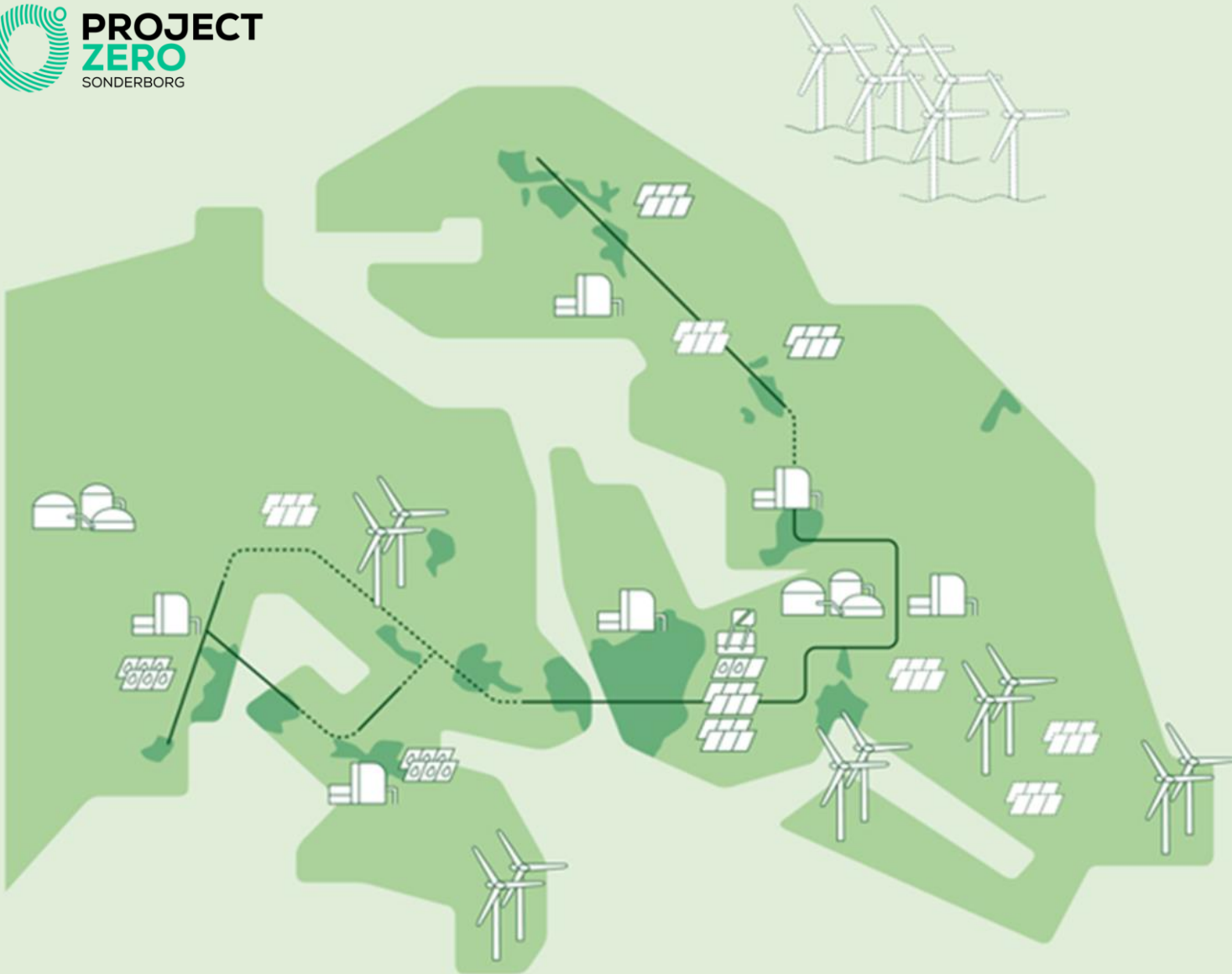
The process

After the application is approved

- The citizens in the given area are not obliged to connect their households to the district heating
- The heating company must deliver at attractive solution!
- Marketing activities:
 - Information for the Press
 - Information directly by mail
 - Meetings with the citizens in a certain area
 - One-to-one meetings on site
 - Highlight of advantages
 - Attractive offers
 - Final meeting at home



The future: Integrated energy system, Masterplan2029



- A way to ensure the most cost-effective path to carbon neutrality
- Utilizing the district heating network to increase society's energy efficiency by harnessing surplus heat
- Utilizing the opportunity to store heat in accumulator tanks and thus support the electrical grid by using power when there are a surplus in the system
- Directly support the electrical grid with system services (frequency regulation, stabilization of the electrical grid e.g.)

To achieve our goals, efficient production planning is extremely important. It ensures:

- Power-consuming units actively work to support the electrical grid
- The lowest possible heat production cost
- Utilization of storage possibilities
- A production plan, which can be carried out hydraulically



•Questions ?

