

THIS IS PREEM





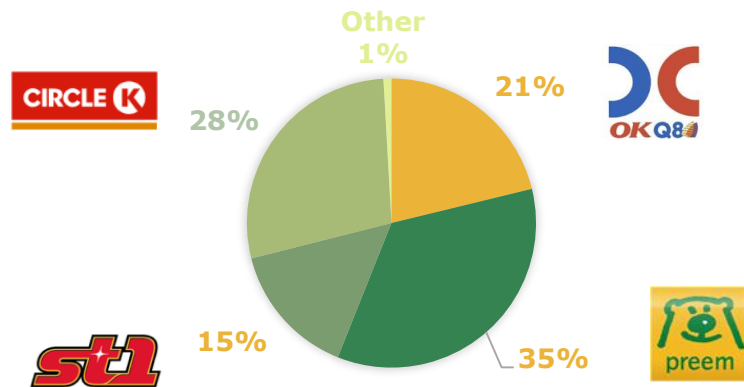
Our vision:
Preem leads the transition
towards a sustainable society

Largest Oil Refiner in the Nordics and One of the Largest Transportation Fuel Suppliers in NW Europe

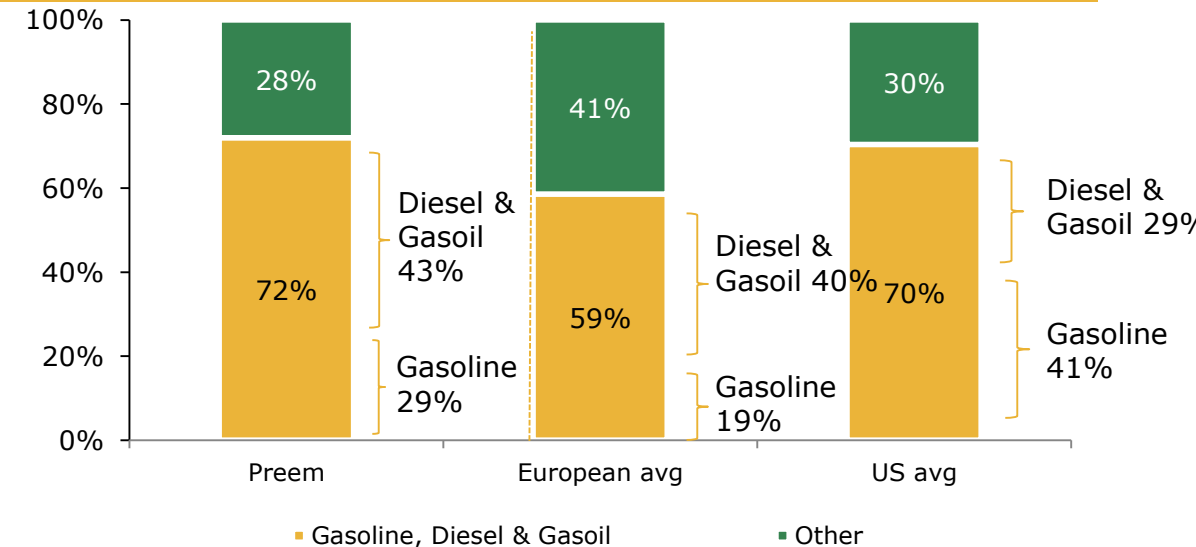
Largest Oil Refiner in the Nordic Region

- 345,000 bpd capacity equal to approx. **~30% of the Nordic capacity and ca. 80% of Swedish capacity.**
- Strong marketing position in Sweden with approximately **40% share of all refined products sold.**
- A leader in the production and sale of transportation fuel in Sweden and one of the largest suppliers of transportation fuel in NW Europe.
- **Sweden's largest producer of advanced biofuels with planned market growth over 500% till 2023.**

Swedish Diesel Market Share⁽¹⁾



Preem is a Transportation Fuel Producer⁽²⁾



Note: 1. As of December 31 2016
2. Preem and Wood Mackenzie – based on production volume for the year ended December 31, 2015



Modern, environmentally- and energy-efficient

Emissions from Preem's refineries compared with the average refinery in Western Europe:

17 % less carbon dioxide

60 % less nitrogen oxides

88 % less sulfur oxides

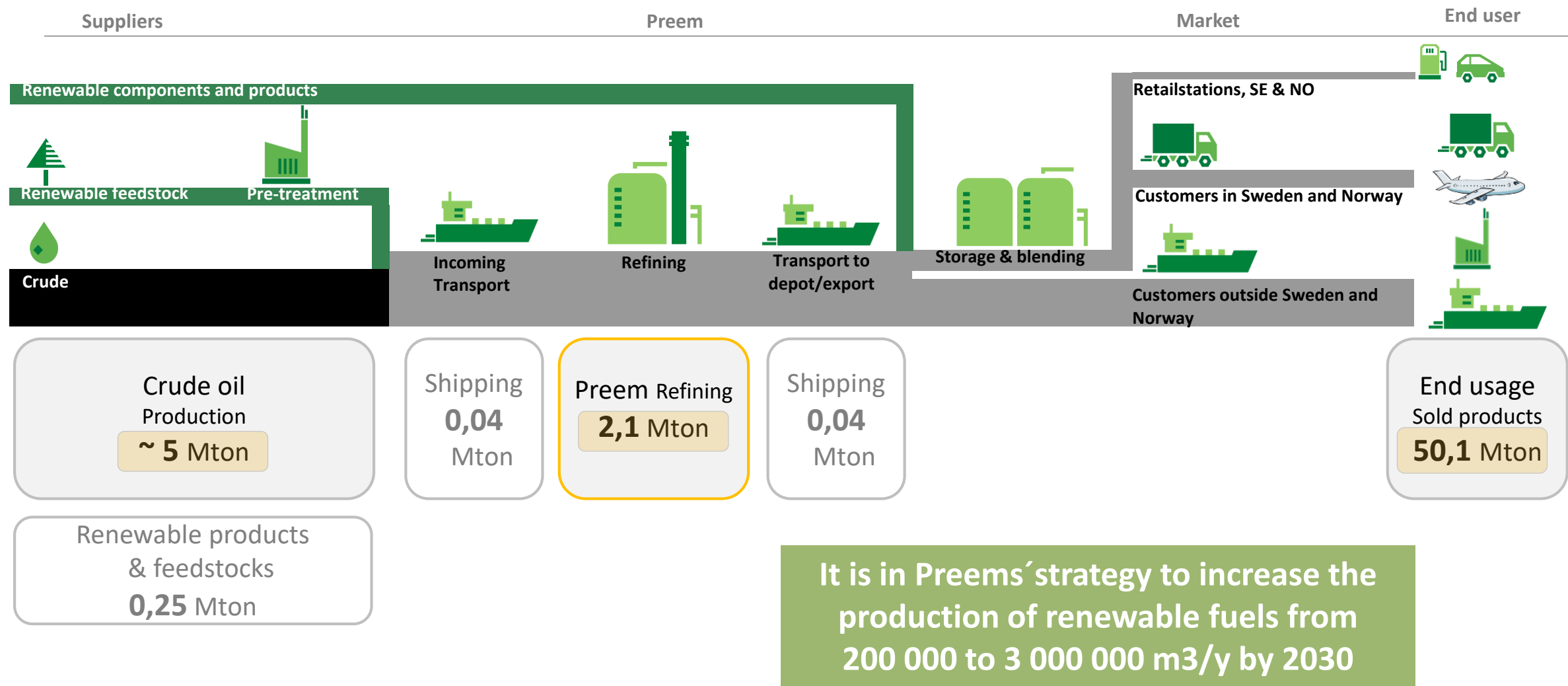


Preem's most important contribution to the climate targets is to reduce fossil CO₂ in the products

Scope 1
Direct

Scope 2
Indirect

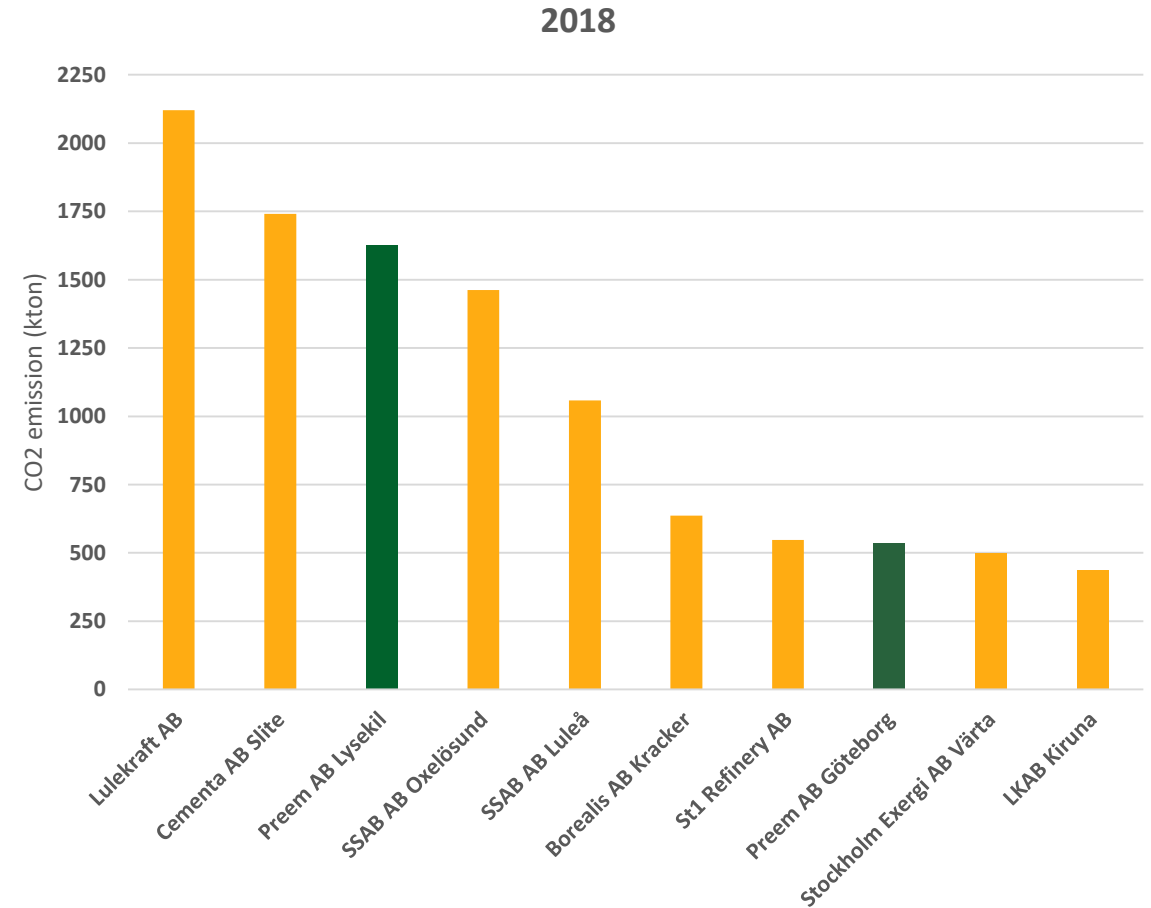
Scope 3
Indirect, valuechain



Preem is one of Sweden's largest emitters of CO₂ but yet extremely efficient

Taking responsibility

- Preem believes that curbing emissions from these two refineries will be a competitive advantage moving towards the 2030ies
- In past Preem studies, finding a solution to where to store large amounts of captured CO₂ have been problematic
- With the CLIMIT program and the Northern Lights project, there is a credible solution to this issue and Preem wants to be an early adopter
- More participants will reduce overall cost for each captured and stored tonne of CO₂



Preem CCS

On-site demo leading to a roadmap for CO₂ reduction

Project

- **Preem** is partnering with **Aker Solutions, Equinor, SINTEF** and **Chalmers University of Technology** in this project
- Norwegian **Gassnova** and the **Swedish Energy Agency** have recently approved funding for a 3 year project to look into resolving many of the issues around CCS
- Project time is 2019 - 2021

Challenges

- Finding the right solutions to capturing and refinery integration is key to reduce overall OPEX
- Under current national and international legislation there are some hurdles to bridge to allow for international trade with CO₂ as a waste
- If EU-ETS price is the only mechanism that would pay for private companies to adopt CCS as a commercial solution the price needs to be a lot higher than current levels

Scope

- Undertake an on-site demonstration of CO₂-capture with Aker Solutions' MTU
- Prepare a basis for full scale design integrated in the refinery
- Investigate a portfolio of possible CCS value chains
- Identify actions to overcome legal- and regulatory barriers
- Establish a roadmap for CO₂-emission reduction pathways at Preem refineries

Next step

- Funding is approved and the Consortium agreement is about to be finalised
- Kick-off meeting was held in Gothenburg 4th of April
- Aker and Preem have started to plan for setting up the MTU in Lysekil in the spring of 2020
- Research and development work will start after summer
- The aim is to have a full scale design ready late 2021, and a capture plant in operation by 2025



Ideal Refinery Locations with Direct Deep Sea Access makes Preem a good candidate for a North Sea CCS solution

Location

- Both Lysekil and Gothenburg Refineries have deep water access
- Both refineries could be a part of a Skagerrak cluster where CO₂ could be transported to a centralized hub for storage

Infrastructure

- Preem has two large Hydrogen plants where CO₂ concentration is high
- Excess heat, available at both refineries could potentially be utilized as energy source for capturing CO₂
- Three more SMRs are being planned



Example of Challenges and Possibilities

- Hydrotreating for cleaner fuels and especially renewable products require large amounts of hydrogen
 - Steam Methane Reforming from natural gas or biogas
 - CCU, CCS, BECCS on SMR with optimal integration in the refineries
 - Electrolysis of water, electrification
- Infrastructure for CO₂
 - Common facilities in Gothenburg



THANK YOU FOR YOUR ATTENTION!



Preem CCS Funding

Total project: 28 million NOK

Partner	funding share %
CLIMIT	34
Swedish Energy Agency	27
Preem	31
Aker	3
SINTEF	3
Equinor	3

