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SYSAV CARBON CAPTURE STORAGE **ÖVERGRIPANDE FÖRSTUDIE,** **FINAL REPORT**



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CONTENTS

1.	Introduction	2
1.1	Background	2
1.2	Design Basis	3
1.3	Carbon Capture Technology Screening	3
1.4	Technology, Transport, Storage & Cost	3
1.5	Regulatory, Market and Cost Potential for CCS in relation to Sysav	3

SUBREPORTS

- /1/** Sysav CCS - Design Basis, *REN2021N00220-RAM-RP-001*, February 2022
- /2/** Sysav CCS - Carbon Capture Technology Screening, *REN2021N00220-RAM-RP-001*, February 2022
- /3/** Sysav CCS - Technology, Transport, Storage & Cost, *REN2021N00220-RAM-RP-001*, March 2022
- /4/** Sysav CCS - Regulatory, Market and Cost Potential for CCS in relation to Sysav, *REN2021N00220-RAM-RP-001*, March 2022

1. INTRODUCTION

1.1 Background

Sysav is conducting a Carbon Capture and Storage (CCS) project (Utredningsprojekt CCS) to outline a cost-effective solution for CO₂ capture, transport and storage of captured CO₂ from the Waste-to-Energy (WtE) plant at Sysav in Malmö, Sweden. The project covers all aspects of Carbon Capture (CC) at Sysav's site, transport and storage of CO₂.

The total project is planned to be carried out through the following project phases:

- Phase 1: Övergripande förstudie
- Phase 2: Fördjupad förstudie
- Phase 3: Utformning av genomförandeprojekt



Figure 1, Sysav implementation model for "Utredningsprojekt CCS".

This report relates to phase 1 "Övergripande förstudie", which is a pre-feasibility study. The purpose of the pre-feasibility study is to:

- Develop the design basis.
- Identify the most favourable CC technology for Sysav through a technology screening.
- Develop a basic concept/solution for CO₂ capture, liquefaction and storage from a technical and economical perspective.
- Outline possibilities for transport and storage/use of captured CO₂ and the associated costs.
- Set out the legal conditions for capture of CO₂ at Sysav.
- Identify a reasonable economic model for carrying out the investment and subsequent operation of the Carbon Capture facility and analyse options for providing a reasonable financial risk while delivering according to the ambitions of Sysav.

The pre-feasibility study covers two scenarios dependent on the realization of a future boiler line.

- 1) A main scenario based on the existing boiler lines P3 and P4.
- 2) An alternative scenario based on the existing boiler lines P3, P4 and a new boiler line, P5.

Existing WtE lines P1 and P2 are assumed to be decommissioned in both scenarios.

The pre-feasibility study comprehends the following sub-reports:

- Design Basis
- Carbon Capture Technology Screening
- Technology, Transport, Storage & Cost
- Regulatory, Market and Cost Potential for CCS in relation to Sysav

The findings and conclusions of the pre-feasibility study will form the basis for Phase 2, Fördjupad förstudie.

1.2 Design Basis

The sub-report /1/ provides the design basis for a future CC facility including basic design information about the existing (P3 and P4) and expected future (P5) Waste-to-Energy plant located at Sysav.

1.3 Carbon Capture Technology Screening

The sub-report /2/ provides an overview of the available technologies for CO₂ capture and the technical and commercial readiness level of relevant technologies for the implementation of CO₂ capture at Sysav.

Based on the projected technical and commercial readiness levels at the expected year of Sysav's financial investment decision the following two technologies are selected for further study in the present pre-feasibility study (Övergripande förstudie):

- Base case technology: Amine (monoethanolamine, MEA)
- Alternative technology: Hot Potassium Carbonate (HPC)

1.4 Technology, Transport, Storage & Cost

The sub-report /3/ presents the technical analysis conducted for the two selected carbon capture technologies (amine and HPC), including a base case concept, related indicative layout, possibilities for CO₂ transport and storage alternatives and an early-stage cost estimation for a CC plant implemented at Sysav's WtE facility.

In addition, the sub-report presents a preliminary overall project schedule for implementation of CC at Sysav's WtE facility with commercial operation starting in 2030.

1.5 Regulatory, Market and Cost Potential for CCS in relation to Sysav

The sub-report /4/ provides an overall regulatory, market and economic analysis of CCS at Sysav's WtE plant, with focus on the following subjects:

- High-level analysis of regulatory frameworks and policies related to CCS.
- High-level analysis of the market for negative CO₂ emissions and the market for CO₂ as a resource (CCU).
- Assessment of the overall lifecycle carbon capture cost (LCCC).