Infrastructure Factsheet

Description of the infrastructure	
Name(s) of the infrastructure(s)*:	**Depressurization flow facility (NO2.5)**
Location (town, country):	Trondheim, Norway
Website:	www.sintef.no
Legal name of organisation operating the infrastructure:	SINTEF Energi AS
Location of organisation (town, country):	Trondheim, Norway
Infrastructure Contact *(i.e. name, email of primary contact)*	Sigurd Weidemann Løvseth Sigurd.w.lovseth@sintef.no
RICC Contact *(i.e. name, email of secondary contact)*	Sigurd Weidemann Løvseth Sigurd.w.lovseth@sintef.no

**Infrastructure (s): means a facility, a resource (or a coherent set of them) together with the related services that are used by the scientific community to conduct research.*
***Installation: is a part of an infrastructure that could be used independently from the rest.*

Description of the facilities

Give a brief general description of the infrastructure to which access is offered. Illustrate, in particular, its state-of-the-art equipment and services offered to users that make it rare or unique in Europe. Outline the areas of research normally supported by the infrastructure, as well as new areas opening to users, if any. If the infrastructure is composed of several installations**, describe these including their specific features. If parts of the infrastructure are still under construction, specify the starting date of construction and indicate the date when access can realistically be made available.

Depressurization flow facility

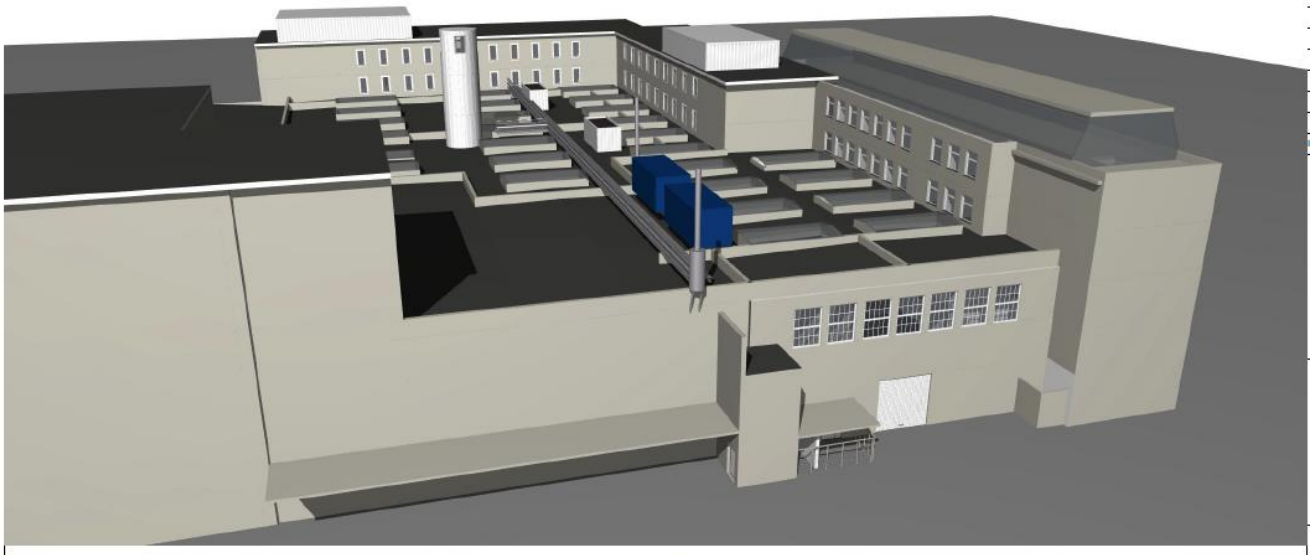
To develop, design and operate CO_2-transport networks, simulation of transient multiphase flow of CO_2 mixtures is necessary, in order to see what happens during start-up, shut-down, depressurization, and varying CO_2 supply. Robust simulation of CCS-relevant mixtures is currently not supported by common engineering tools.

This facility is built to support the development and validation of physics-based pipeline integrity models and flow models, and consists of two interconnected installations for depressurization experiments:

1. A depressurisation pipe
2. A depressurisation tank

The pipe is 60 m long and has an inner diameter of 40 mm. Experiments are performed by sudden full bore or constricted opening at one end of the tube. The tank is 1 meter high with an inner diameter of 300 mm. It is depressurized by opening a rapid valve. The maximum pressure rating is 200 bar for the pipe and 150 bar for the tank, and the initial temperature can be controlled between 5 and 40 °C for both. Both the vessel and the pipe are highly instrumented to record rapid changes in temperature, pressure, and phase behaviour.

The installation is constructed on the Gløshaugen campus. After completion and shakedown in 2017 it is booked, but is available for access from 2018.



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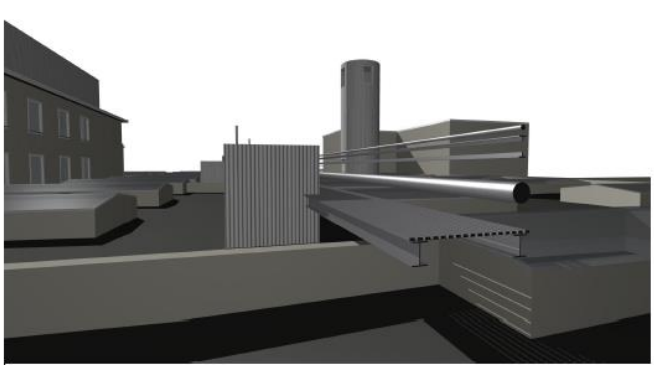

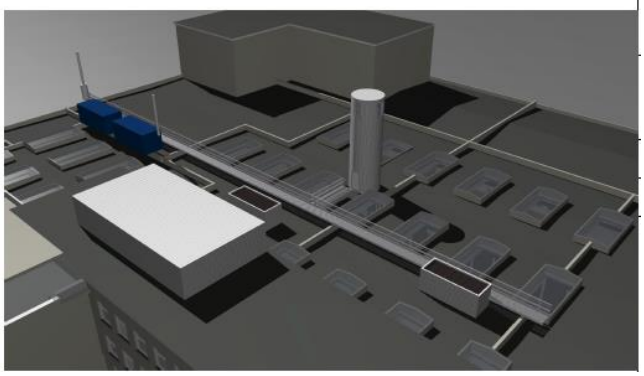

State of the Art, uniqueness (if applicable), and any specific advantages (e.g. technical, economic etc)
The pipe has a better and denser instrumentation than any other known depressurization facility, and no other facility we are aware of has the means to directly detect phase behaviour. Care has been made in the design to allow upscaling of models, and to achieve full opening without inducing artificial shock waves. As far as we know, there is no facility available worldwide similar to the depressurization tank.

Scientific environment (related and potentially available scientific and technical services at RI's location e.g. analysis, material preparation etc.)

Located in the thermal laboratories of NTNU/SINTEF with its available infrastructures and services and directly adjacent to the offices of leading scientists in the field of SINTEF and NTNU. Further advanced facilities for flow experiments are planned adjacent to this facility.

QUALITY CONTROL / QUALITY ASSURANCE (QA):

Activities / tests / data are:

☐ accredited to standard

☒ 'while not specifically accredited, data quality and facility design and operation procedures are controlled in accordance with institute's accreditation to standard ISO 9001,ISO 14001 and OHSAS 18001.

http://www.sintef.no/en/a-certified-institute

CCS PROJECTS:

EU-funded CCS projects:

ELEGANCY (A recently funded ACT project)

ECCSEL Infradev http://eccsel.org

Other CCS projects:

NCCS http://nccs.no/

Main/major non-CCS projects:

Patents:

Selected publications:

(The facility is new)

FACILITY AVAILABILITY:

Unit of access:

1 month

Availability per year:

6 months

Expected duration of single experiment:

Minimum 1 month

OPERATIONAL OR OTHER CONSTRAINTS:

Specific risks:

Necessary instructions for operation is important in order to reduce risks, but one experienced person from SINTEF ER will anyhow have to participate. A risk assessment will have to be performed ahead of the introduction of certain gases. Depressurization experiments of pipe is only allowed after work hours and with some wind.

Legal issues:

Access to SINTEF ER lab will require acceptance of safety and security policies and training.