

# Energibrønner og energisystemer i Bergensområdet

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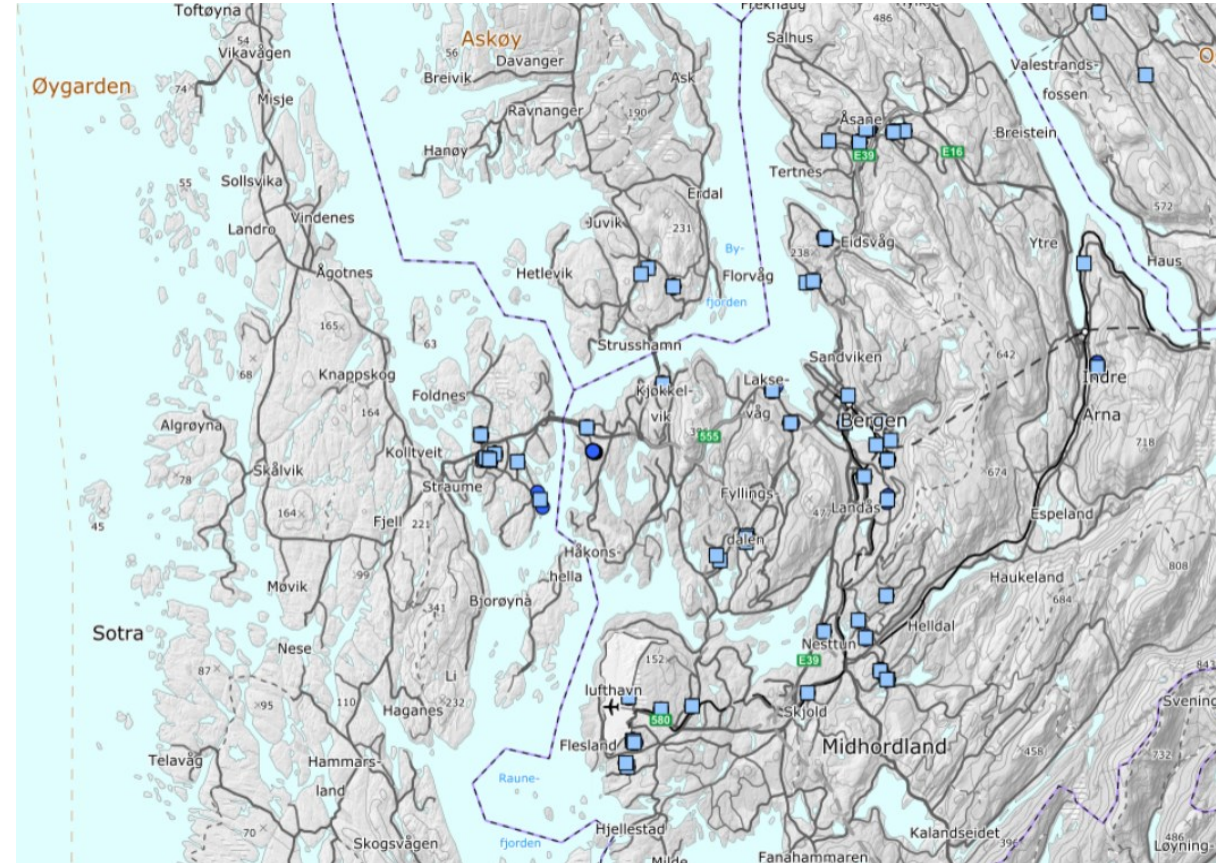
16. FEBRUAR 2023

# Registrerte energibrønner i Bergen kommune



Pr 14 feb 2023

- 57 større bergvarmeanlegg (3%)
- 539 brønner i mindre anlegg (<1%)
- 866 brønner i større anlegg
- 133,5 km borelengde totalt
- 8 store anlegg i 2022
- Over 5 % av Norges befolkning bor i Bergen



Brønnparker i Bergen, Grunnavnsdatabasen



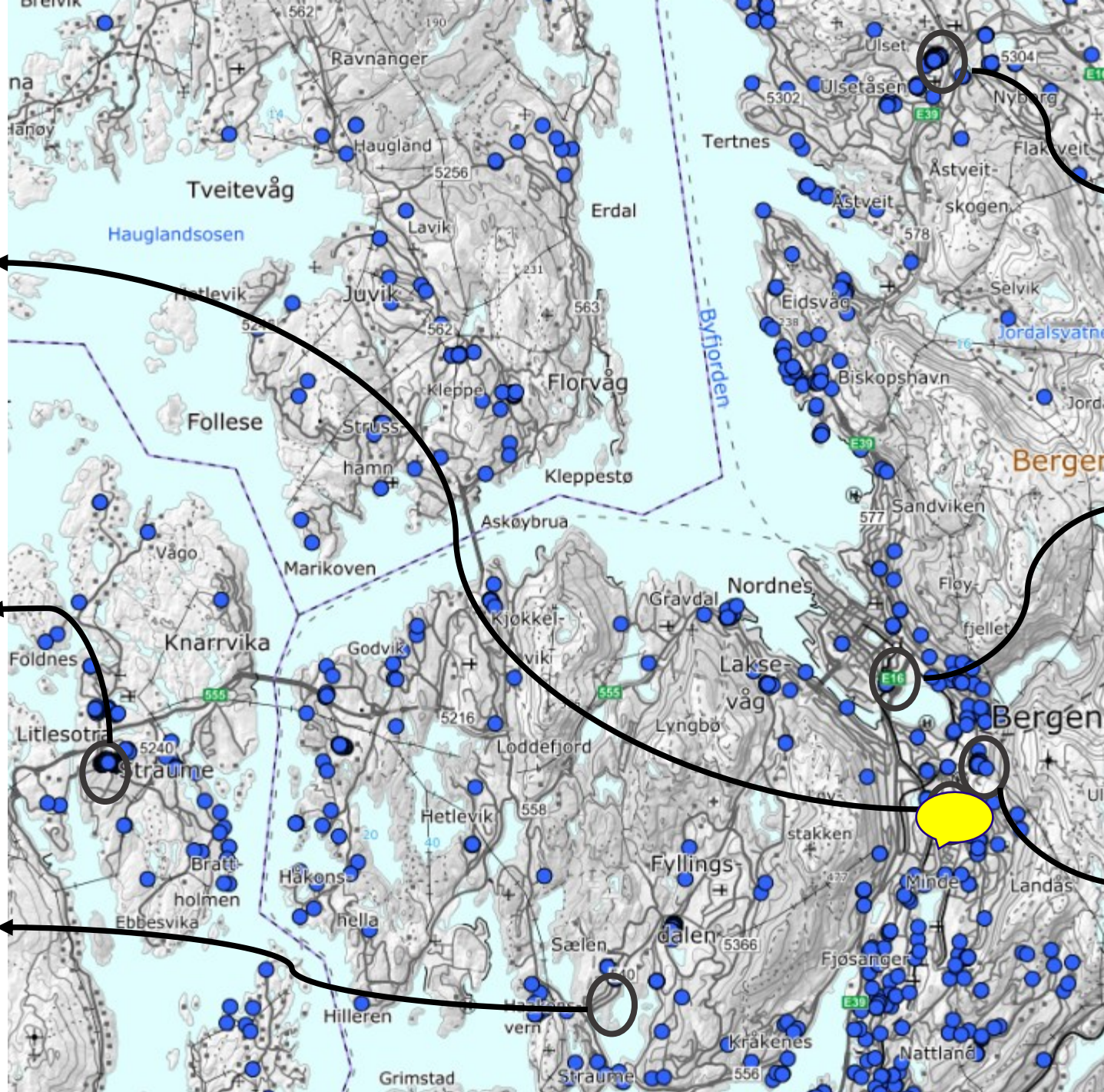
**Høgskulen på Vestlandet - 2012**  
80 BHE x 220m



**Sartor Storsenter**  
2013  
165 BHE x 200m



**4 blokker Varden**  
1984  
12BHE x 160m



**Horisont Åsane -2013**  
112 BHE x 212m

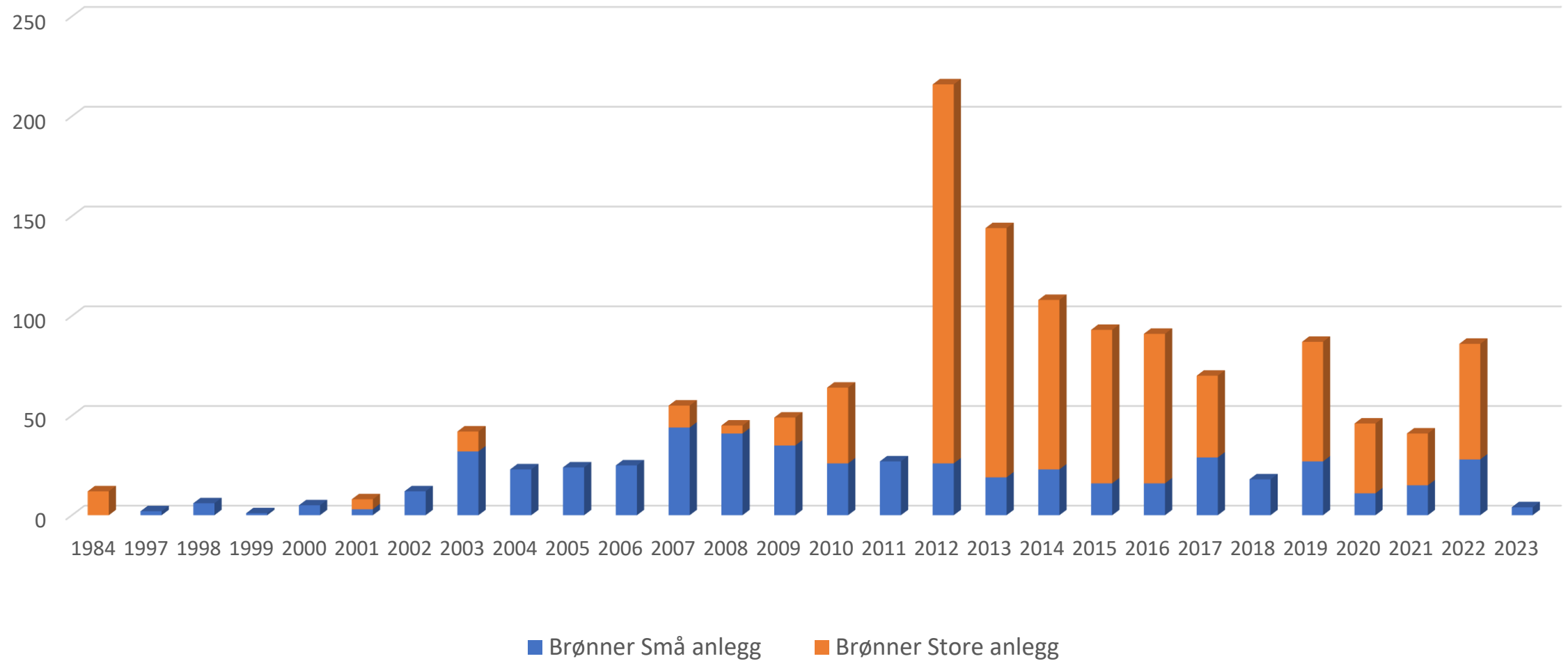


**Nygårdsporten -2015**  
55 BHE x 300m

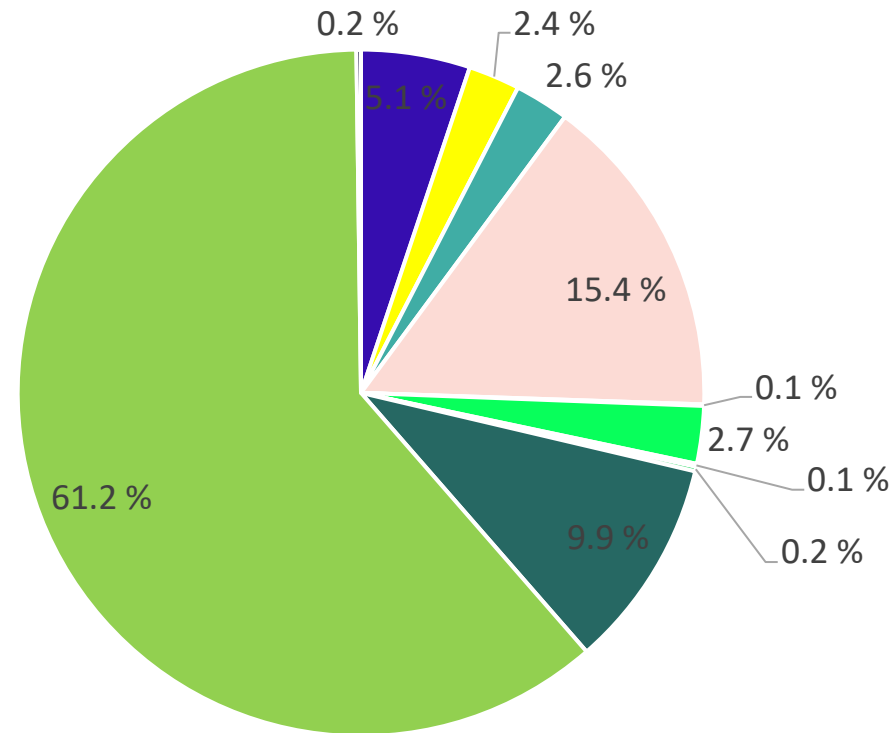


**Haukeland sykehus -2013**  
Barne og ungdomsavd.  
77 BHE x 250m

# Energibrønner pr år



# Brønnborere



- Brønn & Spesialboring a/s
- Fundamentering as
- Holt Risa AS, avd. Brønnboring
- Vestnorsk Brunnboring as

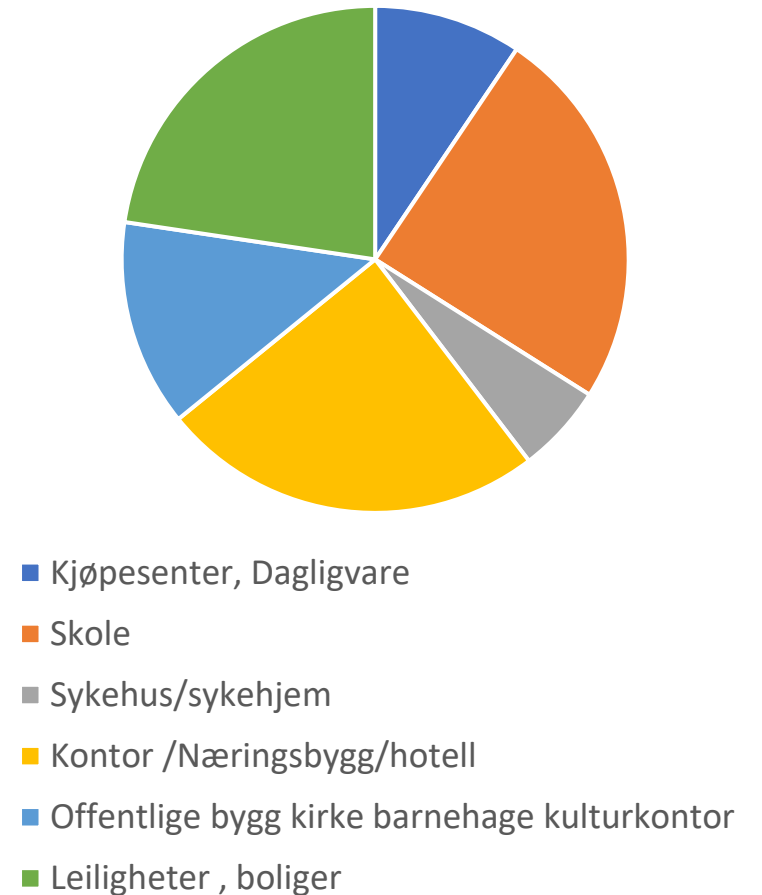
- Båsum Boring Trøndelag
- GEOTECH AS
- Sartor Maskin AS
- Voss Brønn og Energi

- Fetveit Brønnboring as
- Hallingdal Brønn og Graveservice as
- Sør-Norsk Boring as

# Store brønnparker



Anlegg	Antall brønner	Total borelengde	År
Coop Åsane	114	23874	2013
Haukeland sykehus barne avd	77	18730	2012
Høgskolen i Bergen	80	16000	2012
Nygårdsporten	48	14100	2015
Liatun borettslag	34	10030	2019
Scandic Flesland airport	50	10000	2016
Åsane sykehjem	18	6720	2021
Gartnermarken Omsorgpluss	23	4931	2014
Eidsvåg skole	22	4400	2022
Alvøen skole	19	4050	2019
Ukjent B.Fonden	17	3400	2014
Sweco Norge Fantoft.	15	3300	2014
Sparkjøp, Kokstad	18	3030	2010
HVL, Kronstad nybygg	14	3000	2020
Ulmåg skole	15	2811	2014
Ådnamarka skole	14	2800	2009
Solberget, leiligheter	13	2600	2017
Damsgårds skole	13	2600	2017
Shell /7-Eleven			
Nattlandsveien	11	2200	2012
NHH Handelshøgskolen	10	2000	2020
Nattland skole	10	2000	2016
Drotningvik senter	10	2000	2012



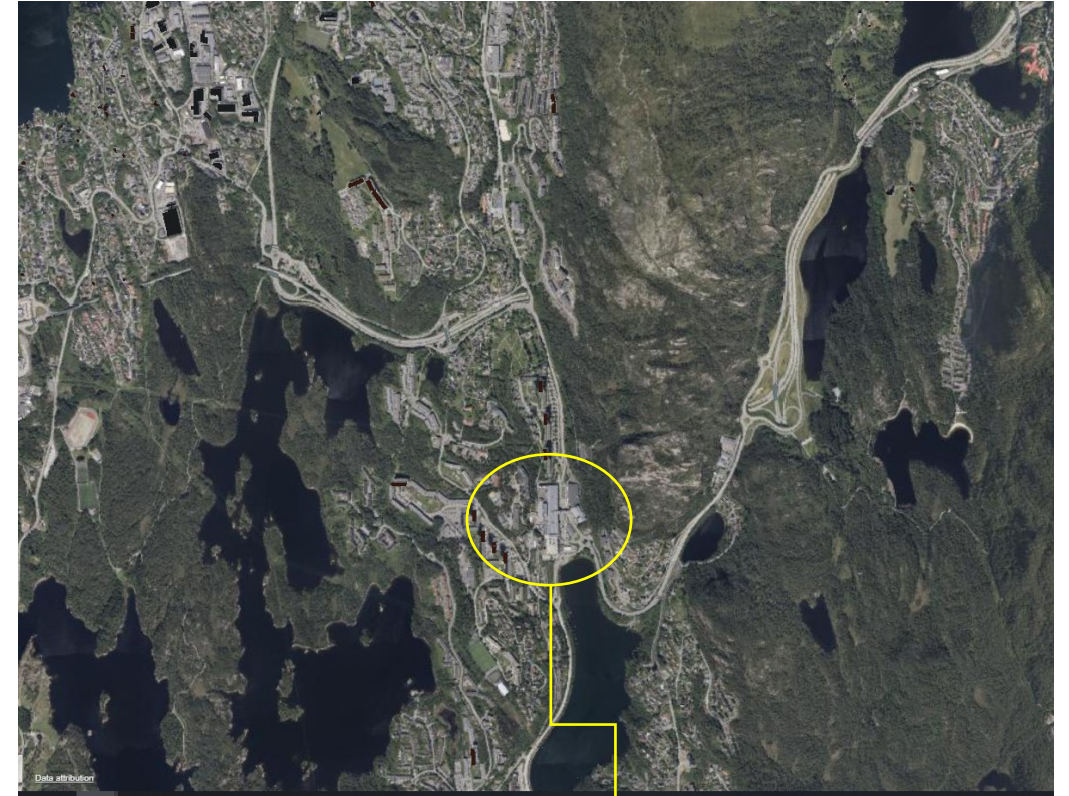
# Egnethet for bergvarme i Bergen ?

## Geologi

- Generelt lite med løsmasser
- Områder med mye grunnvann og utfordringer med boring
- Områder med høye radonverdier i grunnvann og høy radioaktivitet
- Hardt fjell, stor boreslitasje ?? Bores grunnere brønner på Vestlandet enn på Østlandet

## Klima

- Blant regioner med varmest klima i Norge
  - Høy grunnvannstemperatur (8-10°C)
  - Mindre oppvarmingsbehov, luft til luft fungerer bra store deler av året



Vestkanten Storsenter

# Største utfordring

- Kontroll på drift av anleggene



Tekniske rom HVL Kronstad,





# HECTAPUS

## HEating Cooling Transition and Acceleration with Phase change energy Utilization Storage

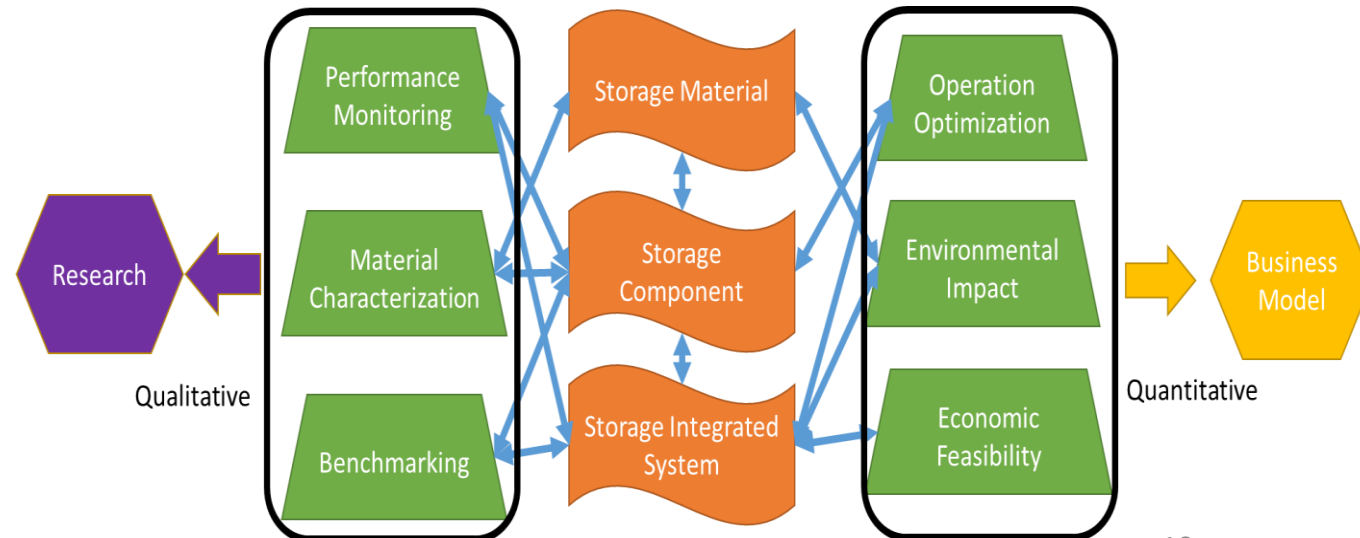
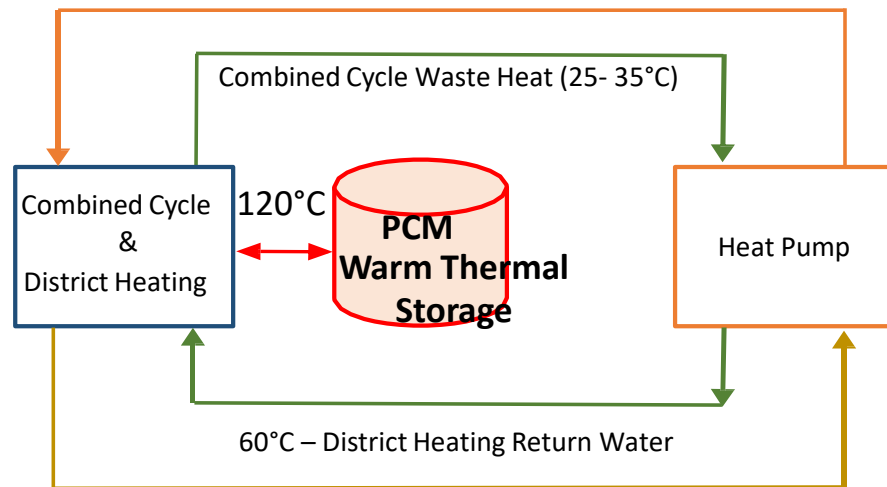
Are energy storage systems performing as they should be?

- Monitoring and performance evaluation of existing projects.

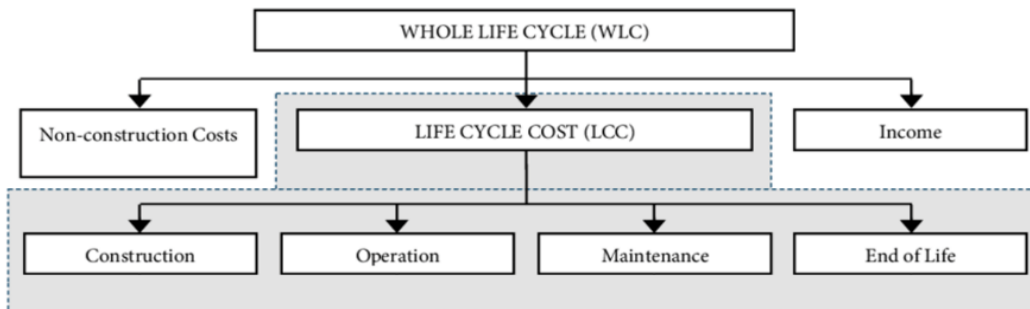
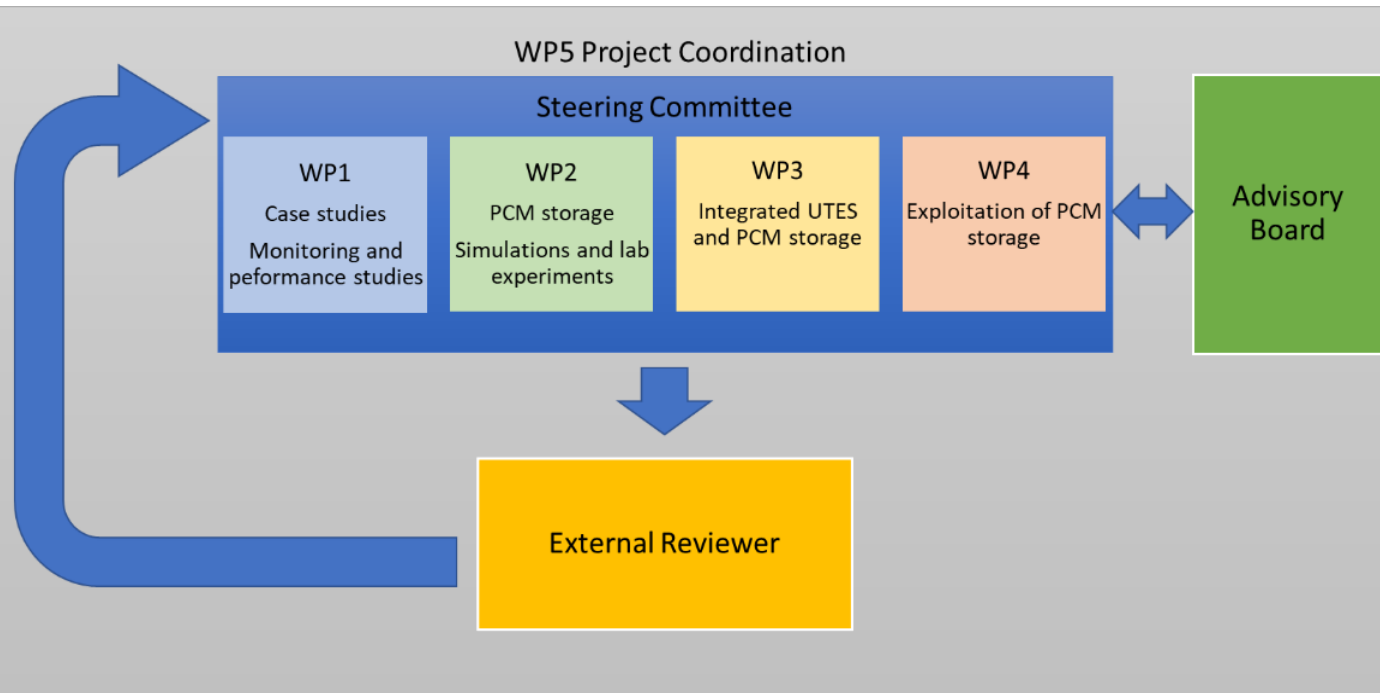


# Challenges: Energy Storage on Heating/Cooling Transition

- Integration of energy storage in heating/cooling systems is scarcely monitored and benchmarked
- Impact on stakeholders for sector coupling and load management
- Full range of expertise is needed for performance evaluation: Material, Component and System
- Perform real case monitoring, evaluation and new business model creation



# Solutions: Monitoring, Evaluation, Benchmarking and Exploitation of New Business Solutions



# Monitoring Sites



Installation	Owner	Use	PCM storage	Capacity	Other energy sources	Year Constructed
				kWh		
Bergen Airport, Norway	Avinor	Heating/ Cooling	Tanks of flat ice elements of salt hydrate	11000	District Heating	2017
Western Norway University, Norway	Statsbygg	Heating/ Cooling	Tanks of flat ice elements with salt hydrates	11200	Borehole TES / District Heating	2014
AWL Building, Sweden	Akademiska Hus	Cooling	Tank with salt hydrate	275	District Cooling	2019
Sigba Office & warehouse, Norway	Sigba	Cooling	Tanks of flat ice elements with paraffin	120	TBD	2018-2019
Shelter for refugee camps, Turkey	Cukurova / Northumbria Universities	Heating / Cooling	Paraffin tank for heating / coco oil tank for cooling	24	Solar Thermal Collectors	2021

Takk for oppmerksomheten

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