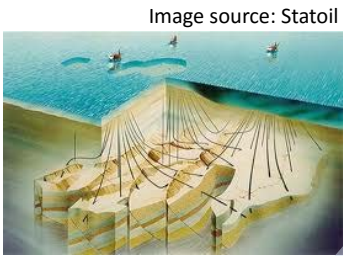


Geotermisk energi

Inga Berre



Petroleum

CO₂ lagring

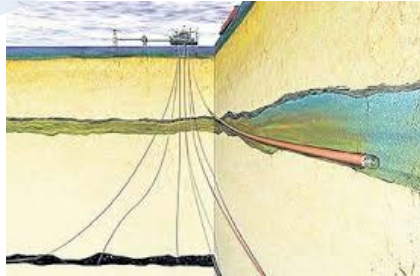
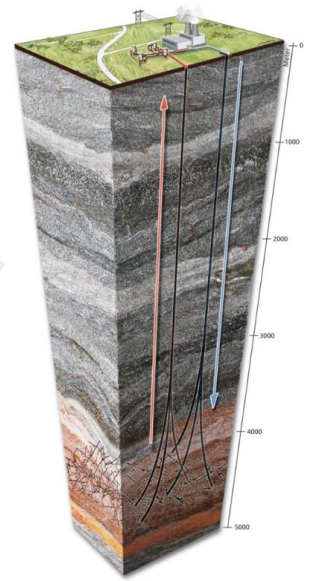
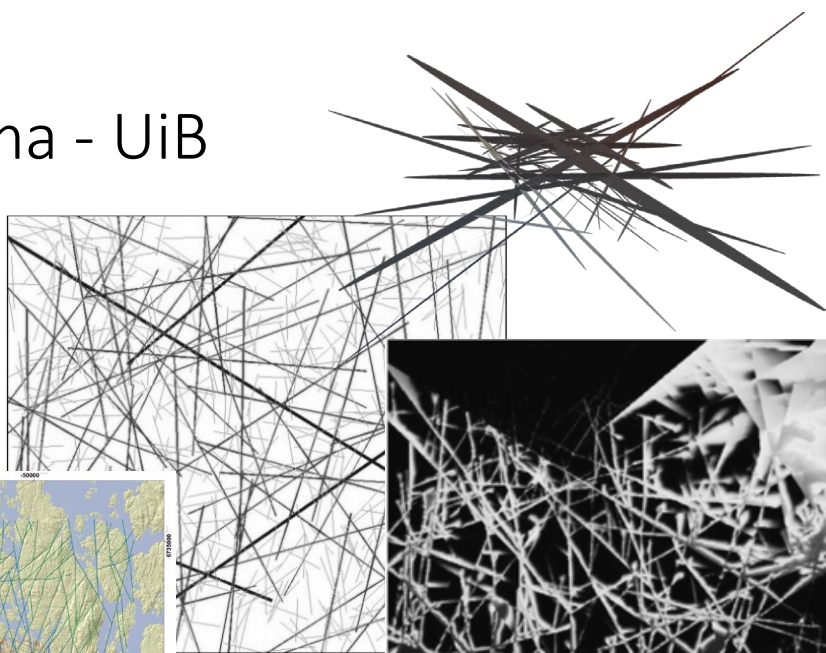
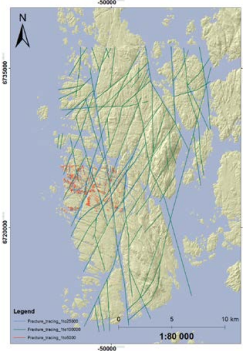
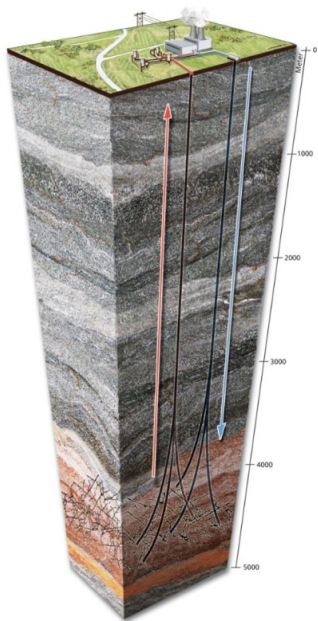


Image source: Statoil

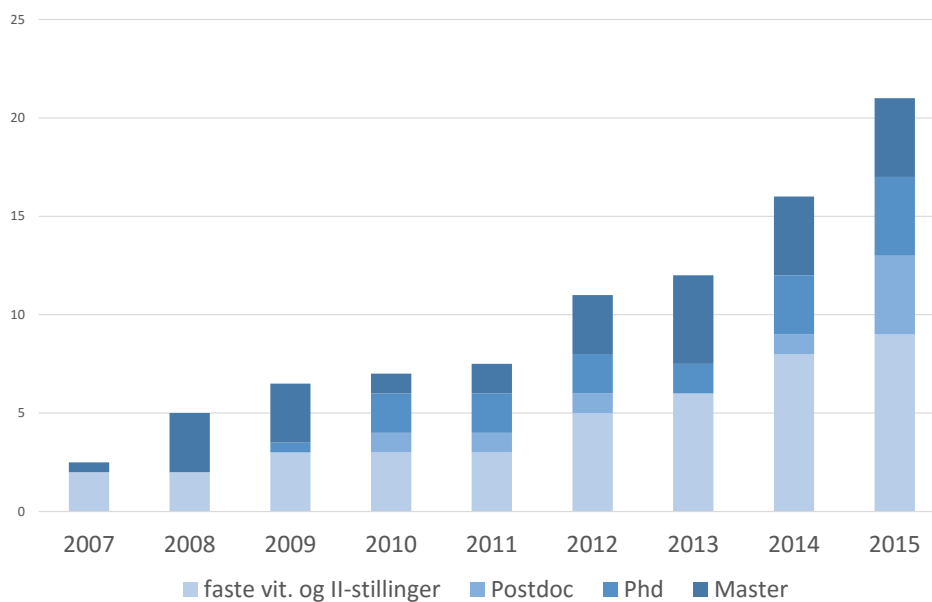
Geotermisk energi (2007)



Forskningsstema - UiB

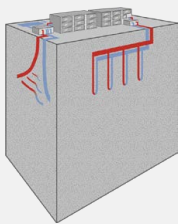


Geotermisk hoderegning på UiB



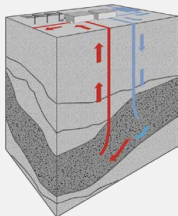
Geotermisk energi

– nasjonale muligheter



Grunn geotermisk energi

- Varme og kjøling for bygninger, veier og industrielle prosesser
- Samspill med andre fornybare energikilder
- **Nasjonale energiløsninger**



Dyp geotermisk energi

- Fjernvarme og kraftproduksjon
- Synergier mot petrolumssektoren
- **Markedsmuligheter for norsk industri**



2007

2009

2011

2013

2015



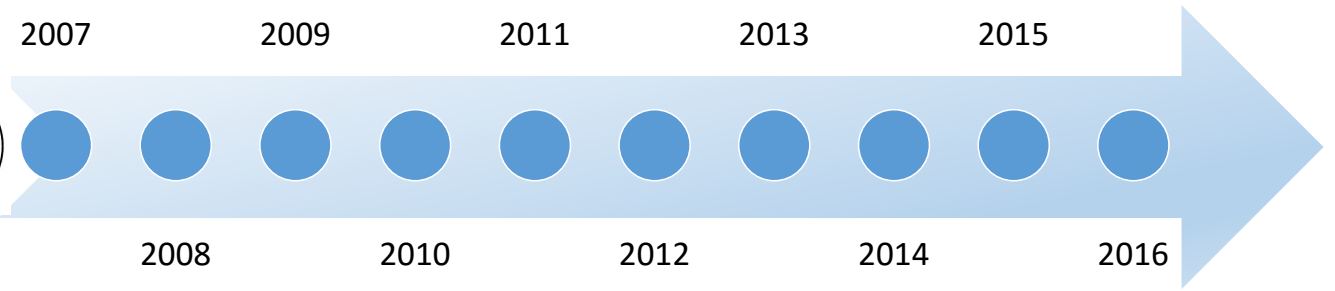
2008

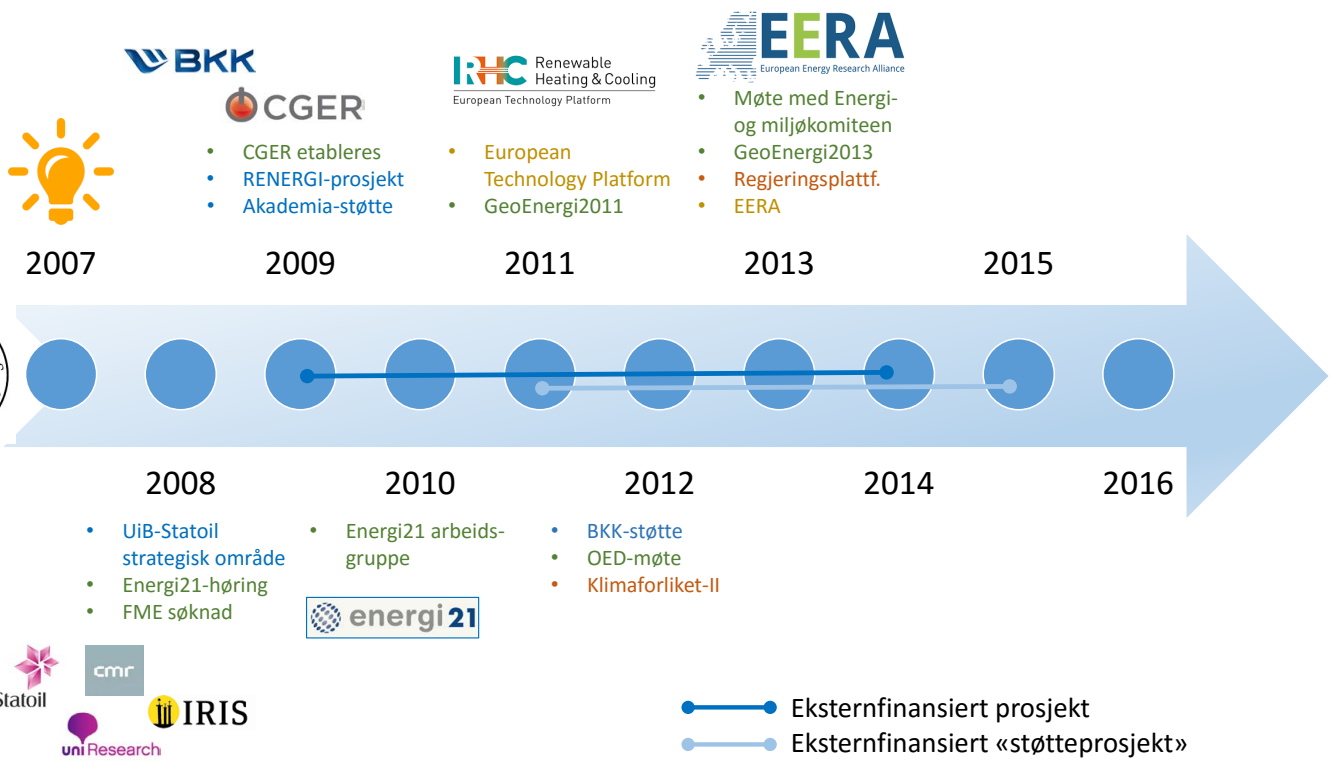
2010

2012

2014

2016







2007



- CGER
- RENE
- Akad

20



- Møte med Energi- og miljøkomiteen

“Regjeringen vil: ... Styrke forskningsentrene for fornybar energi (FME sentrene) og opprette et eget FME senter for geotermisk energi i tråd med klimaforliket.”

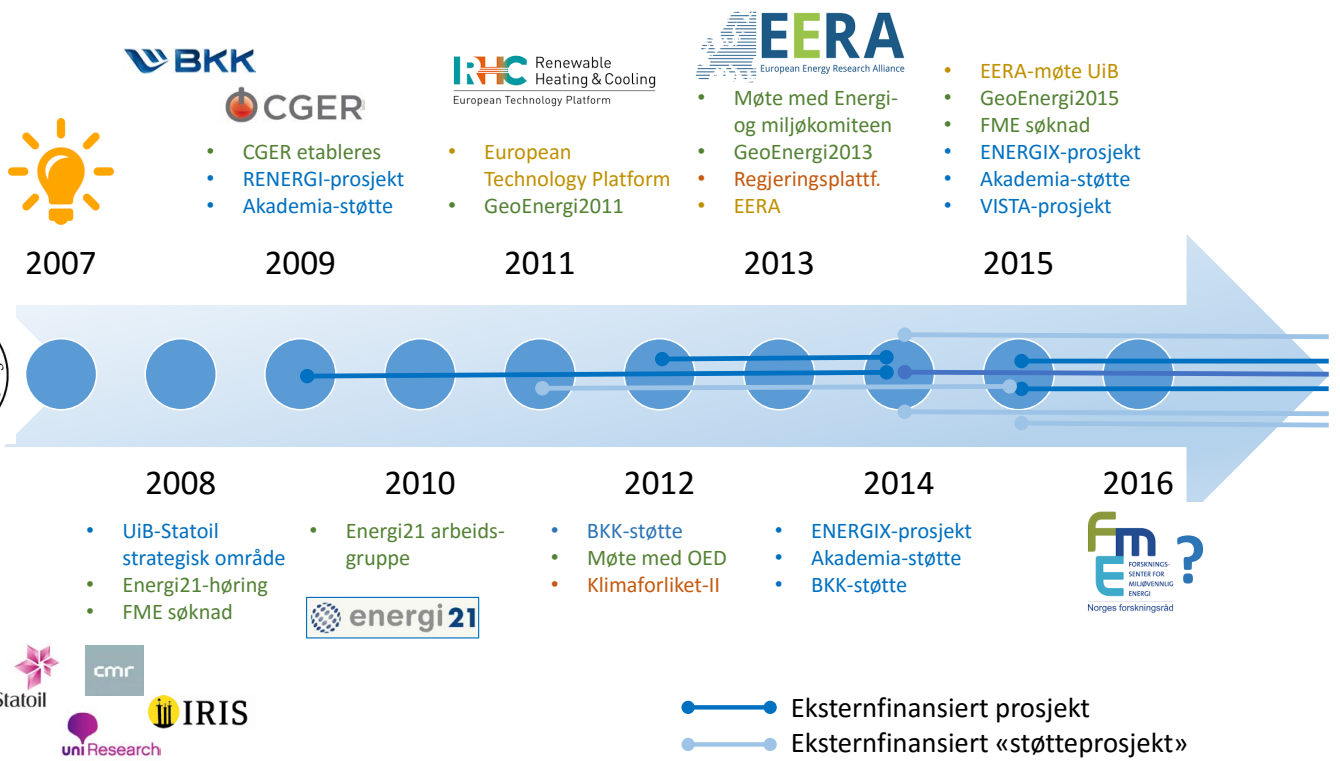
Regjeringsplattformen (7.oktober 2013)

”Stortinget ber regjeringen i de kommende statsbudsjett øke bevilgningene til FME-sentrene og at det opprettes et FME-senter for geotermisk energi.”

Innstilling fra energi- og miljøkomiteen om norsk klimapolitikk [Innst. 390 S (2011–2012)]

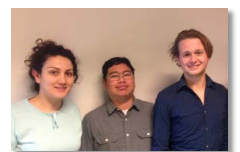


- Eksternfinansiert prosjekt
- Eksternfinansiert «støtteprosjekt»



Suksessfaktorer

- Forskningstema
- Forskningsmiljøet/gruppen
- Samarbeid og arbeidsdeling med randsonen
- Nasjonalt nettverk/synlighet
- Internasjonalt nettverk/synlighet
- Sterk støtte i organisasjonen
- **Å gjøre alt på en gang (inkl. å prioritere)**



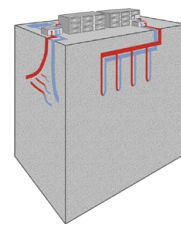
Geotermiske framtidsperspektiver

UiB-energising - Samarbeid i Bergen og på Vestlandet



Tilleggsmateriale

Shallow geothermal energy / Geothermal heat pumps



Status

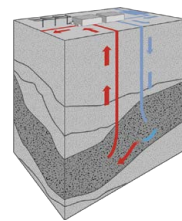
- Heating and cooling for buildings, roads and industrial processes
- Worldwide increase of 62% in production from 2010 to 2015
- Norway: more than 300 systems with more than 10 boreholes in use

Potential

- The national production of geothermal energy from the use of GHP systems for heating and cooling of commercial buildings has potential to reach 16.4 TWh/yr¹, worth 13.8 bnNOK/yr in energy savings

¹R.K. Ramstad, Grunnvarme i Norge - Kartlegging av økonomisk potensial (2011). NVE Rapport nr. 5, 2011.

Deep geothermal energy



Status

- Electricity is produced in 24 countries, amounting to a total of 73.5 TWh/yr based on an installed capacity of 12.6 GW_e¹
- Direct heating from DGE resources generated more than 0.263 EJ/yr in 2015
- The vast majority of production is from hydrothermal resources.

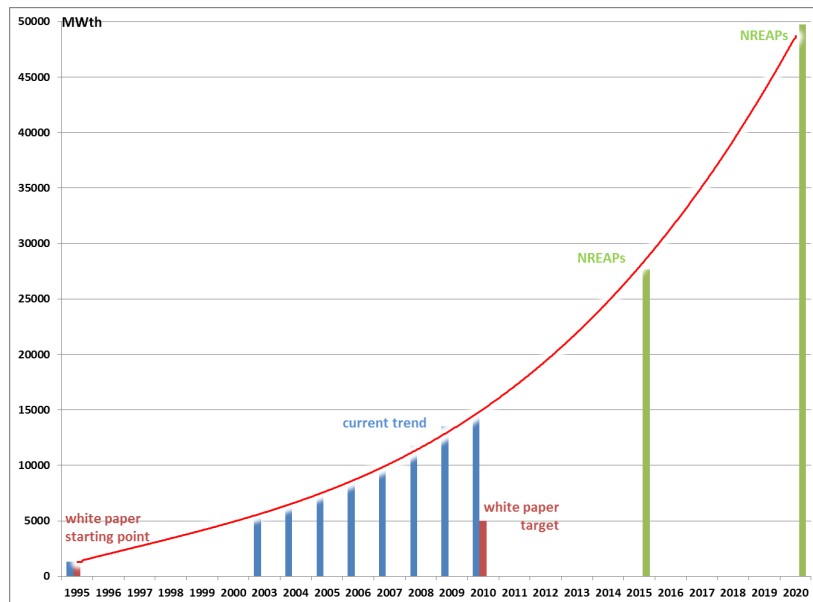
Potential²

- IEA: by 2050, electricity generation could reach 1400 TWh/yr, which is almost a 20-fold increase from 2015 and avoids 800 Mt/yr of CO₂ emissions. Direct heating could reach 5.8 EJ/yr (1600 TWh)
- Achieving these targets requires significant **research, development and demonstration of innovative technologies**

¹Bertani, R., Geothermal Power Generation in the World - 2010-2014 Update Report, Proc. World Geothermal Congress, 2015.

²Technology Roadmap, Geothermal Heat and Power, OECD/IEA, International Energy Agency, [online] available at https://www.iea.org/publications/freepublications/publication/Geothermal_Roadmap.pdf

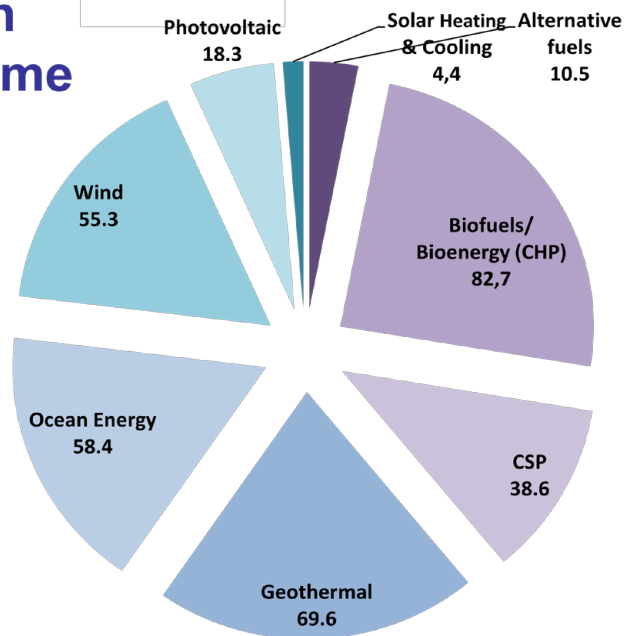
EU installed capacity – renewable heating and cooling



The work programme 2014-2015



Low Carbon Energy Outcome



Budget allocation by sector (M€)