
# Identification and Assessment of Deep GEOthermal Heat Resources in Challenging URBAN Environments

Project Overview

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## Aims and Objectives

"The **overall objective of GEO-URBAN** is to identify the geothermal resources available in two challenging urban locations and to demonstrate a commercialisation strategy that has the potential to be adapted in other similar locations, thus advancing geothermal energy from a TRL 5 to a TRL 7 in the target areas."

*GEO-URBAN Stage 2 Proposal Document, November 2017*

Dublin City
Ireland


Vallès, Catalonia
Spain

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# Introducing our consortium


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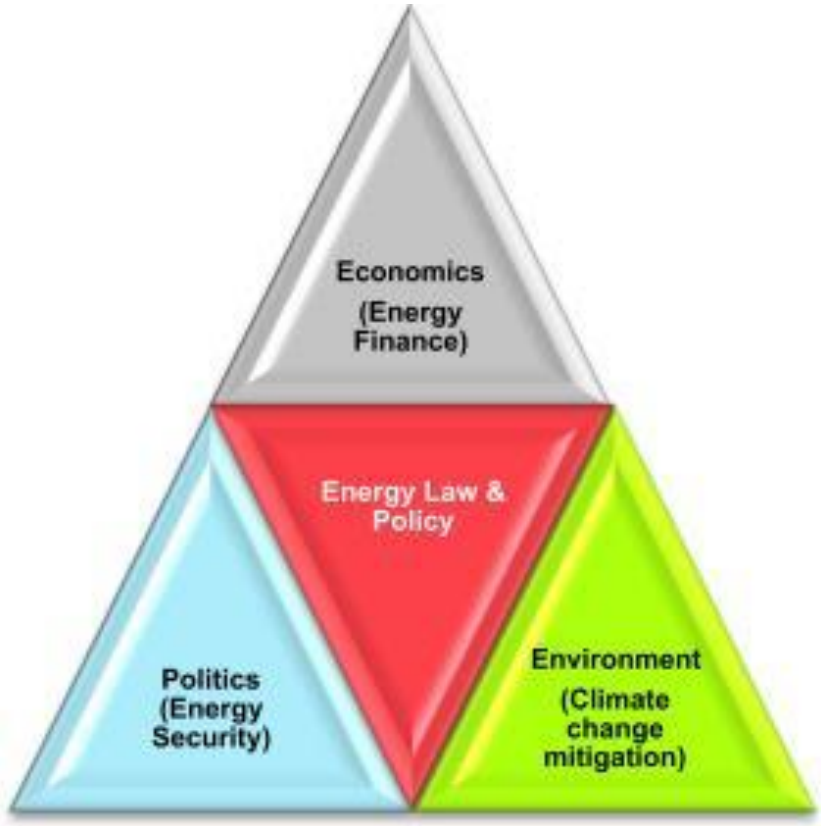
## Motivation

- Pressures faced by EU member states to reduce fossil fuel consumption (40% reduction on 1990 levels by 2030)
- Heat sector (homes and businesses) accounts for around 40% of total annual energy expenditure in Ireland (SEAI, 2015)
- Geothermal heat energy could provide a solution to the “Energy Trilemma” (Heffron et al., 2015)




*Representation of the ‘Energy Trilemma’, or the aim of trying to achieve a balance between the competing demands of economics, politics and the environment. From Heffron et al., 2015.*

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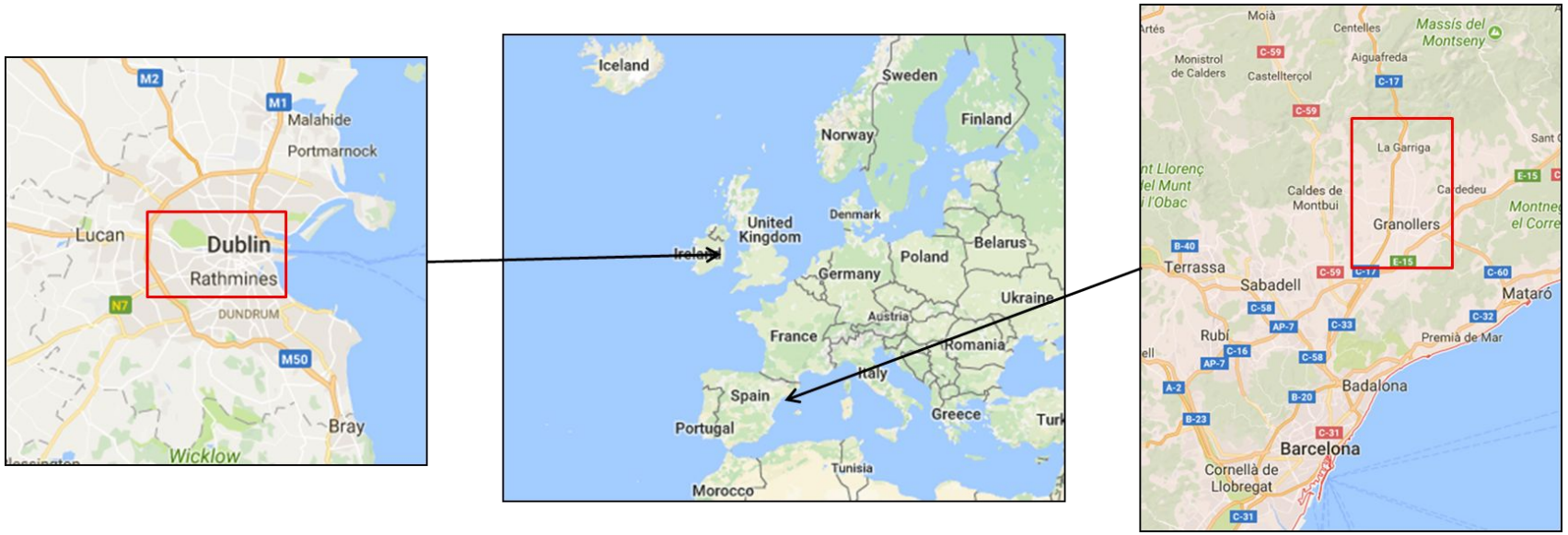
## Specific objectives for each test location

1. Improved conceptual understanding of the subsurface geology
2. Promotion of geothermal energy as an option for district heating (DH)
3. Geothermal feasibility study including review of policy and legislation

Dublin City
Ireland




Vallès, Catalonia
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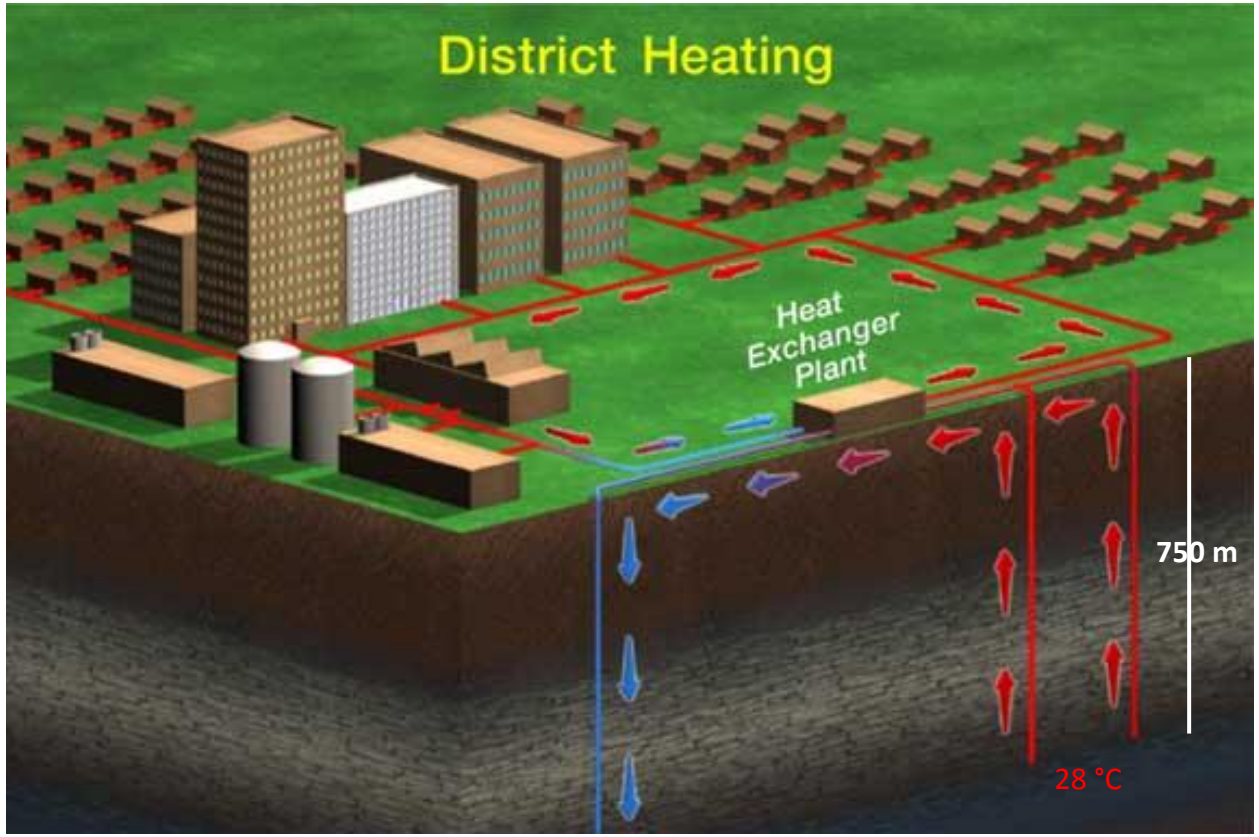
# Geothermal for District Heating?

- District heating systems deliver heat for both space heating and water heating needs to buildings through a network of insulated underground pipelines.
- 4th Generation District Heating and Cooling using a **mix of renewable heat sources** (4GDH) is on the way (Lund et al., 2014)
- Geothermal plants have a small surface footprint, ideal for input into large scale DH systems in dense urban areas.




*"The Minewater Project", Heerlen, the Netherlands (inhabitat.com)*

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## Geothermal for District Heating

A successful geothermal resource will

1. Provide enough heat
   - Sliding scale between volume and temperature
   - Sliding scale between **permeability** and **depth**

2. Be accessible close to end-users
   - few kilometres at most

**Imperative to match favourable geology with areas of high heat demand**

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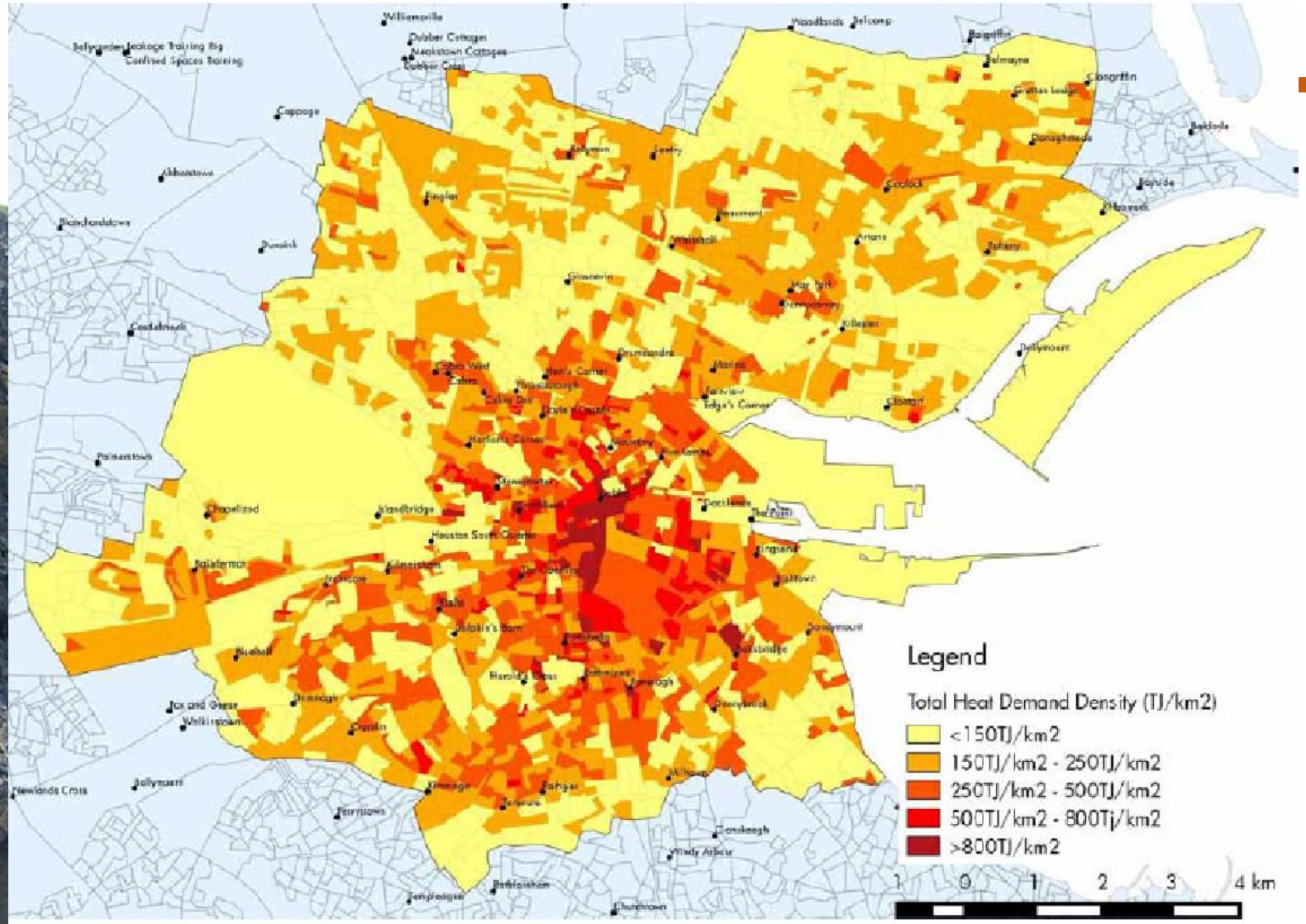
*Huntstown Fault, Dublin Basin*




*CODEMA, 2015*

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## Research challenges

- Exploration challenges – dense urban environments
  - Dublin: city centre, densely built up
  - Valles: urban centre of Granollers

- Signal to noise ratio worse in urban areas for many geophysical methods

- We've chosen a combination of methods that utilise noise as a source of signal
  - Passive seismic, H/V
  - Controlled source EM

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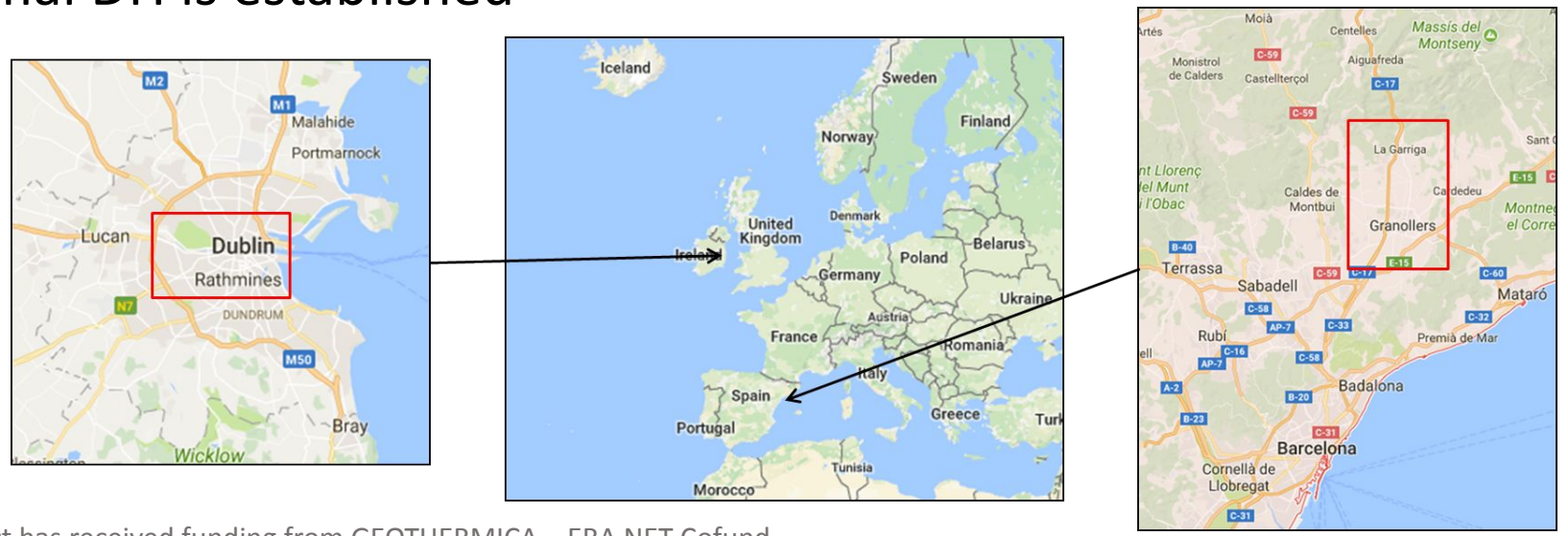
# GEO-URBAN in a nutshell

- An investigation of deep geothermal energy for district-scale heating in cities and towns
- Focussing on low-enthalpy geothermal settings in urban environments
- Two test areas, Dublin and Vallès
- Commercial partner in Denmark providing knowledge transfer from region where geothermal DH is established

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