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INTERNATIONAL PLATFORM FOR ENVIRONMENTAL MONITORING

Good Practice in Environmental Monitoring - Virtual Meeting

9th February, 2021

This presentation is part of a project that has received funding by the *European Union's Horizon 2020 research and innovation programme* under grant agreement number ENER/H2020/764531/SECURe

Housekeeping

- Welcome to all our participants and speakers
- Please mute your microphone and video during presentations
- We are not recording the session. Slides will be made available after the meeting wherever possible
- Closed Captions - subtitles - are enabled. Switch them on/off using the CC function at the bottom of your screen
- Have questions?
  - Please submit questions in the chat (publicly or direct) for Q&A session
  - Very urgent questions only please at the end of each presentation
  - We'll put any unanswered questions to speakers to address offline - please let us know who you are if it is not obvious from your Zoom identity

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Welcome

Professor Mike Stephenson

Chief Scientist, Decarbonisation & Resource Management

British Geological Survey

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SECURe – Subsurface Evaluation of Carbon Capture and Storage and Unconventional Risk

International Platform for Environmental Monitoring

Tuesday 9 February 2021

Ed Hough, project co-ordinator

This presentation is part of a project that has received funding by the *European Union's Horizon 2020 research and innovation programme* under grant agreement number ENER/H2020/764531/SECURe

Context

- Decarbonisation of the use of fossil fuels- CCS and shale share some of the same challenges related to potential environmental impact
  - Emissions
  - Seismicity
  - Pollution?

How do we identify? ***Monitoring; Communication***

- CCS- uptake required to meet C-emissions targets (essential to limit to 1.5degree/C-neutral by 2050)
- Shale gas- can aid transition to low carbon energy generation
- Other new energy technologies: hydrogen; compressed air energy; geothermal

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SECURe- project concept

- Consortium has broad and relevant experience in many CCS-Unconventional Hydrocarbons projects
- Research at ~20 field sites
- Understand risks associated with CCS and shale gas
- Progress state-of-the-art site
- Teaching and training for research community and stakeholders
- Establish international network

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SECURe- impact

- Change existing behaviours and understanding
- Influence management of CCS/shale gas sites
- Risk assessment framework to evaluate hazards and specific risks
- Develop new ways of monitoring, novel approaches to seismic, groundwater and atmospheric monitoring
- Knowledge exchange between industries
- New ways of communicating effective messages
- Good practice guidelines for environmental baseline assessment and monitoring

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International Platform for Environmental Monitoring

- Establish international network – SECURe's legacy
- Bring together international pilot, demonstration projects and research communities to share knowledge, experience and good practice
- First meeting - good practice in **environmental monitoring** and effective **community engagement**
- Build on SECURe's factfinding missions to Australia and north America

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USA & Canada mission

Reactions & Reflections Video

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Session 1 - Making community engagement work

Chair – Simon Shackley

University of Edinburgh

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Alberta Energy Regulator

Cultural Systems Solutions

Environmental Systems Solutions

Participatory Monitoring: Best Practice to Bridge the Cultural Divide

Scott Heckbert and Troy Mallie *Feb 2021*

Best Practice: Value-base participation

- Participatory Monitoring
  - Example: Braiding Environmental Knowledge project
- Goal: Ability to exchange meaningful information
- First steps:
  - Relationship building: Understanding values.
  - Communication: Receive and exchange information.
  - Equal footing: Technical and skills capacity.

Braiding Environmental Knowledge

1. Demonstrate a method to exchange digital information related to environmental conditions.

2. Design a community-based monitoring program.

3. Adopt an appropriate technology for information management.

4. Capacity development
   - Training and skills development: Monitoring methods, technical skills.

Braiding Environmental Knowledge

- Braiding: Mutually-supporting strength
- Partnership: Environmental Systems Solutions, Piikani Nation, University of Lethbridge, Alberta Energy Regulator

https://www.youtube.com/watch?v=axirLqzZhg0&t=4s

Monitoring, evaluation and reporting systems (MER)

- Components and processes in a deliberate sequence

1. Identify strategies, key values and threats.
2. Develop road maps.
3. Identify indicators, with targets and aligned to priorities.
4. Adopt information management systems (monitoring data and indicator assessments).
5. Capacity building (governance and operational).
6. Reporting (working with partners to improve the health of key values).

1. Strategies, key values and threats: The Plan

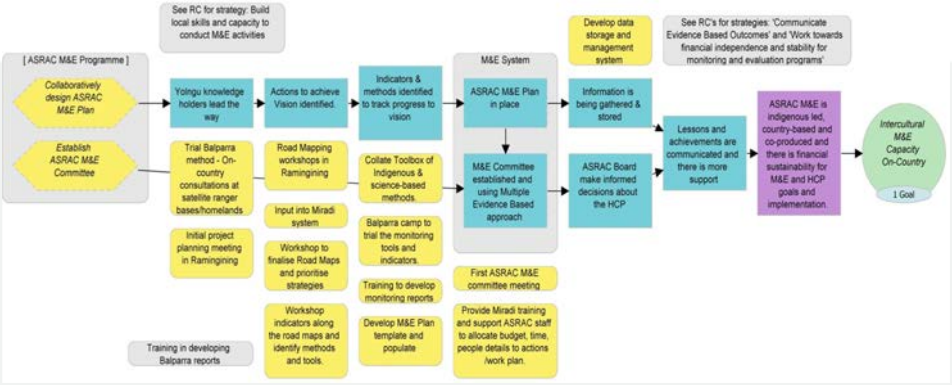
The plan identifies key cultural/environmental values, threats to values, and situates current and future activities in terms values and threats. This step effectively builds the infrastructure for all MER and sets the direction for all monitoring activities.

Key Value	Existing Condition	Desired Condition
Ailan Kastom, Aboriginal Lore/Law, cultural heritage and enduring connection to land and sea	Good	Very Good
Traditional Ecological Knowledge (TEK)	Some Concern	Very Good
Scientific research and monitoring	Some Concern	Very Good
Strong regional and community-based management capacity	Good	Very Good
Healthy sea ecosystems	Good	Very Good
Marine water quality	Good	Very Good
Coral reefs	Good	Very Good
Seagrass meadows	Very Good	Very Good
Dugong	Good	Very Good
Marine turtles	Some Concern	Very Good
Subsistence fishing	Good	Very Good
Healthy land ecosystems	Good	Very Good
Sustainable human settlements	Some Concern	Very Good
Coasts and beaches	Some Concern	Very Good
Mangroves, tidal and freshwater wetlands	Good	Very Good
Coastal birds	Good	Very Good

Key processes:

- Relationship building with groups
- Consultation with groups
- Production of a Plan

2. Road maps



Road Maps are directional flow charts that display the relationships between the components of the Plan i.e. Key values, strategies, activities, threats. This step shows how these components fit together and highlight where indicators (see next step) could be placed to most effectively conduct M&E.

Key Processes:

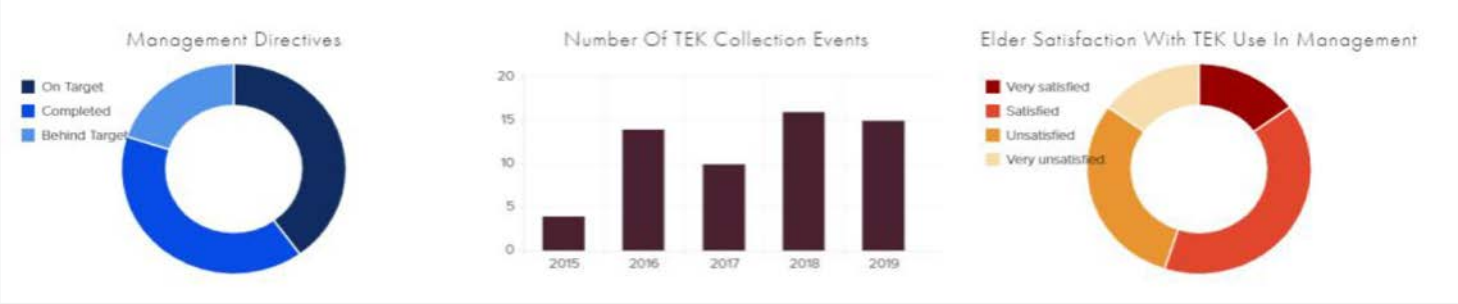
- Produce Road Maps from Plan information

3. Indicators

Indicators are the specific aspects of culture or the environment that are measured and assessed to demonstrate the health of a Key Value. Developing indicators must be highly pragmatic to consider and account for the technical and logistical constraints involved.

Key Processes:

- Develop appropriate indicators
- Establish monitoring techniques for each indicator



3. Indicator alignment

Find alignment between Indigenous-led indicators and non-indigenous indicators that are already being monitored and evaluated. This will provide significant logistical benefits and produce a more regionally integrated MER framework.

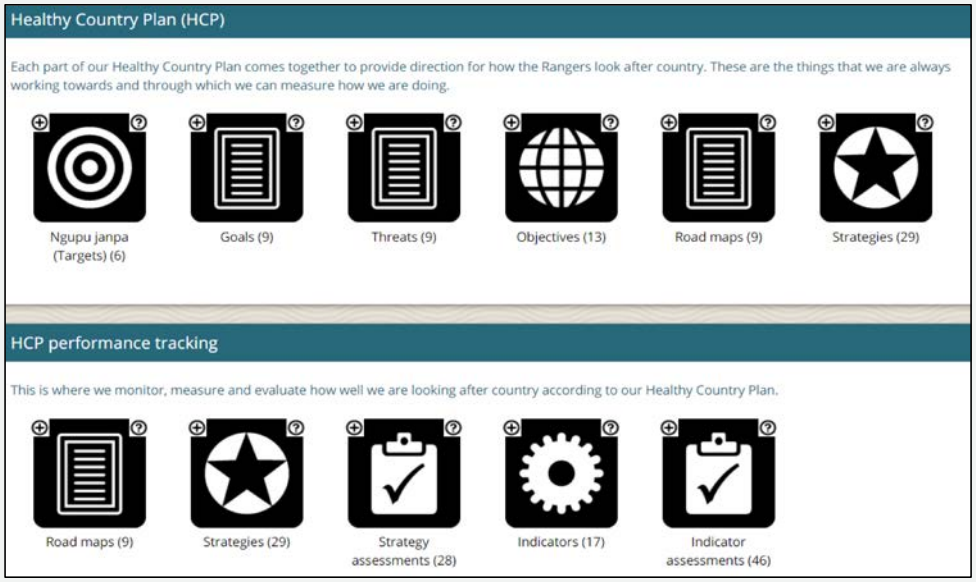
Key Processes:

- Understand what M&E already exists for the reef
- Identify overlaps between Indigenous-led indicators and current M&E
- Establish the accuracy of these overlaps and the appropriateness of using them for M&E of Indigenous values
- Establish data-sharing protocols between different parties

4. MER information management systems

These systems provide the technical infrastructure for collecting, storing and organising all data related to MER. The systems are information management hubs that:

- store and organise all HCP data including key values, strategies/activities, threats, and indicators (and the linkages between each).
- collect/record monitoring data.
- store and display all monitoring data in one place.
- automatically link monitoring data to indicators.
- generate data summaries for evaluations.
- record evaluations and collate results.
- dashboards to demonstrate results.



Key Processes:

- Implementation of MER information management systems

5. Skills and capacity

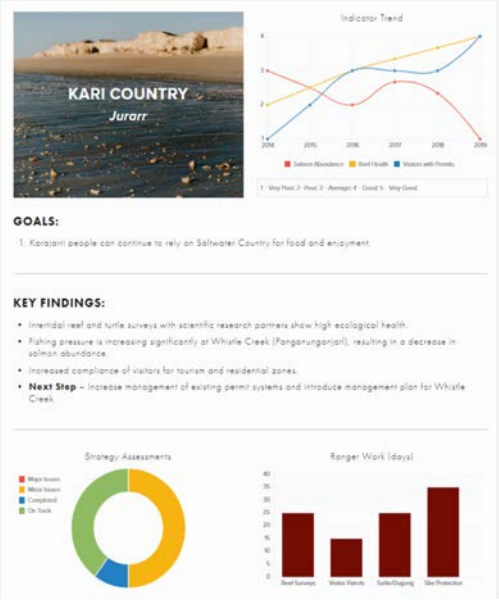
A set of simple skills in data collection, handling and evaluation are required for effective MER. It is very likely that some training and capacity development will be required for local Indigenous people so that they are able to conduct MER activities. This training involves basic MER principles, the use of monitoring techniques and equipment, evaluation procedures, and the use of the MER information management system.

Key Processes:

- Establishment of monitoring methods and technology
- Training on MER principles (why, what, how to monitor)
- Training in data collection and handling
- Training in evaluation
- Training to use the MER information management system

6. MER Dashboard (Reporting)

Dashboards are an easy and effective way of reporting the results and outcomes of M&E. Dashboards should be simple, yet comprehensive and must abide by any data sharing restrictions or sensitivities of Indigenous groups. The data presented in dashboards can be linked with the M&E information management systems so that they are automatically updated after any evaluation has been made.



Key Processes:

- Implement data sharing restrictions.
- Design dashboards according to data sharing restrictions and reporting priorities.
- Link to MER information management systems.
- Publish dashboards

Thank you

Participatory Monitoring: A must-have for geo-energy project strategies?

INTERNATIONAL PLATFORM ENVIRONMENTAL MONITORING

ONLINE EVENT 9 AND 10 FEBRUARY 2021

MIKE DUIJN - ERASMUS UNIVERSITY ROTTERDAM & HANNEKE PUTS - TNO

This presentation is part of a project that has received funding by the *European Union's Horizon 2020 research and innovation programme* under grant agreement number ENER/H2020/764531/SECURe

Geo-Energy Projects: distrust prevails

UGS

Resistance!

Controversy!

Induced seismicity Natural gas

Shale gas

CCS

Opposition!

How to socially embed geo-energy innovations?

This presentation is part of a project that has received funding by the *European Union's Horizon 2020 research and innovation programme* under grant agreement number ENER/H2020/764531/SECURe

Open the black box of geo-energy projects

- Too often restricted to operators, legislators, investors.
- Too often covert for local governments, NGOs and local communities
- Can an approach be put in place to open up the black box of project development, in subsequent stages?

- → Participatory Monitoring – as part of a broader socially inclusive project development strategy - includes local governments, NGOs and local communities in setting up, managing and using monitoring programs, making environmental monitoring more societal relevant and trusted.

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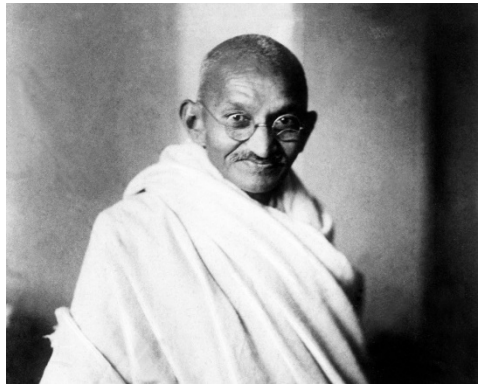
Open the black box; The role of trust



Anything you do *for* me, *without* me,
you do *against* me.

Conversation based on equality and open mind.

All potential outcomes must be ‘welcome’.

Principle questions:

- ✓ Why this project and why at this location?
- ✓ Who needs to build trust, and why?
- ✓ What (local) stakeholders are present in the surroundings of the intended project and what are their interests?
- ✓ Potential added value of the project? What’s in it for whom?
- ✓ Interdependencies between developers and local stakeholders

Building blocks:

- ✓ Intentions (project initiators)
- ✓ Competencies (idem)
- ✓ Knowledge (experts) en research
- ✓ Initiators – beneficiaries
- ✓ “Victims” – bearing burdens
- ✓ Legislators
- ✓ Operators
- ✓ Multiple interests
- ✓ Options for Compensation

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Theoretical background Participatory Monitoring (PM)

Increasing degrees of Public Involvement; Public understanding / Public awareness / Public engagement Public Participation in science / Citizen Science.

Participatory Monitoring (Community-based Monitoring; Community Science):

- "A process where concerned citizens, government agencies, industry, academia, community groups, and local institutions collaborate to monitor, track and respond to common community (environmental) concern" (Whitelaw et at., 2003).

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Participatory Monitoring

- Context-dependent: administrative culture, history with geo-energy projects, societal values and preferences.
- As such: Tailor-made!
- Relates to interactive governance and citizen science in a networked society; it is not the 50s any more.
- Presupposes interaction between operators – regulators – citizens / local communities – scientists / experts – intermediate organizations (NGOs). Or part of this 'network'.

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How: a first step

Very common through Feasibility studies

Characteristics sub soil & technology

Often overlooked, but necessary to prevent deadlocks

Characteristics societal playing field

Part of the project strategy is Participatory Monitoring

Project Strategy

Starting from site location:

- Cultural and historic background
- Actors analysis
- Balance between costs and benefits.

› More focus on assessing local and societal situation at hand needed! To design a better and more inclusive project development strategy which contributes to embedding the project in its societal context.

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Participatory Monitoring: Design Basics

Why? Broadening the scope of monitoring systems

What should be monitored?

Monitoring needs and objectives

How should we monitor?

And who should do this?

What methods/instruments?
What indicators?

When?

What stage of the project?

Preparation - Project design - Exploitation

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Participatory Monitoring: Impact

PM presupposes significant involvement of stakeholders.

This calls for taking into account values, interests and information needs of (key) stakeholders (groups) in designing and implementing monitoring systems.

- Might strengthen willingness to participate
- Might increase enthusiasm for participating
- Leads to better connection research goals and societal needs
- Leads to more effective use of data by a broader group of stakeholders
- Provides new principles for communication strategies on future events (i.e. nuisance, tremors, etc.)
- Contributes to improve trust of the local community in project developers and project operations

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Participatory monitoring: Value inclusive design

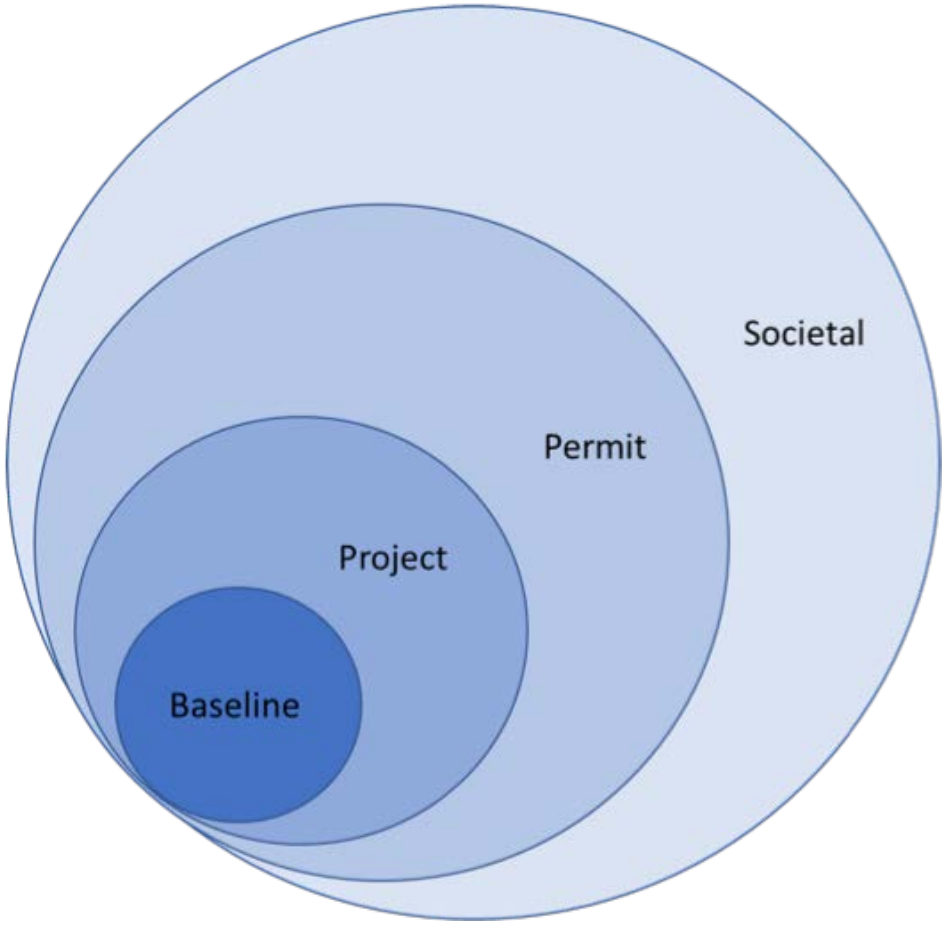
Value Inclusive Design for the PM-system

Baseline Values
Values about the (natural) system 'as is' without interference by man (project).

Project Values
Values about the characteristics of the intended project

Permit Values
Values following regulatory requirements regarding the potential impact of the project on the (natural) system it will be embedded in

Societal Values
Values of non-project actors that will (might) be affectend by the intended project



Stakeholders	Baseline	Project	Permit	Societal
Operator(s)		Prio	Prio	
Legislator(s)	Prio		Prio	
Citizens				Prio
Other local stakeholders				Prio
Experts / scientists	Prio		Prio	

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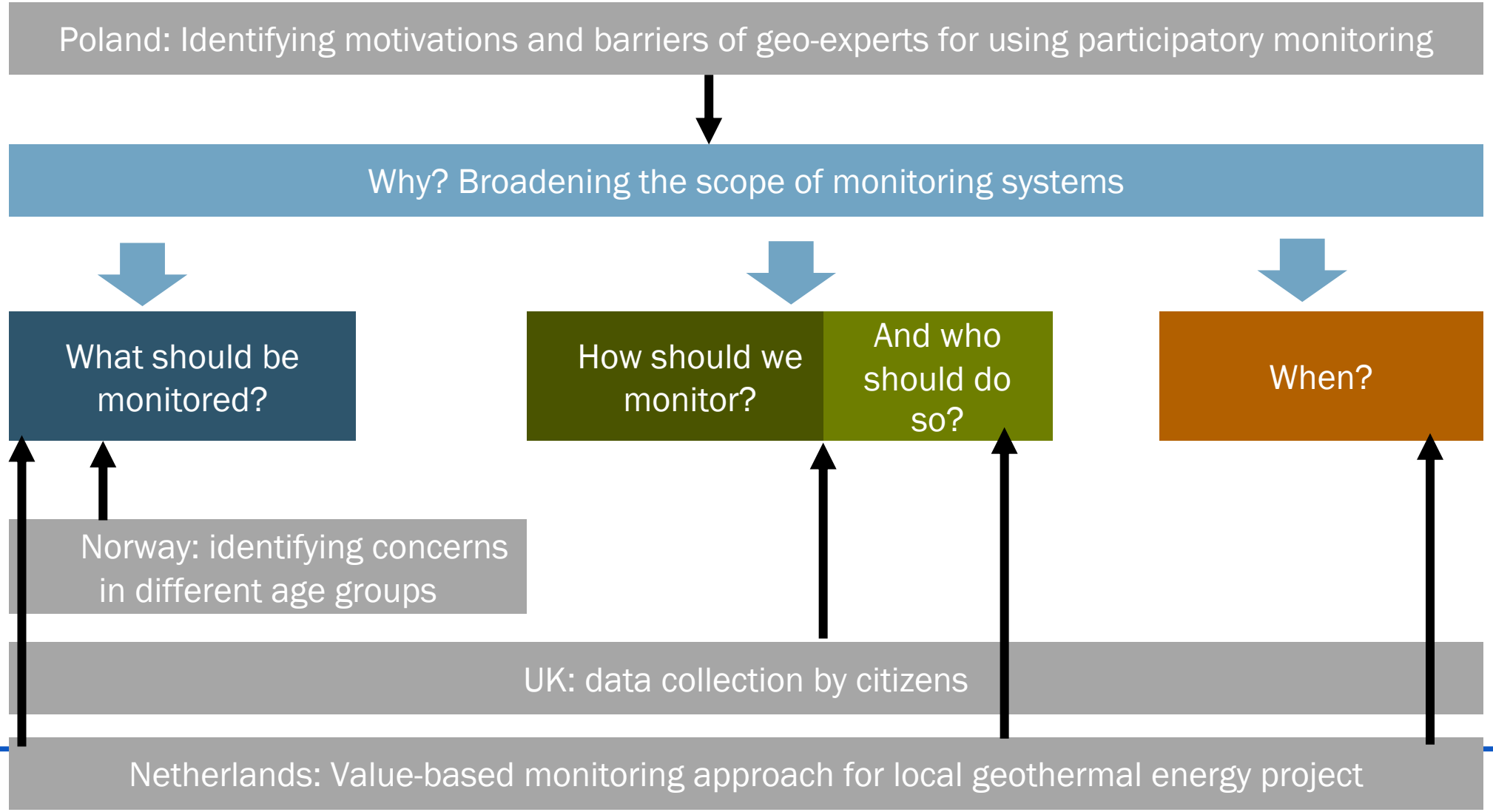
Participatory monitoring in SECURe: 4 case studies



Results research on participatory monitoring

- Report with introduction of participatory monitoring approach (2019)
- Report with first experiences applying appraoch for participatory monitoring in 4 case studies (2021)

- Thank you for your attention.
- Questions? Contact Hanneke.puts@tno.nl or duijn@essb.eur.nl

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SECURe
Subsurface Evaluation of CCS and Unconventional Risks

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BREAK

UK Research and Innovation

BGS British Geological Survey

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Simon Shackley
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SECURe – Subsurface Evaluation of Carbon Capture and Storage and Unconventional Risk

Work Package 6: Sharing Best practice

Public Attitudes towards Geothermal Energy: UK and Poland Survey Responses and Analysis

Revision number: **00**

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Overall Aim

To obtain statistically representative data on public attitudes towards geothermal energy from disused mines (mine water heat geothermal – MWHG) to provide advisory material for current and future mine energy geothermal developments in the UK and Poland.

To examine differences in attitudes between those who live in different proximity to disused coal mines.

To explore and test ideas around place identity and place attachment, mining identity, social deprivation, energy justice, decision-making

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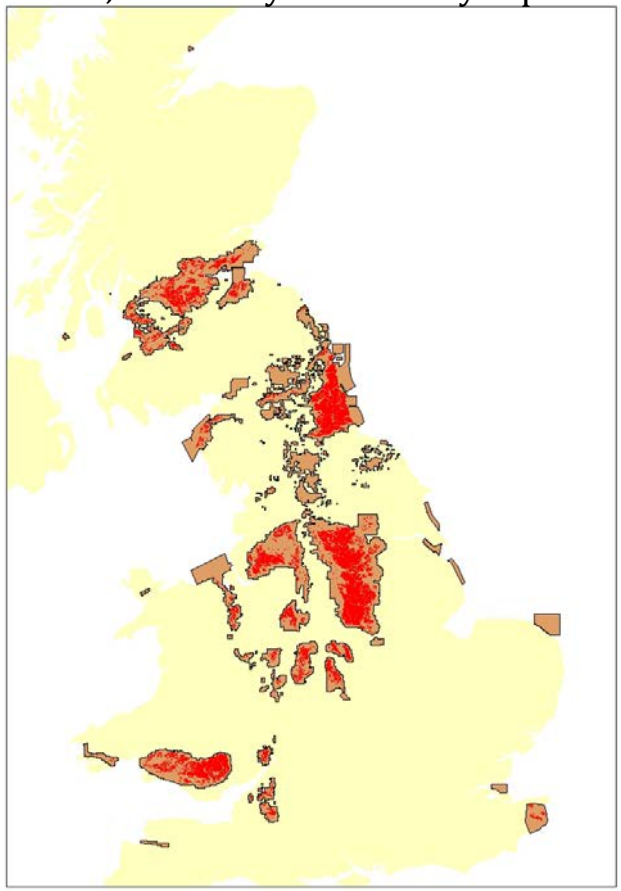
Sample population UK

Non-random, nationally statistically representative



Responses from those above the Underground Workings (red – core former mining areas) (50%)
&
those within the Coal Mining Reporting Area (brown – more peripheral former mining areas) (50%)
N = 2013 August 2020
Implemented by Dynata Inc.

Many thanks to Coal Authority (UK) for sharing spatial data

How important is mining identity and sense of place?

What features of MWGE are (un)attractive to the public?

Equity issues raised (income, gender, etc.) and preferences for how decisions are taken

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Polish Survey

statistically representative of three voivodships

- Computer Assisted Web Interview (CAWI) (14-19 August 2020)
- Sample: N=1500 (age 18-65) in 3 coal mining regions
  - Upper Silesia –existing mines, many decommissioned
  - Lower Silesia- closed mines
  - Lubelskie –one still extracting coal mine

Implemented by Kantar Research Agency Internet PANEL

- Spatial analysis using Geographical Information System (GIS)

Source: https://www.ispionline.it/en/energy-watch/polish-coal-enfant-terrible-eu-climate-policy-14384 (accessed 1.12.2020)

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Poland: Geothermal projects and coal mining

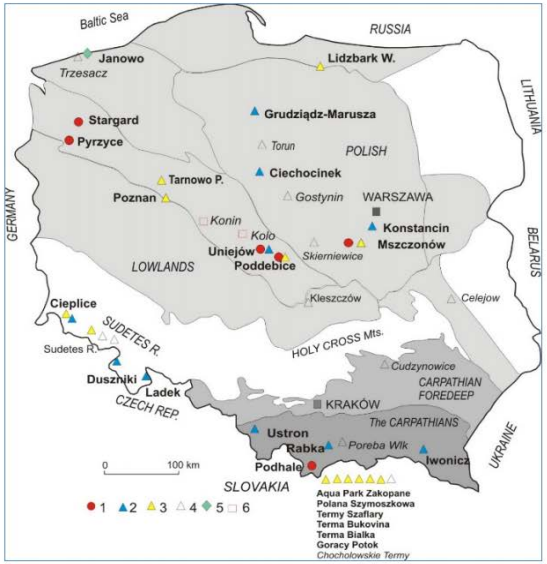

Fig. 5.2.3. Poland – geothermal direct uses, 2017 (based on Kępińska, 2016, updated):
1. district heating plants in operation, 2. health resorts, 3. recreation centers in operation, 4. some recreation centers under construction, 5. fish farming, 6. co–generation plants at early stages of investment projects
In several past years by (2012) a semi-technical fish farming (a part of R+D cascaded system) was operating by MEERI PAS in the Podhale Region – that facility initiated geothermal aquaculture in Poland

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Awareness of Geoenergy and Mine Water Heat Geothermal (MWHG) and Attitude Prior to Information Provision

- Higher awareness of geothermal energy in Poland (90%) than UK (70%), though smaller % have some knowledge (60% Poland, 40% UK).
- Awareness of MWHG is lower than for geothermal in general (52% Poland, 40% UK) and those with some knowledge yet smaller (25% Poland, 10% UK)
- Perception of MWHG pre-information positive in Poland (80%) and lower in UK (53%). Strongly support = 15% in the UK, 24.5% in Poland. 11% against in UK, but only 3.5% against in Poland. 16% don't know in Poland but 36% in UK (most frequent response)
- Remove DK response in UK, support for MWHG is 83% (17% against) and strongly support 24%
- In UK, only 40% know something about MWHG, yet 64% give an opinion on MWHG
- In Poland, 52% know something about MWHG, yet 84% give an opinion on MWHG
- Associations between MWHG and 'coal mining' – positive bias? Poland still has 80,000 people working in coal mining compared to very few in UK

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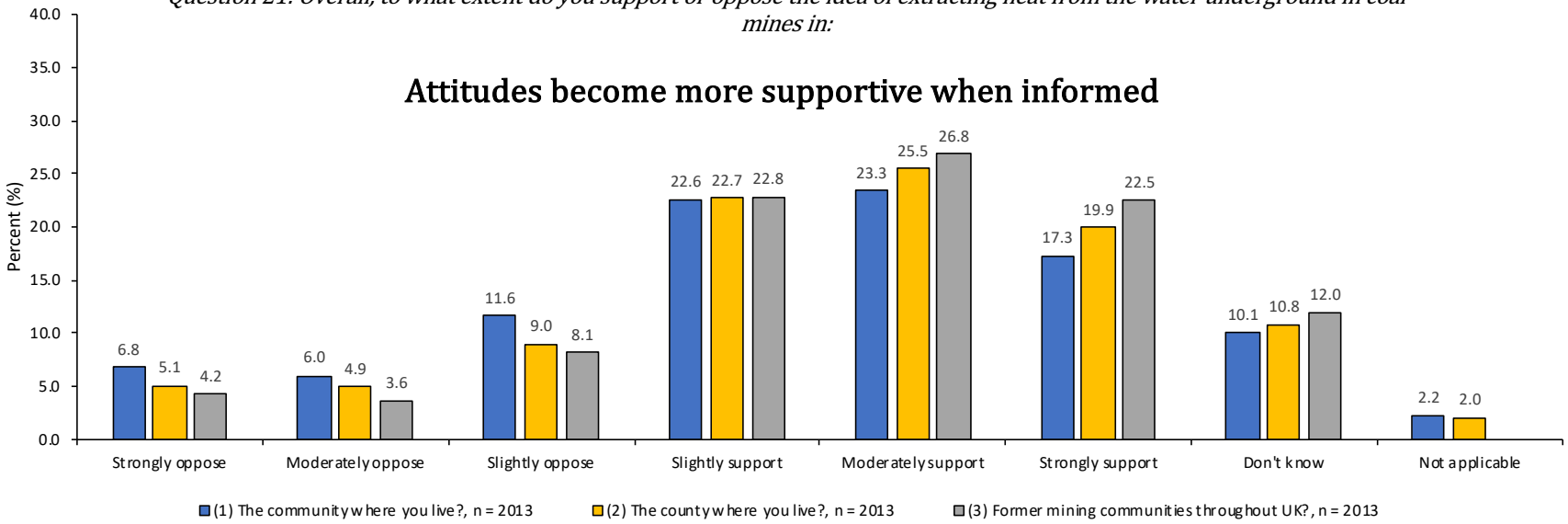
UK: Informed Attitudes

Question 21: Overall, to what extent do you support or oppose the idea of extracting heat from the water underground in coal mines in:



- Somewhat less support for local development
- More support than other sub-surface geoenergy tech (e.g. shale gas extraction, CO_2 storage)

- NIMBY? Potentially
- Sense of identity and place attachment?

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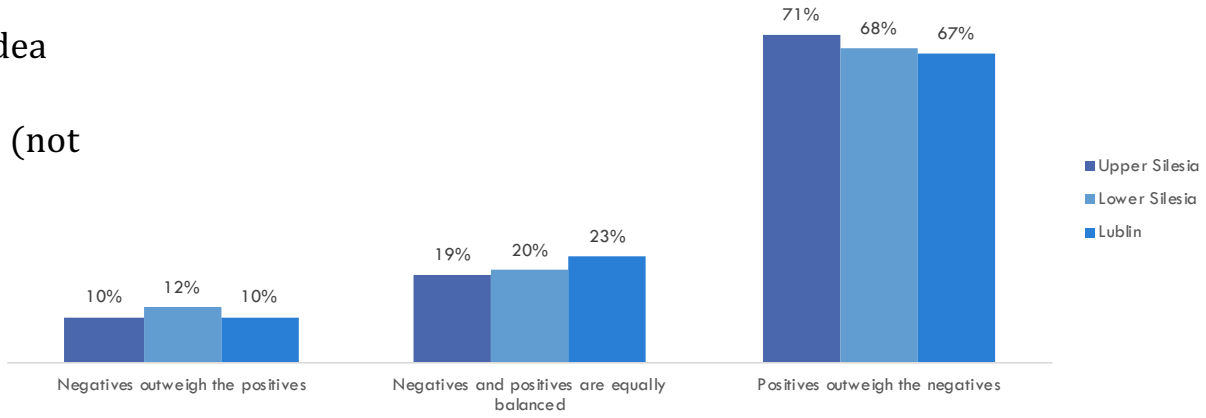
Poland: Balance of Positives and Negatives

Question10: Overall, how do you assess the balance of positive and negative aspects of heat recovery from mine water? N=1500

Attitudes become more supportive when informed

- All regions are very positive about the idea MWHG
- (Slightly) More support in Upper Silesia (not only among mining communities)



- The assessment of MWHG by women is less positive when compared to men (also found in UK).
- The wealthier people are, the more positive effects of MWHG they perceive.

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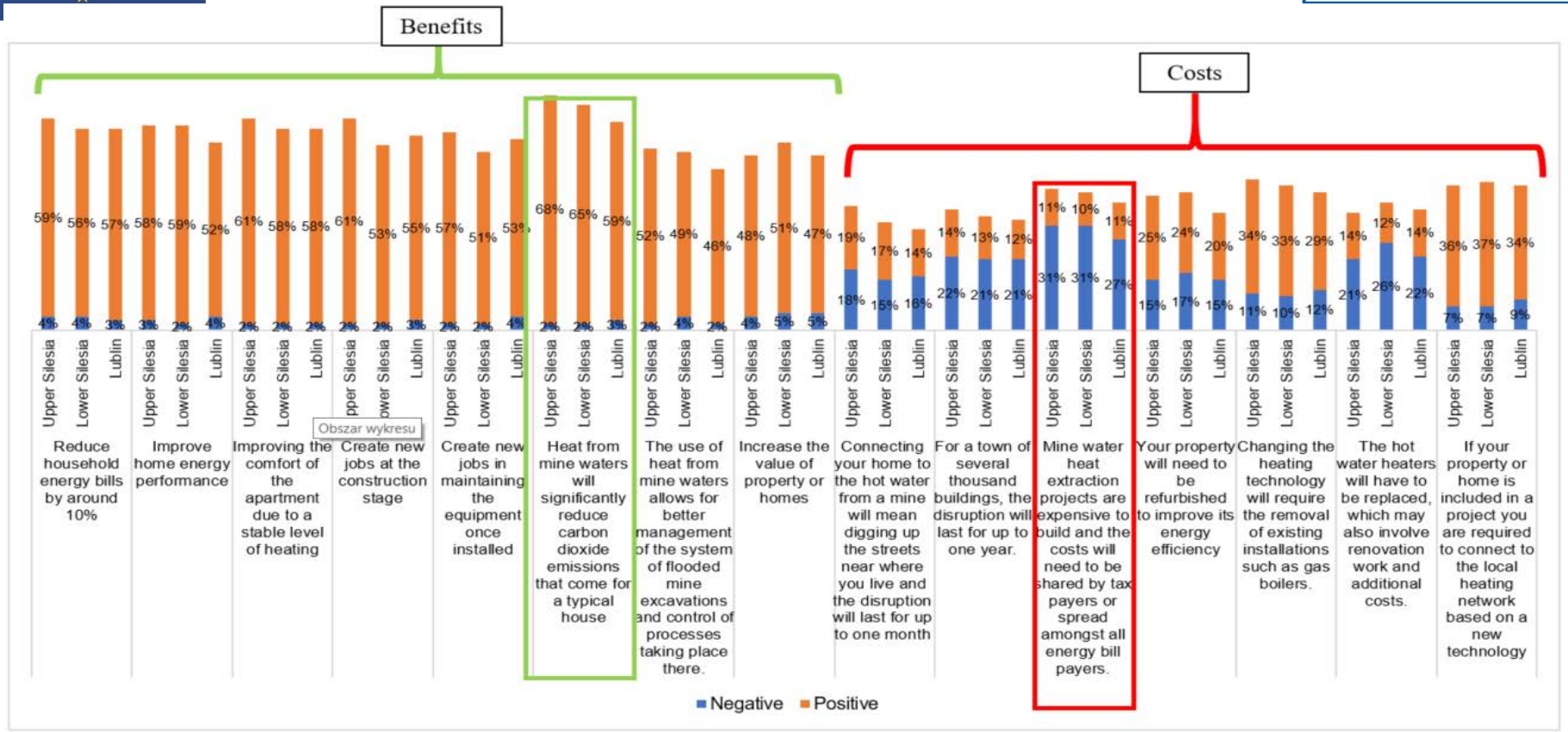
Poland: Perceived costs and benefits



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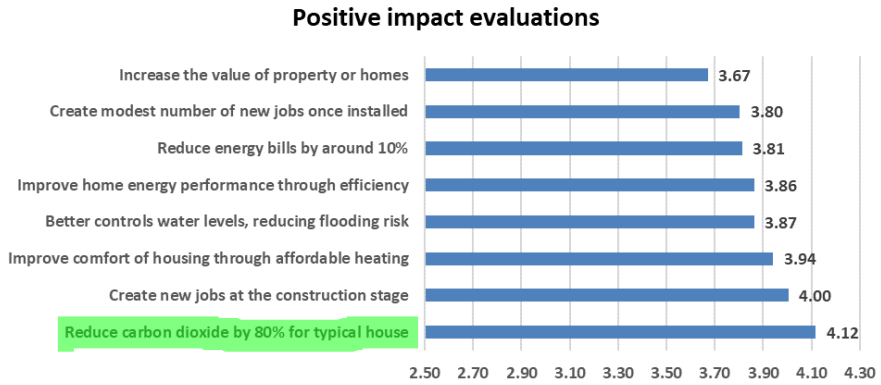
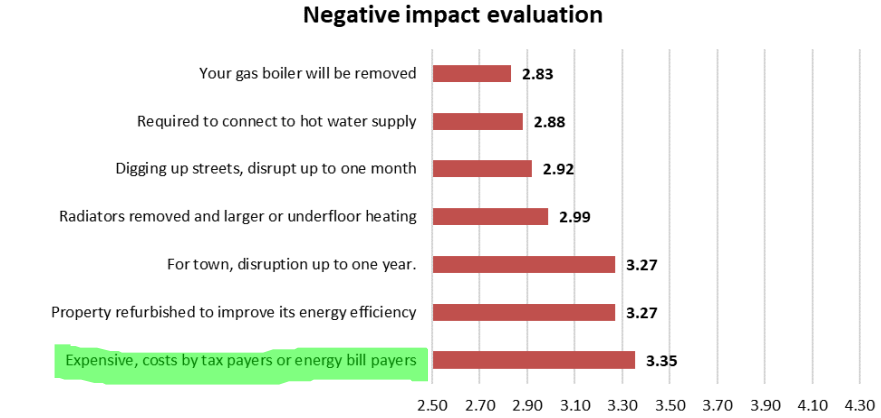
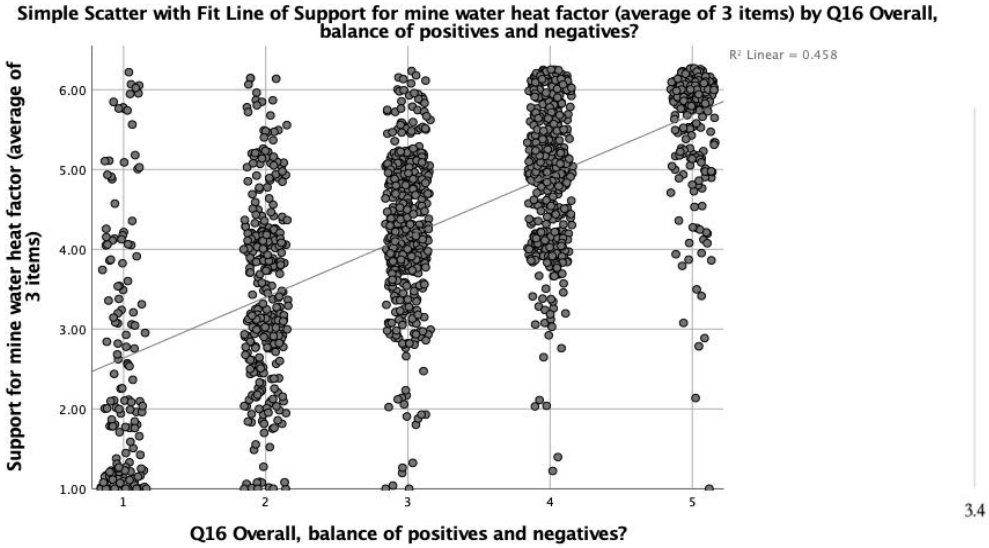
UK: Perceived positives and negatives







- Most positive impact in Poland and UK: reduction in CO_2 emissions from peoples' homes.
- Most negative impact in Poland and UK: costs of MWHG and the disruption caused installing a heat network

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Attitude to MWHG once Information Provision has been provided

- Positive outweigh negative impacts: 69% in Poland, 41% in UK
- Negative outweigh positive impacts: 11% in Poland, 26% in UK
- Introducing negative impacts from MWHG sways respondents to become slightly more negative

"Would you actively pursue MWHG for your home if a project existed in your community? "

- **Poland:** YES 59%, NO 11% DON'T KNOW 30% [movement from +v'es>-v'es to DK]
- **UK:** YES 35%, NO 30% DON'T KNOW 30%

Poland v. UK differences: stronger association between MWHG and coal-mining in Poland than UK?

Coal mining associated in respondents minds as 'positive', then MWHG looks good by association

In Poland, support for MWHG drops off for those working in coal mining or with family members employed in mining – could be seen as a threat to continued coal mining?

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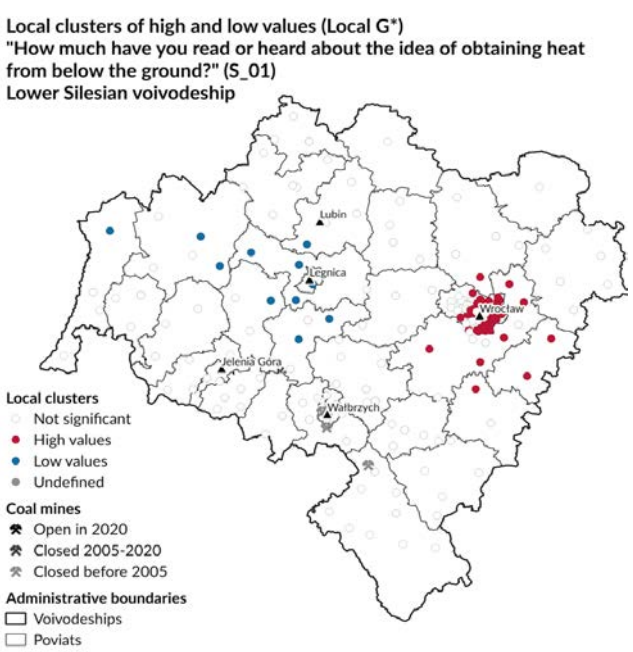
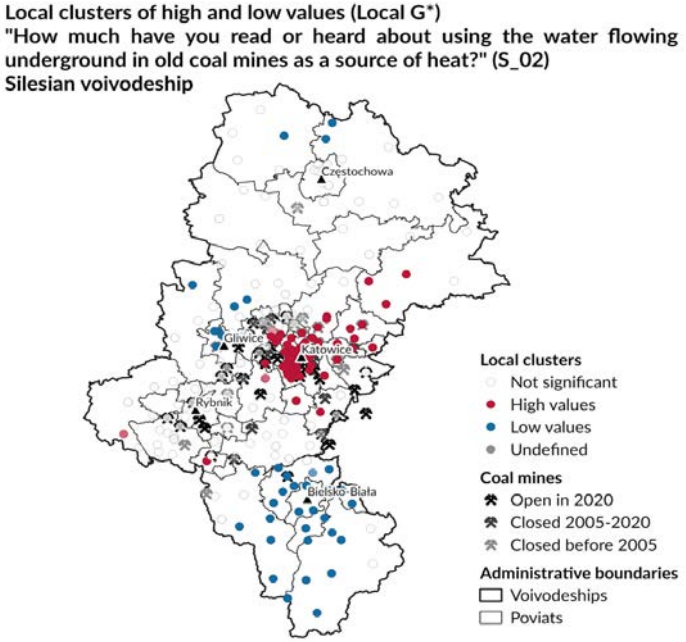
Poland: Goals and results

Spatial distribution of knowledge on geothermal projects (GIS)





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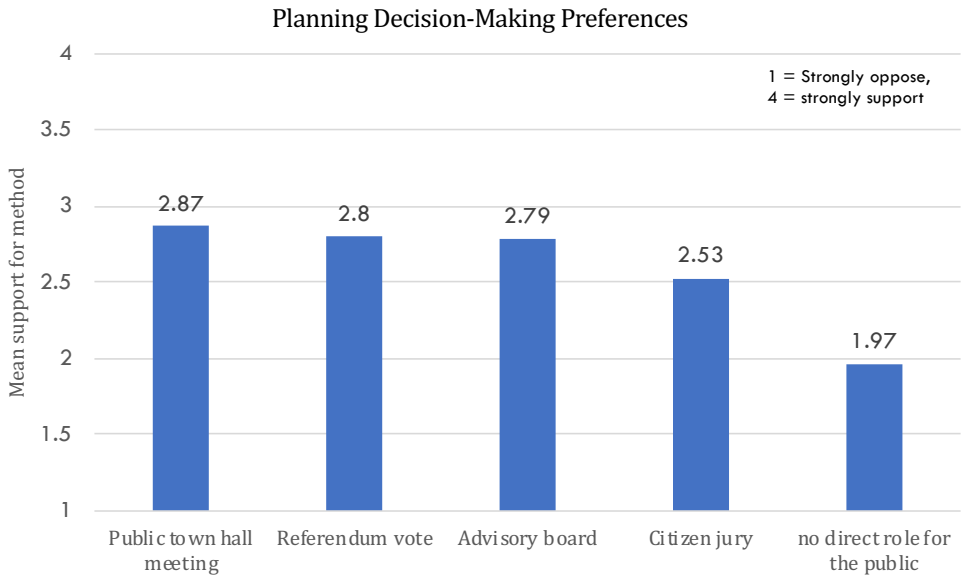
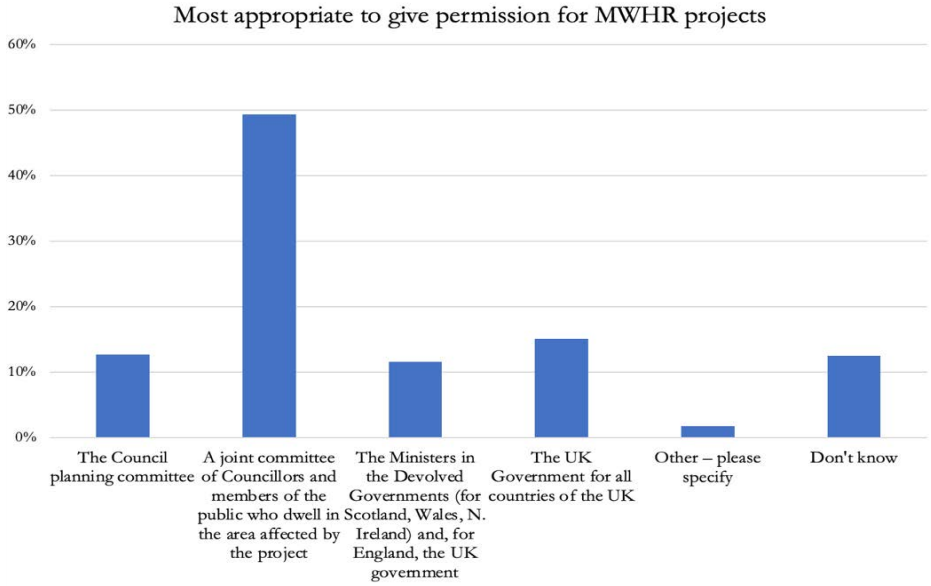
UK: Informed Attitudes

Inequity Justice





The public want to be involved in planning and permission

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Key Findings for Development

1. There is public support for mine water heat geothermal (MWHG), especially compared to other geoenergy technologies (e.g. hydraulic fracturing, CCS)
2. Evidence of a positive bias towards MWHG – respondents in sampled areas have positive association with (present and/or past) coal mining – the association of MWHG with coal mining may explain the positive bias.
3. Stronger support for MWHG in Poland than UK –possibly explained by still active presence of coal mining in Poland *contra* UK
4. Support drops away somewhat when projects get 'closer to home' but overall still positively perceived.
5. Mining identity directly influences support for MWHG (UK) but direct employment in mining deters support (Poland)

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Key Findings for Development

6. Socio-economic deprivation increases support for MWGH. (e.g. Those who find it difficult to meet heating costs support MWGH more in UK)

7. Employment opportunities and reduced household CO_2 emissions are sought after, but high costs and disruption are not

8. Public want compensation in the form of lower heating bills and public want to be involved in planning and decision-making (UK)

9. Providing adequate and accurate information on the technology increased support

- ✓ Integrity - public are open-minded to information presented and more persuaded by positive arguments for MWGH rather than negative ones
- ✓ Pre-conceived framing? - public appear willing to consider MWGE on its merits; may be positive bias due to positive association with coal mining

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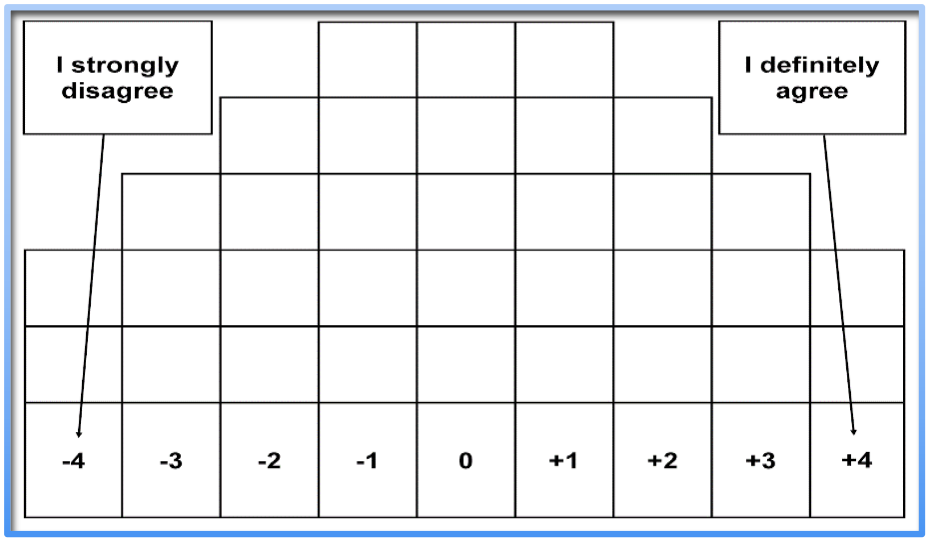
INVITATION to participate in a Q-method study



- **Q Methodology** studies HIERARCHY OF STATEMENTS
- TOPIC: perception towards stakeholders' and community engagement in the geoenergy projects
- TIME: 20-30 minutes to fill in the grid
- We gather data from all SECURe PARTNERS – We COUNT ON YOUR PARTICIPATION - Thank YOU☺

Contact: Krzysztof.Maczka@amu.edu.pl

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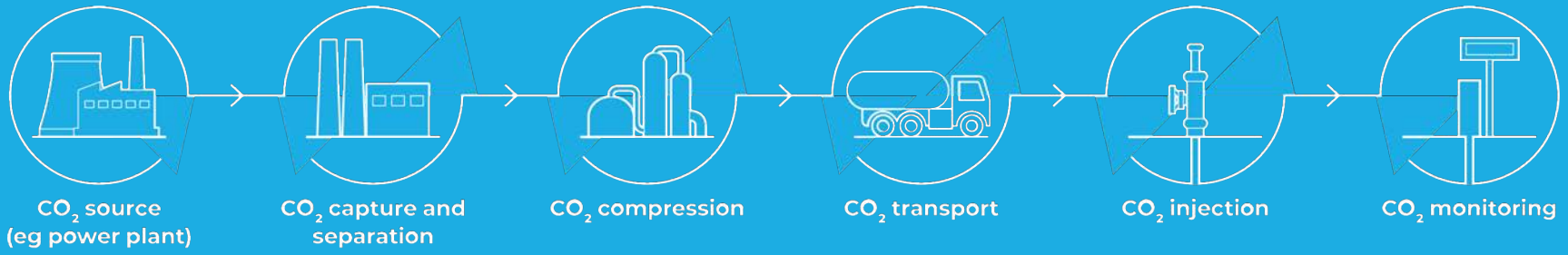


CTSCo Community Engagement

How are we applying lessons learned from the Northern Surat Basin to the Southern Surat Basin?

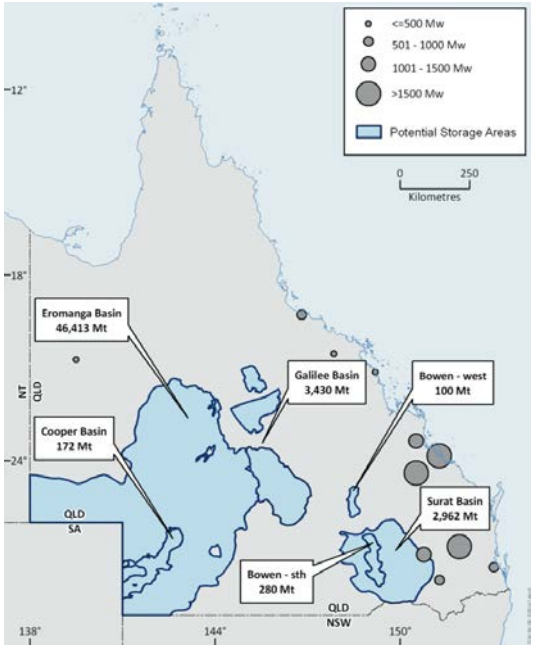
IPEM Meeting
9th to 10th February 2021
(10th to 11th February AEDT)

CTSCo Carbon Transport and Storage Company

CTSCo Surat Basin CCUS Project

The Project

- CTSCo (100% Glencore) is developing a CCUS project in the Surat Basin in Queensland, which includes:
  1. **Capture:** CO_2 capture plant project at existing Millmerran power station
  2. **Storage:** Transport and CO_2 storage or use (EOR) in the Surat Basin
- Currently in the Pre-Final investment Decision phase



The Context

- CTSCo holds one of the largest land-based CCS tenements in Australia (EPQ10 in the Surat Basin) and the only active GHG exploration tenement in Queensland.
- The Surat Basin was identified in the 2010 Queensland CO_2 Geological Storage Atlas as having the potential to store up to 3 billion tonnes of CO_2.
- Only State/Territory in Australia to have a dedicated GHG Act.
- CTSCo has subsequently assessed and explored both the northern and southern Surat Basin for storage potential and is advocating the southern Surat Basin as an area for safe and cost-effective permanent CO_2 storage at potential future industrial-scale.

Engagement Principles and Approach

- Principles of internationally recognised standards:
  - AA1000 Stakeholder Engagement Standards
  - International Association for Public Participation (IAP2)

AA1000 Stakeholder Engagement Standard 2ND EDITION

iap2 international association for public participation

- Key objectives:
  1. Build trust and maintain relationship
  2. Focus on 'directly interested' local community
  3. Communicate the science i.e. build technical knowledge of CCS
  4. Position the project in the context of a low carbon future

Application of a phased approach designed to build on the success of the previous phase

Phase 1 Establishment and Baseline

Phase 2 Foundation Building

Phase 3 Targeted Engagement

Phase 4 Broader Localized Engagement

Community profile of the Northern and Southern Surat Basins

Original site = Northern Surat Basin (EPQ7)

- Closest township (Wandoan) - approx. 550 people
- Local economy traditionally based on agriculture
- Have been heavily reliant on the resource sector in particular Coal Seam Gas industry
- Site of the injection was on Glencore-owned land
- Relatively shallow bore (1,200m) and accessible by community.
- Major concern - perceived long-term impacts to aquifer (potable water)

Current site = Southern Surat Basin (EPQ10)

- Closest township (Moonie) - approx. 190 people
- Site of Australia's first commercial oil field from the 1960s
- Mainly agricultural area producing grain, beef cattle and prime lamb
- Much deeper bore (2,300m) and in accessible by community.
- Less community concerns around aquifer (non-potable, not suitable for stock or irrigation)

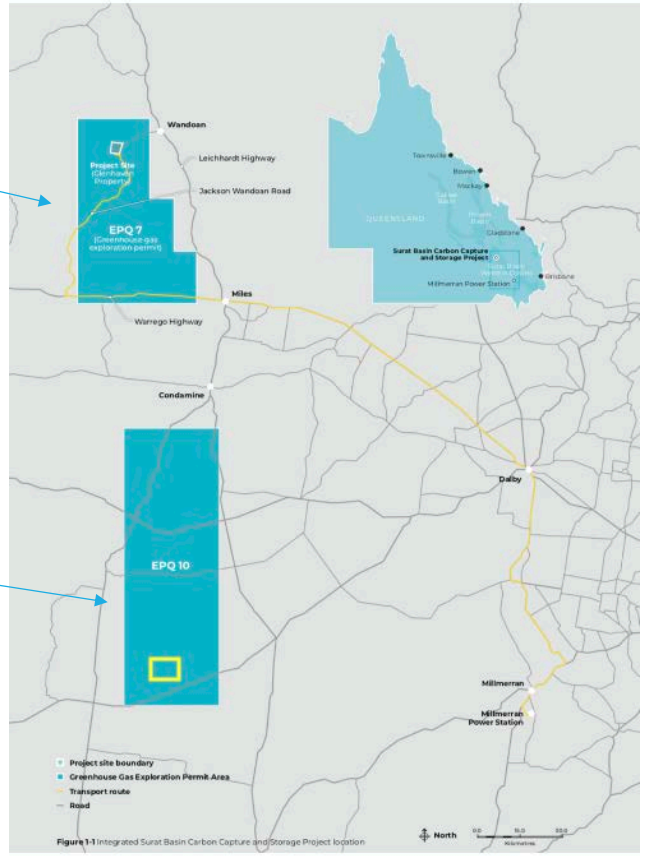


Figure 1-1 Integrated Surat Basin Carbon Capture and Storage Project location

Applying learnings from the Northern Surat to the Southern Surat

Northern Surat Basin (EPQ7) – 2014 to 2019

- Baseline understanding of the community (community perception survey).
- Identified local community influencers and co-designed engagement program.
- Focused on achieving support for the process NOT the outcome.
- Engaged early and frequently in order to build technical knowledge with key groups (including access to subject matter experts).
- Built relationship with the decision-makers i.e. those that would give approval or have influence over the decision.
- Adaptability and flexibility in approach and activity when it mattered most.

Southern Surat Basin (EPQ10) – 2020 to current

- Apply sound understanding of key community issues/concerns to forensic stakeholder analysis at a local level.
- Capitalise on key relationships built up over the years including Government/Regulator; local members; NGOs e.g. AgForce.
- Test and review with community leaders/influencers.
- Continue to apply fact-based information accessing credible subject matter experts.
- Leverage current industry and national CCS learnings (including CCS projects around the world) and messaging and public support for a low carbon emission future.
- Always maintain a flexible and adaptable approach to engagement especially in a highly political environment.

For more information visit our website:

www.ctsco.com.au

For direct enquiries contact:

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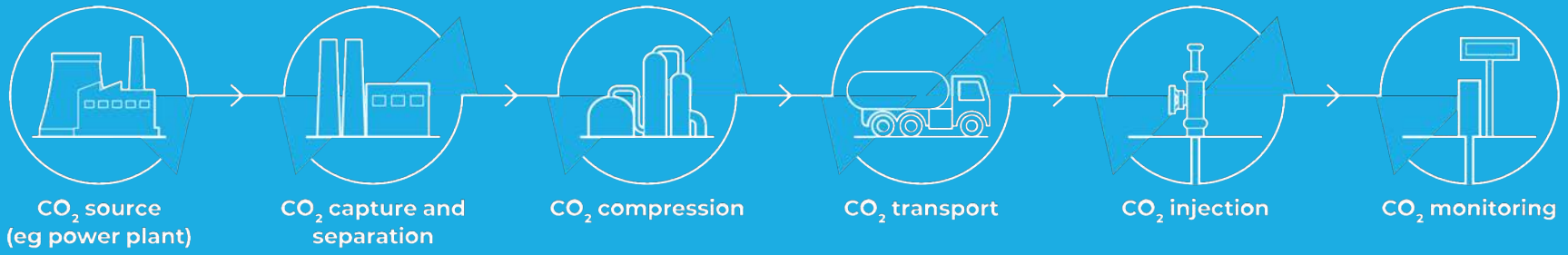

Questions ?

CTSCo Carbon Transport and Storage Company

SECURe
Subsurface Evaluation of CCS and Unconventional Risks

www.securegeoenergy.eu

Q&A and IPEM Discussion

UK Research and Innovation

BGS British Geological Survey

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SECURe
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Thank you

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