

GeoTHERM
expo & congress



'Environmental considerations of innovative shallow geothermal technologies'

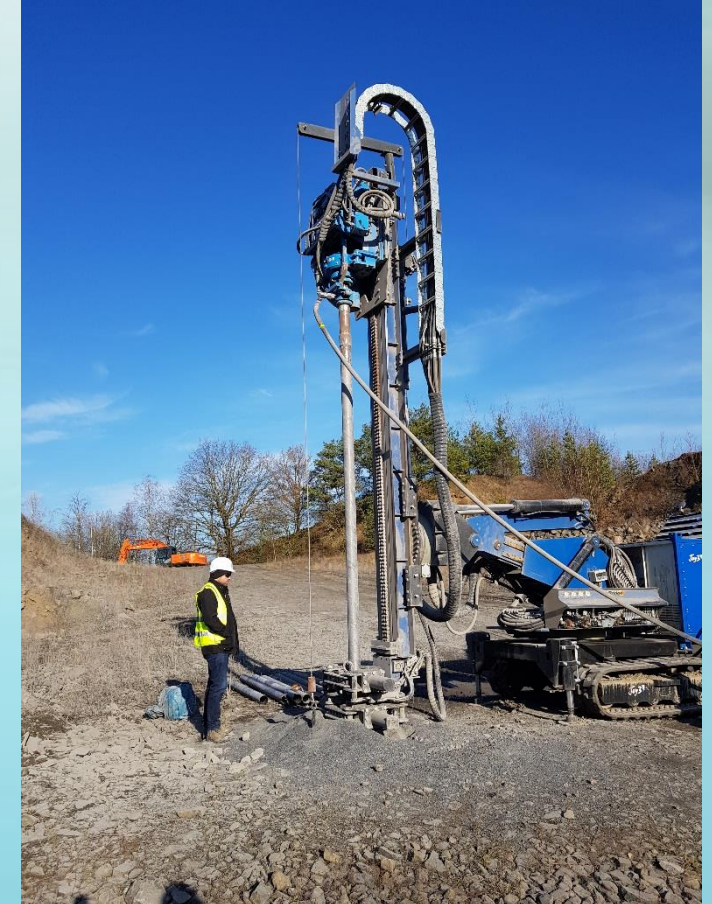
Speaker: Riccardo Pasquali, rpasquali@geoservsolutions.com

Affiliation: GEOSERV

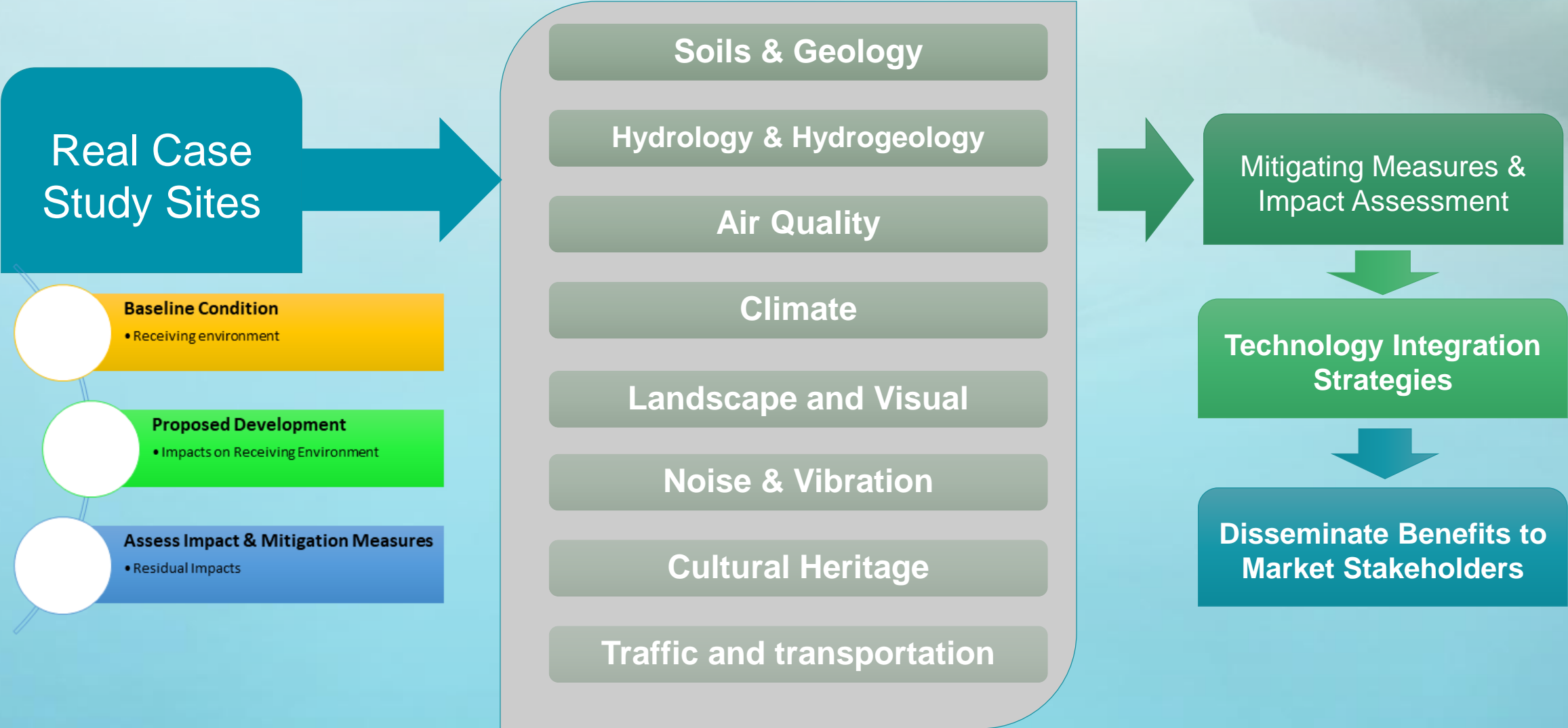
Geoserv

Objectives

- Define the Environmental impact of new shallow geothermal technologies against existing technologies
- Risk Assess implementation methodologies and develop solutions
- Complete a Life Cycle Analysis
- Regulatory assessment for GSHP systems in the retrofit market
- Develop Building Integration Strategies



EIA Assessment – A Common Methodology



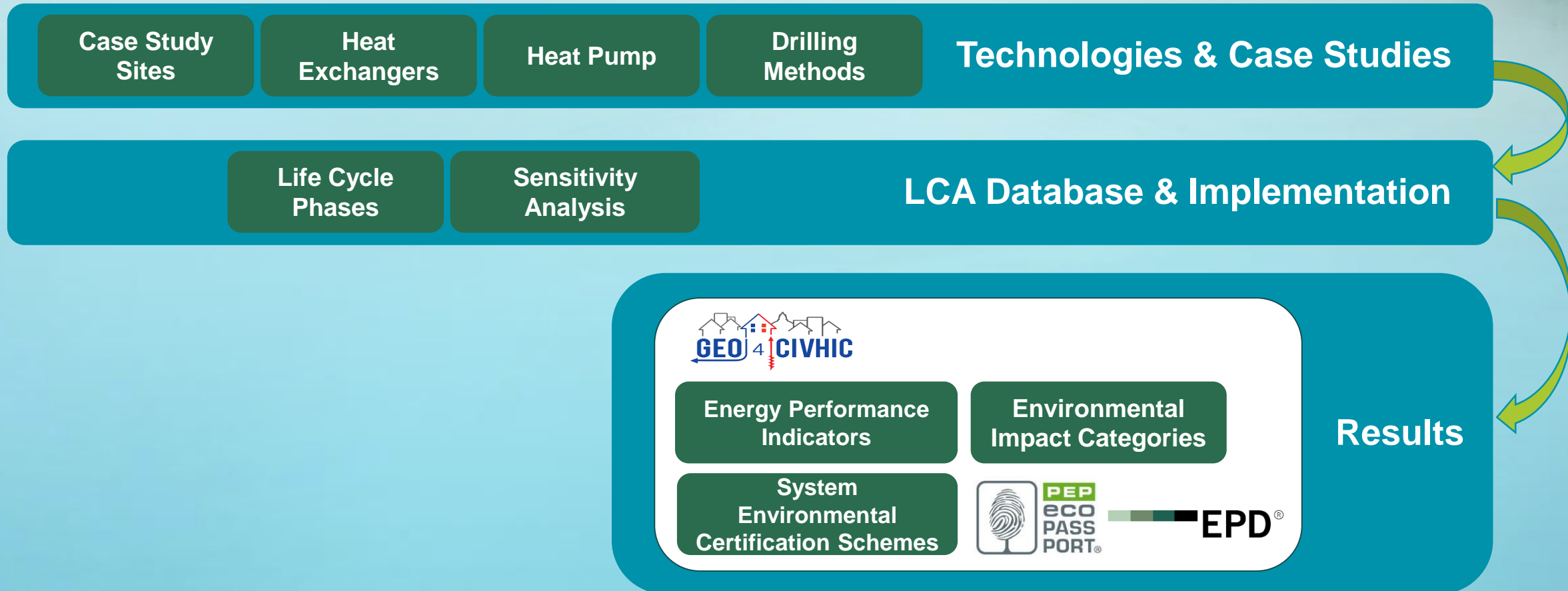
EIA Assessment – Results

Criteria	Impact	Magnitude	Overall Impact
Environmental Impact	Low	Low	Low
Emission from Construction Phase	TBC	Low	Insignificant
Traffic & Transportation	within $\pm 10\%$ of baseline	Low	Low
Visual Receptors impact	Limited	Limited	Negligeable
Operational Phase Impact	TBC - Low	TBC - Low	TBC - Low

- Overall Impact of the Using the GEO4CIVHIC technologies is low
- Impact is Further reduced where Hydra-RED method is used

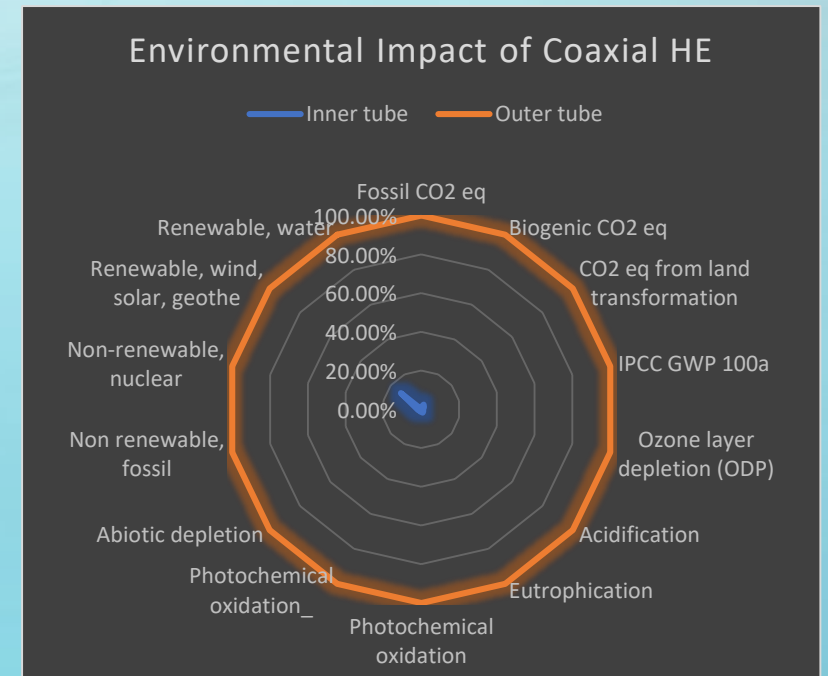
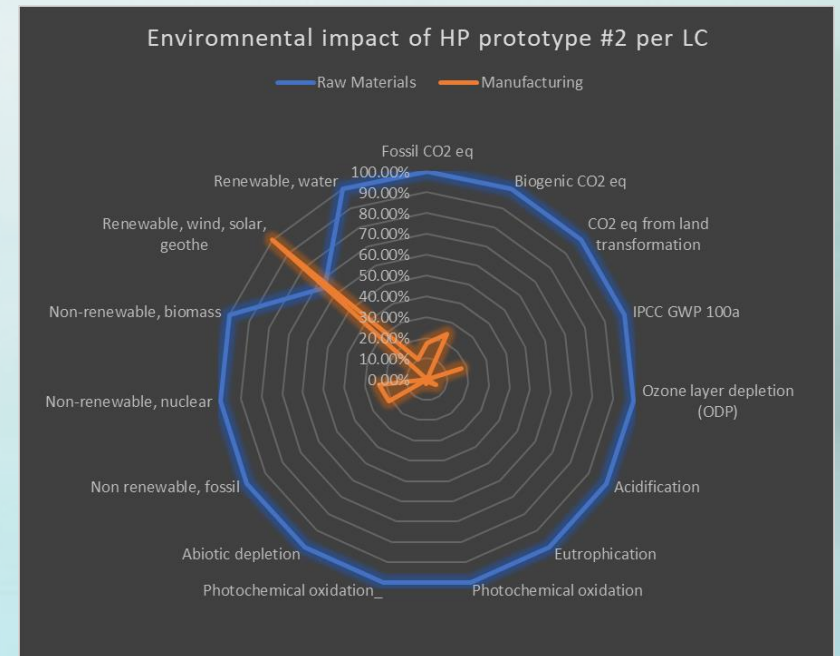
LCA Objectives – A common Approach

Demonstrate improved life cycle environmental impact of project technologies



Life Cycle Analysis Interim Results

- Up to 15 Environmental Impact Indicators
- Assessment of individual project components:
 - Heat Pump Prototypes
 - Coaxial Stainless Steel Heat Exchanger
 - Coaxial Heat Exchanger - Enhanced Plastic
- CO₂ Emissions & GHG Emissions



Barriers to Implementation – Historical Buildings

External Space restrictions:

- Heat Exchanger space compared to energy load
- Limited GHE deployment spacing options
- Presence of Archaeological Artefacts

Internal spaces restriction

- Availability of plant room space to house the HP
- Piping and cabling space required for connections

Detailed planning required prior to installation

- GHE equipment access in historical centres
- Preliminary surveys of outdoor spaces

Low impact of the drilling operations

- Noise, vibration, waste material, visual impact



Architectural
Integration

Aesthetic
Aspects

Space
Restrictions

Installation

Integration Recommendation Strategies

- Building Integration:
- Building Typology Recommendations
- Retrofit Design Strategies
- Heat Pump Selection
- Terminal upgrades
- Urban Geothermal Solutions:
- Integration in Congested Urban centres
- HP solutions Integration
- Regulations & Standards
- Recommendations for Technology integration

