A Decarbonization Solution for Buildings
In 2021 the operation (excluding the CO₂ emitted by the cement, steel and other materials used in construction) of buildings accounted for 30% of global final energy consumption and 27% of total energy sector emissions (8% being direct emissions in buildings and 19% indirect emissions from the production of electricity and heat used in buildings). In 2021 direct and indirect emissions from buildings operation rebounded to about 10 Gt CO₂. (IEA - International Energy Agency, 2022)
A Decarbonization Solution for Buildings

Why?
Building heating and cooling is one of the largest contributors to GHG emissions worldwide.

What?
A sustainable alternative to traditional heating and cooling.

How?
Using the geothermal energy right under our feet!
Geoenergy: How it works

HOW GEOENERGY REDUCES CO₂ BUILDING EMISSIONS BY 90%
Benefits from Geoenergy Heating & Cooling

Sustainable
- 90% Less CO₂
- 60% Less Energy
- No Heat Island

Comfort
- Invisible
- Quiet
- Resilient

Scalable
- Single Building
- District
- Community
A SLB New Energy Business

World’s leading technology provider for energy industry

Our Commitment to Sustainability

The energy industry is changing, and Schlumberger’s vision is to define and drive high-performance, sustainable business. As a leading energy service company, responsible environmental and social sustainability is an integral part of the way we operate. This includes addressing opportunities and risks associated with energy transition and climate change, protecting the environment, investing in and engaging with our workforce and the communities where we and our customers live and work; promoting diversity and inclusion and respecting human rights.

Reservoir Characterization
Drilling
Production
Processing

100,000+
Employees
120+
Countries
$26B+
Revenue
A Scalable Turnkey Solution for Heating & Cooling

At Building Scale

At Community Scale

New & Renovation | Zero Upfront Cost
Benefits from Geoenergy Heating & Cooling

**Sustainable**
- 90% Less CO₂
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**Scalable**
- Single Building
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Celsius Energy – Benefits Beyond the Norm

- **Cost-Effective**
  - 30% Less Bores
  - 70% Less Piping
  - 40% Less OPEX

- **Sustainable**
  - 90% Less CO₂
  - 60% Less Energy
  - No Heat Island

- **Small Footprint**
  - 200 SF Land Impact
  - Preserve Real Estate
  - Retrofit Flexibility

- **Comfort**
  - Invisible
  - Quiet
  - Resilient

- **Smart**
  - Optimized Design
  - Digital Control
  - Turnkey Solution

- **Scalable**
  - Single Building
  - District
  - Community
Optimized Borehole Heat Exchanger

- 30% less wells
- 70% less horizontal piping
- 90% less site impact
- Preservation of real estate
- Flexible construction planning - Non critical path
- COST EFFICIENCY!
Optimized System Design

- **Ground characterization**
  - Optimize bore depth
- **Pioneering digital platform**
  - Digital Twin
  - Monitor, control, optimize
- **Turnkey solution**
  - Ground + Building + Digital
  - Eliminate “over-build”
  - Single point accountability

Standard

- 1.84 Btu/hr-ft
- 56.5 °F

Efficiency = Performance Accountability + Turnkey Solution

Celsius Energy

- Distributed Thermal Conductivity
- Distributed Temperature

Graphs showing data points and trends.
Digital Narrative

- Digitally connected installations
- Proprietary ground-to-building models
- Continuity and integration of systems
- Reliability
Installation Dashboard
Private hospital

- Commissioning Date: September 2020
- Heat Pump Capacity: 856 Mbtu/h
- Total Borehole Length: 9,281 feet
- # of Borehole: 18
- Building Surface Area: 71,041 ft²
Optic 2000
Headquarters
Clamart, IDF

Why?
ROI
Net Zero 2030
Renovation

What?
- 70% CO₂ emissions (254 TCO₂ per year)
- 66% energy consumption
- 60% energy bill

How?
8 months renovation in occupied site
21 bores + Heat Pump + Gas

129,000 ft²

- 66% energy
- 70% CO₂
- 60% usd
Orpéea
Private Hospital
Plancoët, Bretagne

Why?
- ROI
- Net Zero 2030
- ESG engagement

What?
- 71% CO₂ emissions (254 TCO₂ per year)
- 78% energy consumption
- 60% energy bill

How?
- 8 months renovation in occupied site
- 18 bores + Heat Pump + Gas

75,300ft²

-78% energy
- 71% CO₂
-60% usd
SLB
Tech center
Clamart, IDF

Why?
- ROI = 8 yrs
- Net Zero 2030
- ESG engagement

What?
- 92% CO₂ emissions (254 TCO₂ per year)
- 74% energy consumption
- 62% energy bill

How?
- 8 months renovation in occupied site
- 10 bores + Heat Pump

32,000 ft²
- 82% energy
- 92% CO₂
- 62% usd
Geoenergy Solution Access

We finance, develop and structure the project from A to Z.

Benefits
- The best solution without initial investment
- Reduce energy consumption
- Reduce carbon footprint without extra operational cost
- Delegate responsibility
- Ability to move cost to short-term debt in the balance sheet

Example

Serenity thanks to geoenergy
A Turnkey Geoenergy Solution
For Heating & Cooling

Pre-Dimensioning

Feasibility

Pre-Dimensioning

Execution

Feasibility

Operation

DIGITAL TWIN

GROUND HEAT EXCHANGER INSTALLATION

MECHANICAL ROOM INSTALLATION

PRE-DIMENSIONING

GROUND HEAT EXCHANGER INSTALLATION

MECHANICAL ROOM INSTALLATION
Sustainable
Small Footprint
Scalable
Comfort
Smart
Cost-Effective
What’s your plan?

Helpful Resources:

Links:
• Celsius Energy Solution
• DOE: Geothermal Heating and Cooling
• Inflation Reduction Act Guidebook
• Property Tax Exemption for Renewable Energy Systems (Connecticut)

Videos:
• Completed Project: A geoenery solution providing low-carbon heating and cooling for buildings (3:40 min)
• GEOENERGY: the solution to low-carbon buildings (3:20 min)
• 6 Reasons to choose Geoenergy (1:41 min)