Clean Energy.
For Life.
Forever.

AIRBORNE

At Airborne Clean Energy, our mission is to create clean, sustainable energy for the world.

We are driven to create novel solutions to clean energy challenges. Solutions such as fission-enhanced geothermal energy (patent pending), in which a geothermal well's output is significantly boosted using nuclear energy.

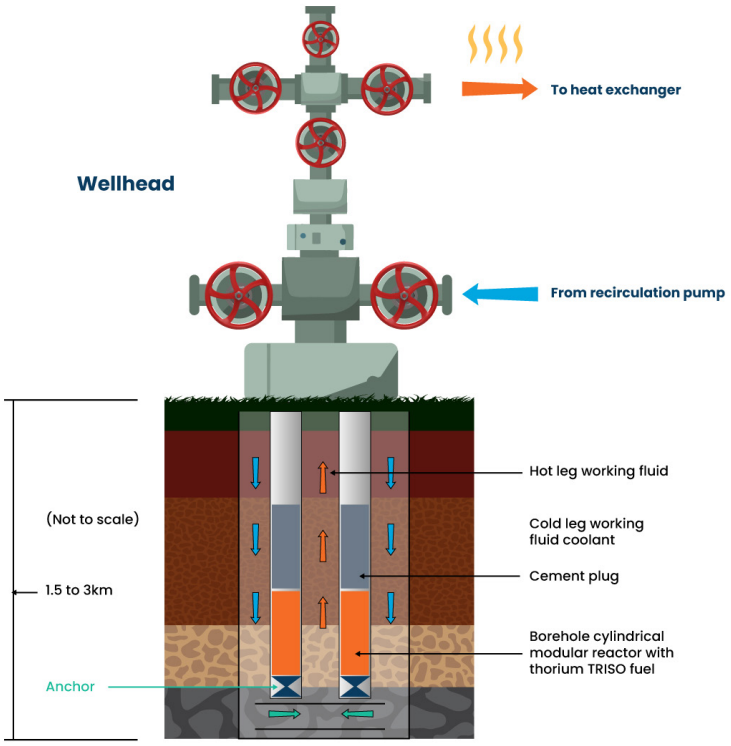
Why nuclear, why now?

As countries worldwide increasingly prioritise energy security and sustainability, and energy demands globally soar, nuclear power is experiencing a global renaissance as a viable, low-carbon energy source.

There has been steady progress in international demand for nuclear energy since 2020, with potentially exponential market growth. Electricity generation using nuclear power is projected to reach 2 760TWh in 2025, and 4 500TWh by 2040 – and these are likely underestimates.

Fission-enhanced geothermal energy may well be the ultimate expression of nuclear power generation: it is highly cost-effective, green, relatively easy to construct, ideal for microgrids and remote locations, and above all safe.

How fission-enhanced geothermal energy works



The fission-enhanced geothermal well design is now patent pending, titled Clean Energy from a Fission Enhanced Geothermal Heat Recovery Well.

The design entails drilling a wellbore up to 5km (3.1 miles) deep, into base granite. Non-weapons-grade, tri-structural isotropic (TRISO) nuclear fuel, which emits heat but not radiation, is placed within a cylindrical reactor core at the bottom of the well. The reactor core is covered with a cement plug.

Supercritical carbon dioxide ($scCO_2$) coolant, piped down the centre of the well, is pre-heated by radiogenic heat, the Earth's primary source of uranium and geothermal energy, before being heated by the reactor. It is pumped back to the surface on the outside of the reactor core, at temperatures of up to 700°C at the surface.

There it expands and gives up its heat in a Brayton cycle, which is used conventionally to create mechanical energy using turbines and from there, generate electricity. The cooled $scCO_2$ is then compressed again and recirculated down the well.

Benefits of fission-enhanced geothermal energy

Ultra-long lifespan
The well can produce 1GW of energy or more, 24/7, and can last for 50 years or more without refuelling.

Huge cost saving
Instead of budgeting US$10-billion and 10 years for a 1GW nuclear facility build, or US$2.2-billion and four years for a coal facility, our solution costs closer to US$1.5-billion. Plus there are no underground maintenance costs, and the well becomes its own disposal zone once the nuclear fuel is spent, resulting in containment savings of 98%.

No safety issues
Placing the nuclear reactor deep underground means there are no safety issues at the surface, and the oxygen-free environment is inherently safe. The TRISO nuclear fuel never leaves the wellbore, and a cement plug is placed over it to permanently dispose of the fuel.

Superior coolant
No radioactive isotopes are in the heat transfer fluid, the $scCO_2$ coolant, which unlike steam is non-corrosive and not prone to explosion.

Ideal for multiple applications
We can create carbon-free nuclear energy centres for both on- and off-grid applications. Our system is designed for combined heat and power applications such as desalination, AI, municipal heating districts, industry applications and data centres.

Quick installation, where it's needed
The wellbore can be drilled anywhere within a month or two, depending on depth. The only geological requirement is a seismic survey at the location, which can be near the end user. This will dramatically reduce the need for long transmission lines, saving time and money
.

Built-in containment
Permanent disposal can even begin before the start-up of the reactor by placing a 300m-deep (1 000ft) cement plug over the reactor.

Meet our specialists

Our expert team possesses the education, extensive experience, skills, patented technology and vision to deliver fission-enhanced geothermal energy.

Murray Mortson, P.Eng CEO, Airborne and AB Catalyst (Canada and United States)

BApSc (Engineering)

Murray brings more than 40 years' extensive experience to the energy industry, with a specialist focus on coal combustion and emissions control. His career journey is rich and varied, encompassing roles from construction supervisor and engineering contractor to both COO and CEO. He possesses significant international experience, having worked on projects across the US, Mexico, China, India, South Africa and Canada.

As an executive, Murray has led companies such as Airborne International Holdings Corp. and managed operations for Optima Engineers and Constructors. He also served as an alliance manager for Colt Engineering, fostering key relationships with major energy firms.

W James (Jim) Hughes Chief innovation officer

BSc (Geology)

Jim brings to the table more than 40 years of specialised experience in drilling for energy, particularly in underbalanced drilling technology. His expertise focuses on non-damagingreservoir drilling, which enhances natural flow and can eliminate the need for hydraulic fracturing in critical formations. Jim holds approximately 30 patents related to non-damaging reservoir drilling and well design.

Notably, his patented technologies have direct applications in CO_2 sequestration and geothermal energy systems. His most recent patent, US Patent #11732929, combines optimised CO_2 sequestration with enhanced geothermal heat recovery, highlighting his crucial contributions to efficient and clean energy solutions.

Danie van Niekerk CEO, Airborne (South Africa)

N(Dip) Mechanical, Adv (Dip) PM

Danie is an accomplished project management professional with over two decades' experience in the energy sector, and has overseen multi-billion dollar projects in Africa. He is also a proven custodian of shareholder and executive interests, with two of his former projects winning the Sasol Project of the Year Award.

Dr AJ (Attie) Botha COO, Airborne (South Africa)

BSc Hons (Chem), PGDipEng (Petroleum), MComm PM, PhD (Comm & Adm), PhD MechE (MPEE)

A highly qualified and experienced professional, Attie is a specialist energy engineer across the petroleum, petrochemical and green energy sectors, including the use of green geothermal power combined with sequestered CO_2 to produce green methanol, aviation fuels, synfuels and chemicals.

Contact us
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