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How to recycle a nuclear power station and how to use the spare parts



The Falkirk Wheel in Scotland is the world's only "rotating lift". It raises and lowers boats and barges, and it connects three Scottish canals.

It is 35m tall and its height is the equivalent of 8 double decker buses stacked on top of each other. The wheel was built by British engineer Tony Kettle as a result of the £84.5 million Millennium link project. It is a spectacular achievement of modern technology.

As usual, the Greeks thought of it first: the Archimedes principle, where floating objects displace their own weight in water.

To drive a barge, manually secure then free the locks through the linked canals is a great day out for a group of friends, a fun lesson on responsibility and cooperation for schoolchildren or any type of team building effort.

When the water lifts the barge to its zenith, you can see the entire Central Belt of Scotland. And it is the ugliest view in the world. That is, before the North Pole, which I believe is not ugly.

Barren in some parts, it is a flat, non-agrarian, once industrial hub now strewn with abandoned factories and, most noticeably, the remnants of decommissioned nuclear power stations.

So where, exactly, is the Eureka moment?

What we need to know is that the world's nuclear fleet is ageing. In late 2020, 440 nuclear reactors have been operating world wide, spread across 30 countries, with the list led by the US, France and China.

Experts from the International Atomic Energy Agency (IAEA) say that 190 power reactors are

in the process of shutdown, so we need to deal with their legacies.

The legacy of nuclear waste is in fact only 5%, and the non-dangerous part can be recovered for other uses. This means the potential for any country to open its door to a "circular economy".

This is clearly no job for a layman; all disposed material must be scrupulously checked by highly trained professionals, who meticulously avoid cross-contamination. The process has been compared with what is being done now with Covid waste at hospitals.

Flavio Bruno, head of Radioactive Division at Sogin, the company responsible for dismantling nuclear power plants in Italy, says, "the basic concept is the same...to be able to manage the material in a manner that will be consistent with what will be its end."

Release, reuse, recycle

The International Conference on Nuclear Decommissioning will be held in May 2023. This initiative aims to consolidate and harness the expertise and knowledge of a range of organisations from a significant number of countries involved in nuclear plant decommissioning, already confident of using dismantled nuclear plants as a breakthrough in cutting edge technologies, such as automation, digitalisation and - yes, you've guessed it - AI.

Green Finland takes Europe by surprise

On 21 May 2022, Finland, a country known for its "Green credentials", ruffled some feathers

when its Green Party became the first in the world to back nuclear power.

From now on, the lifespan of nuclear reactors will be acknowledged in the Finnish Green Party's manifesto as "sustainable energy".

This appeared to be a u-turn on traditional Green orthodoxy, from people whose political provenance was anything other than pro-nuclear.

But the Finnish Greens for Science and Technology Group, represented by Tia Törmänen, has described it as a "moment long overdue".

The bottom line is that anxiety over the global environmental crisis is fuelling increasingly radical action, including embracing technologies so far considered environmentally unacceptable.

There is a possibility that this approach could spread further throughout European Green Parties, as Törmänen seeks to do. But there is also a possibility it will set a collision course between her radical pro-technological policies and traditional political environmentalists.

Radical aims and a lot of funding

RePlanet is a pro-nuclear, "pro-GMO vegan" entity which was launched to shake the roots of the environmental environment.

It wants the public to go vegan, and calls for animal products to be replaced by fats and proteins grown in genetically modified "microbial soup". And it is funded by billionaires.

Not only has it campaigned at EU level that

nuclear should be included as a green energy source, but it has also campaigned against the EU's farming targets, and long standing ban on genetically modified crops.

The roots of Replanet lie in splintered factions of ecomodernist groups, predominantly Extinction Rebellion and Just Stop Oil, notorious for active civil disruption involving activists gluing their bodies - ears and heads in particular - to roads (they don't like cars either).

They also enjoy pouring cans of soup - not microbial, presumably - over treasured works of art throughout Europe. The motives come from accusations of complacency among the general public and governmental incompetence.

When I began this article, I imagined that, like former hospitals, churches and schools, the prospects of a decommissioned nuclear plant refashioned into a safe family or communal home was a possibility.

But naturally this was a pipe dream - the world is moving too fast. Housing is more likely to rise than to spread out.

But there is no shame in recollections of the non-weaponry nuclear orbit. Relax in the Electron Lounge! Enjoy a range of treatments in the Proton Spa! We care for your pets in the Neutron Grooming Room! Let your children play supervised in the Atomic Playstation Emporium!

Dr Doug Parr, policy director at Greenpeace, has injected some hard facts, saying that "...crucially, we don't need nuclear. Solar and wind technologies are a much cheaper to cut carbon emissions and studies show we can keep the lights on with a wholly renewable energy system. All we need is the political will."

It's always about political will.