Introduction to the global programme
https://repower.world
https://repowerscore.com

REPOWER
Introduction to the global programme
The Repower Initiative

- Funded by Founders Pledge, we are in the middle of a global non-profit research & promotion programme dedicated to the repowering of fossil power plants by low carbon heat sources such as nuclear or geothermal energy, reconfiguration as thermal heat stores or as clean energy grid interconnection points.
- The initiative was joined this week by a new partner, one of the world’s top-10 financial institutions, with $1 trillion USD earmarked for decarbonization project finance by 2050.
Addressing a Key Decarbonization Challenge

“Decarbonisation is about two things: Building stuff and closing stuff”
The Original Research Question(s)

1. Can we decarbonize and at the same time avoid stranding investments, avoid firing the local workforce & avoid abandoning the site and the equipment?

2. Can fossil power plant sites continue to fill *all their full current roles* in the system without the continued burning of fossil fuels?
A Vested Problem

1. Coal power is the largest form of electricity generation & largest source of emissions

2. The effective age of all coal plants is ~15 years, in critical places 7 years!

3. $ Trillions of recent investments

All to be scrapped, trillions stranded and millions of workers fired?
Last 15 years of new coal power

1350 GW capacity
3400 units
1300 large sites
A wide suite of great options with varying TRL & timeline!

1. Repower or repurpose site with new heat sources
2. Use as renewable resource grid interconnection point
   - Large utility-scale solar farms
   - Onshore wind farms
   - Offshore wind farms (coastal plants)
3. Repower as “thermal battery” energy storage plants
4. Partially repurpose (for example the district heat interconnect)
5. Combination of the above
A spectrum within the repowering options!

• **Full repowering**
  Brand new (or under construction) coal plants are repowered by high-temp heat sources in 2030s, including re-use of the full steam cycle, condenser cooling system, grid connection and all auxiliary buildings

• **Partial repowering**
  Modern coal plants (effectively less than 15 y/o) today are repowered re-using condenser cooling, grid connection and auxiliary buildings

• **Repurposing**
  The plant sites of old, already decommissioned or fully depreciated units are repurposed with low-carbon energy, in many cases including grid connection
Options for “full” repowering

1. Energy density and ability to use existing equipment and workforce suggests advanced nuclear and advanced high-temp geothermal repowering as main pathways

2. Repowering a large steam turbine with smaller reactor(s) or geothermal wells via a thermal energy storage interface introduces flexibility!
Summarized Example of a Parallel Process

1. Coal power plant
2. Repowering
3. Decarbonized
Repowering highlights

- **Global emissions-avoidance:** potential of up to 200 billion tons of CO₂
- **Job retention:** potential of up to 2/3rds of local plant work force
- **Just transition:** Long term investments and jobs in the communities that would otherwise suffer the worst local impacts from the energy transition
- **Cost savings:** Upfront cost savings of up to 35% compared to equivalent green-field projects (full repowering nuclear example)
- **Permitting:** No need for new sites, cooling water permits or power lines for new zero-carbon energy infrastructure – solving a main bottleneck
A solid and growing peer-reviewed research base
Learn more

https://www.repower.world

NEW (beta)

https://www.repowerscore.com