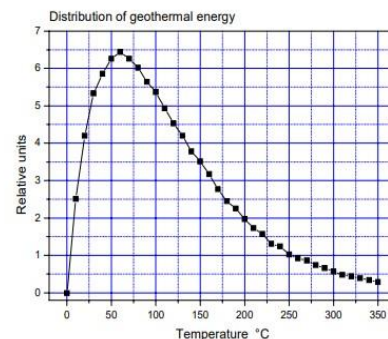
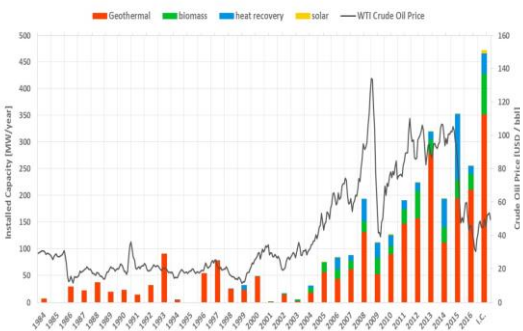


Sector Coupling of Geothermal ORC with LNG Regasification and Absorption Refrigeration

Akhil Kovattu Murali

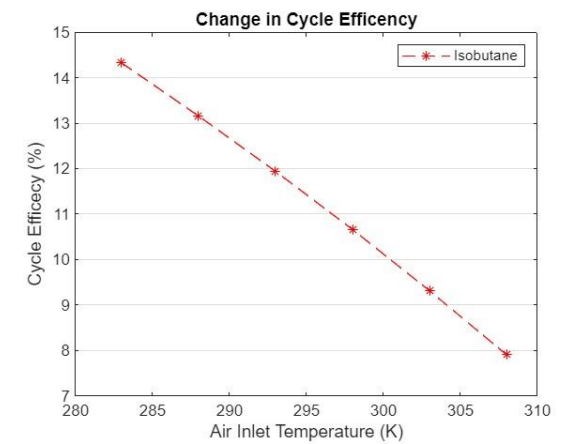
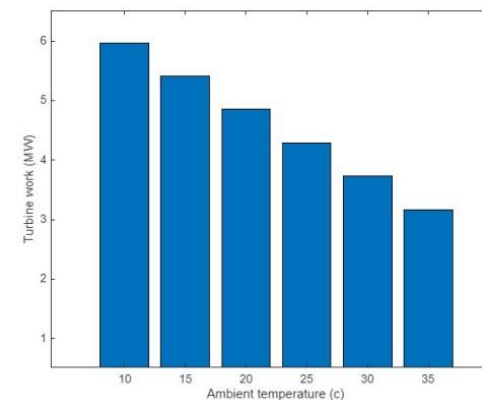
Future of Geothermal with ORC

- Most viable option to extract energy from low–medium enthalpy geothermal reservoirs.
- Highly relevant in geological setting of Germany
- ORCs plant construction is technically less challenging and can be installed as Turnkey.
- Less corrosion from geothermal brine due to its binary nature.



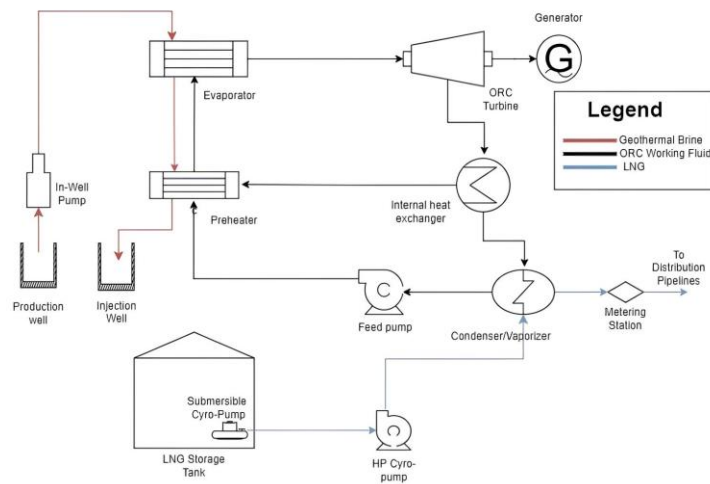
Performance loss from air-cooled condensers

- Condensation fluids is ambient air whose temperature is fluctuated throughout the year.
- Performance drop is observed when the ambient is increased especially during summer months.
- Noise pollution.
- Large area requirement.
- Require highest CAPEX for single component in ORC.



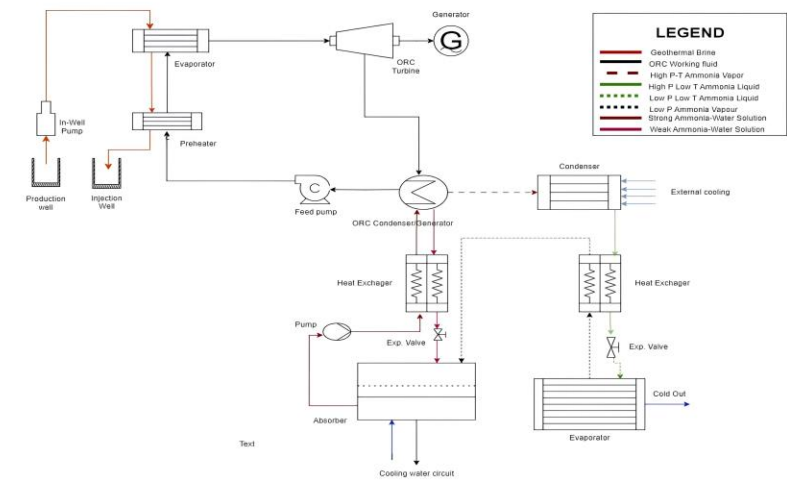
G-ORC coupled with LNG Regasification

- Cold energy stored in LNG during regasification is often wasted during regasification.
- LNG can be used as the fluid in a liquid cooled condenser to act as heat sink in G-ORC
- Increase performance parameters of G-ORC and improve efficiency of LNG regasification.



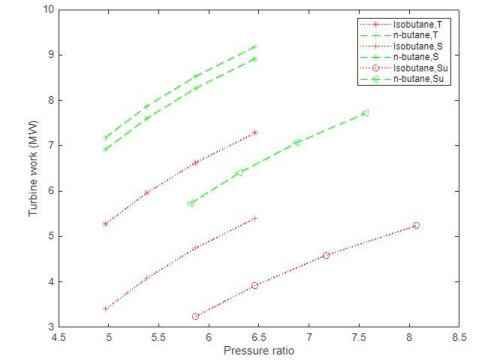
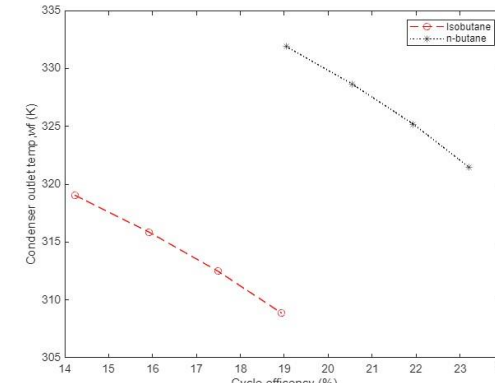
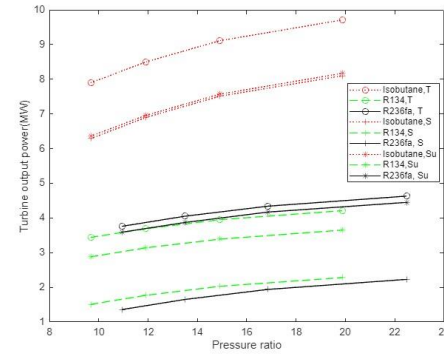
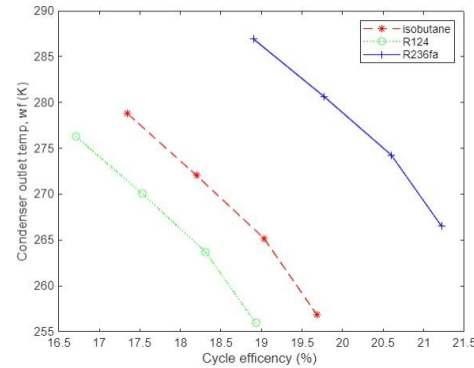
G-ORC with absorption refrigeration

- Exhaust heat from the ORC turbine can be used to power the absorption based refrigeration cycle.
- Aqua ammonia solution is used as working in the refrigeration cycle as well as ORC condenser.
- Proposes condensation of ORC working fluid and evaporation of ammonia solution simultaneously.
- Additional revenue can be generated through district cooling network.



G-ORC coupled with LNG Regasification

G-ORC with absorption refrigeration



Type	Output (MW)	Condenser area(m ²)	Payback period (Y)
ACC	4.85	256293.744	20
LNG	6.97	854	12
ABS	6.85	15093	8.5

