



3<sup>RD</sup> JULY 2024

# Novel Biofeedstocks using Geothermal Resources

PRESENTED BY  
Andy Blair



**“Doing cool stuff,  
with great people  
for the good of  
the world”**

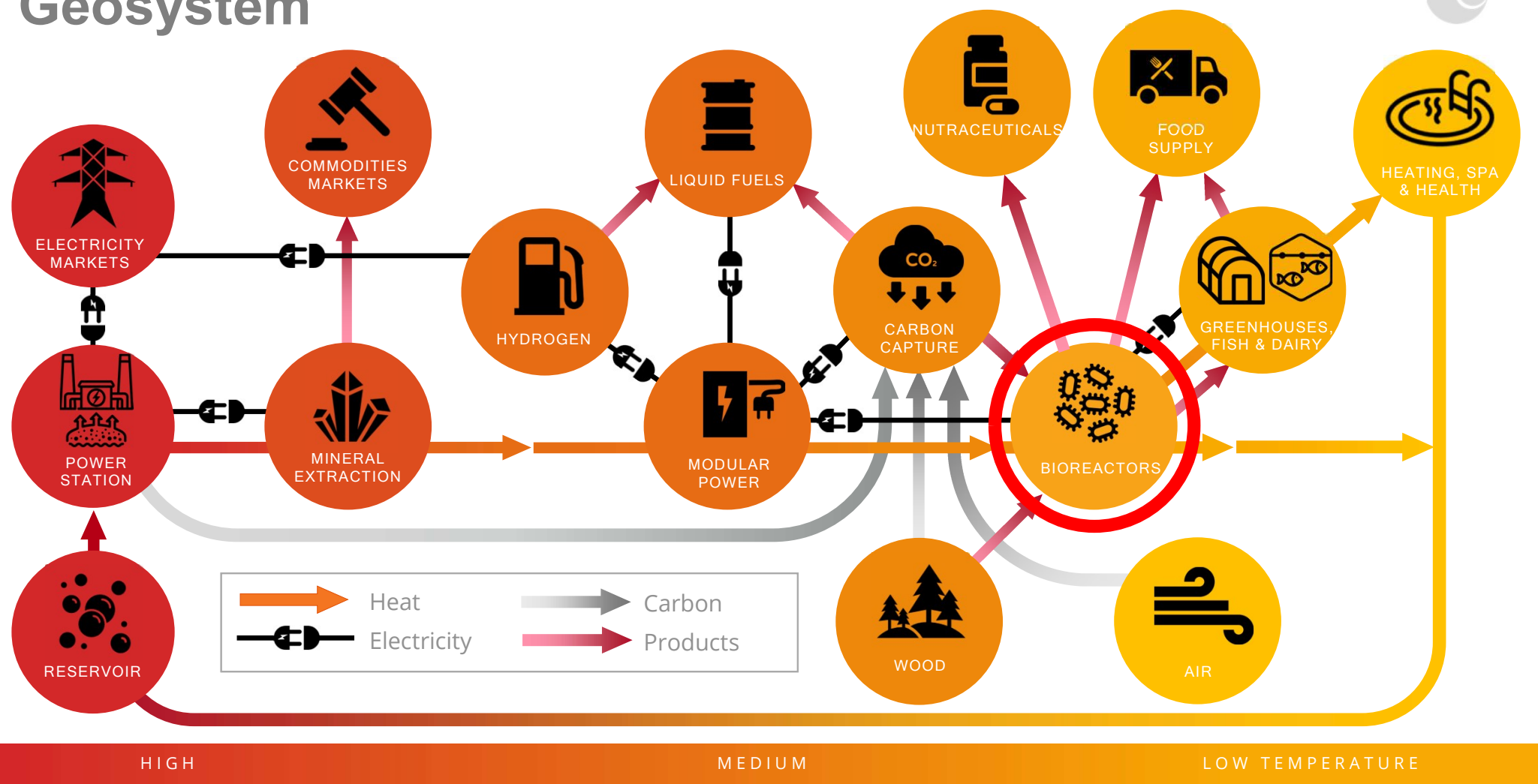
UPFLOW

# Workstreams



GEOTHERMAL

# Geosystem



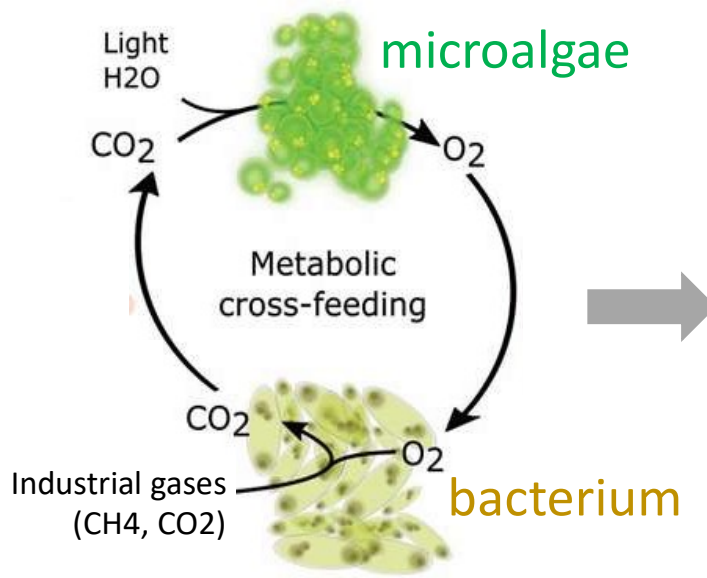
EXTREMOPHILES FEEDSTOCKS



# Extremophile Feedstocks Project (Xphiles)



# Extremophile Feedstocks

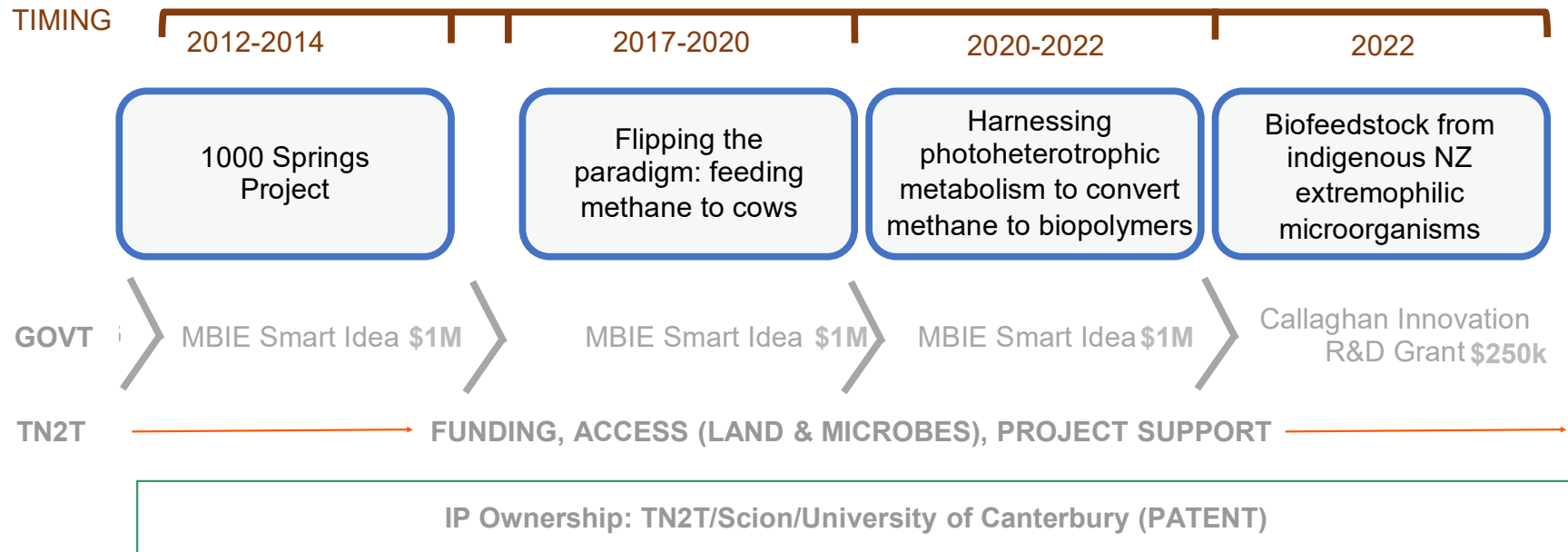


Develop a commercially-viable bio-feedstock suitable to supplement animal feed using local extremophiles sourced from Māori-owned geothermal ecosystems.

The microorganisms are grown on waste gas emissions from geothermal power-stations (e.g., methane, CO<sub>2</sub>).



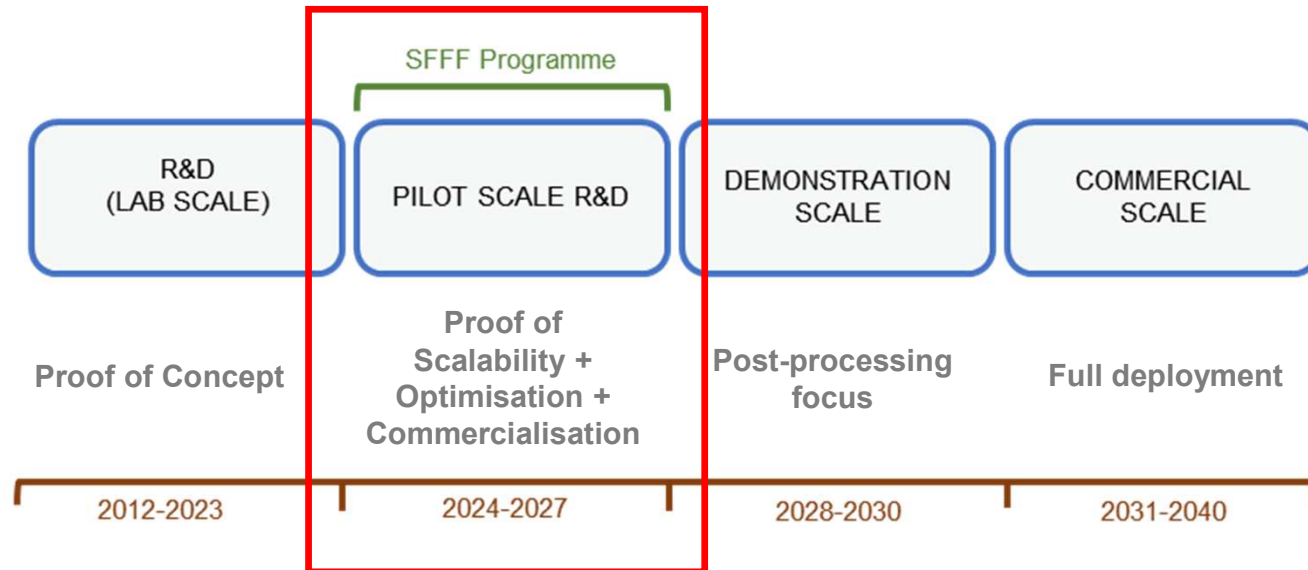
# R&D to Date







# Next...



**FUNDING ANNOUNCEMENT 1<sup>st</sup> July 2024**  
**MPI's Sustainable Food & Fibre Futures Fund \$2.5M (50% of project)**  
**Project Owner TN2T**



EXTREMOPHILES FEEDSTOCKS

# Project Team

**Owner:** Tauhara North 2 Trust (TN2T)

**Delivery Partner:** Upflow

**Funder:** Ministry for Primary Industries (MPI)

**Research Partners:** University of Canterbury,  
Cawthron, Scion

**Industry Partners:** Inghams Group, Dairy, Equine,  
Aquaculture



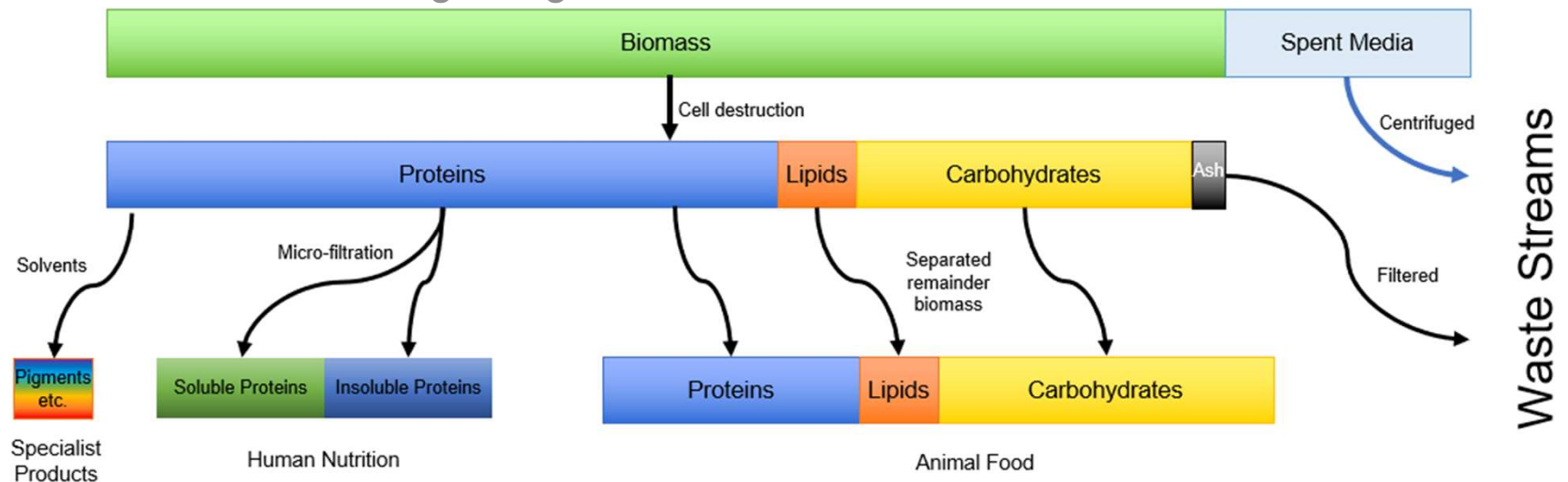
**Andrew Mitchelmore**  
Project Manager





# A New Biomass

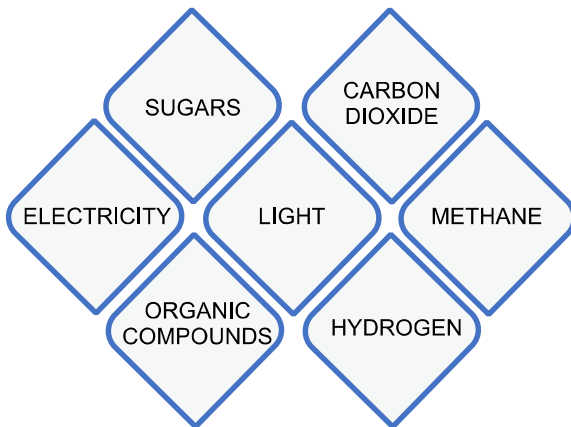
- Uses inputs readily available at a geothermal operation
- Consumes industrial greenhouse gases
- Produces a protein-rich (~60%) biomass (+other components)
- Resilience to protein market volatility
- Decarbonises food production (Scope 3 emissions)
- Creates new industry & employment
- Long-term alignment with TN2T aspirations
- NZ climate and economic target alignment



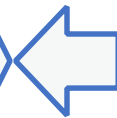
# Project Focus

- Optimise operating conditions and improving yields at pilot scale (1,000 L)
- Optimise the processing technology (for cost, efficiency, and quality)
- Customise the biomass output (by tweaking inputs and process conditions)
- Align the product with the most suitable market (to maximise commercial return)
- Work through regulations
- Develop the commercial pathway

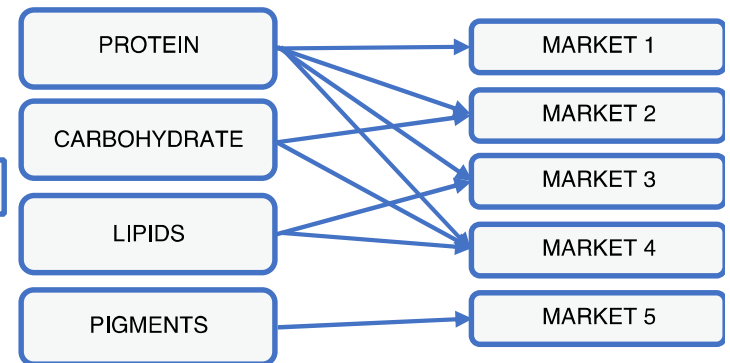
## Process Inputs



OPTIMISE  
PRODUCT  
PRICE  
POINT

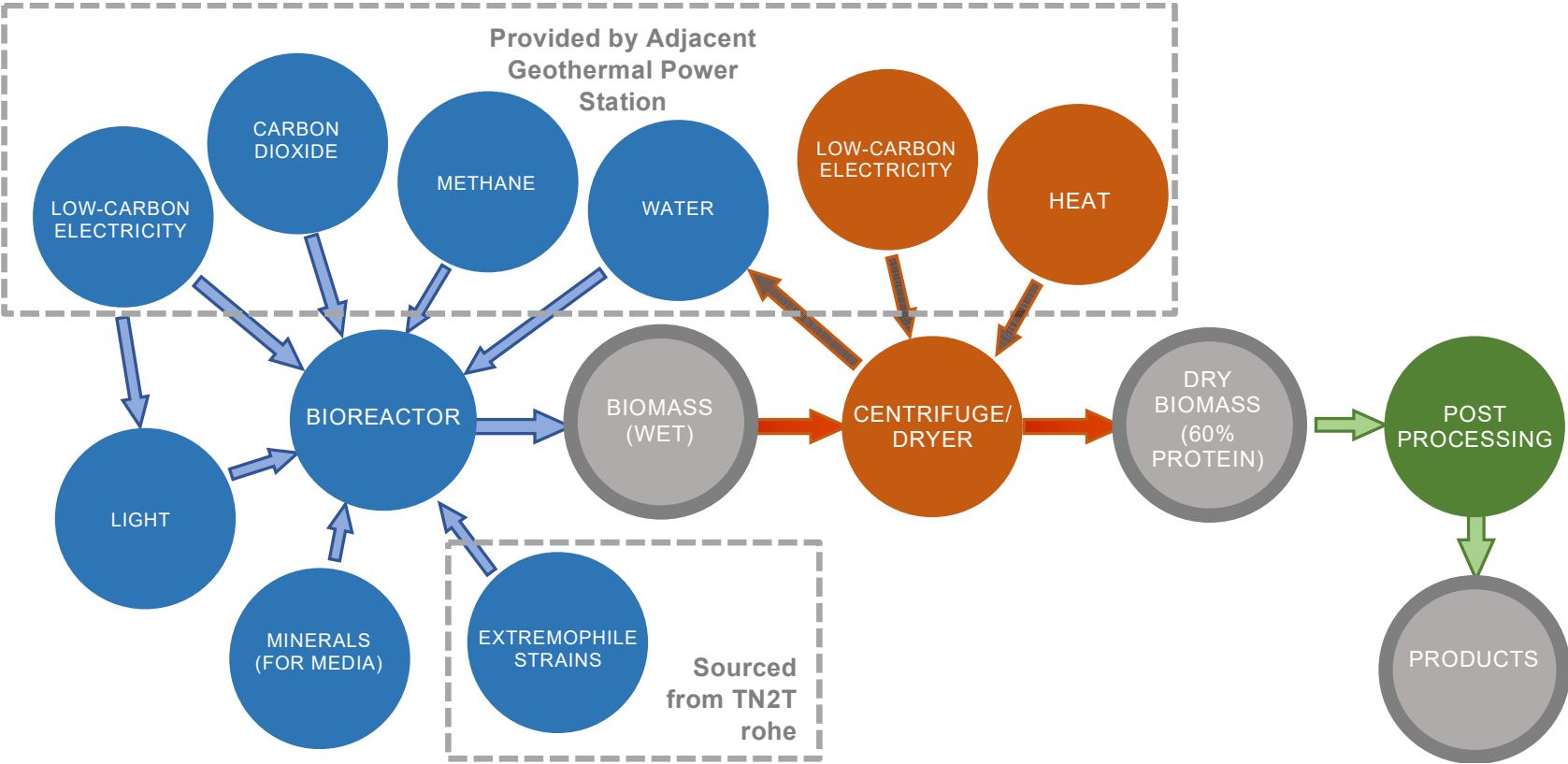


## Product-Market Fit



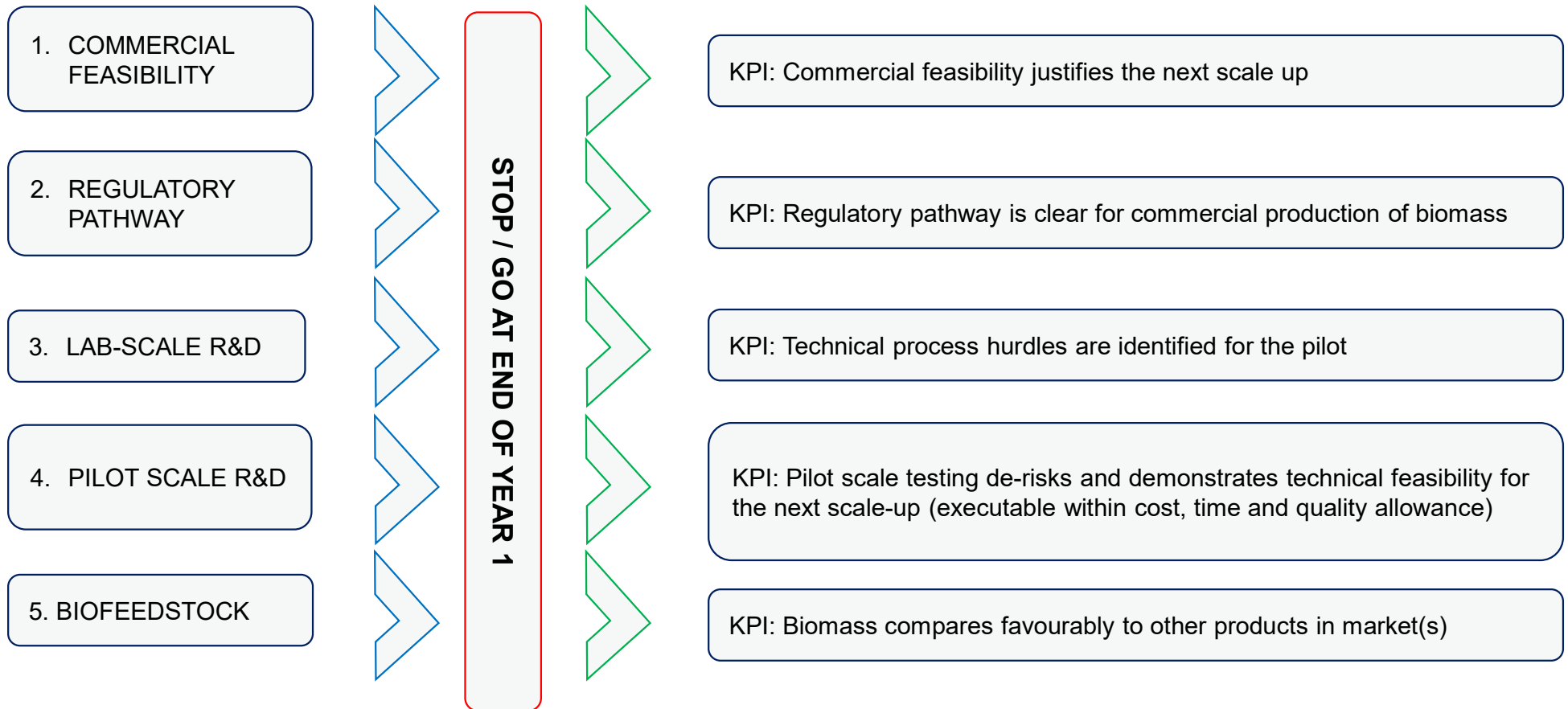


# Process Overview





# Project Design & Risk Management







**First-in-world** to couple the production of a biofeedstock with geothermal waste gases and geothermal-sourced microorganisms

**Scientists—  
because  
engineers  
need  
heroes too.**

