Poster Number 15

Project: Solar Updraft Power Plant

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SOLAR UPDRAFT POWER PLANT

WE DESIGNED — A laboratory-scale plant

WE OPTIMISED — The CFD & dimensions

WE MODELLED — A cost & structural analysis

HERE'S HOW IT WORKS

1. Air inside the **collector** inlet is heated by greenhouse effects.
2. Cool air enters the collector under a translucent **canopy**, the density falls in proportion to the temperature difference.
3. A continuous updraft causes hot air to rise inside the **chimney** due to the buoyancy pressure difference.
4. A turbine is set in the path of the airlow converting the kinetic energy in the flowing air into electricity.

THE PROBLEM

- Low cost-efficiencies compared to Solar PV.
- Lack of optimisation: huge capital costs for concrete SUPPs.
- Is it technically feasible to 'scale-up' a plant that large?

THE SOLUTION

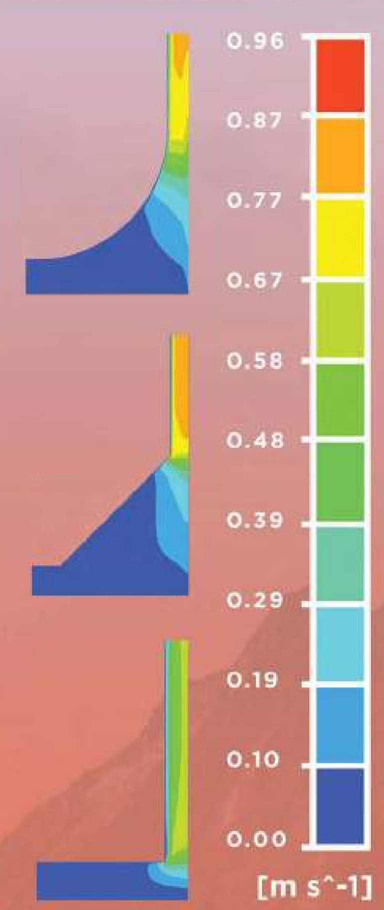
- Designing a range of small-scale prototypes.
- Identifying optimised configurations using modelling techniques.
- Studying the structural integrity of large, inflatable fabric solar chimneys.

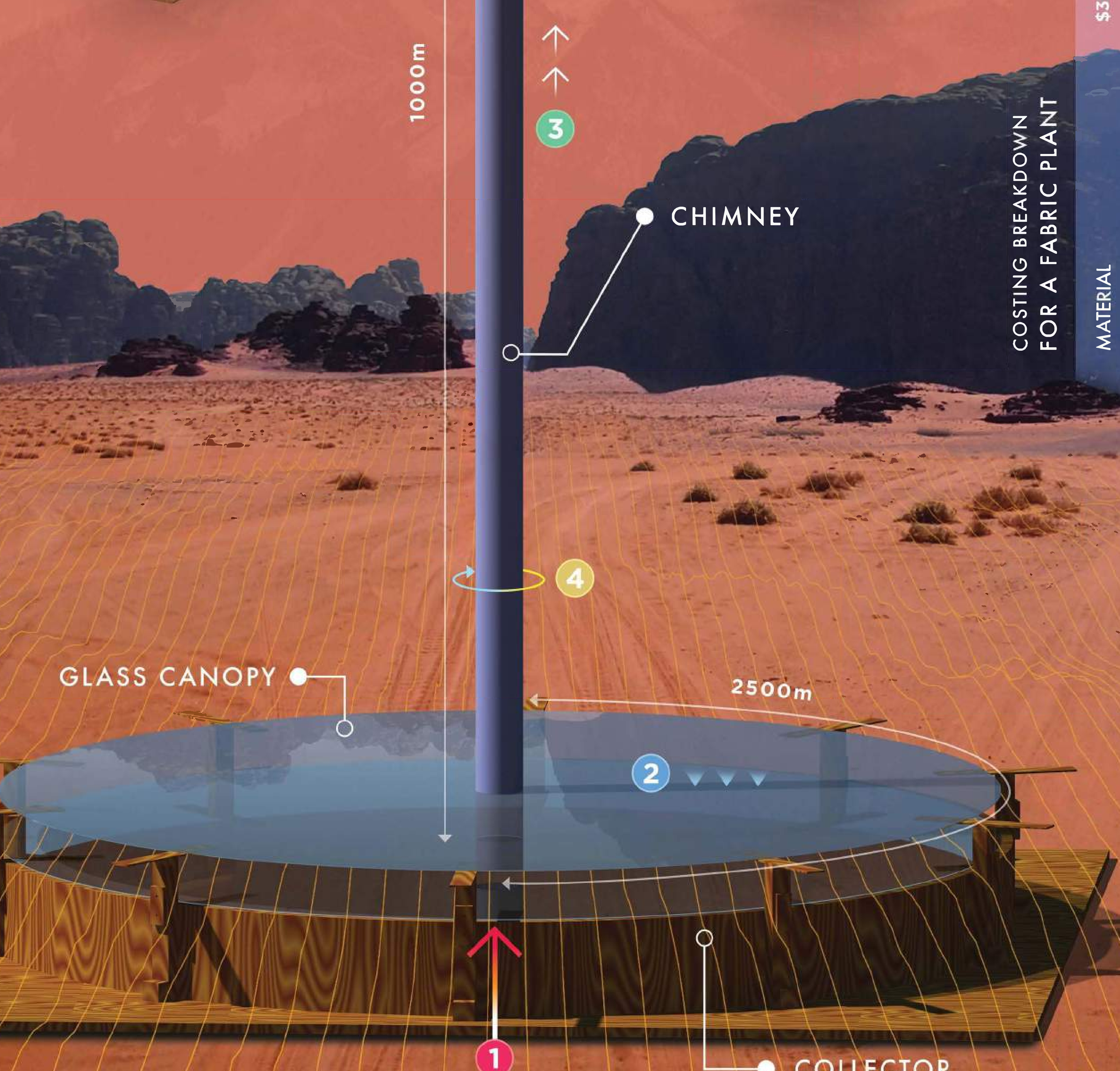
THE INNOVATION

- Longer operating times and boosted efficiency when using water storage.
- Altering the collector angle boosting the performance.
- Structural testing on 2-meter inflatable fabric prototypes.

THE OPTIMISATION

- Filleted & chamfered edges increase air velocity by **20%**





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