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## CABLE SOLAR: Small Unit Aerostat for Solar Generation

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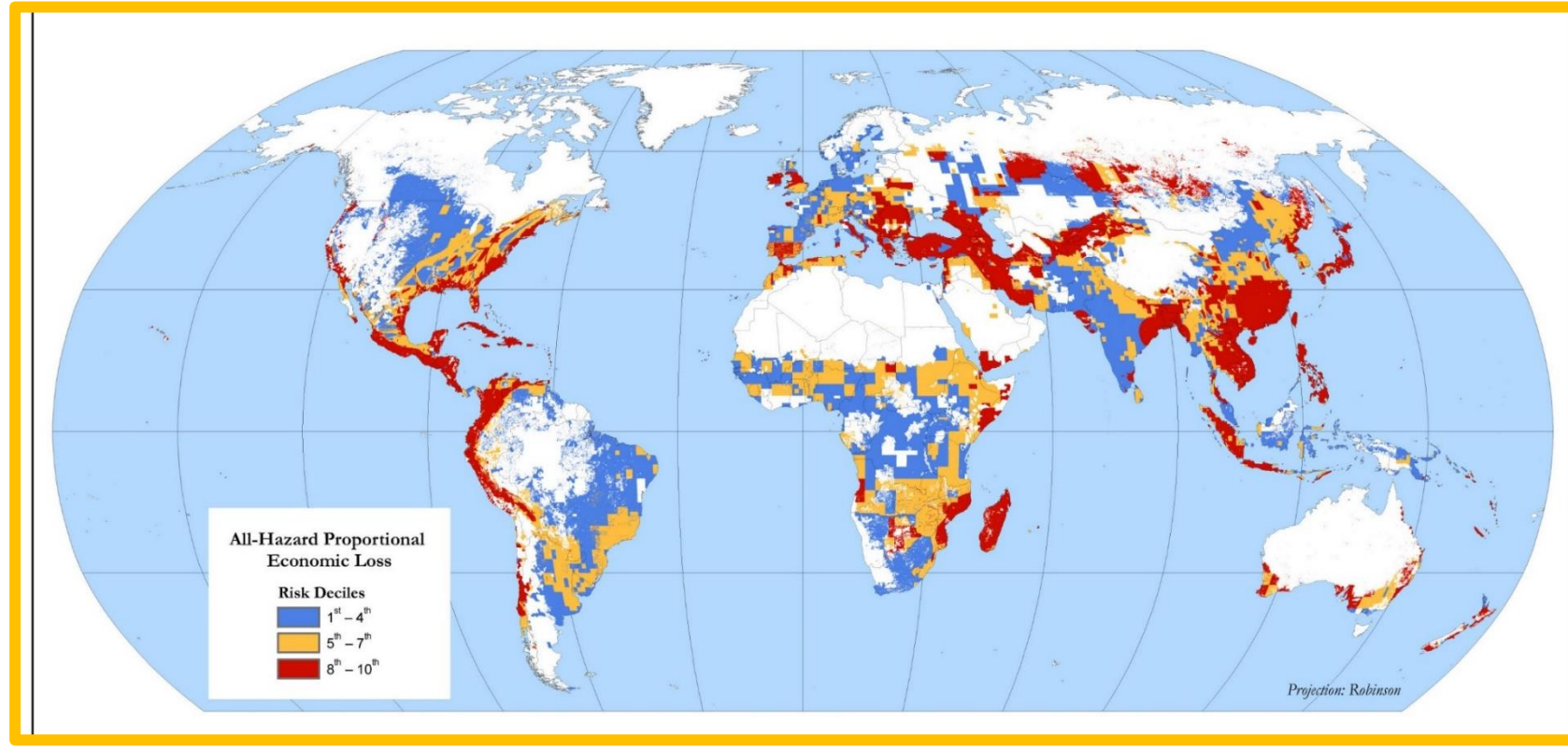
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# CABLE SOLAR: Small Unit Aerostat for Solar Generation

## ADVANTAGES OVER DIESEL GENERATORS

- Autonomous system
- Sustainable energy source
- Fast deployment and setup
- Ability to function in an off-grid/remote area
- No carbon emissions



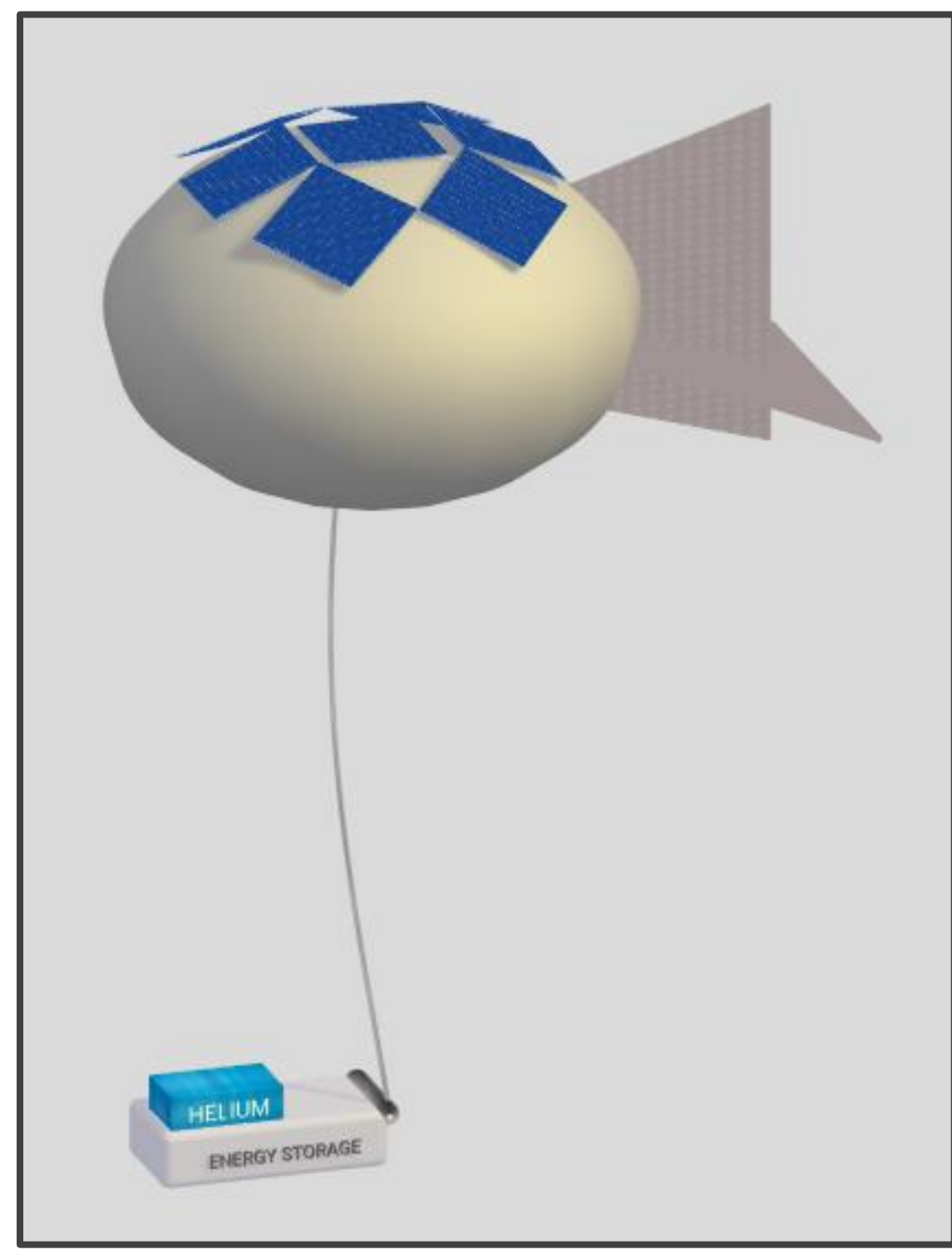
Multi-hazard areas with high risk around the globe  
Natural Disaster Hotspots: A Global Risk Analysis. Washington D.C. World Bank, 2005

## APPLICATIONS

- Natural disaster relief
- Communities in remote areas
- Autonomous surveillance system
- Weather data gathering

## MAIN PARTS

- Envelope/balloon stabilized
- Solar cells integrated using a net
- Tether for transmission of electricity
- Energy storage / Battery
- Trailer equipped with winch and helium tank



## TECHNICAL DATA

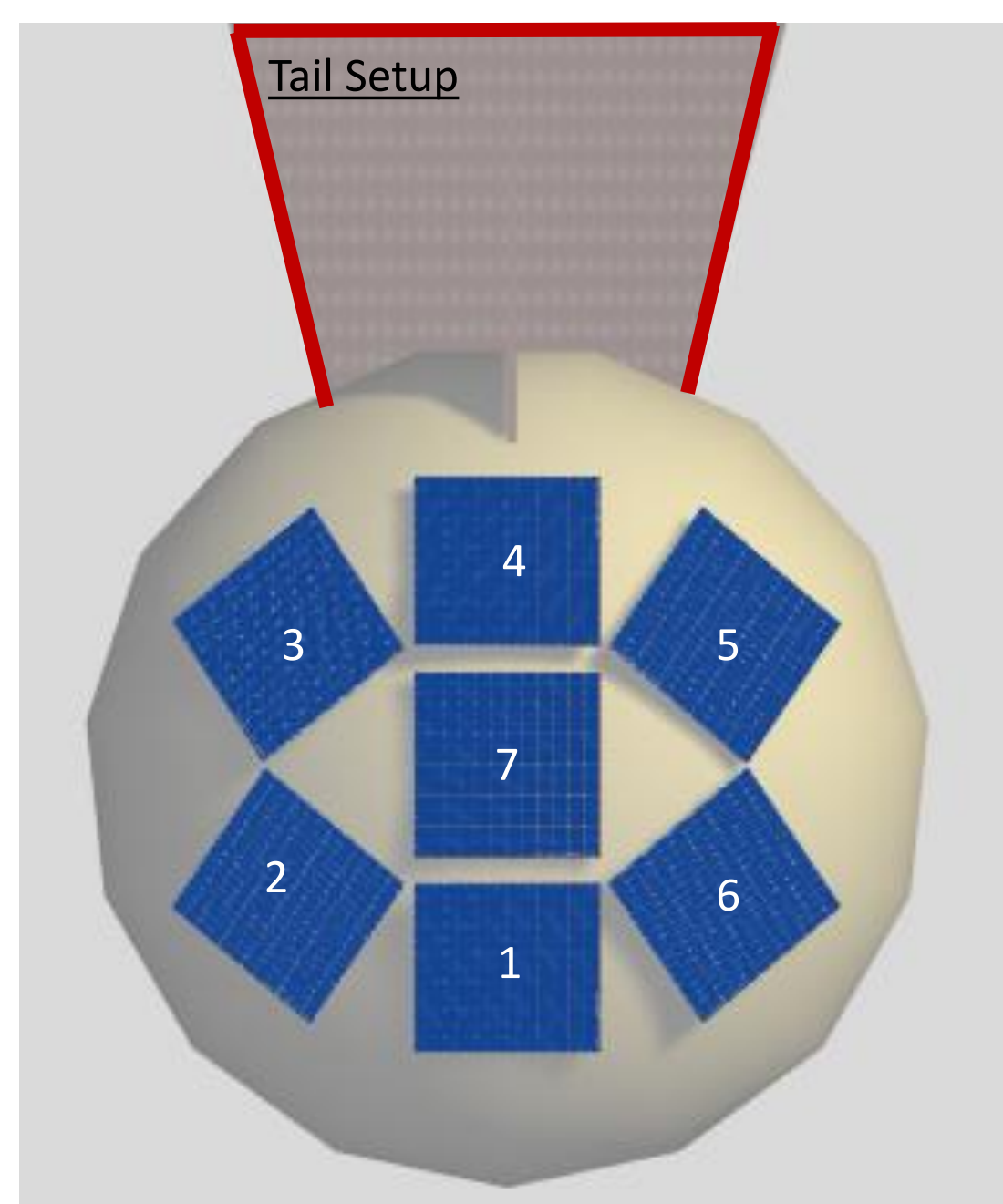
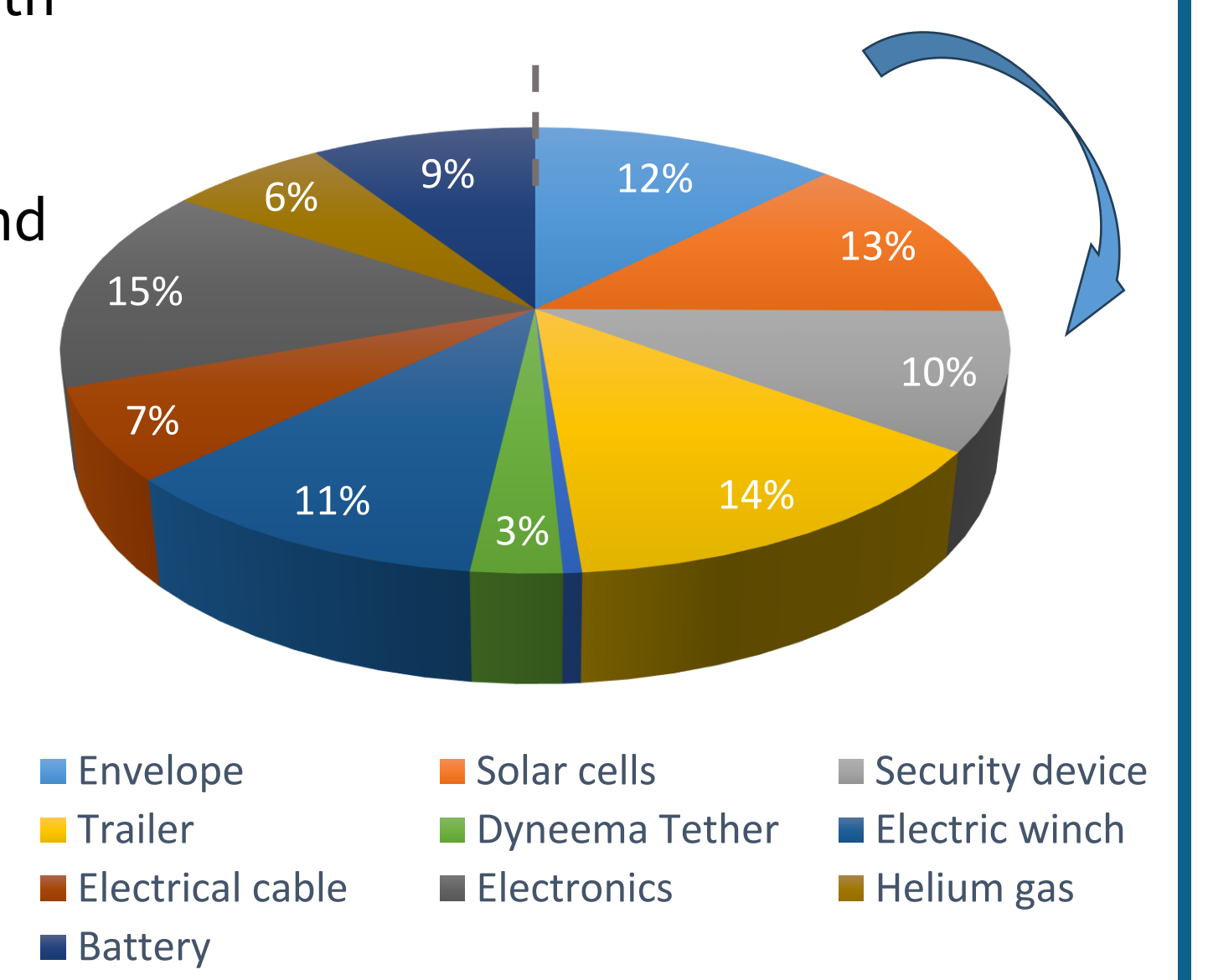
- Operational altitude of 150-300 meters
- Balloon volume of 30-60m<sup>3</sup>
- Payload between 5-10 kg
- Flexible CIGS solar cells (Solar Cloth data)



## ECONOMIC CORNER

- In 2023, 568000 people were left homeless with no access to electricity
- In the US, power outages cost business around \$150 billion yearly
- The diesel generator (direct competitors) market is projected to have a size of 26.09 billion USD by 2029
- CAPEX estimated at around 22900 €
- OPEX over 10 years, is 15000 €
- LCOE "Levelized Cost Of Electricity" 3,86 €/kWh

### Cost Breakdown by Parts

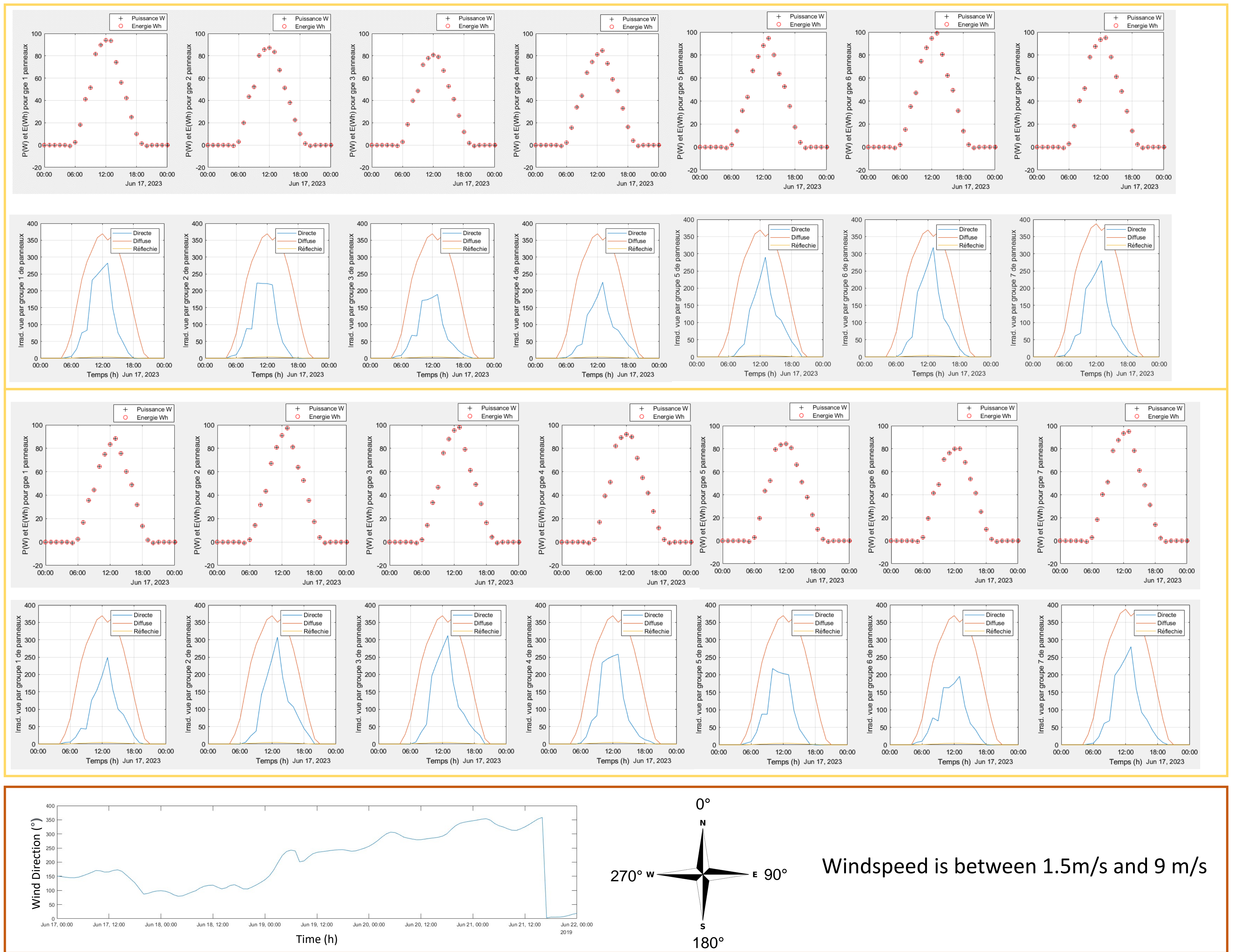


- 2 different cases**
- Fixed aerostat facing South (without kite)
  - Aerostat facing wind (with kite)

- Main Results for Solar simulation**
- The data was chosen for June 2023, direct radiation is dominant
  - Except group n°7, all cells have a 25° tilt with respect to the horizontal.
  - Very similar energy performance either constantly facing south or aligned with the wind
  - May be better to have the balloon aligned with the wind, for a more uniform degradation between panels

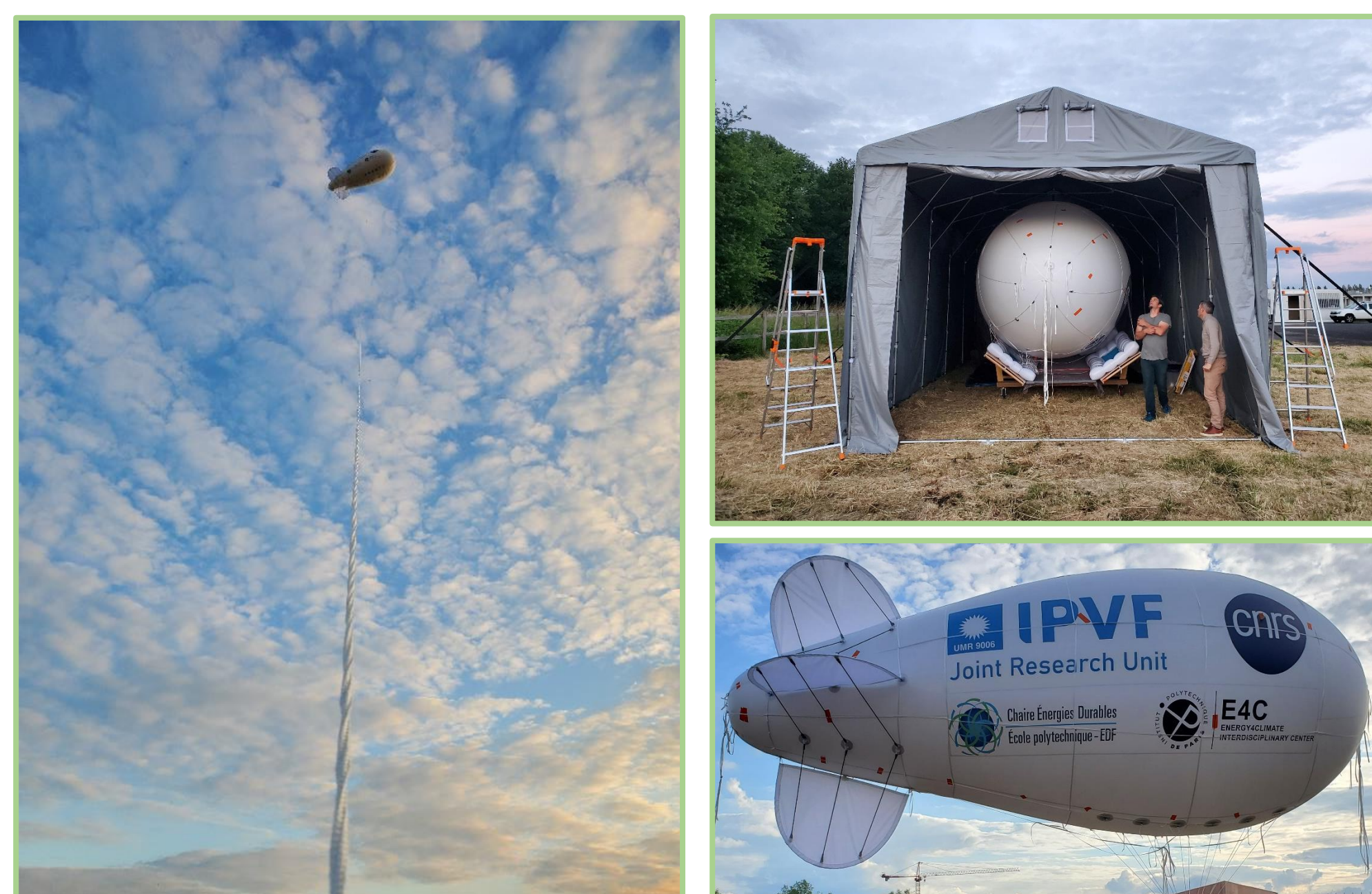
Fixed Direction Pointing South

Direction aligned with the wind



## PROSPECTS

- First demonstration at **SIRTA Flying Campaign in June 2024!**
- Irradiance data measurements with characterization of solar cells integrated to the balloon in progress.
- Electrical transport and storage using Li-ion battery is planned in a near future.



### Possible Aerostat Partnership

- Aerophile
- Helikite
- Altaeros
- A-NSE

### Acknowledgments and Funding

