



FAMU-FSU
College of
Engineering

Solar Wind Generator **VDR 1**

Team 303 10/20/2023



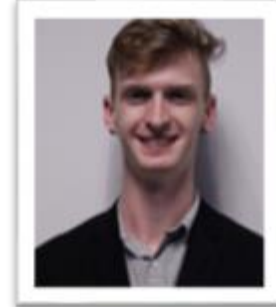
Team Introductions



William Touza
- *Team Lead*



Andrew Putnam
- *Technical Lead*



Tristan Witkowski
- *CAD Designer*



Alberto San Segundo
- *CAD Designer*



Brandon Ortiz
- *Treasurer*



Carlos Vilarino
- *Documentation Specialist*

Sponsor and Advisor

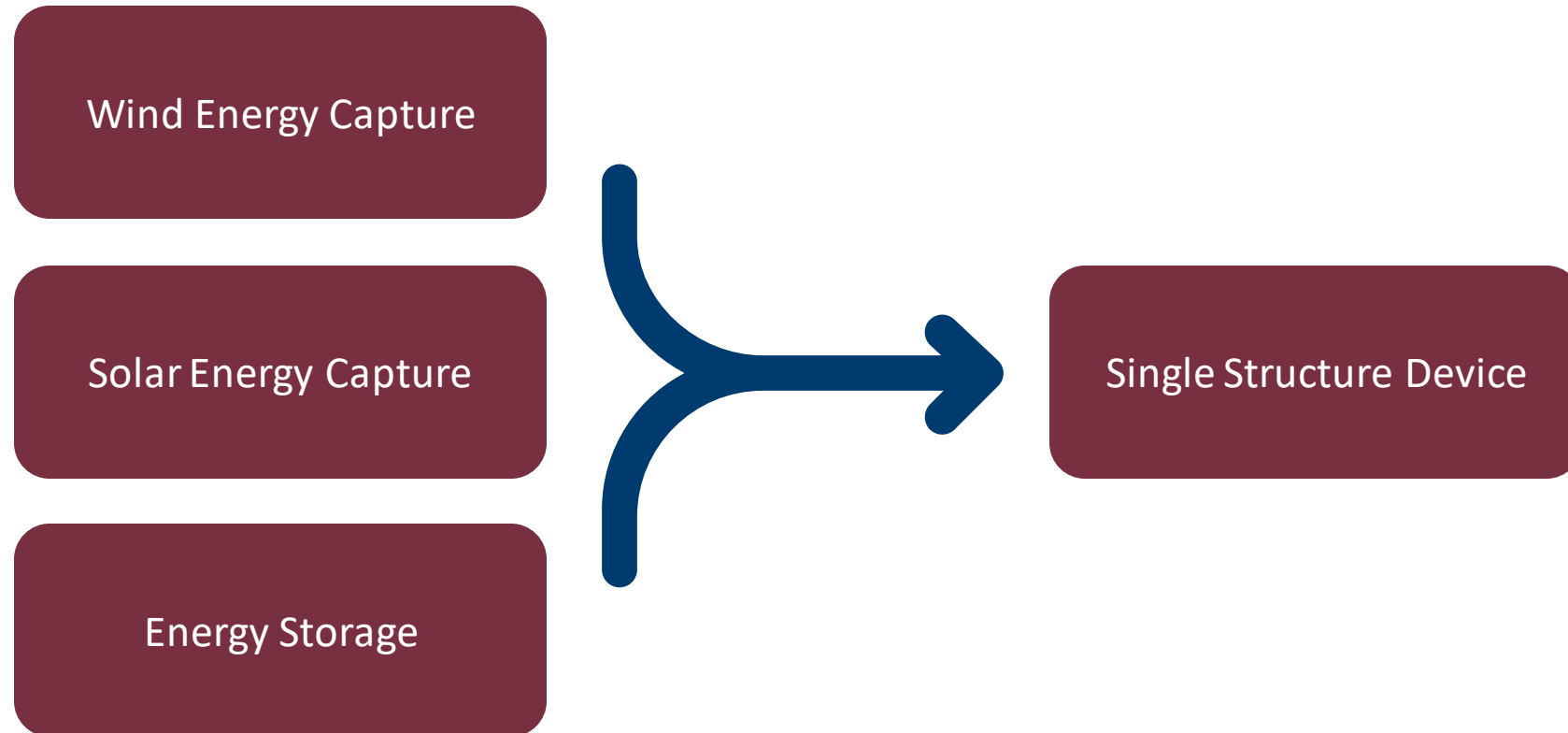


Bruce Morrison
-Sponsor



Dr. Simon Foo
-Advisor

Project Objective



Project Scope

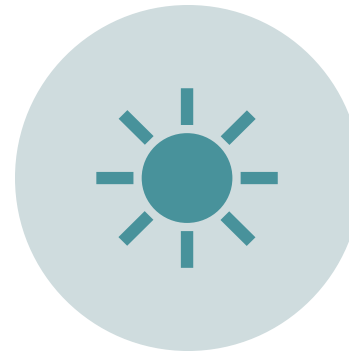
Key Goals



SUPPLY 100W



SEMI PORTABLE



HARNESSES SOLAR
AND WIND ENERGY

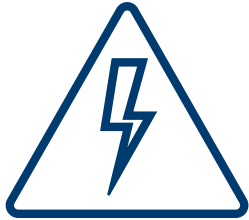
Assumptions

Device will be placed outside

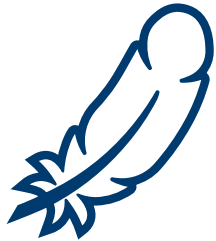
Sufficient solar and wind energy provided

Proper usage of the device is expected

Technical Challenges



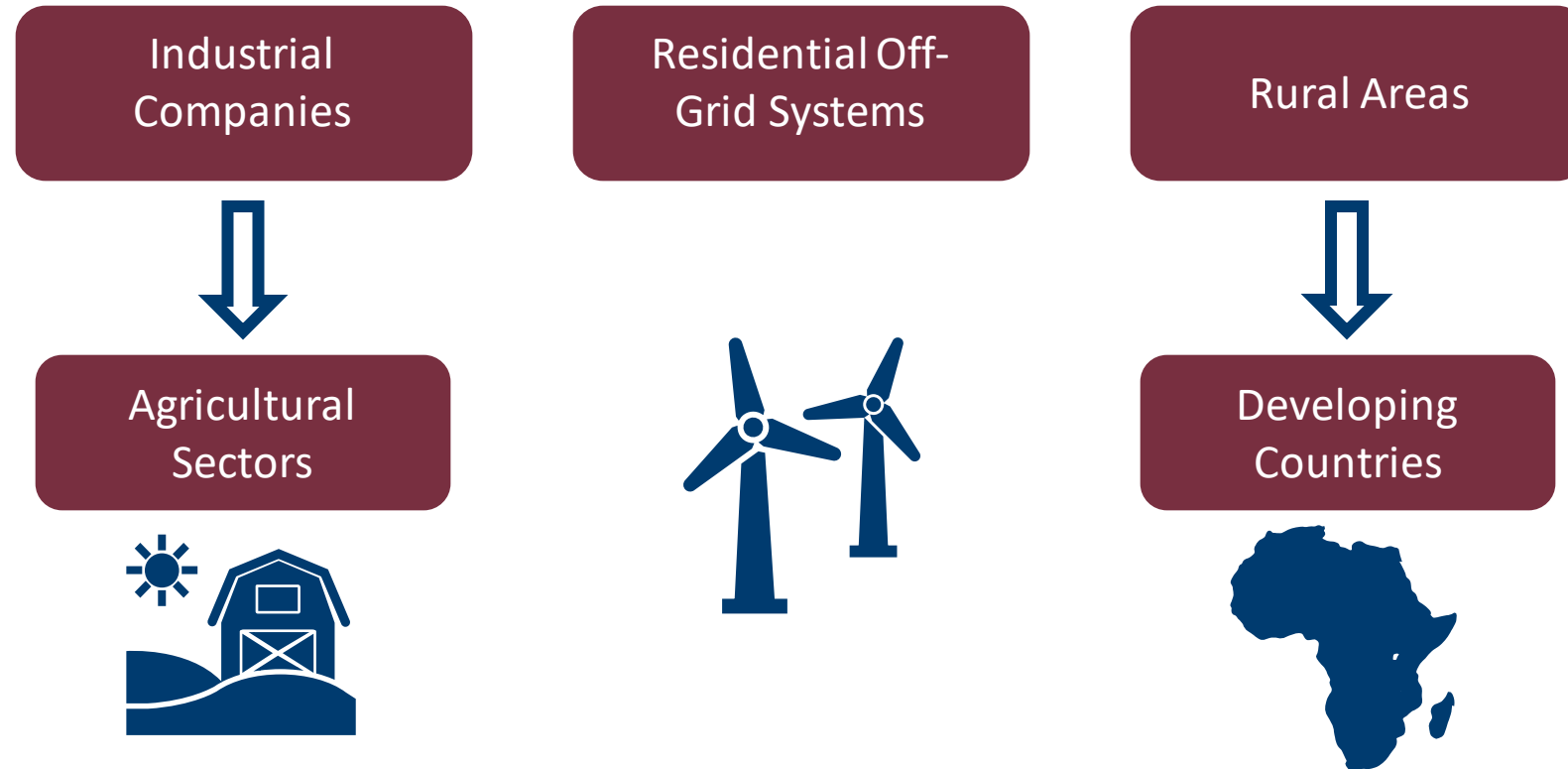
Designing a device that can capture both wind and solar energy efficiently



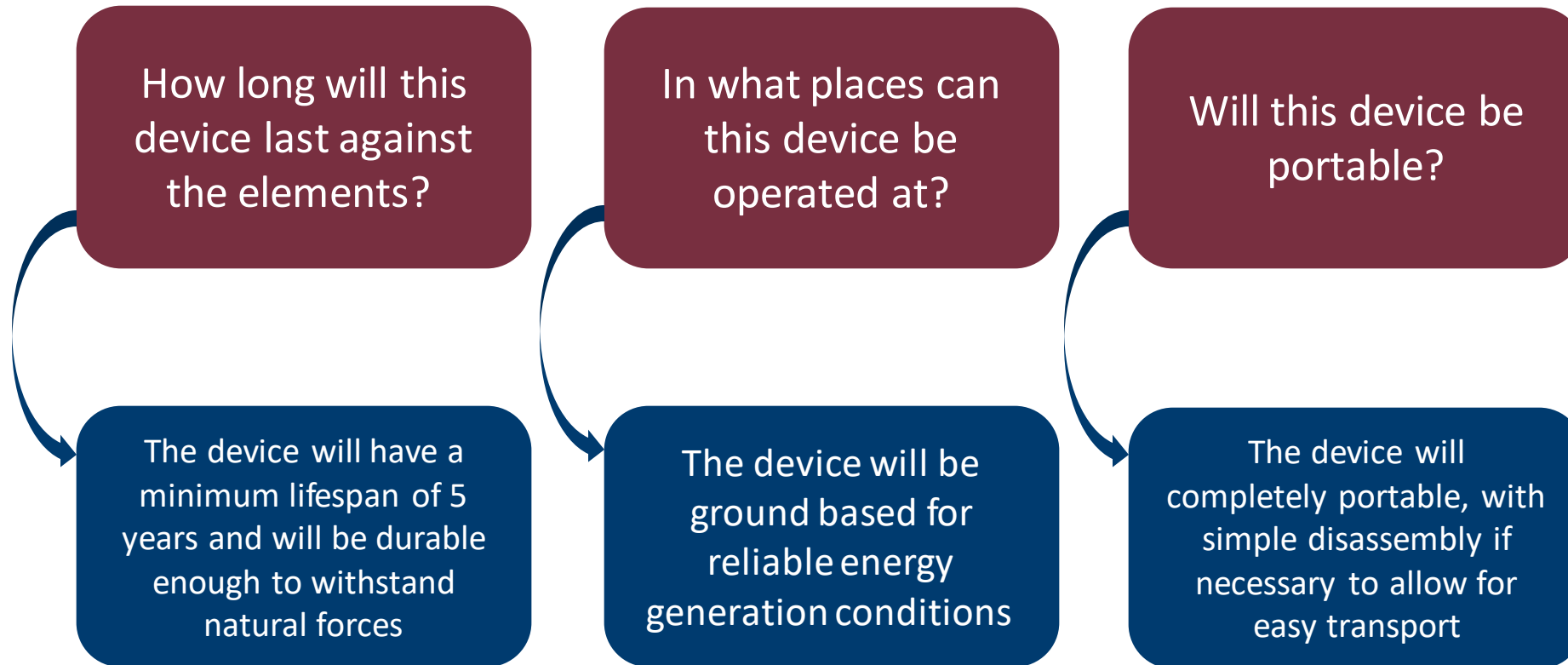
Creating a structurally sound device that is also portable

Project Background

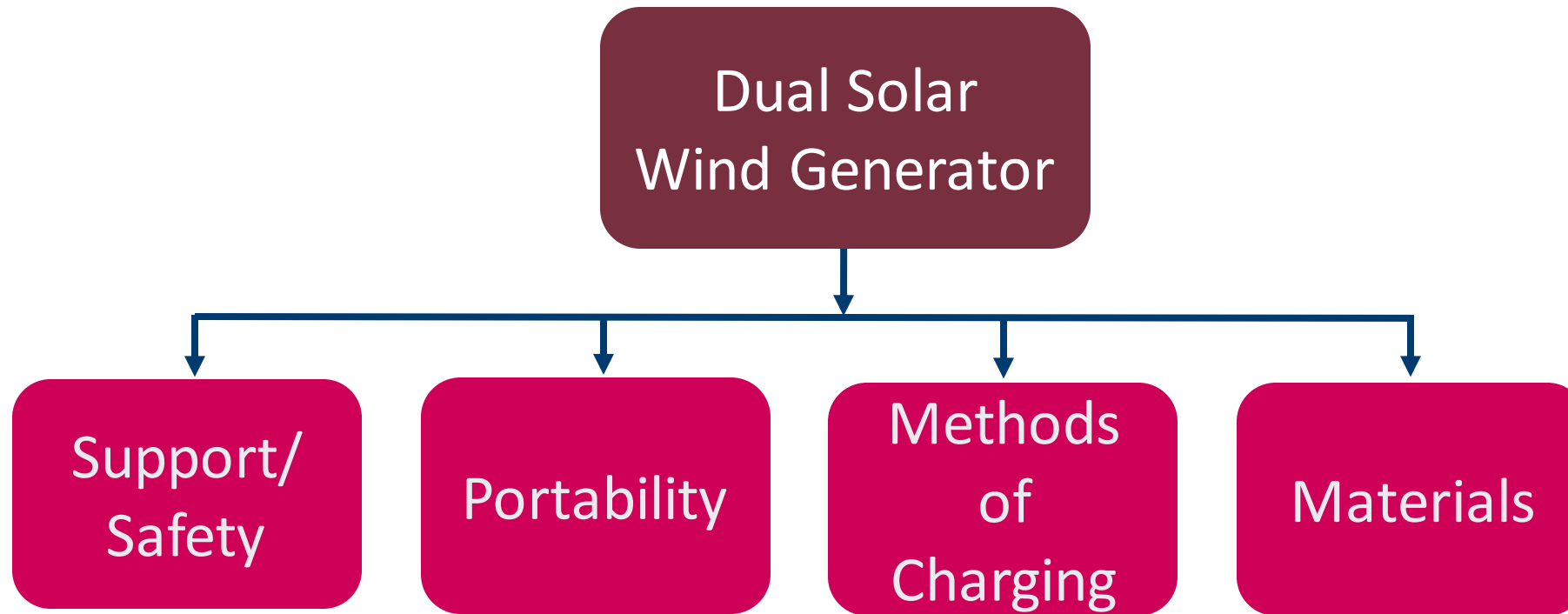
Expected markets



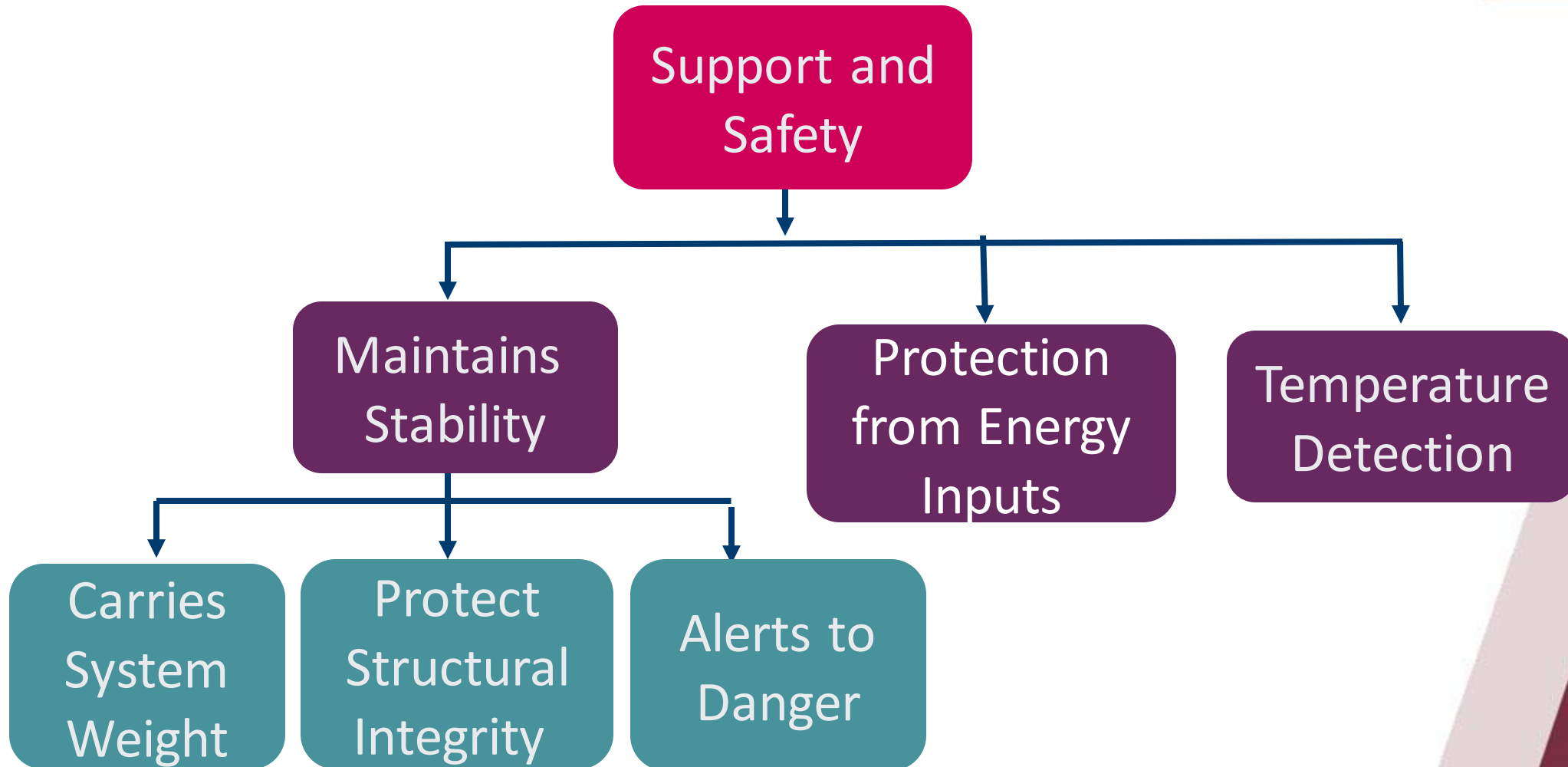
Customer Needs



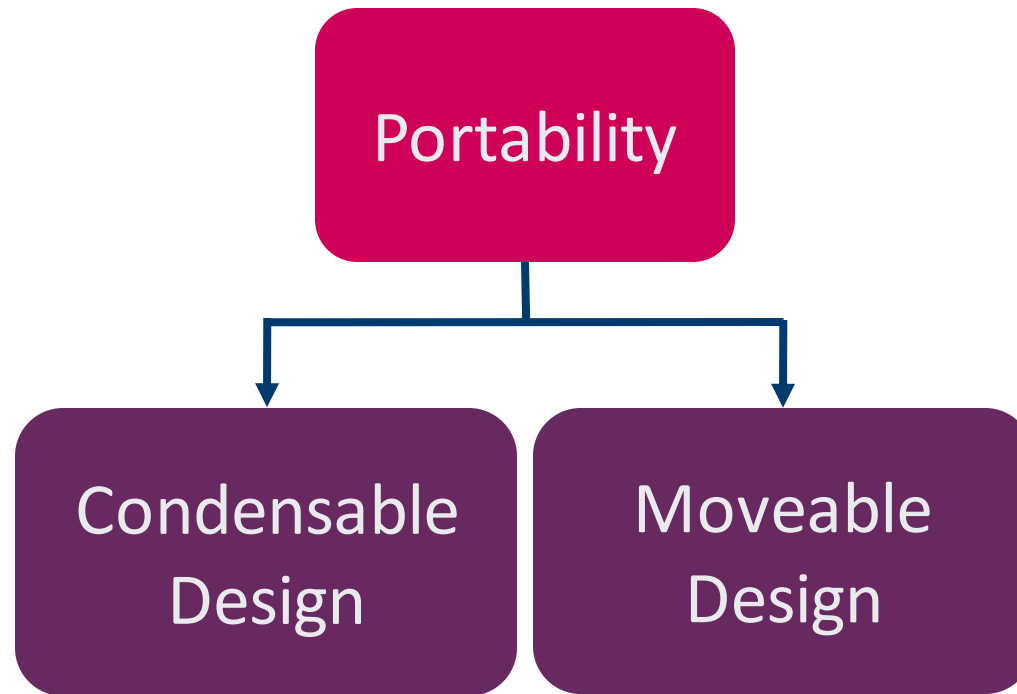
Functional Decomposition



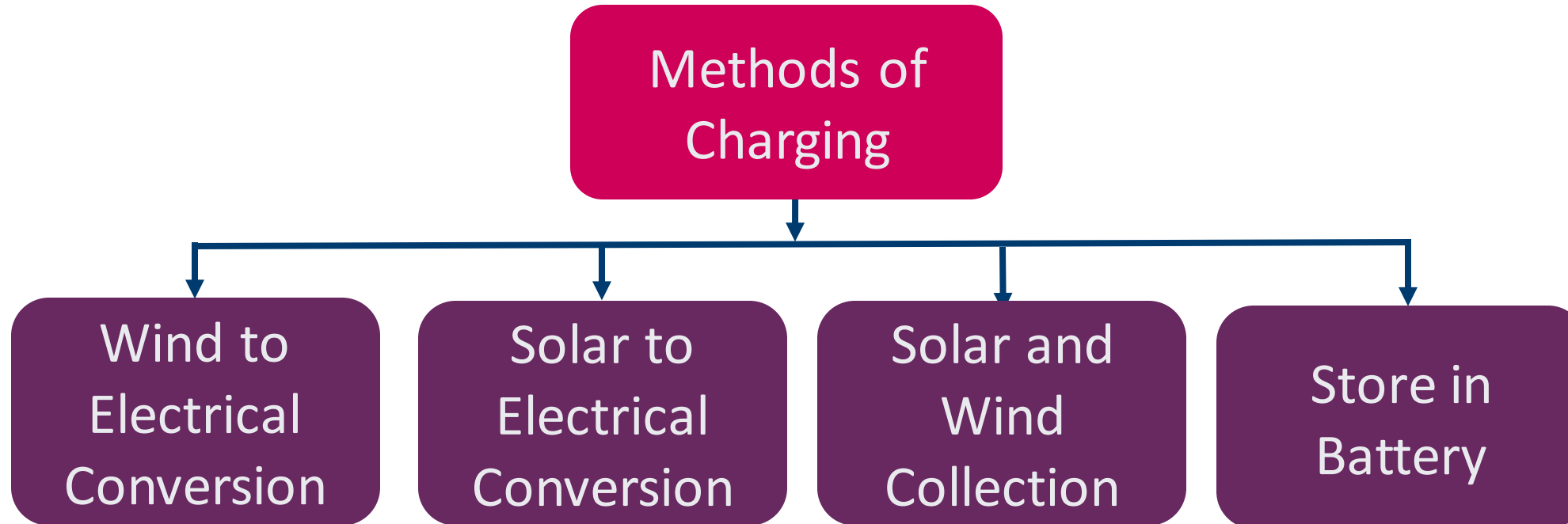
Functional Decomposition



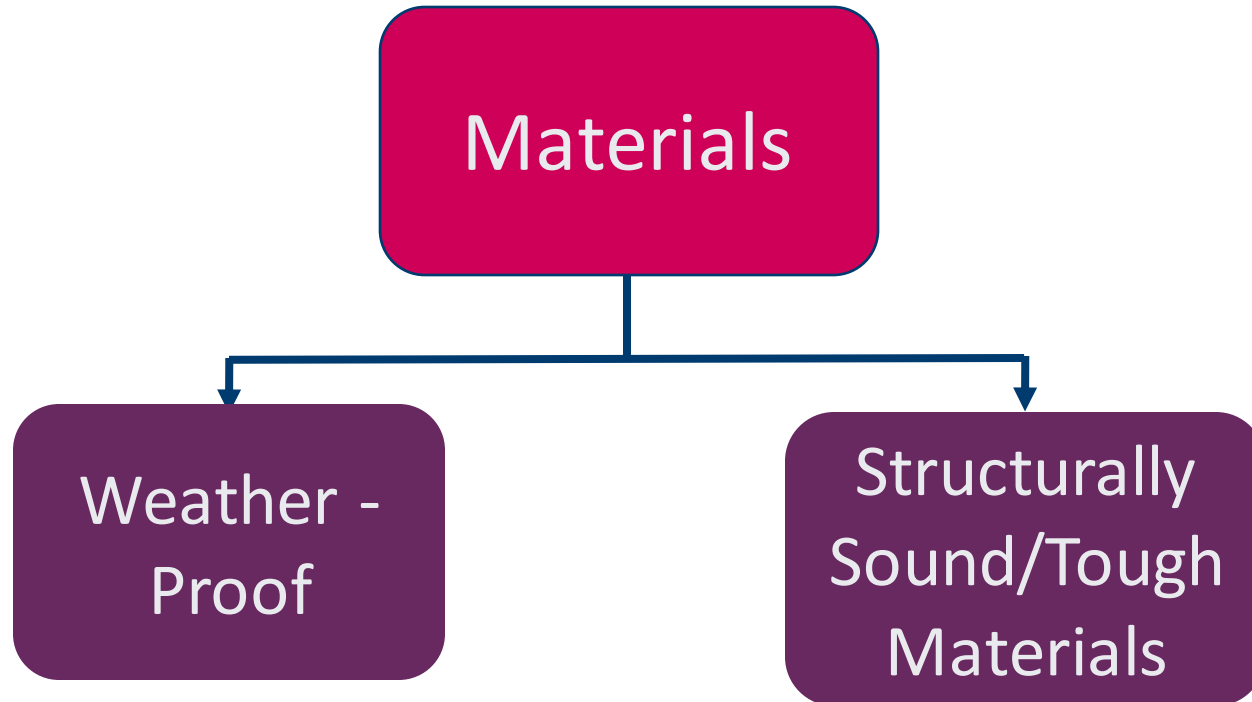
Functional Decomposition



Functional Decomposition



Functional Decomposition



Up and Coming



Solar Energy Capture Options



Solar Photovoltaic

Advantages

- Cost Efficient
- Season independent
- Durable

Disadvantages

- Space consuming
- Sunlight dependent



Solar Thermal

Advantages

- Space-Efficient
- Energy Storage

Disadvantages

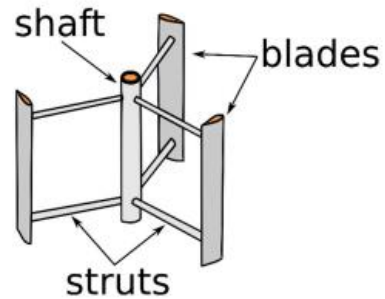
- Seasonal Dependence
- Short Lifespan
- Only works well with water heating solutions

Wind Turbine Options

Vertical Axis Wind Turbines (VAWTs)

Lift based capture

Drag based capture



[1]: *Darrieus Turbine*



[2]: *Savonius Turbine*

Horizontal Axis Wind Turbines (HAWTs)

Lift based capture



[3]: *Horizontal Axis Turbine*

Alternative Wind Energy Options

Kite Type Design

Kite with Pulley

Alternative Turbines

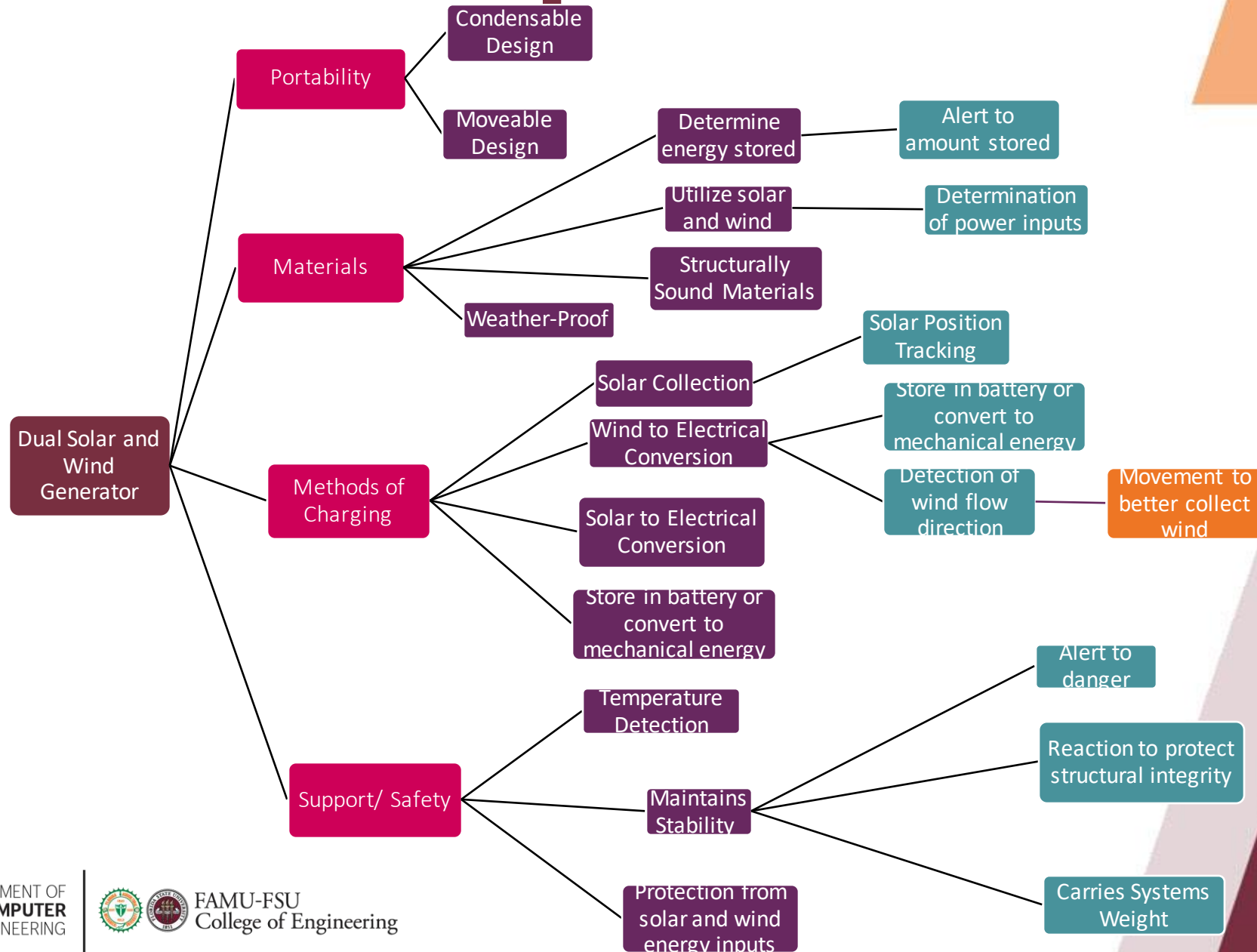
Oscillating Bladeless
Wind Generator

Questions?

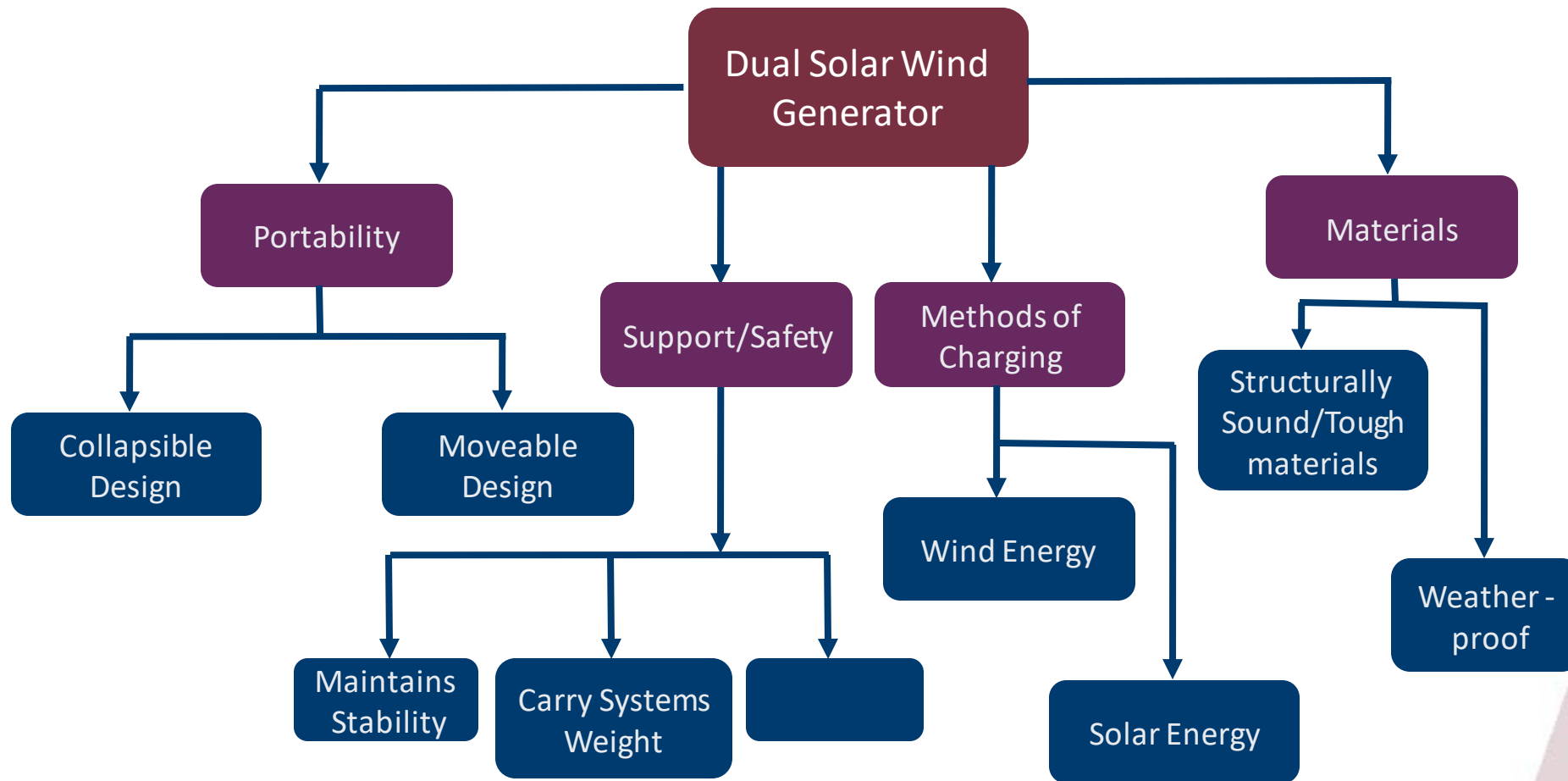
Backup Slides



Functional Decomposition



Functional Decomposition



Sources

- [1] Rogowski, “CFD computation of the H-Darrieus Wind Turbine—the impact of the rotating shaft on the rotor performance,” *Energies*, vol. 12, no. 13, p. 2506, 2019. doi:10.3390/en12132506
- [2] S. S. Ajarostaghi, S. S. Mousavi, and C. Bhojaraju, “Numerical Analysis of Double Stack blade savonius wind turbine with secondary blades,” *IOP Conference Series: Earth and Environmental Science*, vol. 1149, no. 1, p. 012006, 2023. doi:10.1088/1755-1315/1149/1/012006
- [3] R. Pereira, G. Schepers, and M. D. Pavel, “Validation of the beddoes–leishman dynamic stall model for horizontal axis wind turbines using Mexico Data,” *Wind Energy*, vol. 16, no. 2, pp. 207–219, 2012. doi:10.1002/we.541