



POWER GENERATION IN DEVELOPING COUNTRIES

Savonius Rotary Battery Charger

THE CLIENT

Municipal Governments of Developing Countries

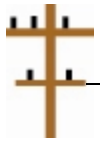
Humanitarian Relief Organizations

THE NEED

130 Watt Off-Grid Car Battery Charging

- 12V 36Ahr battery
- 3 hour charge time
- throughput: 3-4 batteries per day
- renewable energy source
- target cost: \$600 per unit
- less than \$5 per charge to customer

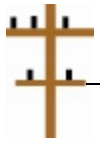




Savonius Rotary Battery Charger

- Environmental Conditions
 - Wind Speed
 - Average 7 to 10 mph inland
 - Average 10 to 15 mph coastal
 - Maximum: 35 mph
- Requirements
 - Startup speed: 3 mph
 - Elevated turbine





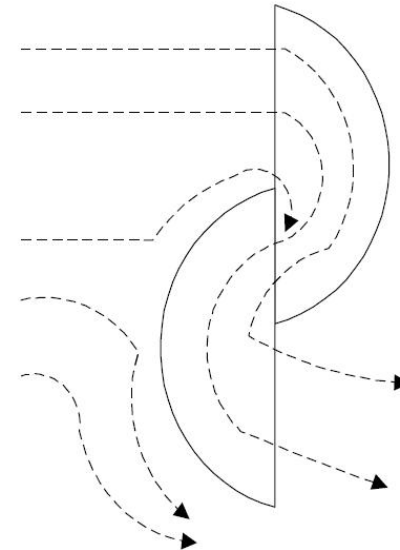
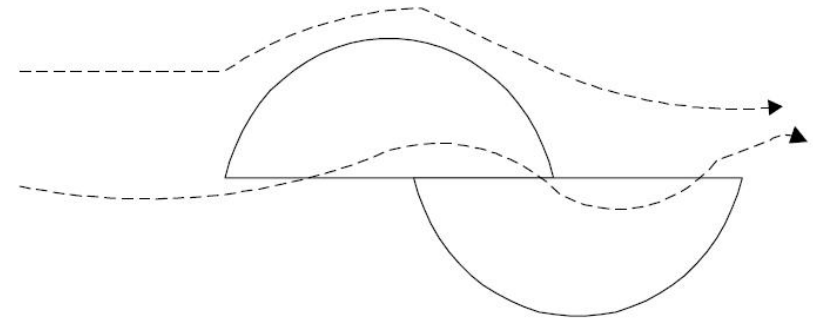
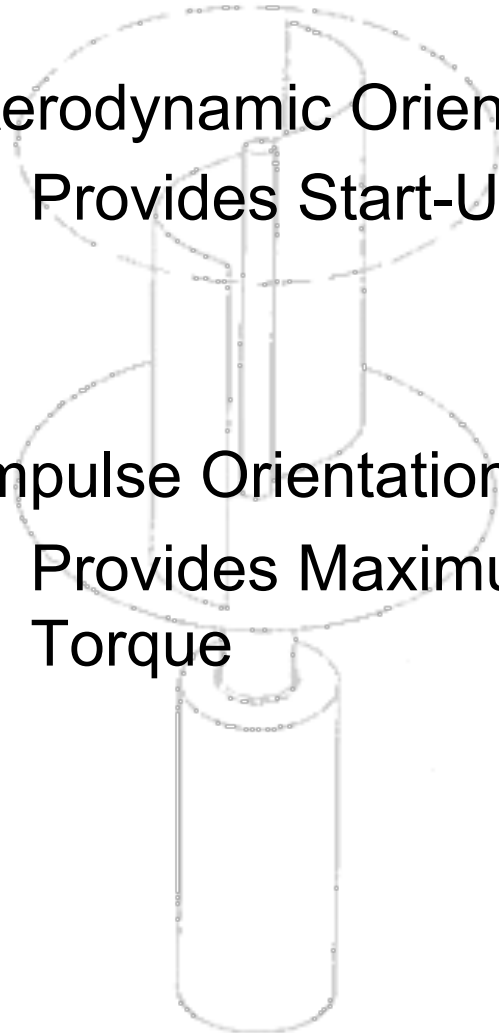
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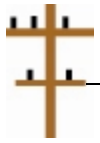
Aerodynamic Orientation

- Provides Start-Up Torque

Impulse Orientation

- Provides Maximum Torque



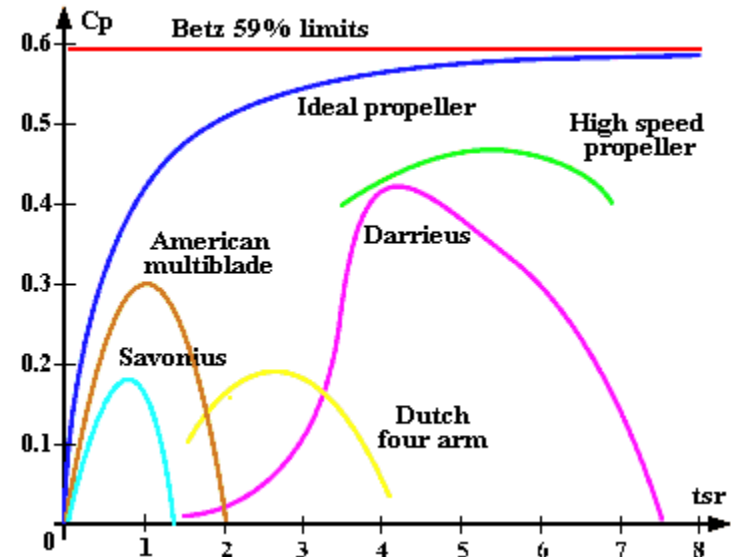


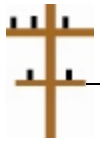
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$$P = \frac{1}{2} \rho_{air} u_{air}^3 A_s c_p$$

C_p = power coefficient

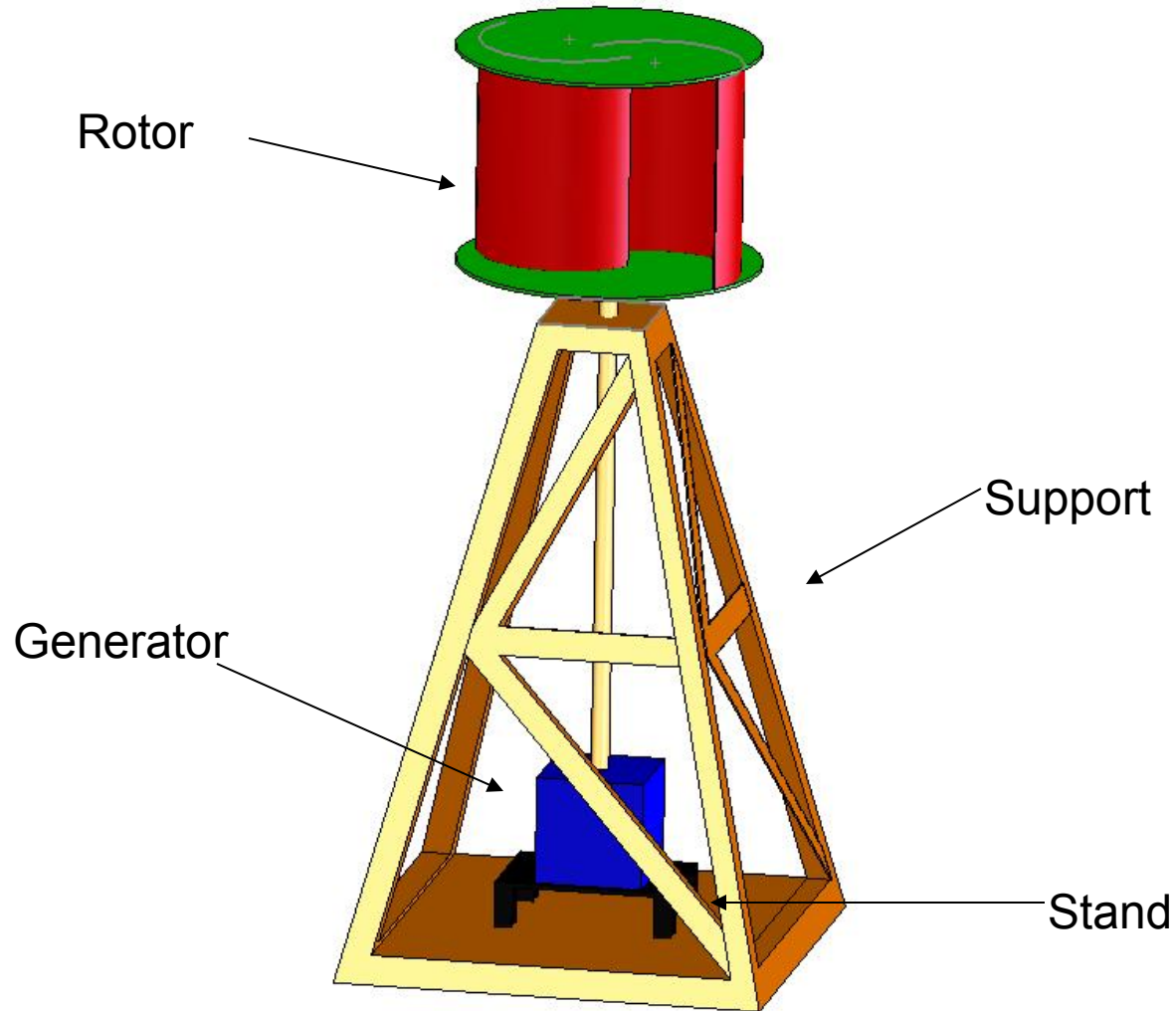
- For Savonius rotor, C_p varies from 0.25 to 0.45

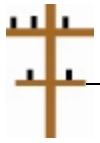




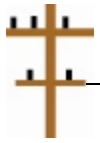
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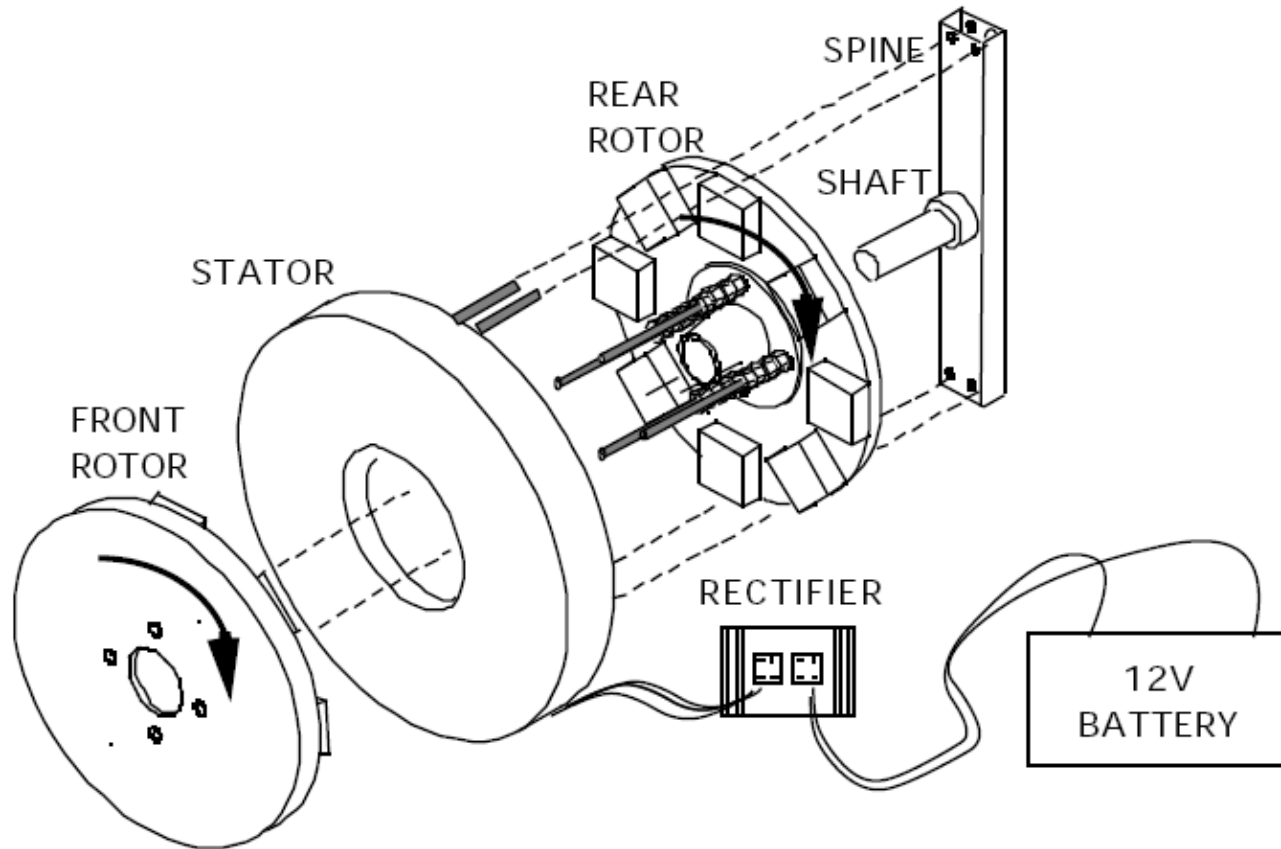


Questions/Comments?



POWER GENERATION IN DEVELOPING COUNTRIES

SAVONIUS: OFF GRID BATTERY CHARGING



Source: *ITDG Permanent Magnet Generator*, Hugh Piggot