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Adding Sliding Solar Panels to a Hybrid Car

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Adding Sliding Panels to a Hybrid Solar Car

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Situation

- According to recent studies, Transportation alone is responsible for one-third of the world's energy usage [2]
- Rising levels of carbon dioxide, as seen in Figure 1, have led the world to more environmental-friendly technologies, like the hybrid solar car
- The problem with hybrid cars is their fast discharge and slow recharge

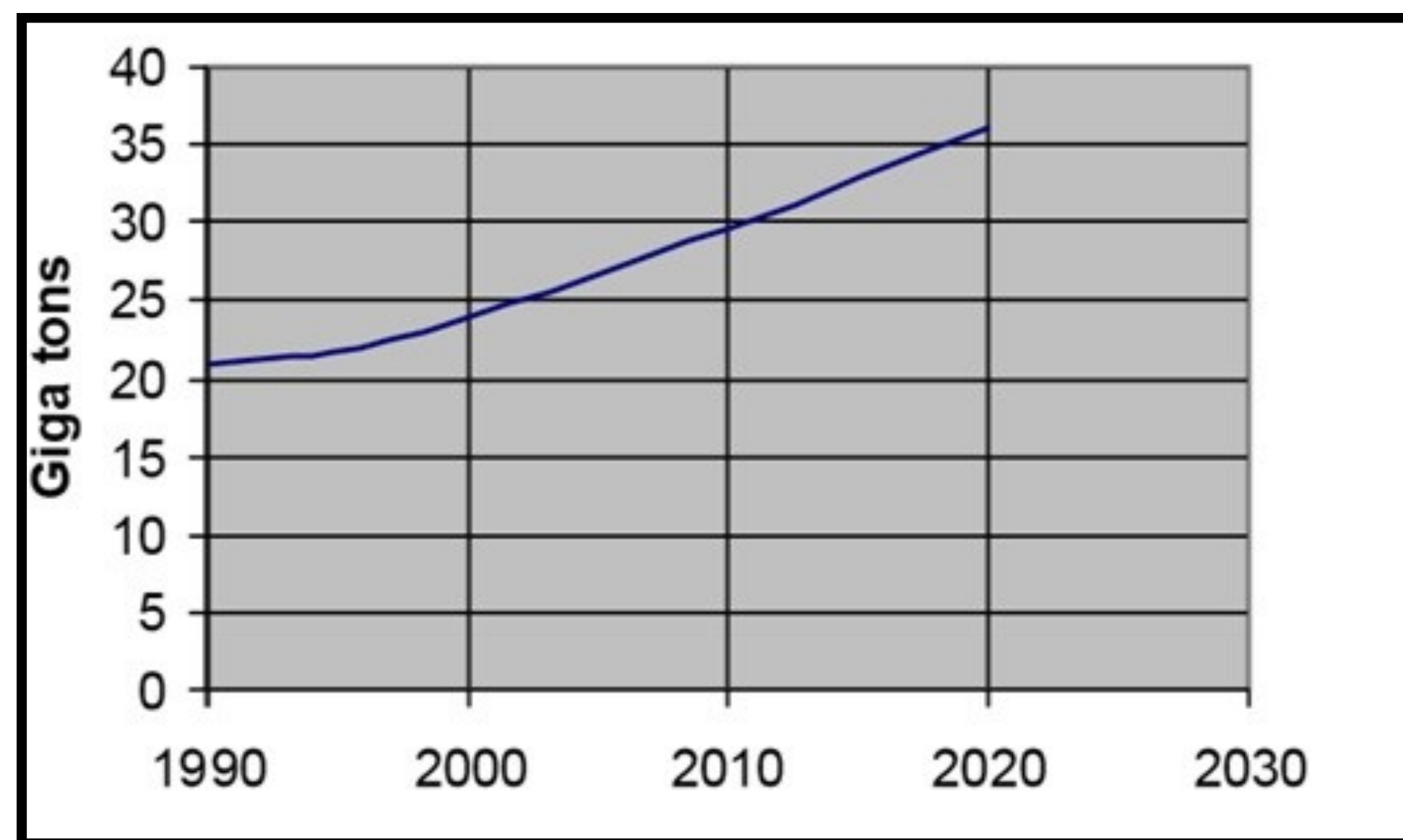


Figure 1: Increasing Level of Carbon Dioxide Per Year [1]

Problems

- The mechanism of sliding the panels down and raising them up again
- Effectiveness of the additional panels, see Figure 2, on the car
- Controlling the panels from outside the car
- Picking a suitable battery with adequate energy storage
- Making sure the sliding wires are flexible
- Selecting a material that has high strength, able to withstand harsh weather conditions, and has a reasonable cost

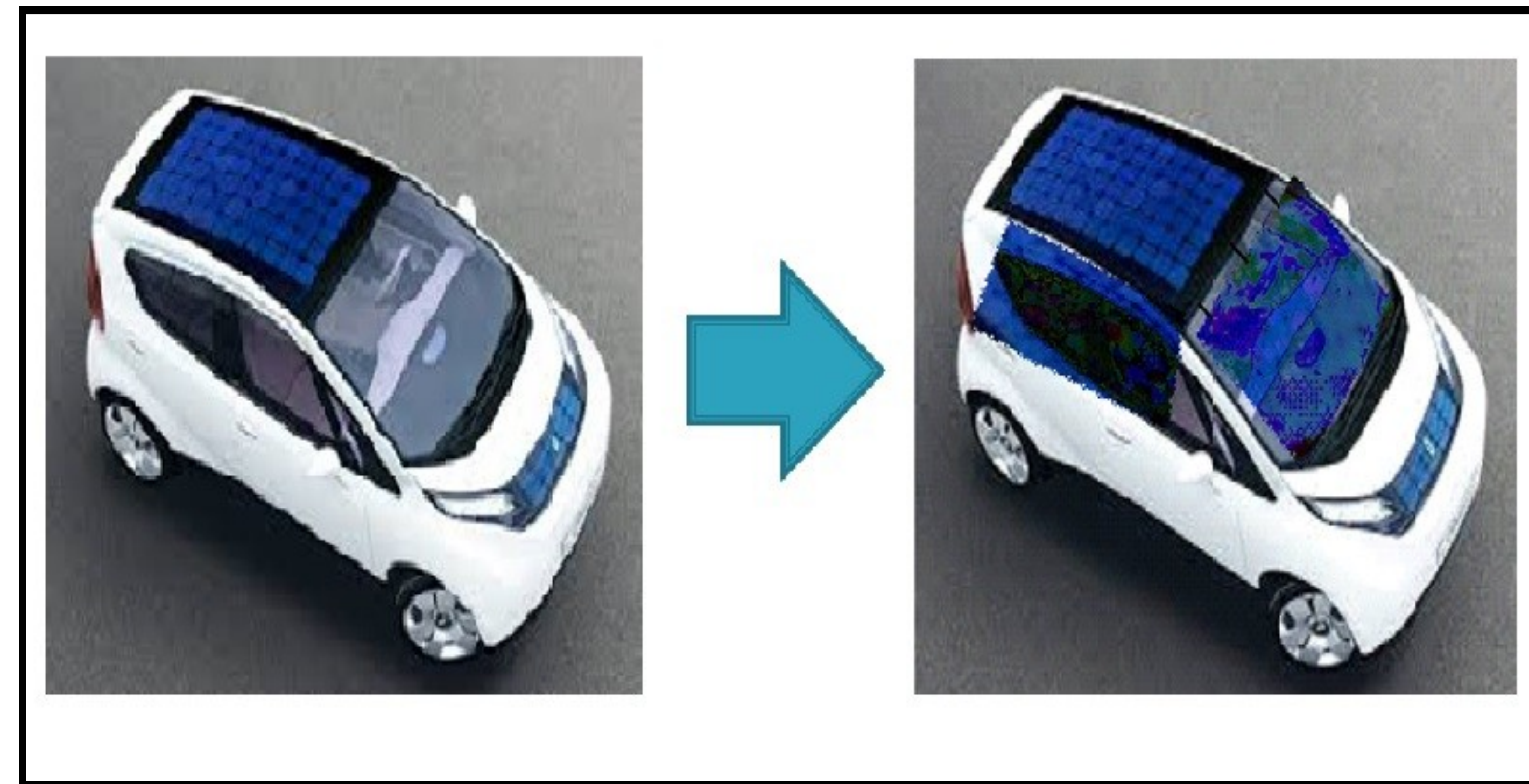


Figure 2: The addition of the sliding panels causes an increase in the surface area

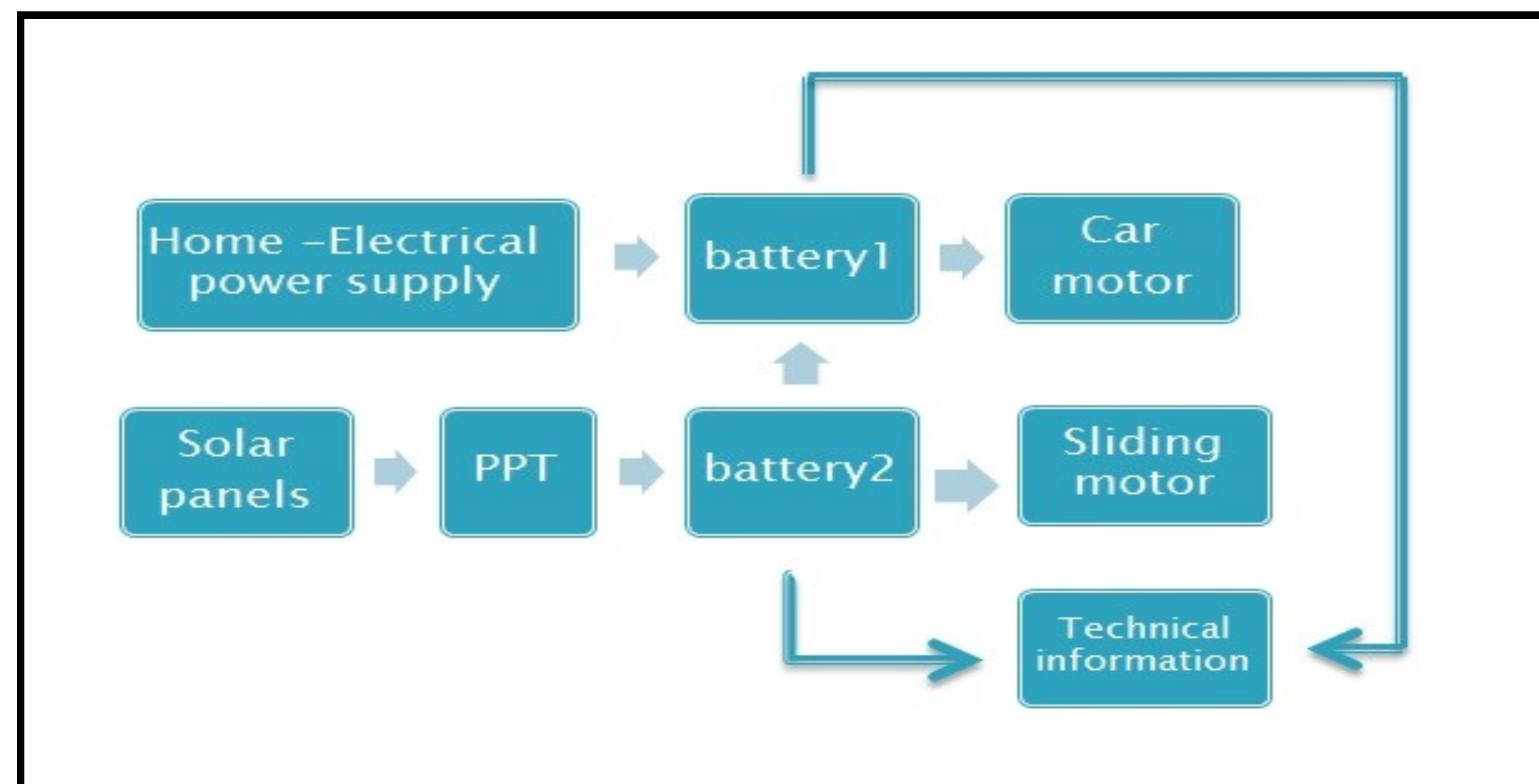


Figure 3: The Connections of the Electrical items

References

[1] Source : "Hybrid electric cars, combustion engine driven cars and their impact on environment," in Power Electronics, Electrical Drives,"

[2] Z. Cerovsky and P. Mindl, "Hybrid electric cars, combustion engine driven cars and their impact on environment," in Power Electronics, Electrical Drives, Automation and Motion, 2008. SPEEDAM 2008. International Symposium on, 2008, pp. 739-743.

[3] M. Farag, *Materials Selection for Engineering Design*. Salisbury: Prentice Hall Europe, 1997, pp 87-113

Solution

- Attaching four shafts to the four motors which are responsible for sliding the panels
- Using four stabling motors that control the movement of the panels
- Using a remote control that controls the panels from outside the car
- Having a backup battery, shown in Figure 3, to provide more energy for the motors
- The use of flexible circular coils (longer wires) to move the panels
- Selection of Steel because of its excellent mechanical properties , as seen in table 1 [3]

Table 1: Comparison between Steel and Aluminum

Material	Strength	Weight	Cost	Life Durability
Steel	✓	✗	✓	✓
Aluminum	✗	✓	✗	✗

Evaluation

- The additional panels will add more weight, which might affect the car movement
- The assumed two minutes for the panels sliding might be time consuming for some users
- Adding a coating to improve the corrosion resistant of steel
- The car's appearance will be a major obstacle, so the panels should maintain a good appearance