In order to select design options that are suitable for the use of shape memory material in adaptive blinds, two main criterions need to be satisfied. First, the shape memory material needs to provide adequate actuation force. Second, it needs to deform back to the original shape before actuation for successful repeatability of the process.

The actuating material can be either shape memory polymer (SMP) or shape memory alloy (SMA). The main advantage of SMP over SMA is its much cheaper cost. **Give a cited example of cost difference.** However, the actuation force of SMP is 100 times less (**citation needed**) than SMA so it may be more difficult for SMP to produce adequate force to actuate the adaptive blinds. Calculations are needed to confirm this. On the other hand, data from SMA manufacturer Dynalloy states that a 0.2mm diametre SMA wire can actuate 570g, which shows that SMAs can provide a very large actuation force if required.

The energy source to activate actuation of the shape memory material can come from heating from sunlight, resistive heating of shape memory material, or resistive heating of an element that is in contact with the shape memory material. Heating with sunlight compared to resistive heating offers the possibility of zero operating energy consumption. However, calculations are needed to find out if it is possible to heat shape memory material to the activation temperature. It may be necessary to intensify the energy from sunlight through devices such as magnifying glasses or solar panels. Resistive heating of the shape memory material itself can be another simple way to reach the activation temperature, but for SMA the energy requirement is high due to the relatively low resistance of Nitinol. Instead, a more resistive material can be used as a heating element to improve energy efficiency of the shape memory actuation.

After activation, returning the shape memory material to its original shape can be done using springs, opposing SMA actuators, or simply with gravity. Springs and gravity work on the same principal and will likely be much cheaper than using opposing SMA actuators. However, a constant power source would be required if using springs or gravity to keep the shape memory material actuated, whereas opposing SMA actuators only need power until activation is complete.

Ideally, a design that utilizes sunlight as the sole energy source for actuation is used since it can achieve autonomous operation without using other sources of energy. Consequently, SMA would be chosen over SMP since sunlight would have a greater impact on SMA compared to SMP **(need citation or calculations)**. If this design is not possible, then a design using opposing SMA actuators that are heated with a more resistive material can be used in conjunction with a light sensing controller. This option may be more expensive, but is the second best option for minimizing operating energy use.