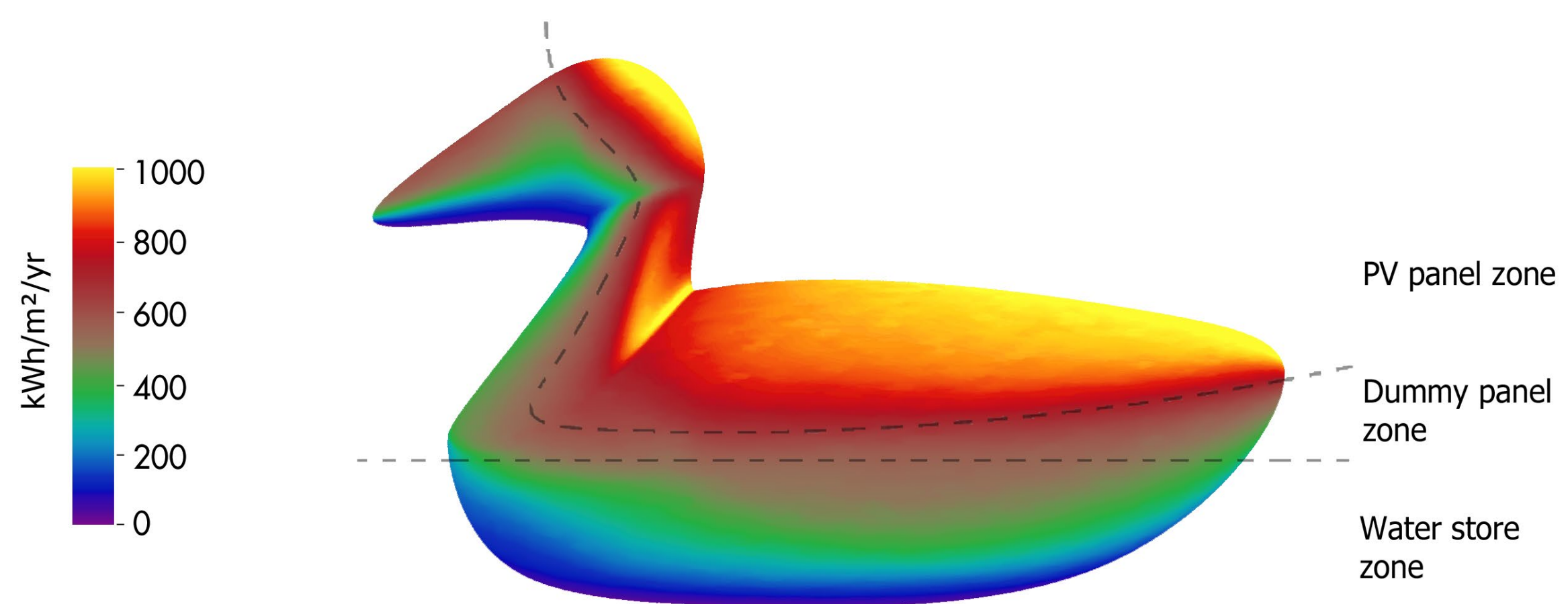
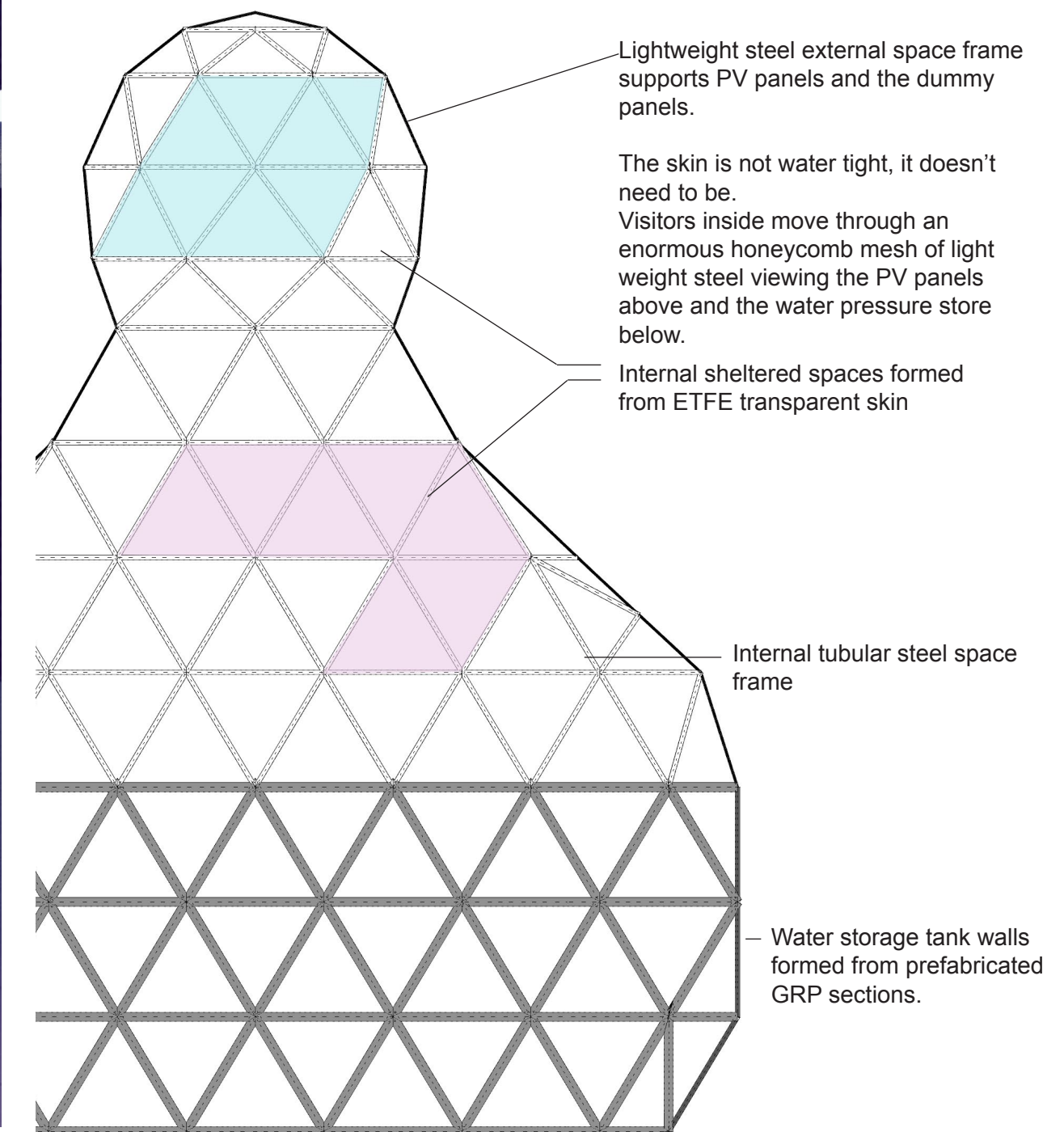


# ENERGY DUCK

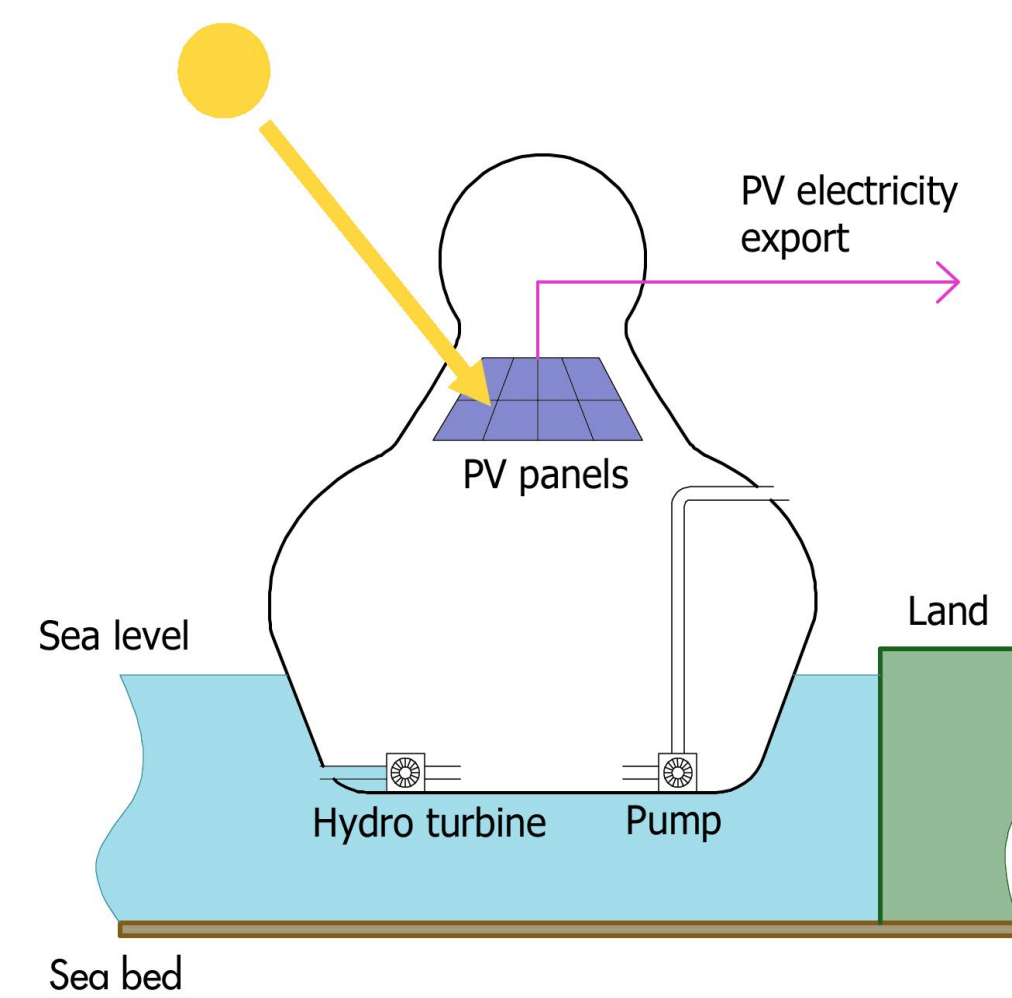
Copenhagen has the admirable aim of becoming carbon neutral by 2025. To achieve such a low carbon future requires a city scale transition to renewable electricity. At this scale, due to the inherent intermittency of renewable energy sources it is essential to be able to store energy and release it as electricity at a later time when the wind is not blowing or the sun is not shining.

Energy duck stores solar energy by making use of its floating nature. Energy is stored by virtue of the difference in water heights inside and outside the duck. Solar energy used to pump water out of the duck and buoyancy brings it to the surface. When stored energy is required to be delivered the duck is flooded through one or more hydro turbines to generate electricity which is transmitted to the national grid by the same route as the PV panel generated electricity. Energy Duck can be used to cover short term fluctuations (e.g. cloud cover) for hundreds of houses or long term (a few days) demands of around fifty houses.

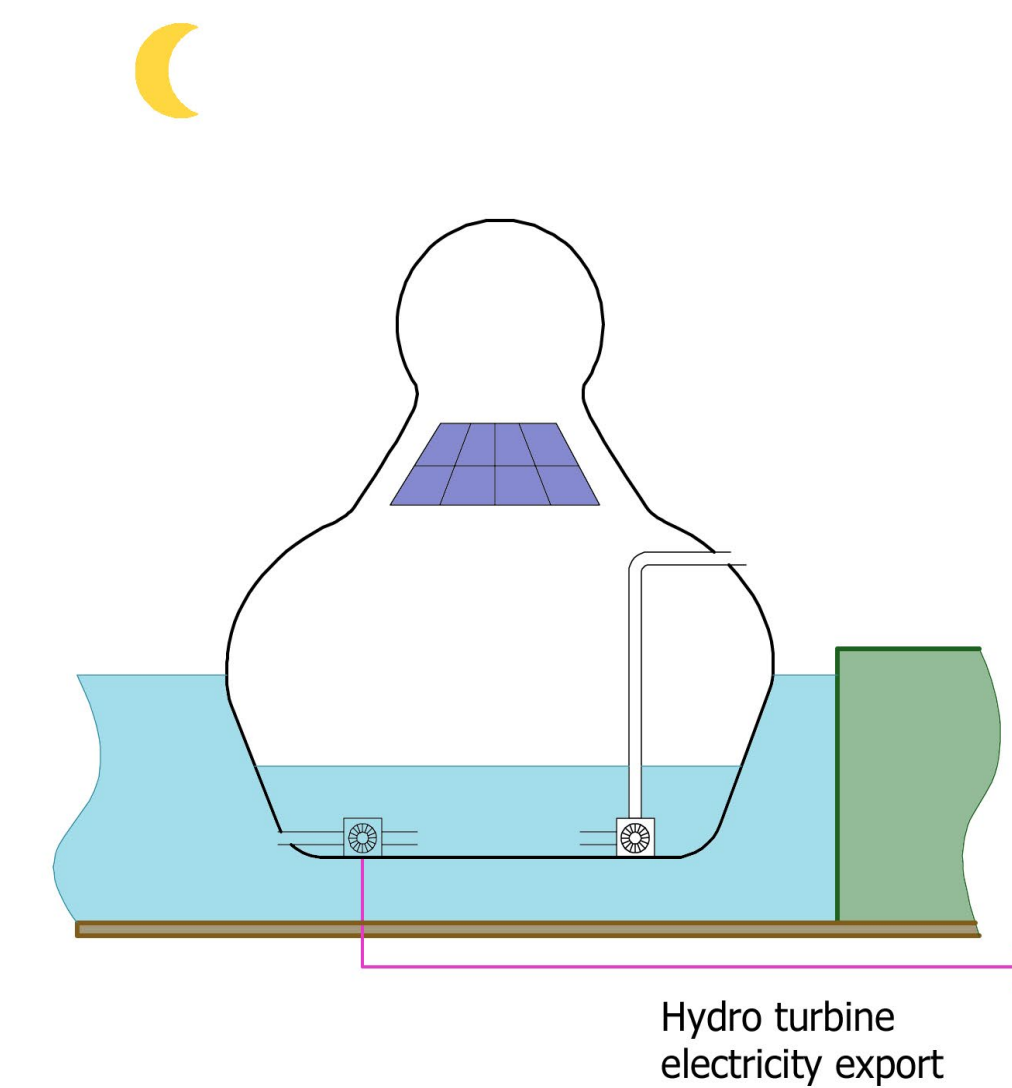
At night the duck is lit with very low power colour changing LED lamps. The colour pattern undulates with a rhythm proportional to the output of the hydro turbines.



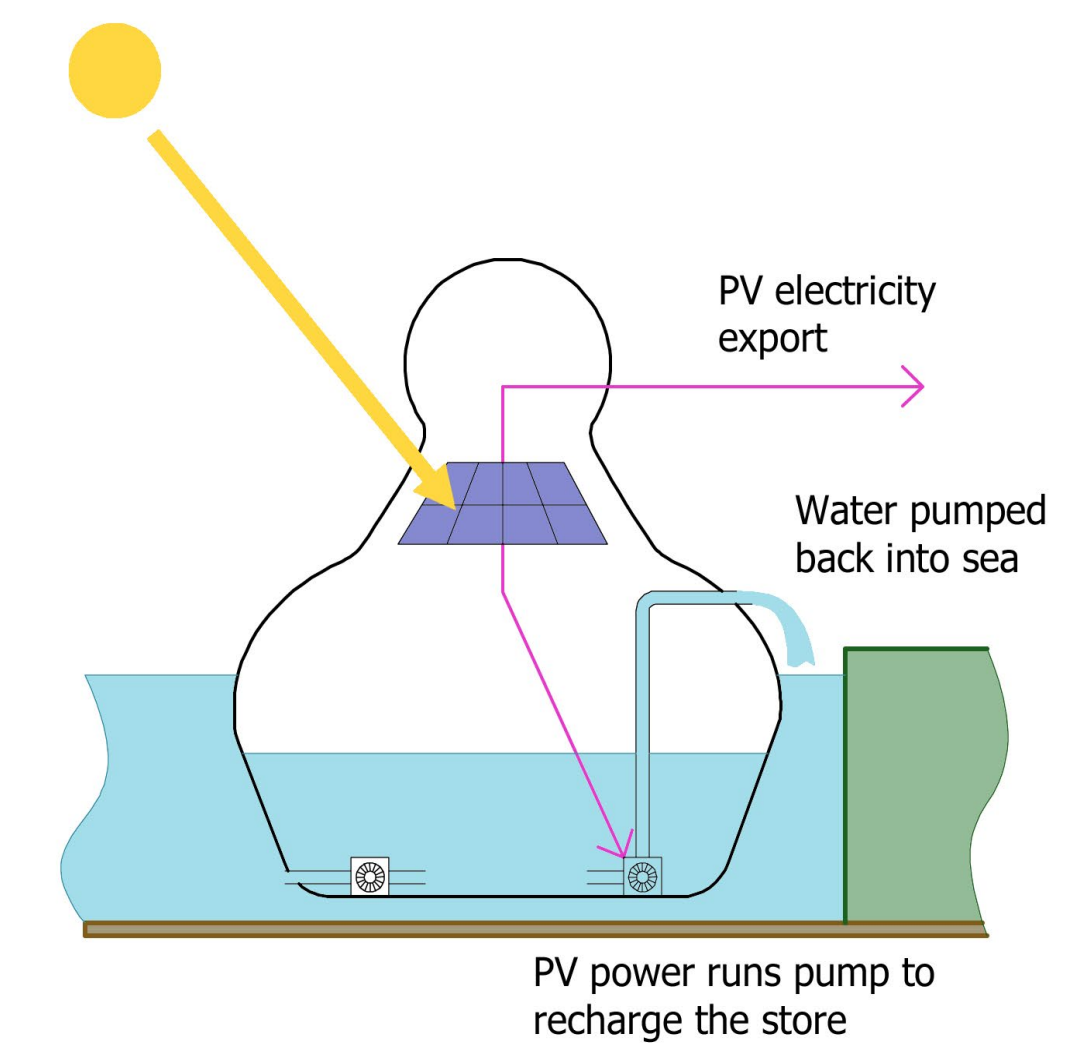
Annual Solar Radiation Collection  
Computer simulation used to tune the duck shape to collect the most solar radiation.



**Duck Floating High**  
Energy store is full.  
All electricity is exported.



**Duck Descending**  
Hydro turbine runs as store is flooded.  
Stored energy is exported.



**Duck Floating Low**  
Stored energy has been used.  
PV panels power the pump.  
Duck rises to recharge the store.