




SURGE

ENERGY: FUTURE HORIZONS

The apocalypse of the floods destroy humanity exists in many religious myths. In the contemporary context, humanity is confronted with a physical and mental moment of conflict: the blind optimism of consumerism and technicism against socio-ecosystems. SURGE creates a tensioned sense of balance, a manifesto of this dialectical relationship. The touch and perception of conflict may be the driving force, to imagine with heart and mind, of brave new horizons.

Energy harvesting material-cost:		Structural material-cost:	
Material	Price(\$)/m2		
fabric(cloth)	0.294	projected area(m2)	19600
itc(etching)	11.76	total stell usage(kg/m2)	121
pvc(transparent)	3.3075(thickness:0.5mm)	construction costs per square meter(\$)	270
PV(material:semiconductor)	73.5(thickness:17mm)	total structural cost(\$)	5,300,000
polycarbonate	12.86(thickness:2mm)		
unit-cost:		The steel quantity for the steel structure is estimated at \$2,200 / ton.	
rigid flapping TENG panel(+PV panel)	24.108	Construction costs per square meter includes all costs of foundation, steel structure frame, coating, power management equipment, etc.	
rigid flapping TENG panel	21.68		
flexible flapping TENG unit	15.36		
total(\$)	682.61247		

Energy Output

	TOTAL UNIT (AREA)	IDEAL POWER	ESTIMATED POWER	WORK PER DAY (ESTIMATED,IDEAL)
 SOLAR POWER	356 Panels 8269m2	24.6w/m2 203417w (Sunlight for 24h)	9.8w/m2 80636w (Sunlight for 6h)	1750mwh-17575mwh
 WIND POWER	356*3(rigid) 356(flexible) 24807m2(rigid) 8269m2(flexible)	2.86w/m2(rigid), 2.88w/m2(flexible) 94763w	0.48w/m2(rigid) 1.8048w/m2(flexible) 26831 w	2318mwh-8187mwh
 HUMAN POWER	2370m2	2.4w/m2 5688w	2.4w/m2 5688w	491 mwh

Power Output =8269*24.6(PV)+8269*2.86*3(Rigid TENG)+8269*2.88(Flexible TENG)+2370*2.4(Piezoelectric Pavement)=303868w
Total budget M=20*P= \$6077360

In order to simulate the performance of our design in the local environment, our team combined the wind, solar energy and the flow of people (estimated value) of Masdar city to estimate the annual and monthly production capacity and make statistics as shown in the table below. It shows that TENG has excellent performance and potential in wind energy collection combined with SURGE's highly integrated design.



Solar Power: radiation per month(w/h/m2)/3600(sec)*4(24h/6, sunlight for 6h)*8269(m2)*12.7%(PV conversion efficiency)
Wind Power: rigid TENG: 8269*(m2)*2.86*3(rigid)*1(hz)*1(rate of wind speed:0.4m/s)
flexible TENG: 8269(m2)*2.88/6(m/s)*average wind speed per month
Human Power: 5688w(use frequency 15hz) affected by the fluctuation of the flow of people

Power Generation Scheme

