ANTHONY SOPHOCLI

BSc (Hons) Engineering Product Design

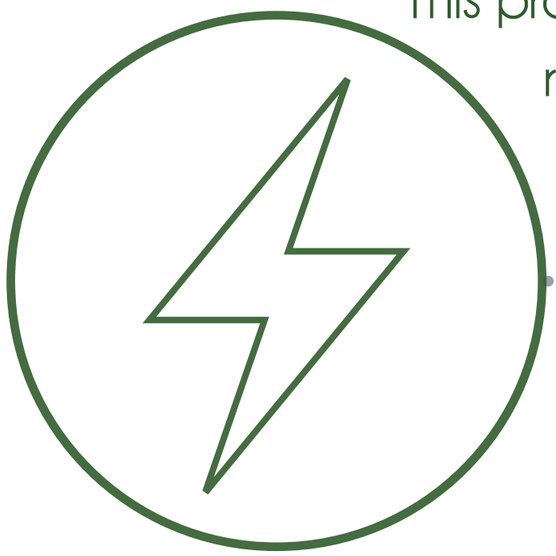
DESIGN PROJECT

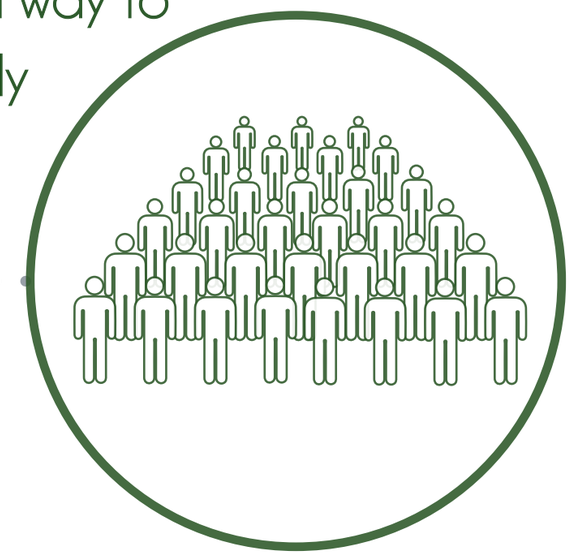
INTRODUCTION

RECLAIM

What is the project about?

This project is about finding a way to reclaim energy in heavily used areas

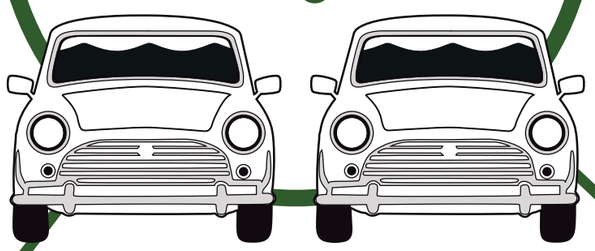




BACKGROUND

Facts & Stats

77.96 GJ –
Energy used per person per year in London
That's the same as
1862Kg of oil...



2013 -
in the UK, primary energy consumption was
205.9 mtoe

2050, UK –
Wind, Solar, Wave/Tidal
&
Biomass combined =
53.67% Renewable energy production

5.2%
of energy in the UK is from renewable energy sources

RENEWABLE ENERGY

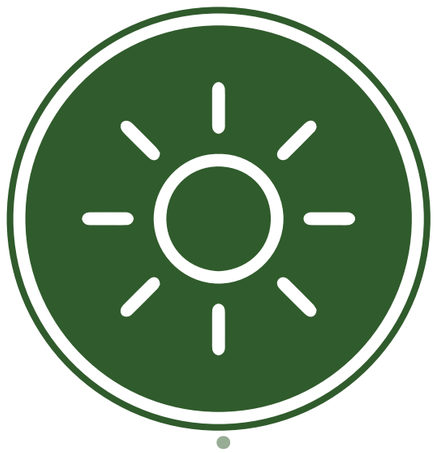
Types

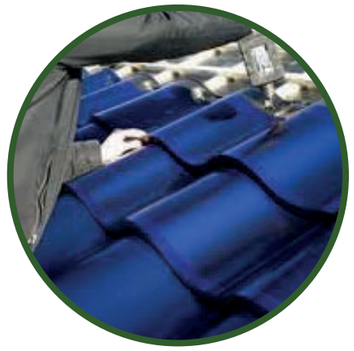
Wind

EWICON-

Bladeless wind turbine

Solar





Solar tiles

Tidal

Kinetic reef

Piezoelectricty

Piezoelectric Floors

Geothermal

Efficient Geothermal Plants

MARKET RESEARCH

Industrial

EWICON-
Bladeless wind turbine

+No sound pollution

+Very efficient

+Uses wind from any direction

-Constant supply of water

-Energy wasted spraying mist

Kinetic reef

+Aesthetic

+Very efficient

+Provides 24 hour power

-Hard to maintain

-Fragile

-Interupt natural habitats

Smart road

+Uses solar and piezoelectricty

+Very efficient

+Prevent icey roads

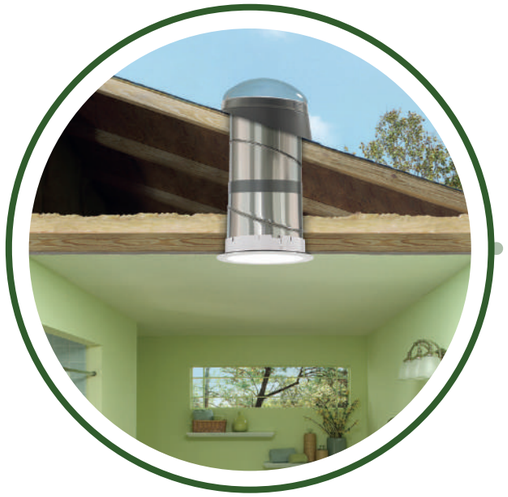
-High maintenance cost

-High installation cost

MARKET RESEARCH

Personal

Velux sun pipe



£298.99

+Runs off natural sun light

+Reduces electricity bills

+Easy to install

+No cost to run

-High cost to install

-Fragile

nPower PEG

£130.00

+Encourages exercise

+Good for emergencies

+Uses natural movement

+Use on the move

+Encourages exercise

-Large sized to carry

Quiet revolution-Qr5

£20,000

+Uses wind in all directions

+Uses low wind speeds

+Quiet

+Aesthetic

-Expensive manufacture

-Expensive installation

RESEARCH

Insight

Airports

191,200 people pass through Heathrow every day.

Train Stations

An average of 2.7 million tube journeys are made on the tube each and every day.

Heavily used areas

There is approximatley 32 million cars on the road in the UK.

Traffic

It is estimated that over 20 million people visit Westfield, Stratford each year.

Shopping centres

LSBU has over 25,000 students & 1,700 staff on campus.

Universitys/schools

Wembley stadium holds over 90,000 people on the day of an event.

Sports arenas

ENERGY

Potential energy

Pressure

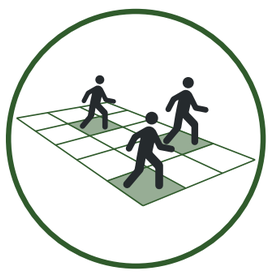
Vibration

Heat

Kinetic

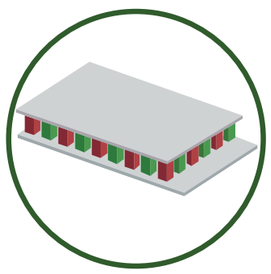
Friction

Infrared

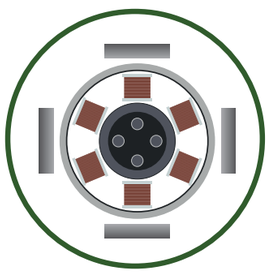


Piezoelectricity
Wind turbines

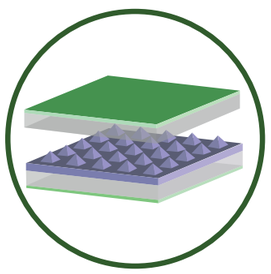
Piezoelectricity
Electromagnetic induction



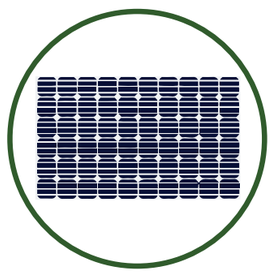
Thermoelectric devices
Electrochemical



Perpetual motion-Pumps
Electric generators



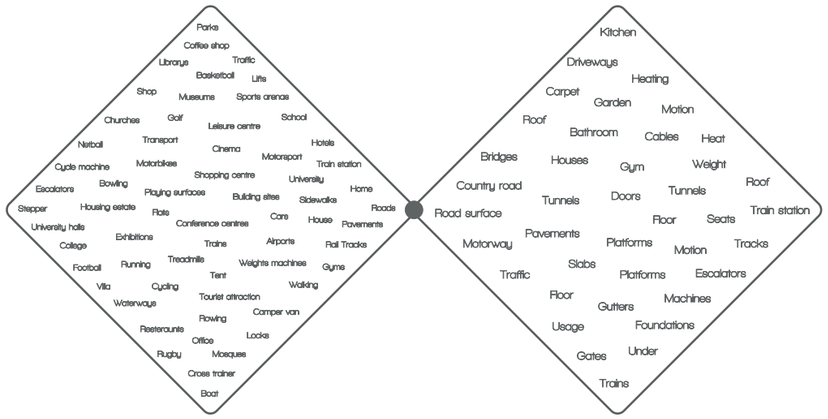
Electrostatic generator
Triboelectric charging



PV Cells

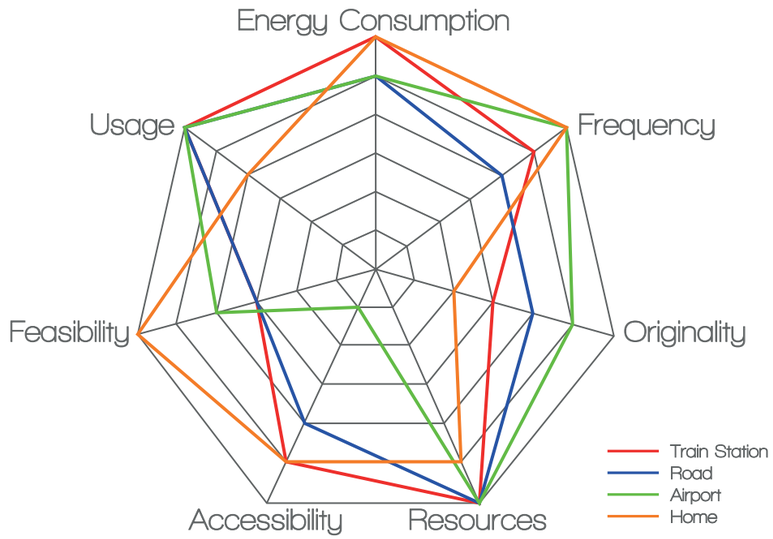
CONCEPT SELECTION

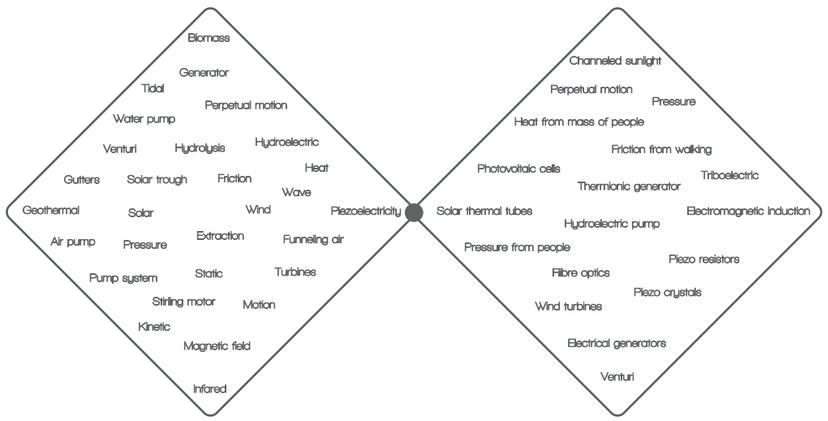
Where & How?



Where?

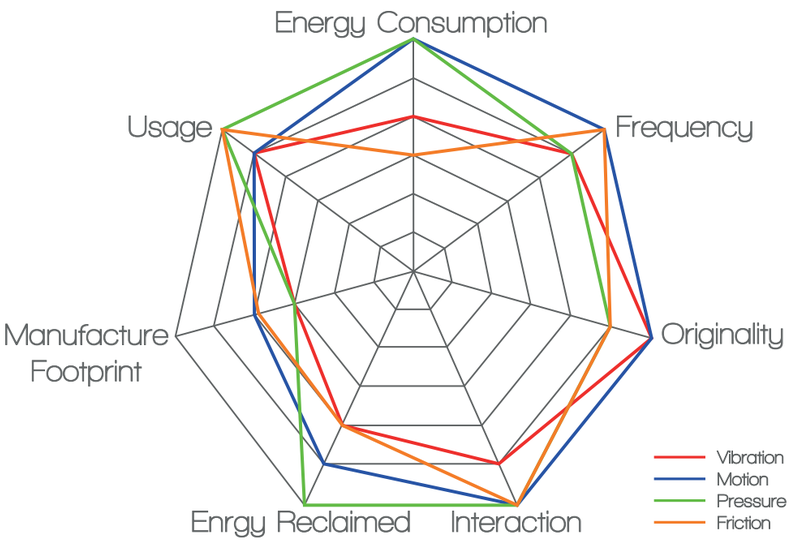
		Where?																	
		A Train Station		B Home		C Sidewalk		D Road		E Gym		F School		G Office Block		H Arenas		I Airport	
Selection Criteria	Weight	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score
Usage	20%	5	1	3	0.60	3	0.60	5	1	4	0.80	3	0.60	4	0.80	3	0.60	5	1
Frequency	15%	4	0.60	5	0.75	3	0.45	3	0.45	3	0.45	2	0.30	3	0.45	2	0.30	5	0.75
Accesibility	5%	4	0.20	4	0.20	5	0.25	4	0.20	4	0.20	2	0.10	3	0.15	2	0.10	1	0.05
Affect on public	5%	4	0.20	2	0.10	2	0.10	5	0.25	3	0.15	2	0.10	2	0.10	3	0.15	4	0.20
Energy consumption	15%	5	0.75	5	0.75	1	0.15	4	0.60	3	0.45	3	0.45	3	0.45	2	0.30	4	0.60
Feasibility	10%	3	0.30	5	0.50	5	0.50	3	0.30	3	0.30	3	0.30	3	0.30	3	0.30	2	0.20
Interaction	5%	4	0.20	3	0.15	4	0.20	4	0.20	3	0.15	4	0.20	4	0.20	4	0.20	4	0.20
Time spent	5%	4	0.20	5	0.25	1	0.05	2	0.10	2	0.10	3	0.15	3	0.15	2	0.10	3	0.15
Size	5%	4	0.20	1	0.05	1	0.05	4	0.20	3	0.15	3	0.15	4	0.20	4	0.20	5	0.25
Originality	5%	2	0.10	2	0.10	5	0.25	3	0.15	5	0.25	3	0.15	3	0.15	4	0.20	3	0.15
Resources	10%	5	0.50	4	0.40	4	0.40	5	0.50	5	0.50	3	0.30	4	0.40	3	0.30	5	0.50
Total Score		4.25		3.85		3.00		3.95		3.50		2.80		3.35		2.75		4.05	
Rank		1		4		7		3		5		8		6		9		2	
Continue?		Yes		Maybe		No		Yes		No		No		No		No		Maybe	





How?

		How?																	
		A Pressure		B Wind		C Solar		D Friction		E Heat		F Motion		G Venturi		H Light		I Vibration	
Selection Criteria	Weight	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score	Rating	Weighted Score
Feasibility	10%	5	0.50	4	0.40	5	0.50	3	0.30	2	0.20	4	0.40	4	0.40	5	0.50	3	0.30
Usage	10%	5	0.50	5	0.50	3	0.30	4	0.40	3	0.30	4	0.40	5	0.50	3	0.30	4	0.40
Accesibility	5%	3	0.15	2	0.10	3	0.15	3	0.15	2	0.10	4	0.20	2	0.10	4	0.20	4	0.20
Affect on public	5%	5	0.25	2	0.10	4	0.20	5	0.25	5	0.25	5	0.25	4	0.20	5	0.25	5	0.25
Energy consumption	15%	5	0.75	4	0.60	4	0.60	5	0.75	5	0.75	5	0.75	3	0.45	5	0.75	3	0.45
Interaction	10%	5	0.50	1	0.10	1	0.10	5	0.50	3	0.30	5	0.50	1	0.10	1	0.10	4	0.40
Size	5%	4	0.20	2	0.10	3	0.15	4	0.20	4	0.20	3	0.15	2	0.10	4	0.20	4	0.20
Originality	10%	4	0.40	2	0.20	2	0.20	5	0.50	4	0.40	5	0.50	3	0.30	2	0.20	5	0.50
Energy Reclaimed	15%	4	0.60	5	0.75	5	0.75	3	0.45	2	0.30	3	0.45	4	0.60	3	0.45	3	0.45
Frequency	10%	4	0.40	5	0.50	3	0.30	5	0.50	3	0.30	5	0.50	5	0.50	3	0.30	4	0.40
Life span	5%	5	0.25	4	0.20	4	0.20	3	0.15	5	0.25	4	0.20	4	0.20	5	0.25	4	0.20
Total Score		4.50		3.55		3.45		4.15		3.35		4.30		3.45		3.50		3.75	
Rank		1		5		6		3		8		2		6		7		4	
Continue?		Yes		Maybe		No		Yes		No		Yes		No		No		Maybe	



AUDIENCE

Need

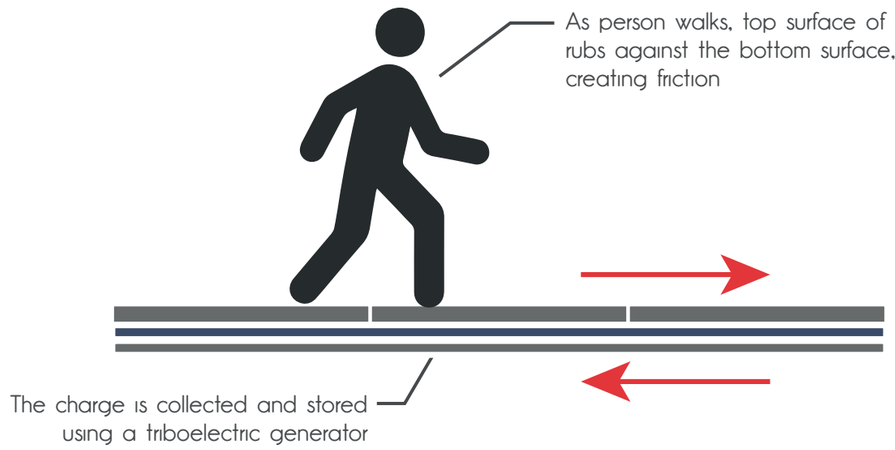
Problem
Too much energy is being wasted

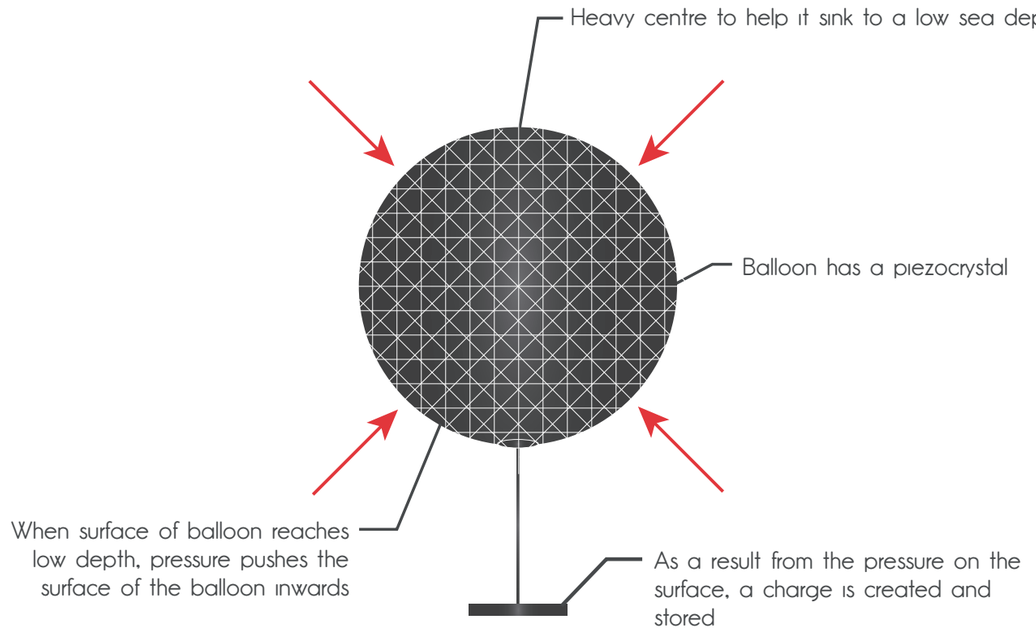
Audience
Airports,
Train stations

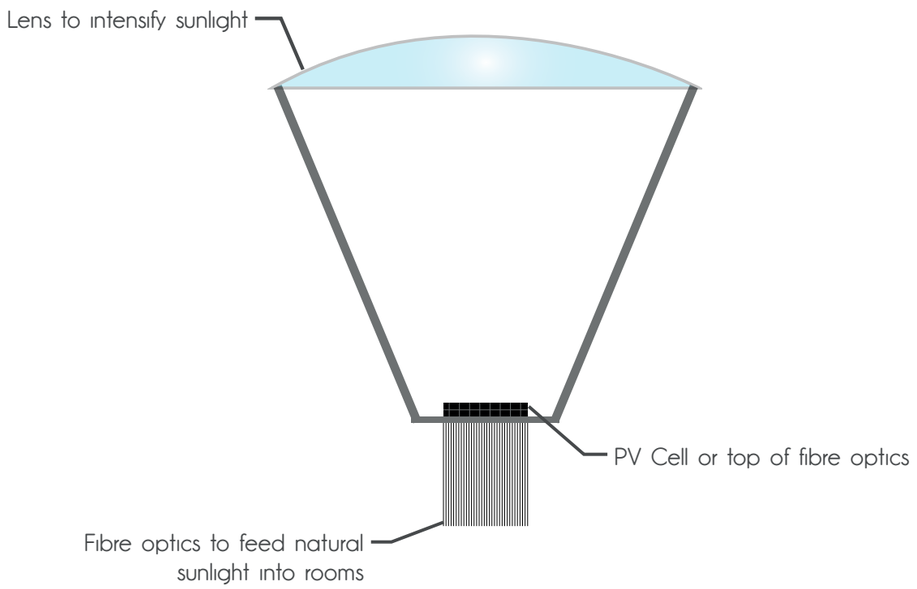
Need
Reclaim energy in heavily used areas

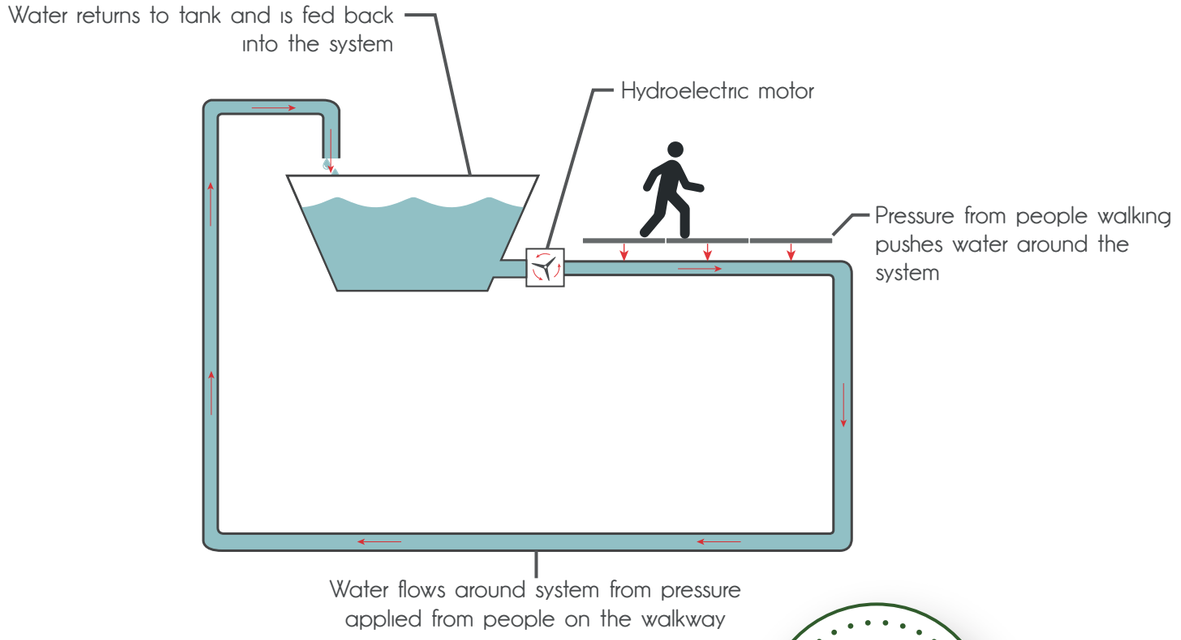
PRELIMINARY CONCEPTS

Sketches









PROJECT PROGRESS

Next Steps

Identify need/Problem (Visited CEREB)

Application of renewable energy resource to product

Research- Heavily used areas

Insight/Ideas

Prototype

Ided generation

Make calculated assumption- Is it worth while?

Research- Renewable energy

Design

Test Renewable energy resource

Interview - Prof Andy Ford Gain insight

Visit location-Heathrow, Kings cross make observations

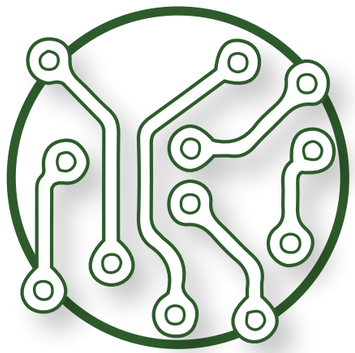
CONCLUSION

What I hope to achieve

By May 2015, I want to produce a product that:

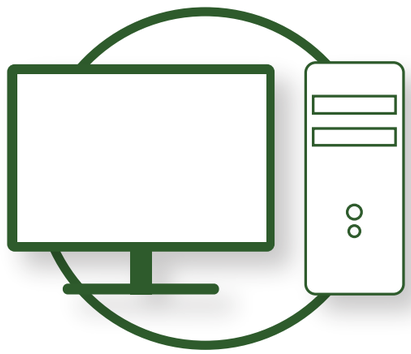
- Will reclaim energy in a heavily used area
- Can be manufactured with a low carbon footprint
- Pays back to the enviroment in a short space of time
- Uses renewable energy sources in an innovative way
- Raise peoples awareness about energy consumption & production
- Looks & works well

Skills I will need



Electronics

Rapid Prototyping



CAD/FEA/CFD

Workshop

Organization

RESOURCES

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Market research-Competition (Slide 6 + 6.5):

Bladeless wind turbine for urban communities - EWICON | Green Diary - Green Revolution Guide by Dr Prem. 2014. Bladeless wind turbine for urban communities - EWICON | Green Diary - Green Revolution Guide by Dr Prem. [ONLINE] Available at: http://www.greendiary.com/bladeless-wind-turbine-for-urban-communities-ewicon.html. [Accessed 10 November 2014].

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THANK YOU!