



# Use of Intelligent Solar Panels to Facilitate Carbon Trading

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# Introduction





- **Intelligent solar panels** are solar panels that have solar tracking, data collection and transmission ability.
- Data transmitted is energy, power and geographical data.



- **Carbon Trading** a system by which countries and organizations receive permits to produce a specified amount of carbon dioxide and other greenhouse gases.
- Permits are based on carbon credits. The higher the credits, the higher the allowance to produce Green House Gases (GHGs).
- Credits are purchased by countries/organizations of high GHGs emission from countries/organization of low GHGs emission.





- The money is used to create and maintain methods that can reduce emission of Green House Gases.
- The concept of carbon trading was developed in the Kyoto Protocol in 1997. 128 countries are bound by it.



# Problem Statement





Solar panels, should be intelligent enough to collect the maximum amount of energy and power data from the environment so as to facilitate carbon trading between private owners, companies and governments.



# Objectives







The goal of this project is to determine a method in which companies and individuals can benefit from carbon trading through use of an intelligent single axis solar panel with the ability to collect and transmit data from the environment.



- To modify an existing solar panel by adding the ability to collect and transmit data from its owners while following the sun.
- To use the data collected to calculate extra carbon credits sold through the carbon market.
- To facilitate financial benefit to individuals and body corporates through the sale of carbon credits.
- To analyze the collected data and come up with information that can be used to improve business processes.



# Justification



Customers Earn KES 9,634.25/year



30%

More  
Electricity

1.2 kwh to 1.56 kwh

569.4 kwh/year



20

Panel  
System

569.4 kwh by 20

11,388 kwh/year



0.705 kg

Of Co<sub>2</sub> /KWH  
generated

11,388 kwh by 0.705

8.02854 Tons of CO<sub>2</sub>



1 200/=

Carbon Credit  
Cost

8.02854 T by 1200

KES 9,634.25/year







# Literature Review





- In Kenya, companies like Mumias Sugar, KenGEN, Standard Group and East African Portland cement have participated in the trade earning millions.
- The NSE is currently considering to recognize carbon trading as an exchangeable security.
- Since solar energy is a carbon neutral energy source, it qualifies as an earner of carbon credits.



# Existing Solutions





- The largest single axis tracker project in Asia, generating 172MW of energy. The project is controlled and managed by Arctech Solar company.
- NEXTracker company projects to install solar trackers on behalf of customers on demand. The company also manages and maintains the solar trackers to ensure they remain efficient and effective.

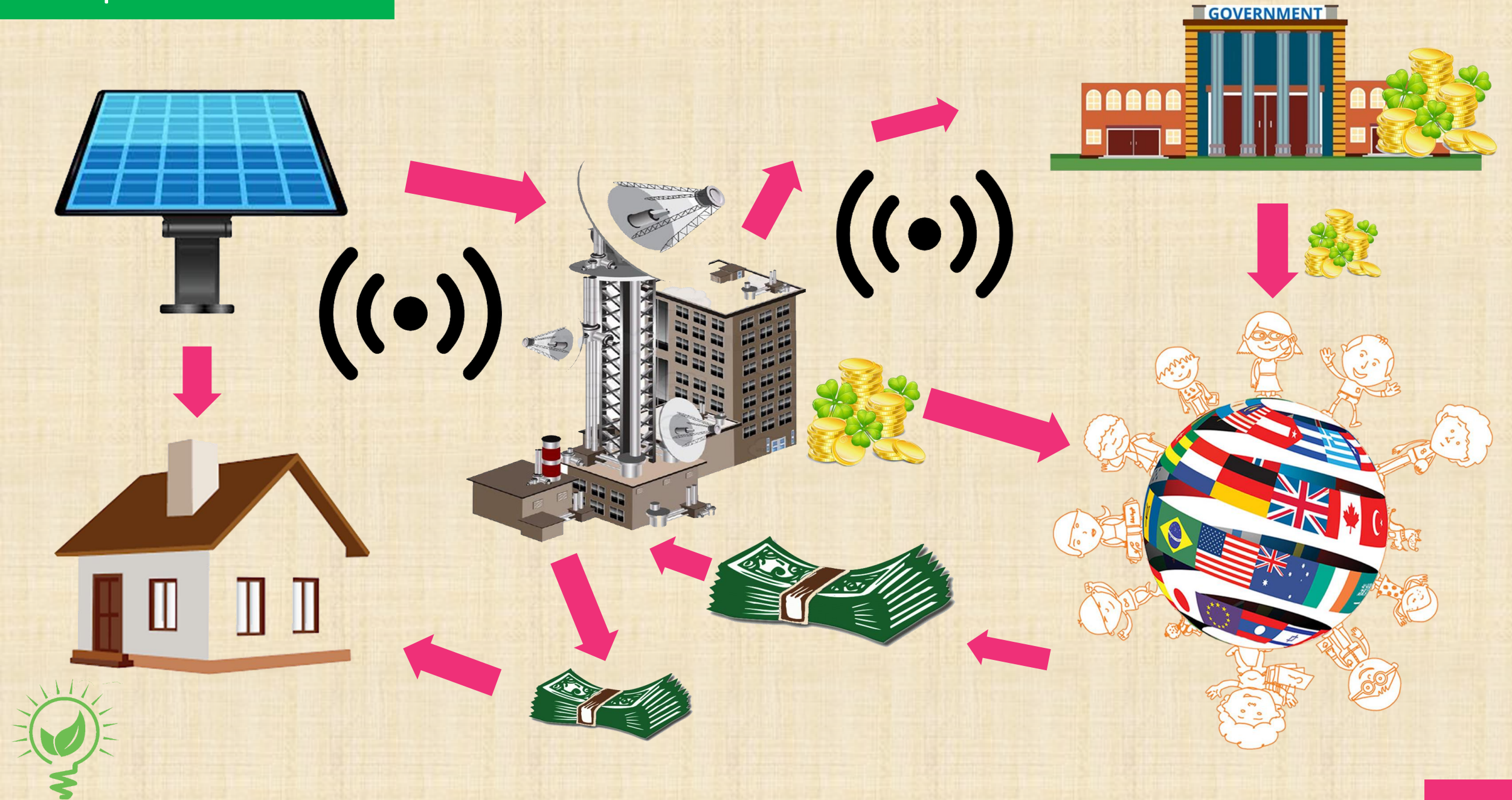




# Proposed Solution



# Proposed Solutions





The following are the major resources required:

- Micro controller
- Solar Panel
- GSM/Wi-Fi Module
- Servo Motor
- Software – Hardware interfacing Protocols
- Voltage and Current Sensors





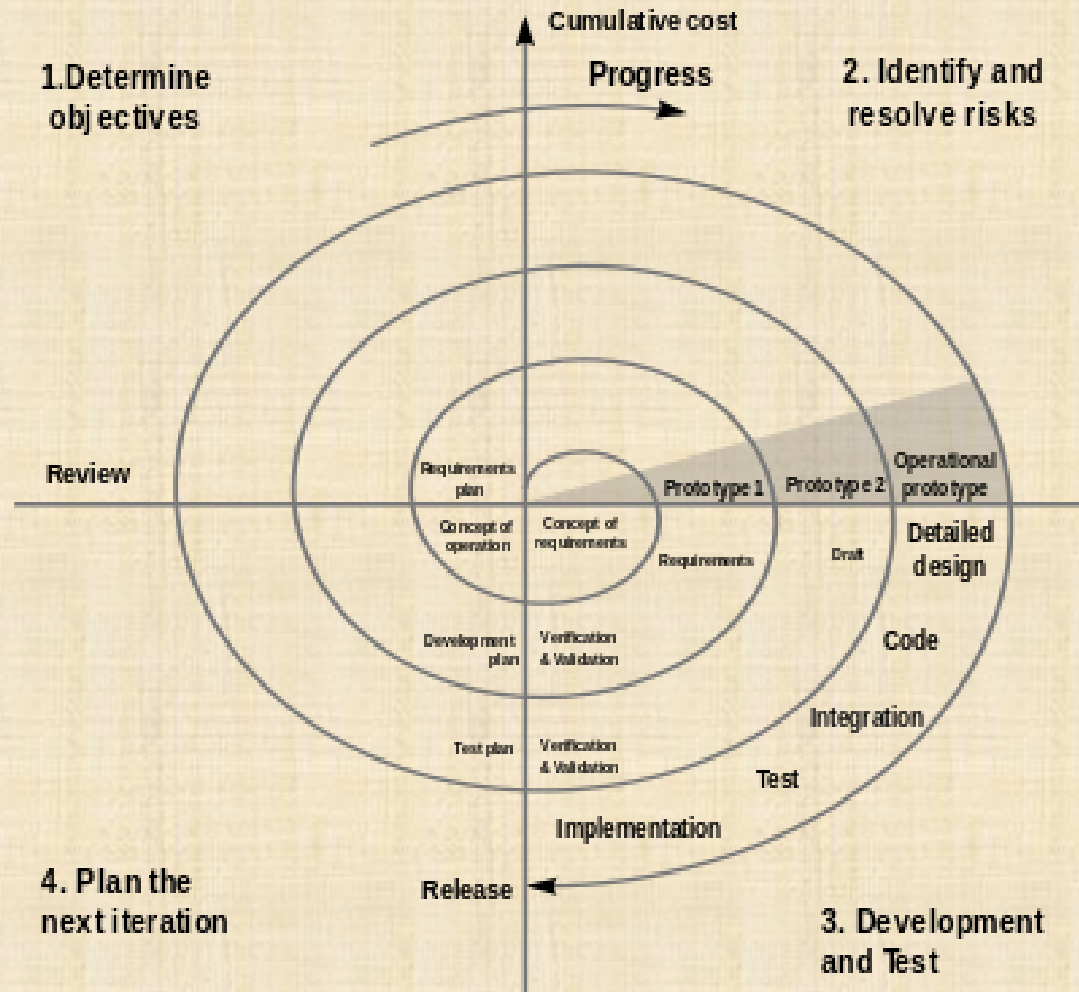
# Methodology







# Spiral Model of Development



## Reasons for this Methodology

- Need for iterations
- Need to take in clients views
- The project is a medium to high-risk project.
- Long term in nature



# Schedule and Budget



ID	Task Name	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct
1	Research									
2	Planning									
3	Testing of Alternatives									
4	Choice Implementation plan and Design									
5	Assembling of Hardware Components									
6	Testing of Hardware components									
7	Software components design									
8	Testing of Software components									
9	Overall Testing									
10	Review									
11	Documentation									

	KSH	KSH
Total Income		0
Expenses		
Simple 6V 2A Solar Panel	1000	
2M PPR Pipes	250	
24 x 24 Inches Wood Board	250	
Arduino Mega 2560 Rev3	2500	
ESP8266 Node MCU	800	
DHT22 Sensor	200	
20 Pieces Resistors	80	
5 Pieces Light Dependent Resistors	15	
50 Pieces Male to Male Jumper Wires	200	
50 pieces Male to Female Jumper Wires	200	
I2C LCD Display	500	
10 Pieces LEDs	30	
Active and Passive Buzzer	100	
Total Expenses		6125





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# Use of Intelligent Solar Panels to Facilitate Carbon Trading

The End