**Clearly describes the problem that will be solved and relates to the background and user needs Does not dictate a specific solution method**

**Renewable Energy Systems in Nigeria**

Need to know:

* Cause of frequent power outages in Nigeria, main power supplies, what alternatives could be used to harness energy (solar-lots of sun there), climate of Africa
* How to harness and convert natural sources to electricity
* Is debris on solar panels an actual issue? But can this still be applied to broader renewable energy?

Know:

* Debris is an issue on solar panels
* Shade on solar cells can TLDR cause shorts
* Keep costs down

Ideas:

* Remove debris from solar panels
* self-cleaning panels?
  + Subsystems: Glass coating, detection, actual cleaning, cleaning solution environmentally stable?

Problem Statement: (State/Symptoms, Impact of solution, users/stakeholders, definition of success, not solutions)

Almost half of Nigeria’s population does not have access to power, and even when it is accessible, it is not of the best quality. Nigeria also has an overdependence on fossil fuels. They have an abundance of renewable resources for energy but they lack the resources and the system is not adequate enough to utilize those resources. Solutions to this lack of sustainable energy would be able to reach the demand of their policies, the economy would boost productivity in agriculture and overall life, and access to more resources. The people who would most likely be affected by this are Citizens of Nigeria, more specifically residential consumers, energy providers, environmental organizations, government, and research institutions. What would make this project a successful one is If the overall percentage of people with access to well-functioning electricity/power increased. Some innovative opportunities to help deal with the problem could be expanding the use of solar power by installing solar panels on rooftops, solar mini-grids, and utility-scale solar farms. There is even the possibility of a self-cleaning solar panel because the dry climate of Nigeria could allow dust to settle on the solar panels, making it harder for sunlight to reach it. Harness wind energy in the coastal regions. We could also explore hydropower and geothermal energy for electricity generation.

Problem Statement Revision:

1. The present unsatisfactory state and its symptoms:

2. The impact of a successful solution

3. An understanding of the users/stakeholder landscape

4. A definition of success

5. Proposes specific innovation opportunities, not solutions

Resources/References

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* [Energy and sustainable development in Nigeria: the way forward | Energy, Sustainability and Society | Full Text (biomedcentral.com)](https://energsustainsoc.biomedcentral.com/articles/10.1186/2192-0567-2-15)
* [Electricity in Nigeria – Issues, Solutions and Risks - Sun Connect News (sun-connect.org)](https://sun-connect.org/electricity-in-nigeria-issues-solutions-and-risks/)