ReneTree – A Sustainable Grid

Team Profile

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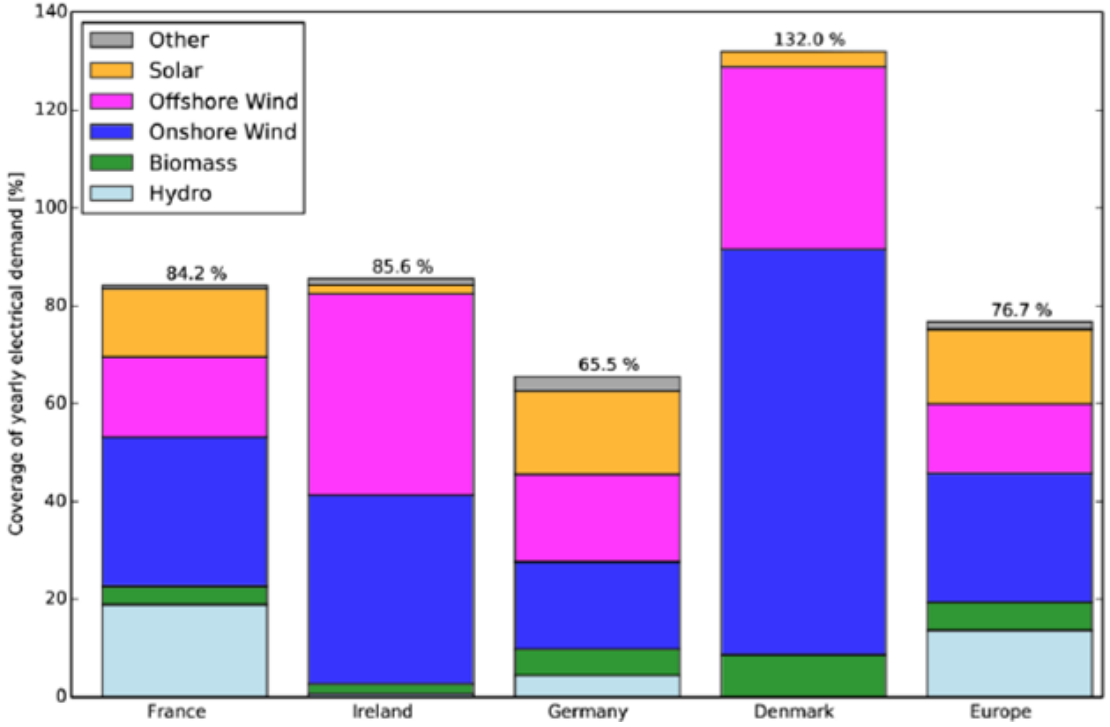
Negative Environmental Impact

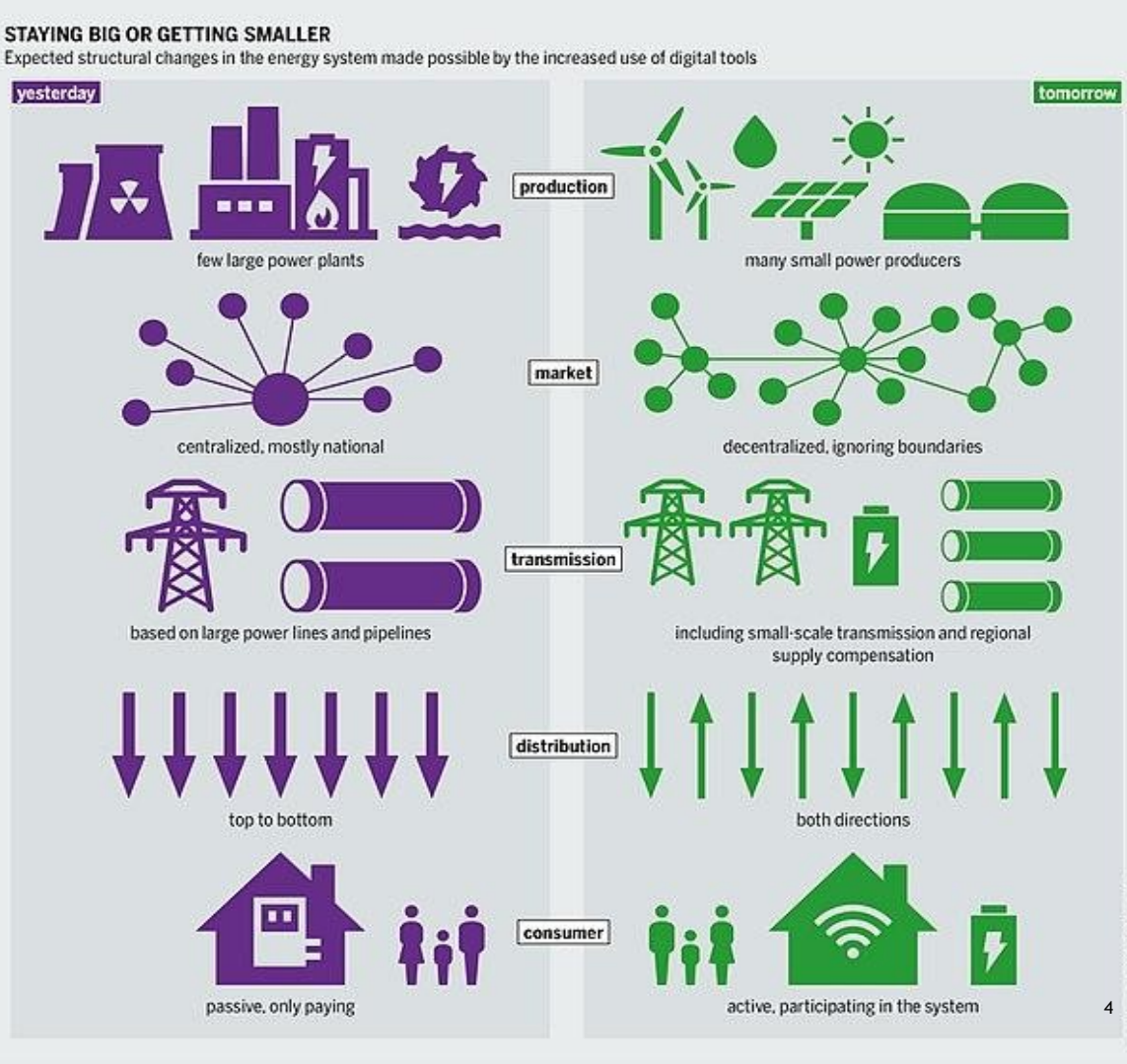
A Sustainable Alternative

Goal for Germany: Energy transition towards 80% Renewable Energy until 2050

Goal for 2030 (acc. to Greenpeace Power Scenario):

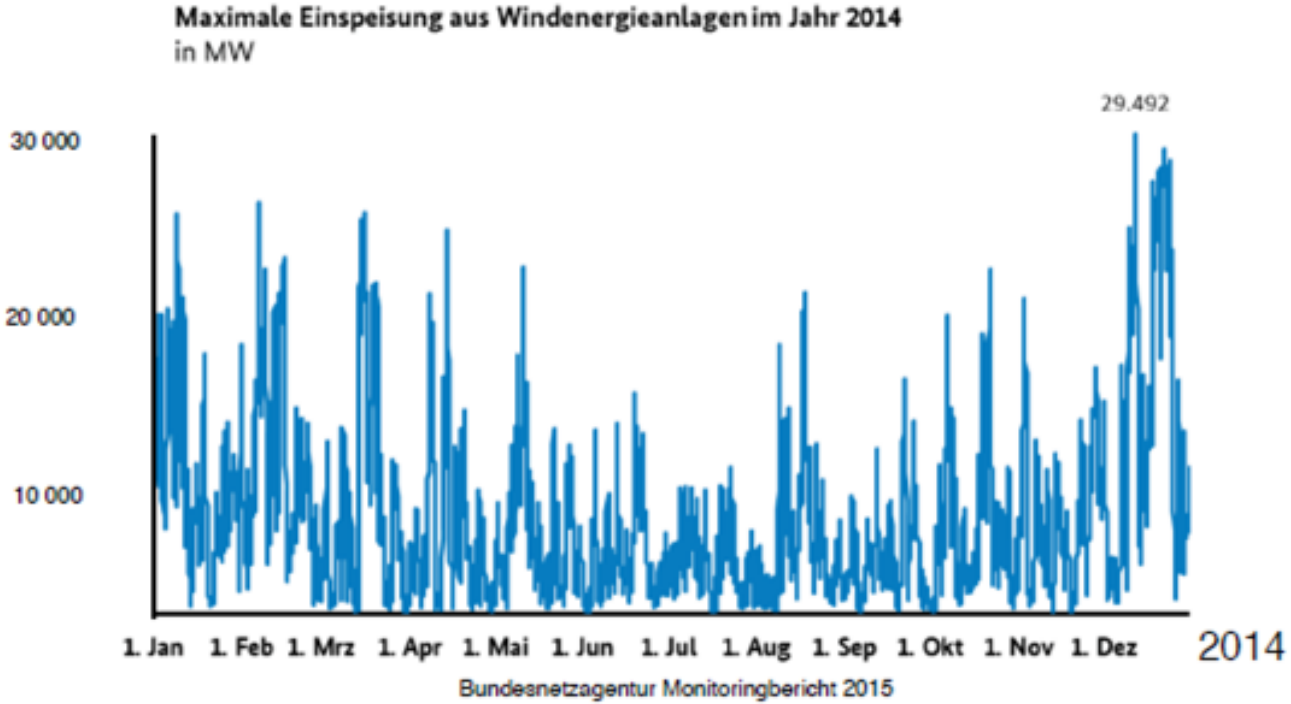


Problem 1: A grid with multiple decentralized sources?

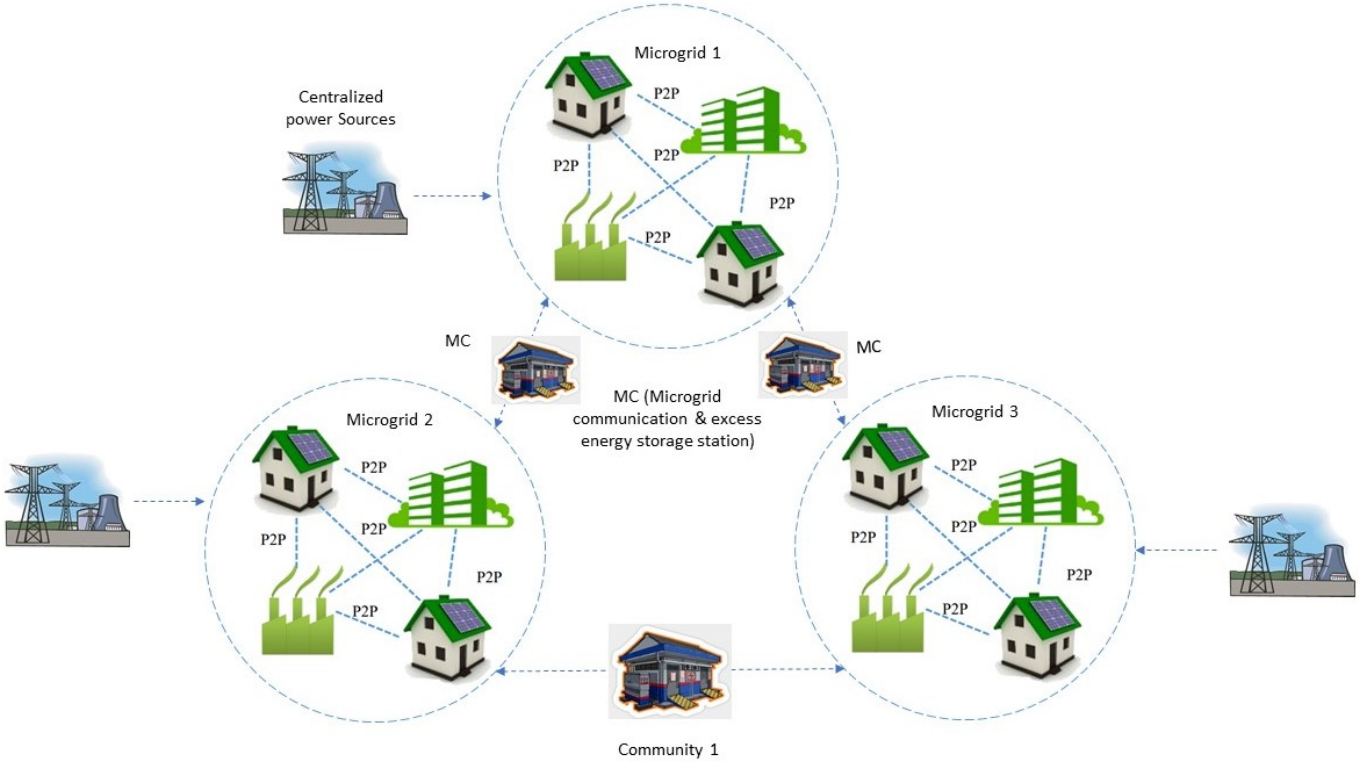


Problem 2: Stability of grid? Wind and Solar Energy Fluctuate Strongly in Time!!

Strong Day to Day Fluctuations in Total Wind Power in Germany

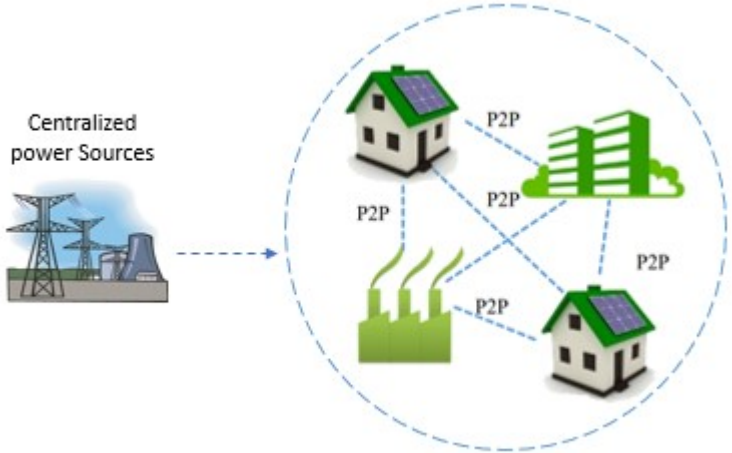


ReneTree- A Sustainable Grid



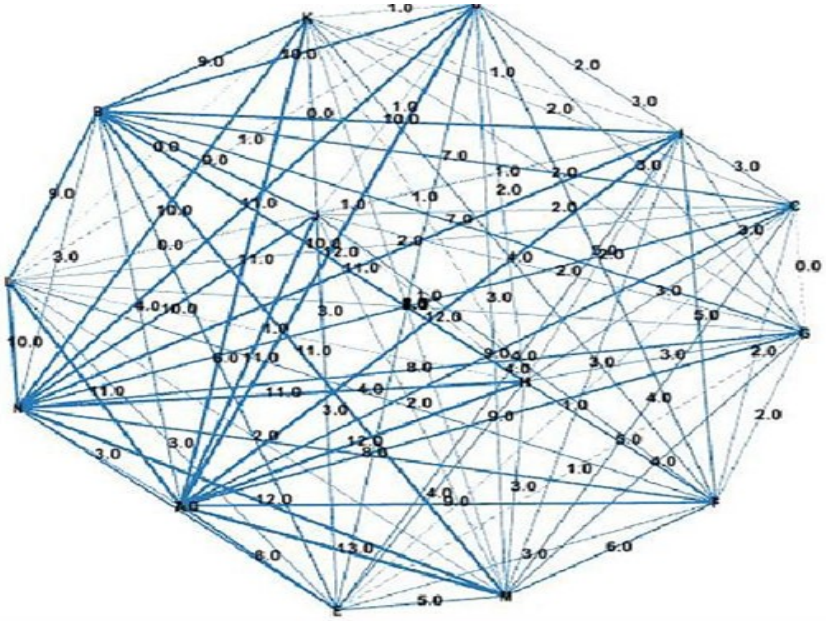
First level- Microgrid

1. Starts from each prosumer being as self-sufficient as possible
2. Peer to peer control using epidemic and gossiping algorithms
3. Traditional power sources still connected to meet supply and demand



Epidemic algorithm

1. Starts with a set of dynamic agents i with initial sate Z=Zi
2. Each agent communicates with neighboring agents
3. After the algorithm is completed, they all agree on converged value

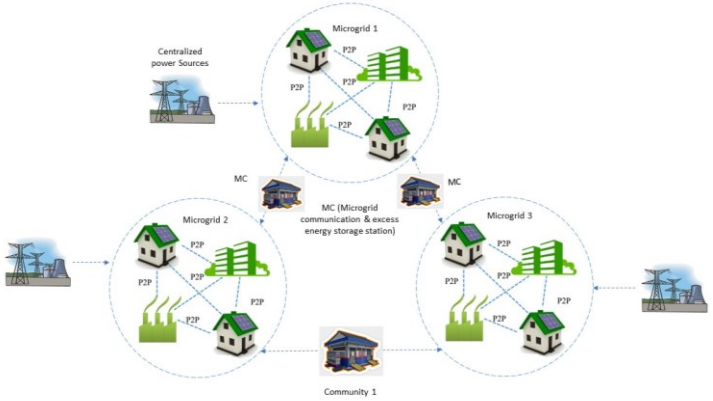


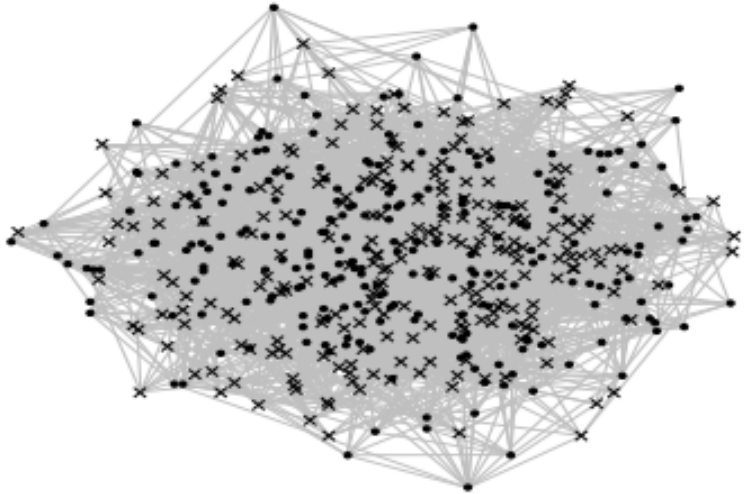
Second level (Community)

1. Network of microgrid forms a community
2. Microgrid communication stations couple two such microgrids and data is exchanged via ReneTree platform
3. Small perturbative effects from individual agents resolved here
4. Energy storage stations

Higher level

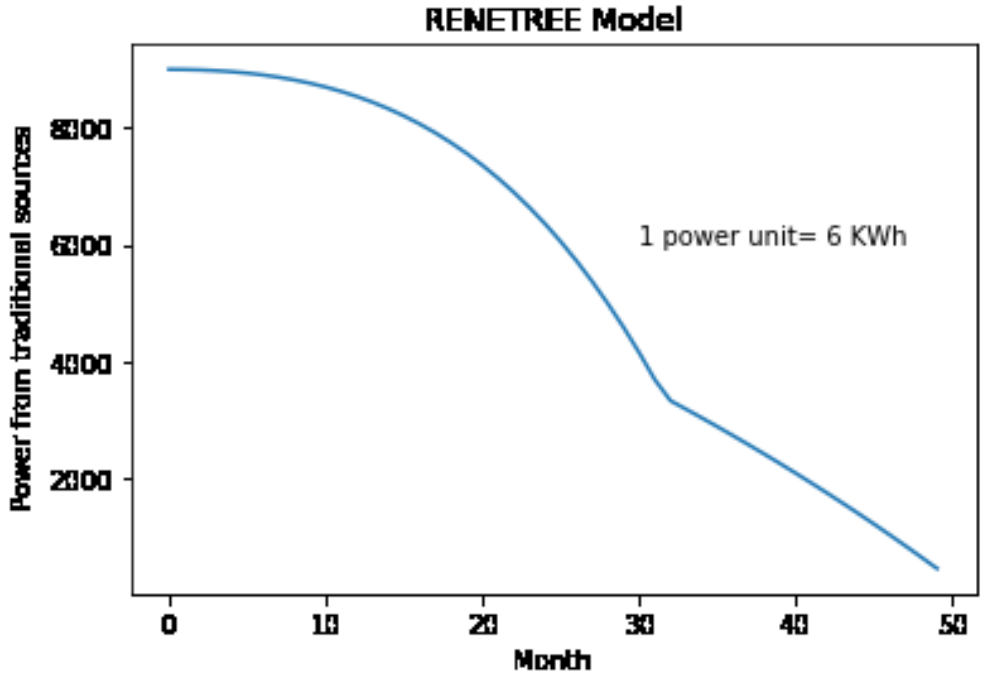
1. Network of such communities
2. Extended to the larger network
3. Scalable and dynamic
4. Semi self sufficient





Test

Time dependent Variables: efficiency and number of distributed energy sources, efficiency of energy storage stations and advancement of technology



Transition from current to sustatinable grid according to RENETREE Model

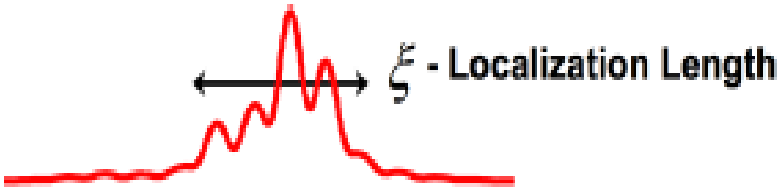
Concepts borrowed from Theoretical Physics for stabilizing grid in ReneTree Model

1. Disturbances can be localized inherently in

a. Unmeshed grid b. By strong random distribution of power (such as in renewable energy)

2. Localization of fluctuations enhances Stability of the Grid

3. Grid topologies can be changed to localize the disturbance



Innovativeness:

Designed for most likely transition from current centralized to future decentralized grid system

Network of microgrids, bilateral communication between generators and consumers and full use of modern technology to optimize the efficiency of grid

Energy storage stations and concepts from Theoretical Physics for tackling renewable energy fluctuation problems

ReneTee is Scalable and Dynamic

Mini Hydropower

ReneTree

+

Nepalese Villages

+

Ngos = Stable Grid

Solar Panel

ReneTree can be implemented in any kinds of grid with distributed energy resources.

Direct Environmental impact:

40% of global carbon dioxide emissions are from current electricity generation methods like combustion of fossil fuels.

Smart grid system can reduce carbon dioxide emissions by up to 25%. (source: U.S. Dept. of Energy)

Indirect Effects:

1. Increase in efficiency of power transmission among the users
2. Management of renewable energy sources

Business plan

1. First stage: Install our platform in an university and a small European city, then

   Install our platform in a small community in Nepal

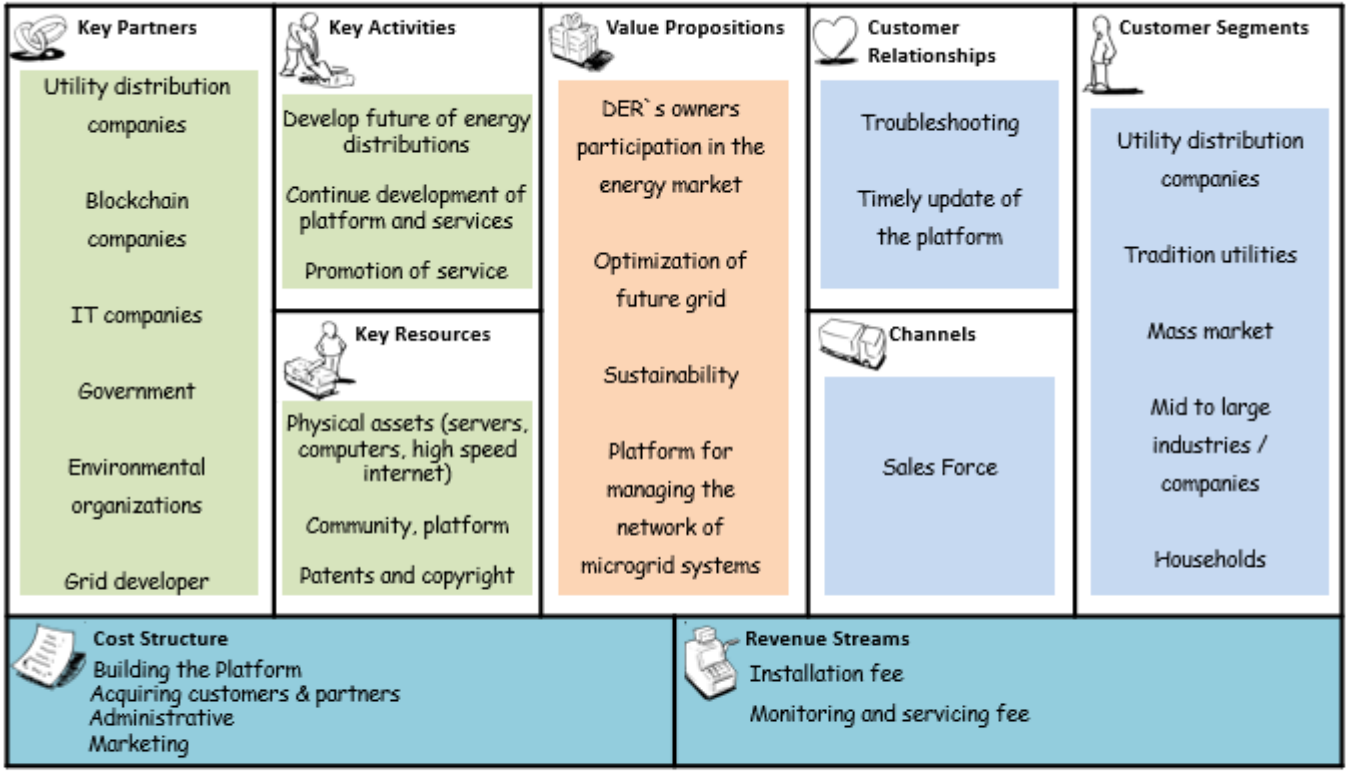
2. Build a success story and take it to next level

Financial analysis:

Investment of 400,000 Euro, our goal is to have cumulative net profits around one million Euro over a period of five years.

Finance & Analysis:

Business Model - ReneTree - Future smart-renewable energy management company



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Thank you for you attention!