Electrical System Simulation Pilot

Background

There is apparent division in the community that has emerged from the meetings around proposals to erect battery storage facilities in West Carleton. This may be largely between two relatively small groups competing for the attention of the majority of the population, which probably sees both sides as having questionable agendas.

Purpose of the Simulation Game

To engage the whole community in a discussion of a stable, sustainable, local electrical system in West Carleton that focuses on learning about electrical systems, the concerns of neighbours and solutions. Such a system would address the long-term needs of this community, as part of a larger entity, the city of Ottawa.

The simulation scenario has frequently been demonstrated to be effective in situations like this, because it tends to focus participants on communication, clearly expressing their concerns, and listening carefully to others in a problem -solving context.

The proposers of this simulation scenario Ottawa Biosphere Eco-city - OBEC has 11 years' experience helping partners such as community associations, professional groups, schools and business groups in Ottawa hold meetings to develop community sustainability plans. , The main facilitator (Rudi Aksim) was learning manager at the Pearson Peacekeeping Centre where he became experienced in the use of simulations to help military personnel understand the roles, challenges and potential solutions in peacekeeping situations around the world. The development of this simulation has been greatly helped by Raymond Leury of the Electric Vehicle Council of Ottawa and members of the Community Associations for Environmental Sustainability (CAFES) community.

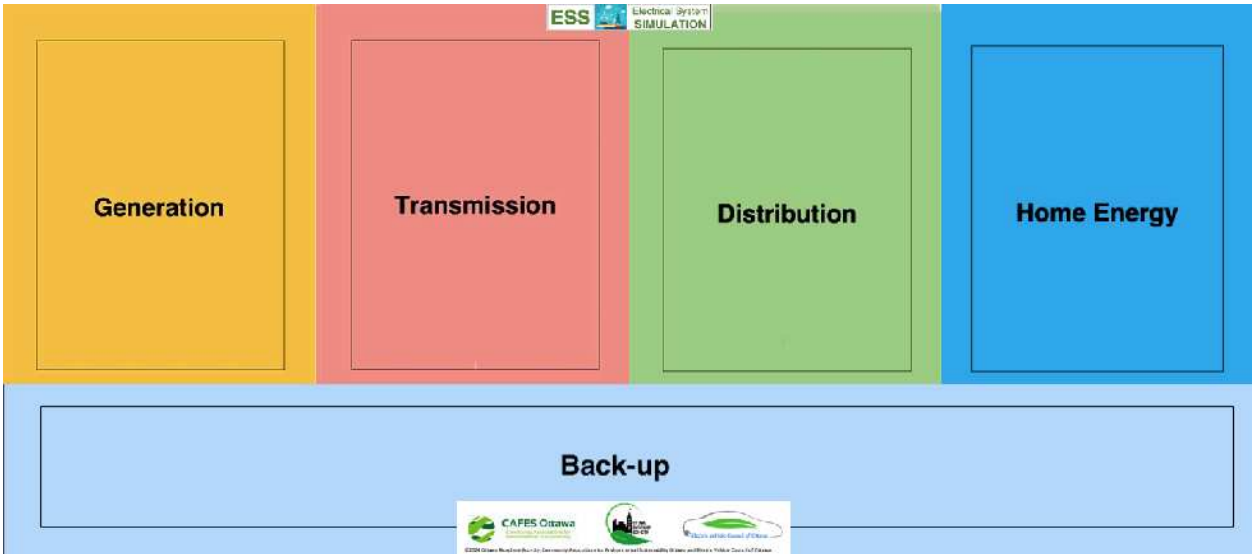
How would the simulation work?

Description:

The simulation will be played on a table-top with a board representing the major elements of a power system (Generation, Transmission, Distribution, Home Energy, Backup), Pick Lists for goals and risks and game cards representing technology solutions.

ESS Electrical System SIMULATION

Game Board



Pick Lists

The pick lists reflect what other participants in this simulation have added to the pick list. In this way the lists come to reflect the goals and risks that concern the communities that have participated in the simulation.

Options/Benefits Pick List:

- Community goals/benefits identified by the participants (such as stability, low risk, low cost, benefits to West Carleton, sustainable long-term, benefits to the wider community local employment, and others identified by participants., which the participants can add to the list of goals)
- Participants write their group's goals on the back of the Goals Pick List for reference during discussions.

Risks Pick List

- Risks identified by the participants (such as fire, air pollution, ground water pollution, ground pollution, costs for building or maintenance, noise, distance from source (long transmission lines susceptible to failure) and others identified by the participants, which the participants can write on the back of the Risks Pick List, for reference during discussions.
- The risks about which the participants are most concerned are written on the back of the Risks Pick List.

Technology Cards

- Technological solutions identified by the participants (such as No new technology required, Nuclear Power Plant, Gas Plant, Pumped Water storage, Community batteries, Home batteries, EV batteries, BESS, Substation, Step-up Transformer, Solar farm, Wind farm, coal plant, Hydro-electric plant, Transmission lines, home generators powered by fossil fuels, gas plant, Roof-top solar or other technologies identified by the participants, which participants can add to the pack of technology cards.
- As with the pick lists, the participants are encouraged to add new technology cards to reflect their knowledge of these systems and the opportunities.
- The current list of technology cards is as follows:

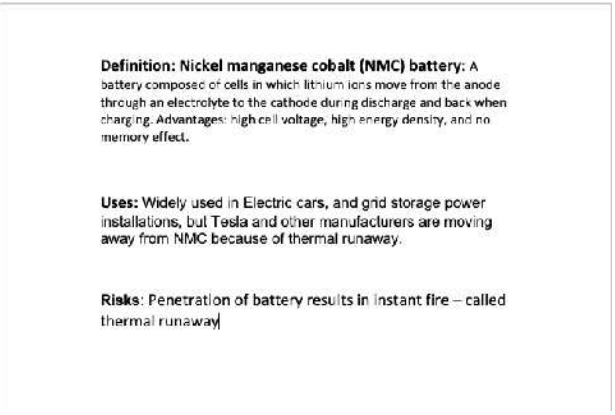
BESS - Grid Level Battery Storage
biomass
Coal plant
Community Battery
EV as Home Battery Backup
Gas Plant
Geothermal
Home Generator (powered by fossil fuel)
Home Personal Solar Panels
Hydroelectric Dam
Lithium-Ion (LFP) Battery
Lithium-ion NMC
Modular Nuclear Reactor (SMR)
Nickel Hydride Battery (NiMH)
No New Technology needed
Nuclear Power Plant
Personal Home Battery
Personal Wind Turbine
Portable Power Station
Pumped Water Storage
Sodium-Ion Battery
Solar Farm
Step-up Transformer
Substation
Tidal Power
Time of Use Management
Transmission Lines
Waste-to-Energy
Wind Farm
Wind Turbine

→ Other technologies/strategies added by YOU!

- Each technology card is named on the front of the card. On the back of the card are a definition of the technology, use examples and known risks and a links to further, curated, information. The following Is an example of the format of the technology cards:

Front

Back



- Each table a collection of options/benefits, risks lists and technology cards.

How is the game played?

The participants are divided into groups or 5 – 7 people.
Each group sits at its own table and has its own set of materials:

- A simulation board
- A copy of each of 3 lists for each member of the group:
  - A Options/Benefits Pick List
  - A Risks Pick List, and
  - A List of the Technology Cards
- A set of Technology Cards.
- A set of erasable markers.
- A pack of blank cards and post-it notes

Each table has a resource person to aid the discussion and clarify the process. The role of the resource person is to explain any technology that may be unfamiliar to the other participants and to moderate the discussion (not to suggest solutions!)

ESS Electrical System SIMULATION

Goal:

Within the group the goal of the game is to arrive at a consensus on a model of an electrical power system for the community that meets the goals, identifies the risks and uses acceptable technology.

Rules:

Within the group, there are no wrong suggestions or answers. All answers and contributions are *correct*. Any goal, risk or card that any member wants laid on the board is put on the board, unless that member agrees it can be removed.

Process:

The discussion around at the table has the following steps:

1. Organizing the table: choosing a chair and recognizing the role of the resource person.
2. Identifying the options or benefits the participants wish to achieve
3. Identifying risks about which participants are concerned
4. Constructing a model using the Technology cards.
5. Sharing the table's model with people from other tables.

1. Setting the goals of the discussion (10 minutes)

- Using the Options/Benefits Pick List as a starting point, the group sets its own options by answering the questions "What do we want the electrical system in our community to be?" (such as stability, low risk, low cost, benefits to West Carleton, sustainable long-term, benefits to the wider community local employment, and others identified by participants., which the participants can add to the list of options)
- Participants write their group's options on the back of the Options/Goals Pick List for reference during discussions.

2. Identifying relevant risks (10 minutes)

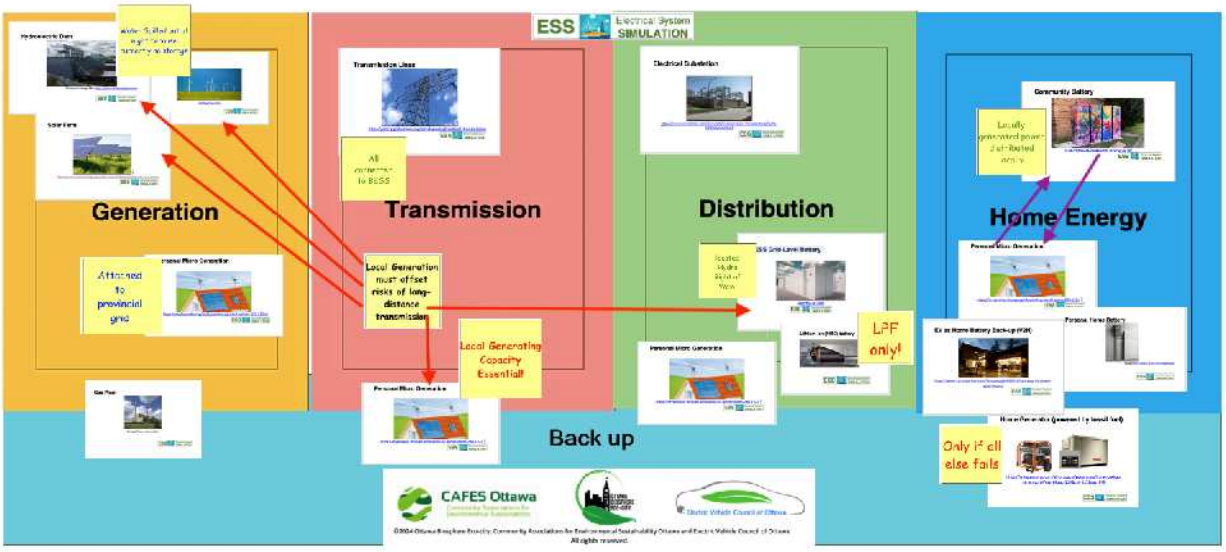
- Using the Risks Pick List as a starting point, the group identifies the risks that concern them (such as fire, air pollution, ground water pollution, ground pollution, costs for building or maintenance, noise, distance from source (long transmission lines susceptible to failure) and others identified by the participants, which the participants can write on the back of the Risks Pick List, for reference during discussions.
- The risks about which the participants are most concerned are written on the back of the Risks Pick List.

3. *Constructing an electrical system model using the Technology cards (up to 1 hour)*
    a. Review of the cards:
        - The participants review the pack of technology cards using the cards themselves and the list of the cards they have each been given.
        - Any question about the cards may be answered by the information on the back of the card or by the facilitator.
        - They also add any new cards to the pack for technology solutions that have been missed.

        - Technological solutions identified by the participants (such as No new technology required, Nuclear Power Plant, Gas Plant, Pumped Water storage, Community batteries, Home batteries, EV batteries, BESS, Substation, Step-up Transformer, Solar farm, Wind farm, coal plant, Hydro-electric plant, Transmission lines, home generators powered by fossil fuels, gas plant, Roof-top solar or other technologies identified by the participants, which participants can add to the pack of technology cards. As with the pick lists, the participants are encouraged to add new technology cards to reflect their knowledge of these systems and the opportunities.

The simulation begins

1. As a group, the participants start to create a model of a sustainable, stable, safe local power system for their community, and lay out cards on the game board to represent technologies that reflect their goals and the risks they have identified.
2. Groups, through discussion, pick Technology Cards and lay them out to create a model of an electrical system, the goals it addresses and the risks it poses. Note – participants are encouraged to choose multiple technology solutions working together. As Katherine Hayhoe, noted Canadian climate scientist says, “There is no silver bullet but there is silver buckshot.”
3. Participants are encouraged to make up their own cards to complete their vision of a stable, sustainable power system.
4. Facilitators take notes on the discussion.
5. At the conclusion of the discussion – when the group is ready (maybe 1 hour later) the resource person photographs each model. Models might look something like this:



Conclusion and Summary

6. As the discussion completes, each group invites the other groups to their table to explain how the system they have designed works. (perhaps 1/2 hour)
    a. The facilitators take notes on the discussion and comments during the table discussions.
    b. The facilitators collect any new risks, goals or Technology Cards that have been made, so they can be added to the game
7. Plenary Discussion and Next Steps
    a. The session concludes with a general discussion to summarize the solutions that the groups have developed and to identify “Next Steps” as appropriate
    b. A “Next Steps” group of volunteers from the group is called to follow up with any next steps that the discussion has identified.
    c. Participants are asked to complete a short questionnaire to give the organizers feedback on the simulation and the process.

Rudi Aksim
OBEC
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