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1. Weather resilience mesh

### **Community Climate Resilience Hubs**

**Concept**: Establish permanent "Resilience Hubs" in vulnerable neighborhoods. These centers serve as education sites, emergency shelters, and distribution centers for essential resources during extreme weather events.

**Technical Innovation**: Equip each hub with renewable energy sources (e.g., solar panels, microgrids) and a cooling/heating system designed for extreme weather, making each hub self-sustaining.

**Community Impact**: Operate under community governance, with advisory boards representing local cultural, social, and economic perspectives to ensure that each hub meets specific needs.

**Justice-Centered Vision**: These hubs prioritize marginalized communities that are disproportionately affected by extreme weather, creating safe spaces during events and training residents on emergency preparedness and climate adaptation.

**Feasibility**: Each hub can be built with modular components, allowing scalability to other regions with similar weather risks.

1. **Extreme Weather Preparedness Education Program with a Digital Platform**

**Concept**: Design an accessible app and complementary workshop series providing localized information on extreme weather preparedness, response, and recovery. Include guidelines for dealing with specific threats like heatwaves, floods, and fires.

**Technical Innovation**: Integrate the app with real-time weather alerts and community-based reporting, allowing users to mark safe zones, share resources, and report hazards.

**Community Impact**: The app could be accessible offline and translated into multiple languages, while workshops would be conducted in community centers to ensure inclusivity.

**Justice-Centered Vision**: Ensure that educational content is co-created with local leaders and community members, addressing cultural and language barriers.

**Feasibility**: Collaborate with meteorological and emergency response agencies for accurate information and funding support. The offline capability would make it useful in areas with unreliable internet access.

### **Warning and Community Alert Network (EWCAN)**

* **Concept**: Develop a grassroots-driven, hyper-local early warning system. This system would leverage existing community networks (e.g., neighborhood watch, religious organizations) to disseminate warnings through mobile alerts, loudspeakers, and neighborhood signals.
* **Technical Innovation**: Use IoT sensors to detect early signs of extreme weather events, feeding real-time data into a community-operated control center that activates alerts across various channels.
* **Community Impact**: Communities would have direct control over their alerts, reducing delays and ensuring rapid dissemination of critical information.
* **Justice-Centered Vision**: Partner with local organizations to ensure alert messaging is culturally relevant and accessible, including in multiple languages and formats (e.g., visual, audio).
* **Feasibility**: Work with telecom companies to provide low-cost or free alert messaging for the system, and partner with local governments for sustainable funding and sensor installation.

### **Neighborhood Climate Action Toolkit**

* **Concept**: Create a toolkit with DIY guides and resources tailored for communities to prepare for and recover from extreme weather events. This could include things like basic water purification, DIY emergency kits, heatwave safety tips, and post-event recovery resources.
* **Feasibility**: Compile and design the toolkit as a digital PDF or simple website. Include illustrations or easy-to-follow visuals, especially for low-literacy accessibility.
* **Community Impact**: Enables vulnerable populations to build resilience with minimal resources, empowering them to act quickly and effectively.
* **Team Skills Needed**: Content curation, graphic design, and basic web development if building a site.

**SARA BAVAN**

**Idea: The Weather Resilience Mesh (Community focused micro-grid model)**

The concept is to create a network of small solar-powered micro-grids that can help our community deal with extreme weather, like heat waves and floods.

The cool part is that these micro-grids can share energy with each other. If one household has extra power, they can help out their neighbors who might need it. This way, we’re not just focusing on the tech; we’re also making sure that vulnerable communities get the support they need during tough times.

Microgrids typically use renewable energy sources, such as solar panels, wind turbines, or biomass, to generate electricity on-site. They can also incorporate energy storage systems like batteries.

The **Weather Resilience Mesh** concept is particularly useful for a variety of extreme weather conditions, including:

1. **Heatwaves:**
   * The micro-grids can provide cooling to vulnerable populations, such as the elderly or those without access to air conditioning. During heatwaves, having localized power can ensure that cooling centers remain operational.
2. **Flooding:**
   * Micro-grids can be designed to be elevated and water-resistant, allowing them to continue operating in flood conditions. They can also provide power for emergency services, such as pumping out water and supporting rescue operations.
3. **Hurricanes and Severe Storms:**
   * The resilience mesh can maintain power supply during and after hurricanes, ensuring that critical infrastructure like hospitals and emergency shelters stay functional. The decentralized nature helps prevent a complete blackout in affected areas.
4. **Wildfires:**
   * In areas prone to wildfires, micro-grids can help power evacuation routes, communication systems, and firefighting efforts. Their location can be strategically chosen to support areas at risk, providing energy for water pumps and other firefighting resources.
5. **Cold Weather Events (e.g., Snowstorms):**
   * In cold climates, the mesh can ensure heat supply for shelters and homes during power outages caused by heavy snow or ice. It can help prevent hypothermia and ensure essential services remain operational.
6. **Droughts:**
   * Although not directly related to weather resilience, maintaining power for water supply systems (like desalination or irrigation) can help mitigate the impacts of droughts, particularly in regions heavily dependent on agriculture.

**ROADMAP**

### **1. Define the Scope**

* **Choose One Weather Event:** Focus on one specific extreme weather event (e.g., heatwave or flooding) to simplify your project.
* **Limit the Features:** Focus on essential features like a basic peer-to-peer energy sharing model and a community engagement component.

### **2. Prototype Development**

* **Simulated Micro-Grid Dashboard:**
  + Create a web-based dashboard that simulates the operation of a micro-grid. Use mock data to show how energy is generated, stored, and shared.
  + Include visuals like a map where users can see the locations of micro-grids and their status (e.g., operational, offline, supplying energy).
* **P2P Energy Trading Simulation:**
  + Develop a simple algorithm that allows users to "trade" energy between micro-grids. For example, if one micro-grid has excess energy, it can be "sold" to another that needs it.
  + Use JavaScript or Python to simulate transactions and display the results on the dashboard.

### **4. Use Available Tools**

* **Mapping Tools:**
  + Use mapping APIs (like Google Maps) to visualize micro-grid locations. This can help illustrate how the mesh connects different community areas.
* **Data Visualization Libraries:**
  + Use libraries like Chart.js or D3.js to visualize energy generation and consumption data effectively.

### **5. Presentation and Documentation**

* **Prepare a Short Presentation:**
  + Create a presentation that outlines the problem, your proposed solution, and how it addresses community resilience and climate justice.
  + Include screenshots or a live demo of your prototype to showcase how it works.
* **Justice-Centered Vision Statement:**
  + Write a concise vision statement that emphasizes how your solution empowers marginalized communities and promotes equity.

### **6. Get Feedback**

* **Engage with Other Teams or Mentors:**
  + Share your idea and prototype with other hackathon participants or mentors for feedback and suggestions. This can provide new insights or improvement ideas.

### **Example Roadmap for 48 Hours**

**Day 1:**

* Morning: Define scope, select the weather event, and outline features.
* Afternoon: Begin developing the micro-grid dashboard and P2P energy trading simulation.
* Evening: Work on the community engagement component (survey/feedback form).

**Day 2:**

* Morning: Integrate mapping tools and data visualization.
* Afternoon: Finalize the prototype, test for functionality, and prepare your presentation.
* Evening: Practice presenting your solution and gather any last-minute feedback.

### **Conclusion**

By focusing on a streamlined prototype that includes a simulated dashboard and P2P energy trading, you can effectively showcase the core aspects of the Weather Resilience Mesh concept in a short amount of time. This approach allows you to demonstrate not only the technical feasibility but also the community engagement and climate justice components essential for the hackathon. Good luck!

Micro-grids can play a vital role in supporting communities during **wildfires** by providing reliable, localized power that helps maintain critical services, supports firefighting efforts, and enhances community resilience. Here are some key ways micro-grids can be effective:

1. **Powering Essential Services During Outages**:
   * Wildfires often lead to large-scale power outages as traditional power lines are damaged or preemptively shut off to reduce fire risks. Micro-grids can power essential services like fire stations, hospitals, shelters, and water pumps, ensuring these critical facilities continue to operate even when the main grid is down.
2. **Supporting Firefighting Efforts**:
   * Micro-grids, especially those connected to solar panels or battery storage, provide independent power sources that can keep local firefighting equipment running. This helps sustain water pressure for firefighting, powers command centers, and provides reliable communication systems essential for coordinating fire response.
3. **Reducing Fire Risks from Power Lines**:
   * In areas with a high risk of wildfires, micro-grids can reduce dependency on long-distance transmission lines, which are often a fire hazard. By localizing power generation, the need for long power lines that can spark fires in dry areas is minimized.
4. **Supplying Power for Evacuation and Communication Centers**:
   * During wildfires, micro-grids can power evacuation sites, emergency communication hubs, and temporary shelters, ensuring people have safe places to gather, receive information, and access medical care.
5. **Providing Resilience for Recovery Efforts**:
   * After a wildfire, micro-grids enable faster recovery by providing power for rebuilding efforts, re-establishing communication networks, and helping communities return to normalcy sooner than they might with delayed power restoration.
6. **Reducing Air Pollution and Supporting Health Services**:
   * Many micro-grids are designed to use renewable energy, which limits air pollution, an important consideration during wildfire events when smoke already degrades air quality. Micro-grids can power filtration systems in health clinics and shelters, improving air quality for vulnerable groups.

### **Digital "Community Climate Justice Bulletin" Platform**

* **Concept**: Develop a digital platform where Vancouver residents can share and access localized updates on climate-related risks and resources—focusing on crowd-sourced data on infrastructure issues, blocked roads, local air quality, and available resources during extreme weather events.
* **Climate Justice Angle**: Emphasize outreach and support for residents in marginalized communities, ensuring the platform is accessible and multilingual, helping bridge information gaps. Collaborate with local advocacy groups to manage and verify community-generated data.

**Rakesh**:

Notes: Real-time data using sensors on drones circulating certain areas in the forest. Depending on sensor readings communicate it to central surveillance then send necessary info to the communities nearby for evacuation to secure places.

How do they go to the places?

Community management or engagement platform for transport-related information in real-time. People can post, or drones circulating the areas can provide information to the people.

Set up microgrids of solar power operated or any renewable resources at evaluation places that are isolated from the main transmission line

Two dashboards -

### **1. Dashboard 1: Real-Time Fire Surveillance and Community Alert Dashboard**

This dashboard would serve both emergency responders and nearby communities, providing a central view of real-time fire data, risk assessments, and safe evacuation routes. Here’s what it would include:

* **Data Sets Required**:
  + **Drone Sensor Data**:
    - Thermal imaging for heat detection.
    - Smoke detection sensors for identifying early smoke signatures.
    - GPS data for precise location of hot spots or moving fires.
    - Air quality sensors for smoke intensity levels affecting nearby communities.
  + **Weather and Environmental Data**:
    - Real-time weather (temperature, wind speed, humidity) to predict fire spread.
    - Historical fire data for risk prediction in areas of high recurrence.
    - Vegetation and fuel density in surrounding areas (satellite or environmental agency data).
  + **Geographic Information System (GIS) Data**:
    - High-resolution topography and road network data for accessible evacuation routes.
    - Proximity to safe zones (e.g., shelters, microgrid-supported locations).
  + **Community and Infrastructure Data**:
    - Population density and demographics of affected regions.
    - Location of critical infrastructure (e.g., hospitals, schools, transportation hubs).
  + **Emergency Notification Systems**:
    - Local emergency contacts and notification systems integrated with community messaging platforms.
* **Key Dashboard Components**:
  + **Map-Based Visualization**: Displaying real-time drone data overlays, with color-coded zones based on fire intensity and wind projections.
  + **Evacuation Routes and Shelter Status**: Showing real-time updates on open, safe evacuation routes and shelter capacities.
  + **Air Quality and Health Risk Notifications**: Visualizing air quality levels and health risk indicators for affected communities.
  + **Automated Alerts**: A push notification system to alert communities about new fire risks or changes in evacuation instructions.

### **2. Dashboard 2: Resource and Shelter Management Dashboard**

This dashboard would track resource availability, infrastructure status, and community needs at evacuation sites, ensuring people have power, transportation, and essential supplies.

* **Data Sets Required**:
  + **Microgrid Status and Energy Availability**:
    - Real-time data on power availability from microgrids at evacuation sites.
    - Solar and other renewable resource production data.
    - Battery storage capacity and remaining charge levels.
  + **Shelter Capacity and Supply Inventory**:
    - Shelter capacities, occupancy rates, and resource availability (e.g., food, water, medical supplies).
    - Data on available medical personnel and volunteers at each shelter.
  + **Transport and Accessibility Data**:
    - Data from community platforms where residents post about transportation availability, congestion, and vehicle-sharing offers.
    - GPS and road accessibility data to highlight safe or blocked routes.
  + **Evacuation Support Needs**:
    - Data on population segments needing assistance (e.g., elderly, mobility-limited individuals).
    - Nearby resources or support teams for special needs populations.
* **Key Dashboard Components**:
  + **Shelter Status**: Real-time occupancy and resource availability (e.g., food, power, medical supplies) at each shelter site, updated as people arrive and supplies are used.
  + **Microgrid Power Levels**: Energy availability for each microgrid-powered shelter, displaying current power levels, usage, and projected endurance.
  + **Transport Assistance and Accessibility Map**: Community-generated transport data, showing areas with available or needed transportation, blocked routes, and vehicle-sharing opportunities.
  + **Community Messaging Board**: Platform where people can post real-time updates or needs, such as requests for transportation, special assistance, or resource shortages.

These two dashboards, when integrated, would support a responsive and well-informed community and resource management effort during forest fires, leveraging drone data, microgrid power, and community engagement for enhanced safety and resilience.