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Power 4 All

White Paper



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RESILIENT ECOSYSTEMS FOR THE KITSAP RESILIENCY PROJECT

Abstract

Resiliency requires that “all” of the basic needs are covered and secure, by this we mean, Food, Water, Power, Medical/Health, Shelter, Transportation etc. To this end we are addressing day to day needs and developing the needs during a crisis.

Kitsap County is the perfect location to create a new and secure power model. We are an at risk location with a large military component that needs to have reliable power continuity during crisis. Yes, the Navy has carriers and several nuclear-powered

ships and boats that can supply power... that said, a disaster big enough, natural or otherwise can disrupt that ability. What is needed is a distributed and redundant power generation and delivery network. This White Paper addresses that need and the needs for power security of all citizens of Kitsap County.

The **Power 4 All** Project is a growing movement toward decentralized/distributed generation based on a community model. This is not an overnight shift and will require that significant public will be developed to move the utilities and government toward adoption. The Kitsap Resiliency Project teams are already working on three separate areas to develop on the ground models for the entire community:

1. The Urban model; we are beginning outreach to newer, urban, developments to explore the possibility of creating a community microgrid fed by roof mounted solar.
2. The Rural model; We are beginning discussions with a South Kitsap farming community to explore a microgrid installation supported by solar and, potentially, anaerobic digestion and wind.
3. If these models are successful we will seek a housing community to model on a larger scale.

Priorities:

1. Power the home/building
2. Power the community
3. Power the grid

The technology exists to make this happen, we need to clear some perception, policy, regulatory and corporate profitability hurdles to make this work.

“On April 30, Germany established a new national record for renewable energy use. Part of that day (during the long May 1 weekend), 85% of all the electricity consumed in Germany was being produced from renewables such as wind, solar, biomass, and hydroelectric power.”ⁱ

The Problem

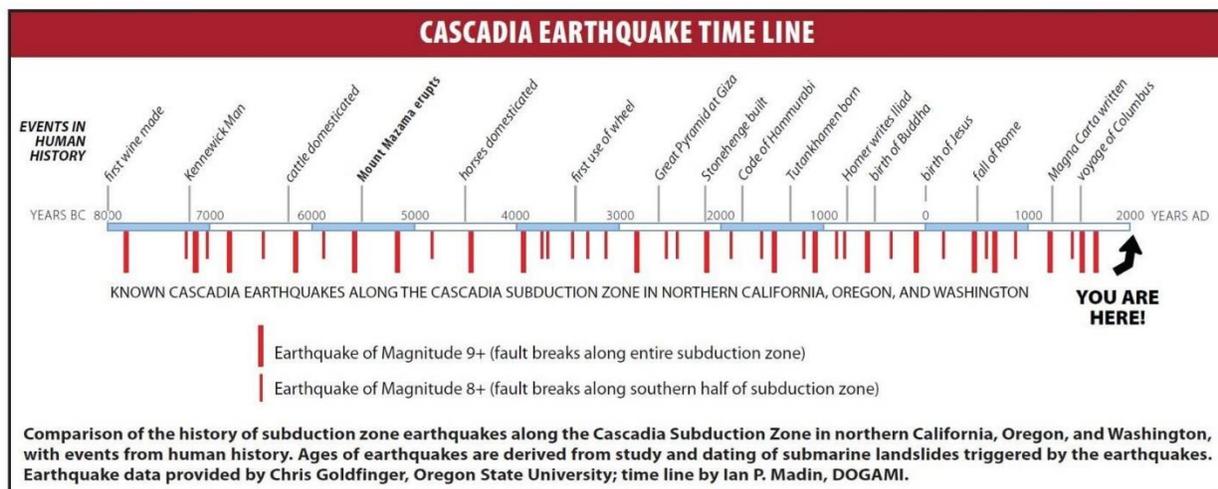
Power Security is a real issue when you live in an area that can become inaccessible in times of disaster. All access points to and from the Kitsap peninsula are at risk of collapse, impediment, or other failure that will prevent reliable transportation. FEMA has projected that due to liquefaction in the Gorst area the corridor between central and south Kitsap will fail and the power trunks coming through Gorst and across the Tacoma Narrows Bridge will fail leaving 266,000 people trapped, hungry and in the dark.

“Just north of the San Andreas, however, lies another fault line. Known as the Cascadia subduction zone, it runs for seven hundred miles off the coast of the Pacific Northwest, beginning near Cape Mendocino, California, continuing along Oregon and Washington, and terminating around Vancouver Island, Canada.

The “Cascadia” part of its name comes from the Cascade Range, a chain of volcanic mountains that follow the same course a hundred or so miles inland. The “subduction zone” part refers to a region of the planet where one tectonic plate is sliding underneath (subducting) another. Tectonic plates are those slabs of mantle and crust that, in their epochs-long drift, rearrange the earth’s continents and oceans. Most of the time, their movement is slow, harmless, and all but undetectable. Occasionally, at the borders where they meet, it is not.

In the Pacific Northwest, the area of impact will cover some hundred and forty thousand square miles, including Seattle, Tacoma, Portland, Eugene, Salem (the capital city of Oregon), Olympia (the capital of Washington), and some seven million people. When the next full-margin rupture happens, that region will suffer the worst natural disaster in the history of North America.”ⁱⁱ

This is a pending reality and we have been in the window for some time. One scientist quoted in the 2008 documentary, Shockwave, about the science behind the Cascadia Rising event said that we know one thing for certain... every day that passes without experiencing Cascadia brings it one day closer.ⁱⁱⁱ



The centralized model for power is antiquated, expensive and inefficient. The insistence on continuing this model has more to do with profit than service provision, and propagates coal, nuclear and massive dirty plants that create situations like Hinkley, CA, the town of Erin Brockovich fame. Long delivery runs and mismatched operating systems, that created the massive U.S. Northeast blackout of 2003, massive central plants that create single points of failure.

*“The **Northeast blackout of 2003** was a widespread power outage throughout parts of the Northeastern and Midwestern United States and the Canadian province of Ontario on August 14, 2003, just after 4:10 p.m. EDT.*

Some power was restored by 11 p.m. Most did not get their power back until two days later. In other areas, it took nearly a week or two for power to be restored. At the time, it was the world's second most widespread blackout in history, after the 1999 Southern Brazil blackout. The outage, which was much more widespread than the Northeast Blackout of 1965, affected an estimated 10 million people in Ontario and 45 million people in eight U.S. states.

The blackout's primary cause was a software bug in the alarm system at the control room of First Energy Corporation, an Akron, Ohio-based company, causing operators to remain unaware of the need to re-distribute load after overloaded transmission lines drooped into foliage. What should have been a manageable local blackout cascaded into collapse of the entire

electric grid. According to the New York Independent System Operator (NYISO) – the ISO responsible for managing the New York state power grid – a 3,500-megawatt power surge (towards Ontario) affected the transmission grid at 4:10:39 p.m. EDT.

According to the official analysis of the blackout prepared by the US and Canadian governments, more than 508 generating units at 265 power plants shut down during the outage. In the minutes before the event, the NYISO-managed power system was carrying 28,700 MW of load. At the height of the outage, the load had dropped to 5,716 MW, a loss of 80%.^{”v}

Finally, it is a security issue:

Distributed Power Generation for Homeland Security:

Proposal for a New Federal and State Partnership by Lewis Milford, Clean Energy Group Assisted by Ruth O’Meara-Costello, CEG Intern (excerpted)

New Unconventional Solutions Needed

Terrorism and energy issues should affect new thinking and new solutions. Planning for power outages has usually assumed the cause of an outage to be either equipment or weather related, and responses to outages related to these causes are necessarily different from responses to terrorism. “Length of outages, coordination of attack, and scope of damage make conflict conditions very different from



blackouts caused by hurricanes or heightened electricity demand. “Faced with these risks, many experts dealing with the problem of energy system vulnerability have returned to solutions first advocated decades earlier. In an unusual statement of support for renewable and distributed energy, former top government security chiefs endorsed clean energy options in a letter to Congress. On September 19, 2001, a week after the attacks, the former head of the CIA Woolsey, former National Security Advisor to President Reagan MacFarland, and former Chairman of the Joint Chiefs of

Staff Moorer wrote, “Our refineries, pipelines and electrical grid are highly vulnerable to conventional military, nuclear and terror attacks.

The Fallacy of U.S. Solar Incentives

Did you know, the way solar is being incentivized through net metering, a home with solar feeds the grid, and is just as dark as the neighbors when grid power is out? Did you know that most of Kitsap County's power is delivered by a line coming through Gorst and across the Tacoma Narrows Bridge? And that FEMA says in a disaster like Cascadia Rising, we, the people on the Kitsap peninsula, could be without power up to a year... 266,000 people, no power for a year? A PSE representative addressed FEMA’s projection by saying it would be no longer that 4-6 months... Think about that.

Background

Coming out of World War II the American industrial base was unsurpassed and the wartime tax structure was still in place providing unprecedented funding to build the U.S. infrastructure. And that we did, under the leadership of President Dwight D. Eisenhower. We built the highway system, and power plants, the phone systems and America became the first modern Superpower. That was in the 1950's...

Starting in the 1970's, actually the end of the 1950's, there started a process of tax reductions and deregulation which has at this point virtually bankrupted the United States. The federal, state, county and city governments can no longer afford to upgrade the infrastructure, leading the American Society of Civil Engineers to give the country a -D grade on the existing infrastructure. No significant upgrades or innovation is pursued, unless a crisis is emanant. Utilities no longer invest in upgrading our aging infrastructure, they barley manage to keep the services operating.

The reality is that the existing financial model does not provide an incentive to install solar but a disincentive. The utility is required to pay retail for power generated from a source that is essentially useless for them. The power generated from a home or building is not significant enough to be useful with the existing systems and centralized model. This combined with the lack of regulatory incentive to invest in research and development, and grid upgrade and you begin to see a picture that will not serve the needs of the people that the utilities are supposed to serve.

It is time to look at other models that are successfully being implemented around the world and learn from them. It is time that the people of the United States become educated and exercise their rights and demand that we pursue a model that serves the stakeholders and not just the shareholders. There also exists a misinformation campaign that prevents people from accepting the need to move to a decentralized/distributed model. The campaign offers statements like these:

- Washington does not have enough wind to make turbines feasible
- Washington does not have enough sun for solar
- Battery technology is too expensive and has not yet been proven

Solution



boundary, need, and potential.

Decentralized/Distributed power systems starting with home generation and community microgrids. Creating secure power generation through massive redundancy and cascading failover potential.

There are many issues to overcome, not the least is the need for a redirection in priority from profit to service. The only way to accomplish this in the necessary timeframe is to drive change through public will and through the development of a model that has value to all parties. Kitsap County has all the elements necessary to make this possible; clear

Clear Boundary



What makes Kitsap a challenge during a disaster becomes a benefit for creating a model for change. The picture clearly shows the water borders that make Kitsap a peninsula and the narrow point of marshland that could make it an island. The power trunks marked in red show the single points of failure for most of the delivered power. Remember, that with the grid down the currently installed solar is also unable to supply generated power.

Creating a distributed/renewable model here is easier due to the clearly defined borders, the need and cost of replacing the grid after the disaster, think Puerto Rico, and the ability to generate buy-in.

Power would no longer be bought or sold but generated. Payments would be made for infrastructure support and maintenance.

The Need

Kitsap will become isolated after the effects of the Cascadia event are done, homes shattered, power gone, water and food unavailable, medical facilities in chaos, and first responders unable to get where they are needed. Added to this is both the lack of access to the peninsula and the greater need, population and infrastructure of the Tacoma, Seattle, Everett corridor, that FEMA states will be in disarray west of Interstate 5. Developing resilient infrastructure that makes Kitsap more self-reliant is critical.

Potential

Kitsap County has a clear potential to become the model for resilience and self-reliance for Western Washington. We have all the elements necessary to make tremendous change and develop secure power generation that does not fail because a transformer, antiquated technology, on a pole fails, or is hit by a drunk driver. The only thing we are missing is the public will to drive the change. Join the movement and become part of the Kitsap Resiliency Movement.

What it looks like

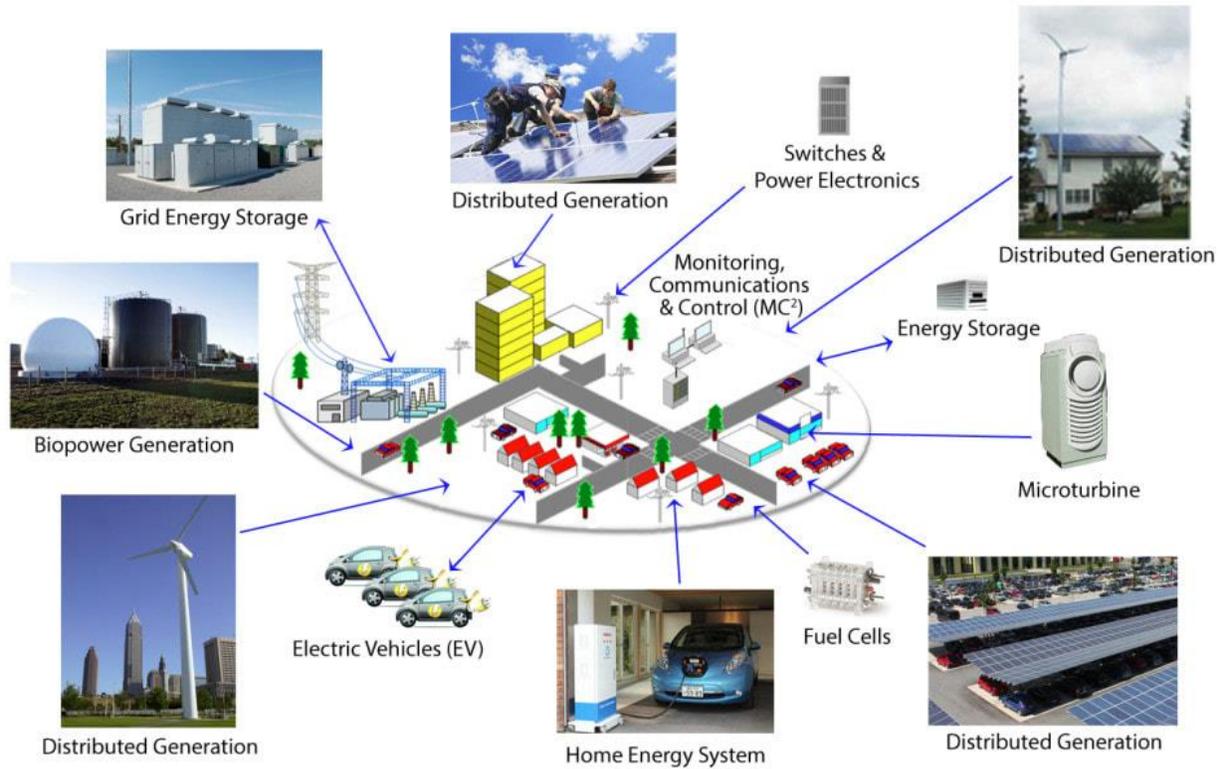
Elements of a Secure Decentralized System

- Local management based on a standardized system that feeds into the grid after the local microgrid charges local storage systems.
- Many into one, the grid does not go away, but becomes a supporting structure for many microgrids being fed by many sources.
- Flexibility to add or refine technologies as they develop.
- No single point of failure, redundancy and far greater security.

Attributes of Microgrids

- Integrates supply-side and demand-side-resources on a local distribution grid at low voltage level.
- Two modes of operation:
- Mutual support-normal state (connected with grid)

- Independence- impervious to grid emergencies- in (island) operation.
- Microgrid incorporates generation, transmission, distribution, storage, and maintains local power balance, and optimal energy allocation.



Kitsap Resiliency Project



ⁱ Excerpted from *Clean Technica*, May 8th, 2017 by Steve Hanley

ⁱⁱ Excerpt from the *New Yorker Magazine* June 2015, *The Really Big One*.

ⁱⁱⁱ Look for educational screenings around Kitsap

^{iv} Excerpted from Wikipedia article