TESCO METERING

Case Study: Switching Between the Grid and Back-up Power

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Industry Context & Need Gap

Background: PG&E's Dilemma

The Challenge of Power Outages:

- Due to wildfires and other emergencies, utilities like PG&E have had to preemptively shut down power to protect property.

- There is a growing need for a reliable and **safe method** to switch between utility power and backup generators.

PG&E's Dilemma:

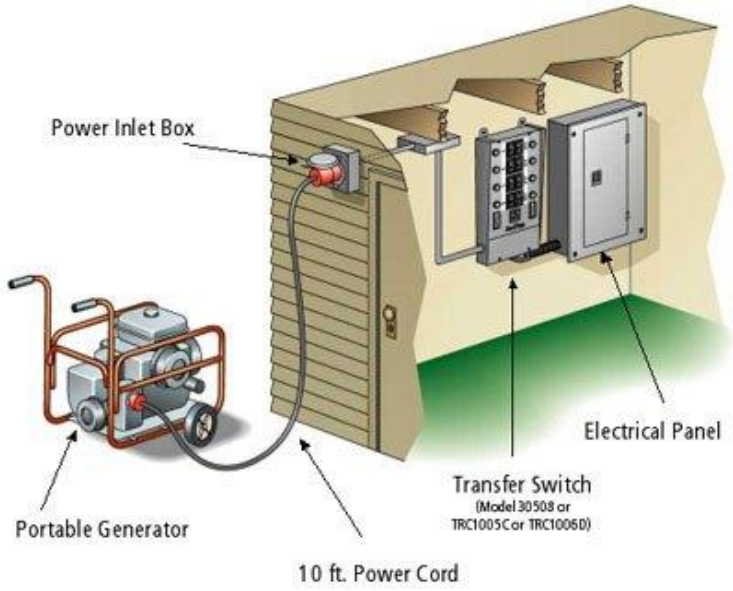
- Customers and the **California Public Utilities Commission (CPUC)** have urged PG&E to find a better solution for backup power access.

- Traditional options, such as **extension cords and manual transfer switches**, are either unsafe or prohibitively expensive.

Portable Generators: Standard Transfer Switch

How a Standard Transfer Switch Works

- A **manual transfer switch** is installed **between the home's electrical panel and an external generator inlet**.
- When utility power fails, the **homeowner must manually switch** from utility power to generator power.
- The generator must be **manually started**, and only the circuits connected to the transfer switch can be powered.
- The transfer switch **prevents backfeeding** by ensuring that utility power and generator power **are never connected simultaneously**.
- Since portable generators are **lower capacity** than the grid, most **transfer switches include a sub-panel**, allowing users to **select only certain essential circuits** to power.



Standard Transfer Switches: Challenges

Challenges & Disadvantages of a Standard Transfer Switch

Requires Professional Installation

- An electrician must install the switch, which can be **expensive ($2,500–$5,000+)**
- Installation is time-consuming and requires a **temporary power outage** during setup.

Manual Operation & Inconvenience

- The homeowner must **physically operate the switch**, which can be difficult during a storm or at night.
- If the outage occurs unexpectedly, users must go outside to **start the generator and engage the switch manually**.

High Cost & Maintenance

- The **cost of a standard transfer switch installation** (including an electrician) can be **more expensive than a generator itself**.
- Users need to maintain both the **generator** and the **transfer switch system**, adding complexity.

The Danger of Not Having BPTM

Existing Backup Power Solutions Are Inefficient or Risky:

- **Manual transfer switches** are expensive, often costing thousands of dollars for installation.
- **Extension cords** are dangerous and not ideal for connecting generators.
- Many utilities **reject third-party solutions** that interfere with the connection between the meter and the socket box due to legal concerns.

Safety and Performance Issues:

- Risk of **backfeeding**, which can be hazardous to utility workers.
- **Voltage surges and lost phases** can damage appliances.
- **Arcing in extension cords cause fires!**

Backup Generator: No BPTM Safety Hazards

Risk of Backfeeding into the Utility Grid

- Without a proper transfer switch, **generator power can flow back into the grid**, creating a serious **electrocution hazard** for utility workers and neighbors.
- Backfeeding is **illegal** in many areas and can lead to **severe liability issues** for homeowners.

Fire & Electrical Risks from Extension Cords

- Many users rely on **extension cords** to connect appliances to a generator.
- Most household extension cords **are not rated for high wattage**, increasing the risk of **overheating and fire hazards**.
- Using multiple cords across the house **creates a tripping hazard** and exposes wiring to potential **wear and tear**.

Overloading Circuits & Damaging Appliances

- Without **proper circuit protection**, users may accidentally **overload** their generator, damaging sensitive electronics and appliances.
- Hardwired systems like **well pumps, furnaces, and water heaters cannot** be powered through extension cords, leaving key household functions offline.

Backup Generator: No BPTM Compliance Issues

Violation of Electrical Codes & Utility Policies

- Many utilities **require a certified transfer switch** for home generator use to **prevent back feed** and other hazards.
- Homeowners using unsafe setups **may face fines, service disconnections, or denial of insurance claims** if damage occurs.

Liability Issues in the Event of an Accident

- If improper generator use causes a **fire, electrocution, or damage**, homeowners may be **liable for injuries or property loss**.
- Some home insurance policies **do not cover damages** caused by unsafe generator connections.

The BPTM Solution

How Does BPTM Solve These Problems?

- **Safely isolates generator** power from the utility grid, preventing backfeeding.
- **Eliminates the need for extension cords** by delivering power directly to the home's electrical panel.
- **Includes built-in circuit protection** to prevent overloads and surges.
- **Detects missing or unstable phases** and prevents the transfer from grid if power conditions are unsafe.
- **Automatically switches** between grid and generator power, reducing manual effort.
- **Fully compliant** with utility safety regulations, reducing liability risks.

Introducing the TESCO BPTM

Solution: The Backup Power Transfer Meter (BPTM)

Key Features:

- **Utility-Owned & Approved:** Installed directly in utility's electric meter socket, eliminating third-party concerns.
- **Automatic Switchover:** Seamlessly switches to generator power when utility power is lost and back when restored.
- **Safety Protections:** Includes **overload protection, backfeed prevention, and surge mitigation.**
- **No Extension Cords Required:** Powers the home safely through the main breaker panel.
- **Ease of Installation:** Typically installed in under **45 minutes** by utility certified personnel.
- **Versatility:** Compatible with **higher-amperage generators, solar panels, battery walls, and EV power sources.**

Advantages Over Other Solutions:

- More **cost-effective** than manual transfer switches.
- Avoids the risks associated with **DIY setups and extension cords.**
- **Maintains compliance** with utility-grade safety standards.

PG&E and Their BPTM Program: TESCO Powered

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First-of-its-Kind Technology Allows PG&E Customers to Safely and Easily Connect Backup Power to Their Homes

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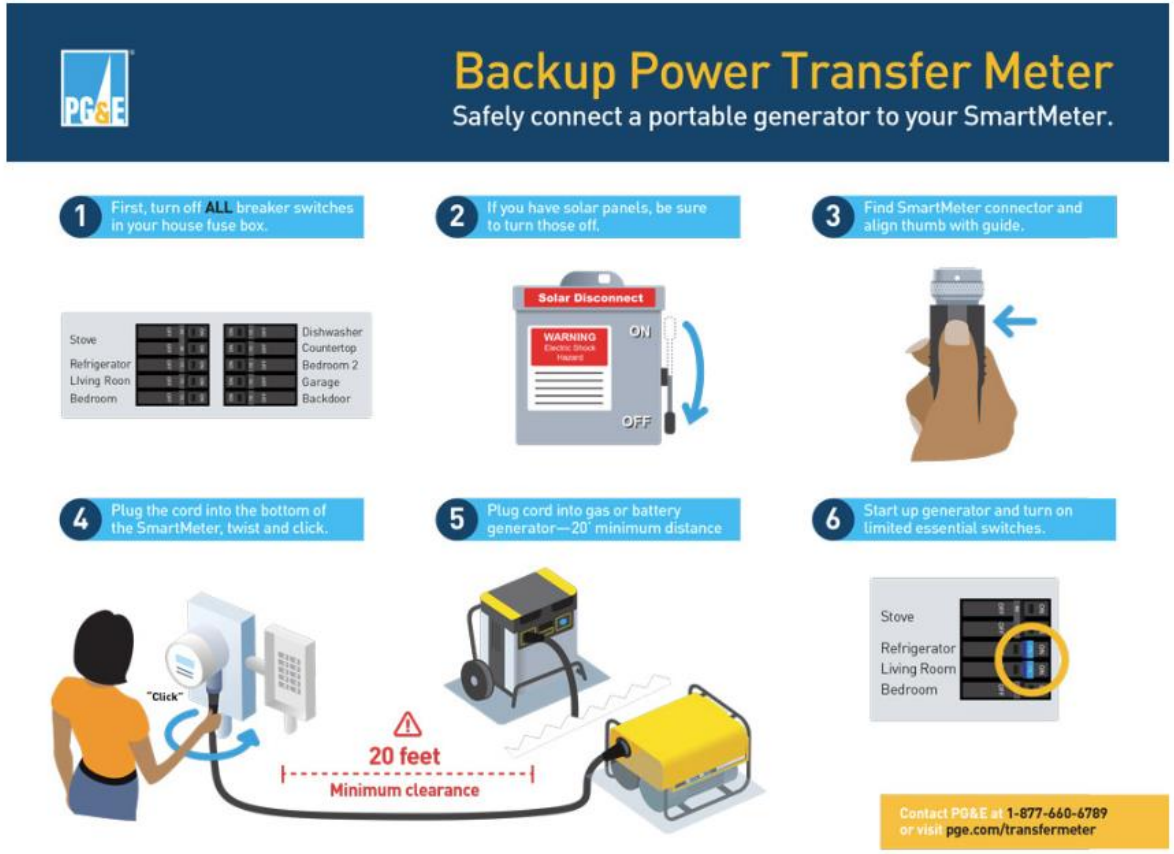

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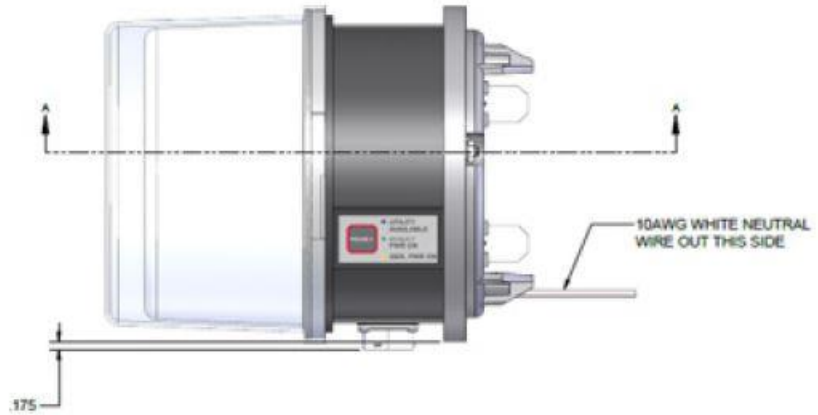

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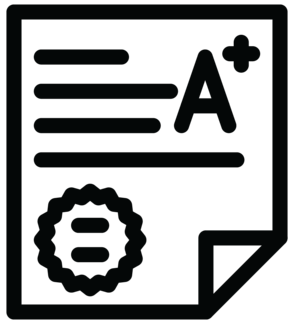


PG&E BPTM Results

Proven Success & Adoption

- PG&E has installed ~11,000 BPTMs since 2021.
- Expansion planned for more customers in 2025.
- Provides safer, utility-managed backup power.
- Reduces reliance on risky DIY setups.

Enhanced Safety & Compliance

- Reduces backfeeding incidents.
- Enhances safety for utility workers.
- Eliminates unsafe extension cords.
- Prevents makeshift wiring hazards.

Increased Customer Adoption & Satisfaction

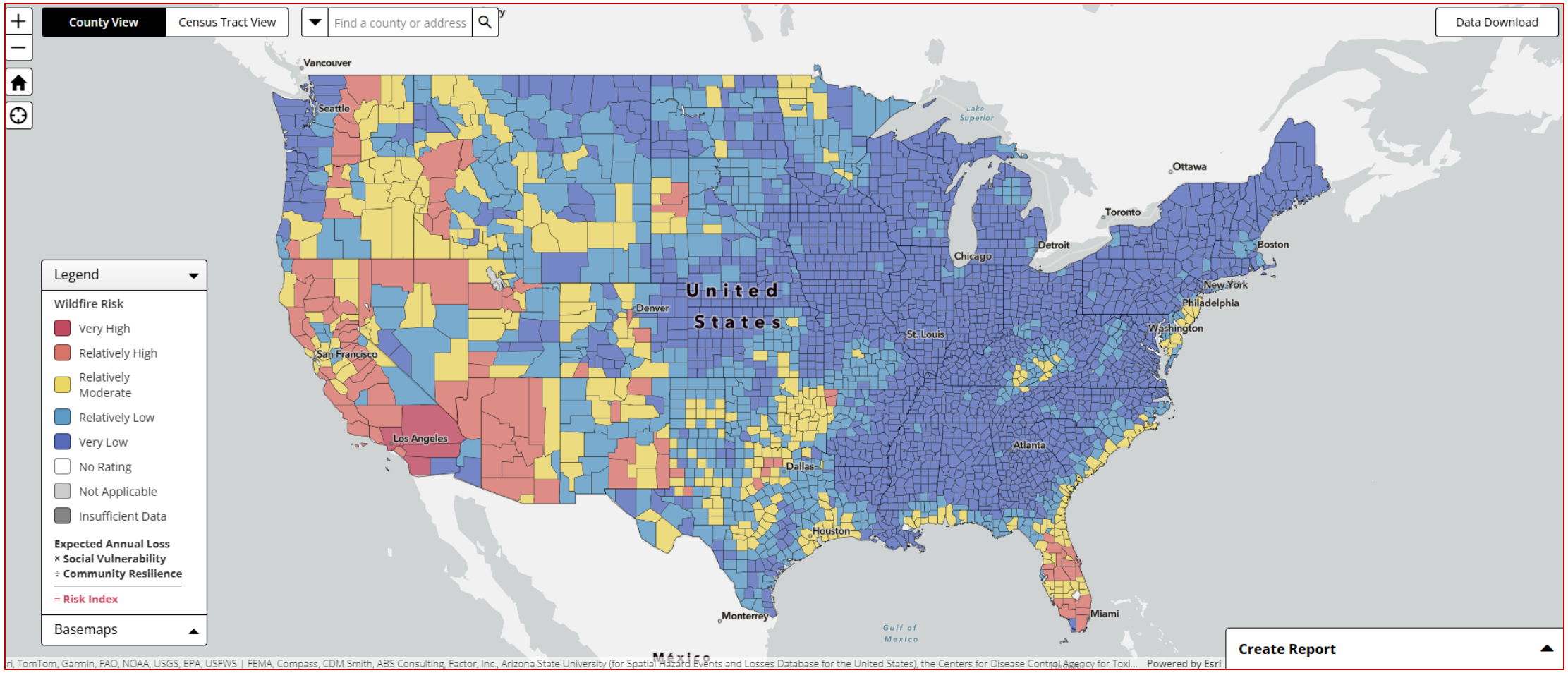
- Customers benefit from a seamless, automatic backup power transition.
- Eliminated the need for costly electrician-installed transfer switches.
- One customer noted: *“Explaining how to start my generator took longer than installing the BPTM.”*

Stronger Utility-Consumer Partnership

- PG&E oversees backup power installation and operation.
- Supports California's grid modernization efforts.
- Scales for future DER integrations like battery storage and solar.
- Improves backup power safety, reliability, and customer satisfaction.

Target Use Cases

Opportunity Areas: Wildfire Risk Map



https://hazards.fema.gov/nri/map

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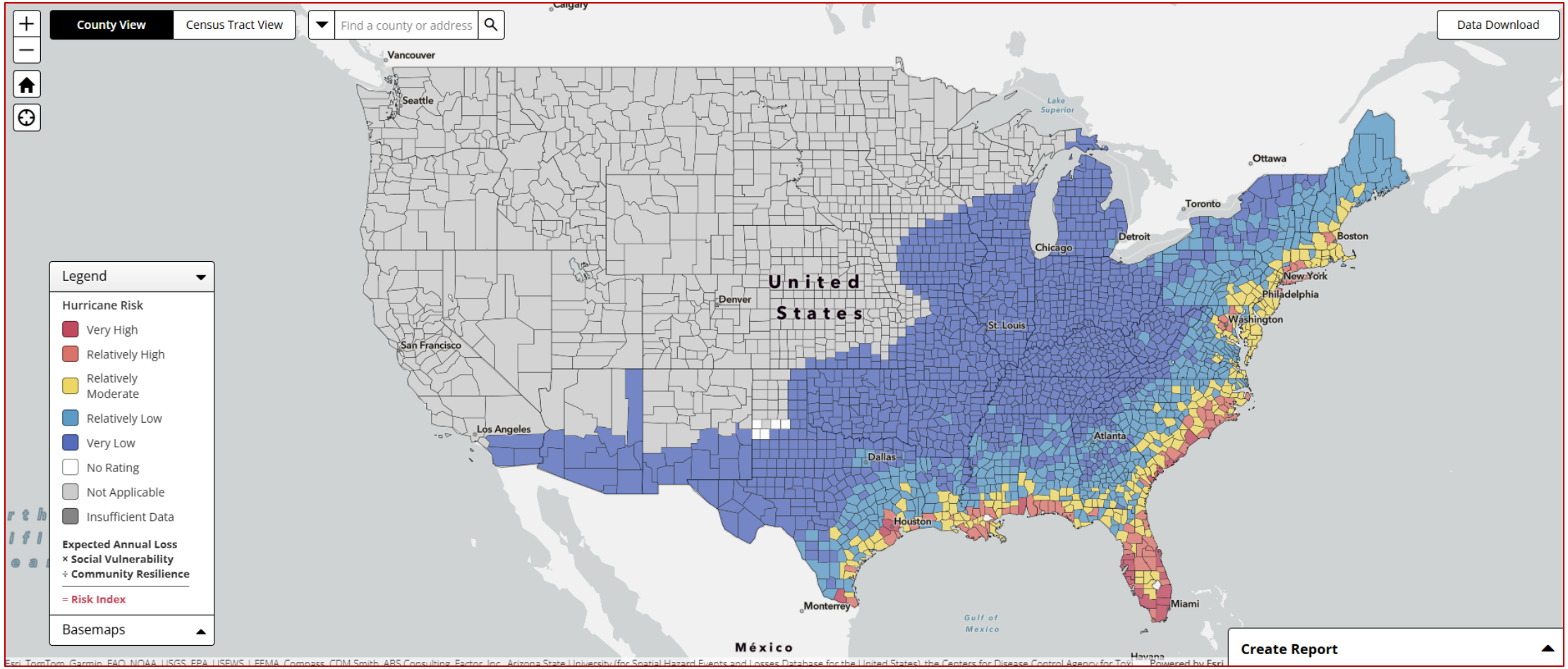
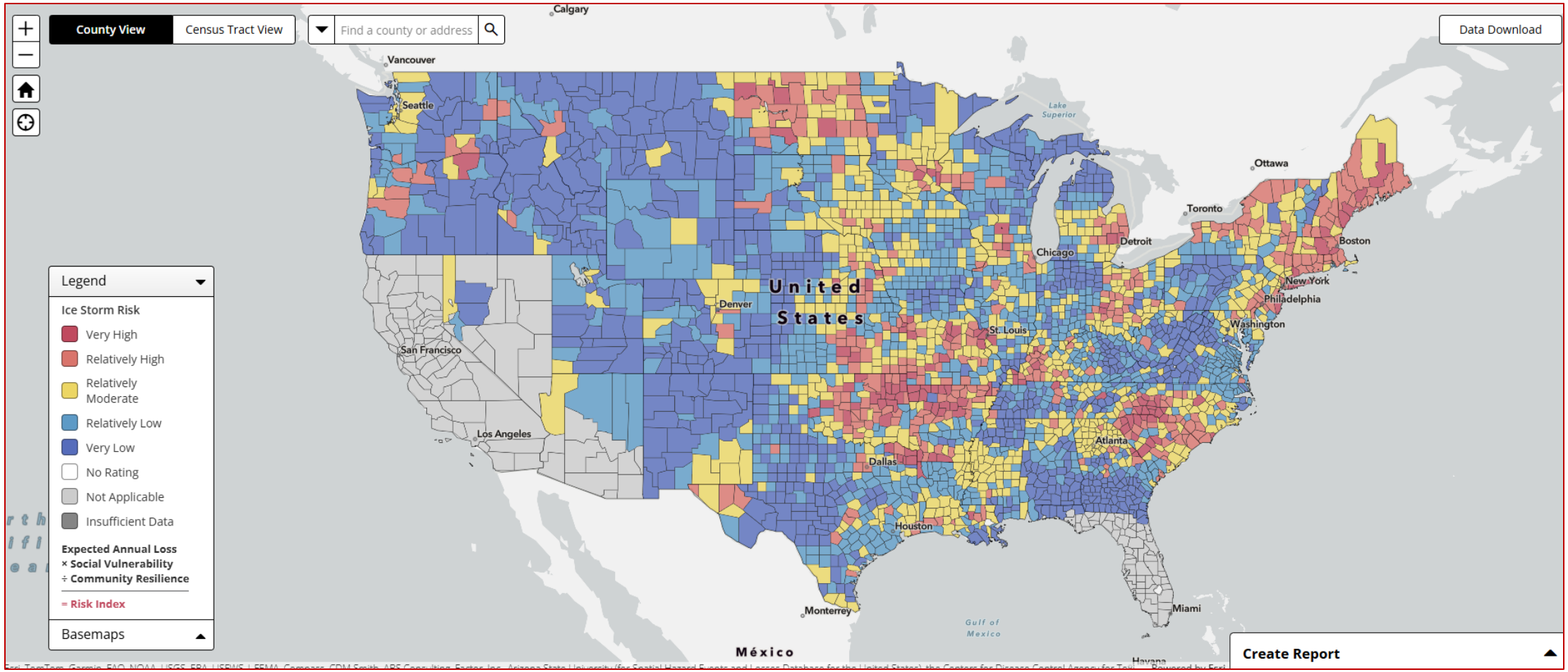
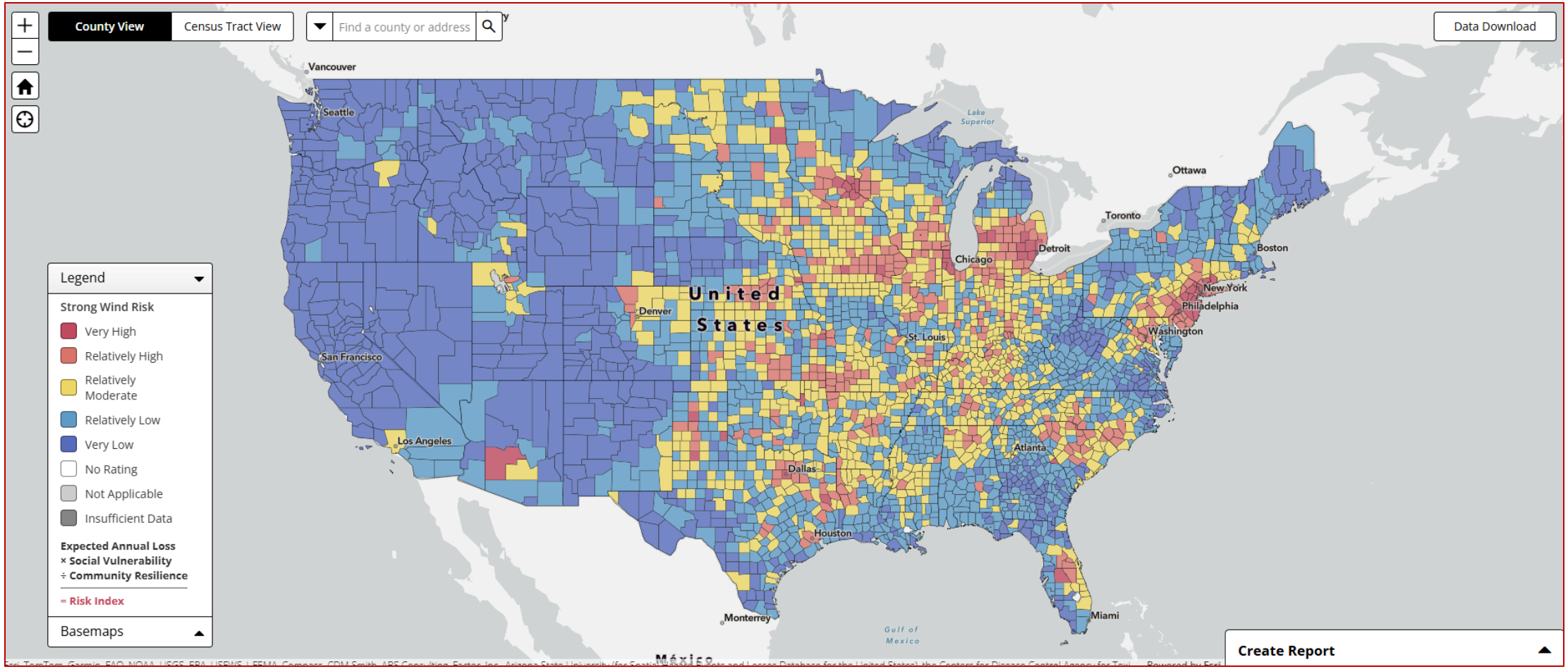
Opportunity Areas: Hurricane Risk Map



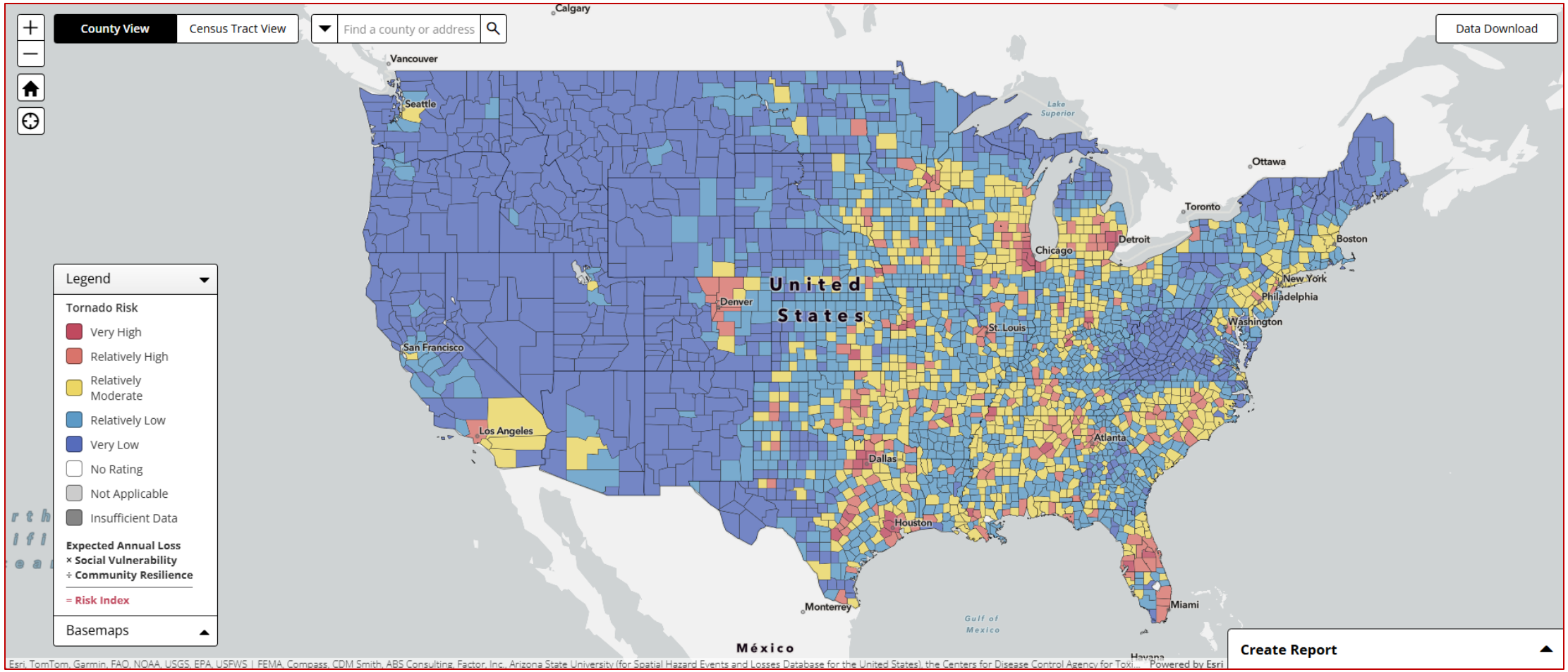
Opportunity Areas: Ice Storm Risk Map



Opportunity Areas: Strong Wind Risk Map



Opportunity Areas: Tornado Risk Map



Additional Considerations

Regulatory Compliance & Wildfire Mitigation

- Aligns with CPUC wildfire prevention mandates.
- Helps utilities reduce ignition risks.
- Supports SB 99 & AB 327 energy resilience goals.
- Ensures compliance with California's DER integration.

Energy Equity & Vulnerable Customer Support

- Supports low-income and medically vulnerable customers.
- Reduces public health risks during outages.
- Integrates with California's Self-Generation Incentive Program (SGIP) program.
- Expands backup power access for disadvantaged communities.

Grid Load Balancing & Demand Response

- Prevents demand spikes by allowing for staggered power restoration.
- Reduces strain on substations during grid recovery.
- Supports future smart grid strategies.
- Enables remote monitoring and power optimization.

Scalability for EV & Battery Integration

- Supports EV-based backup power (e.g., bidirectional charging).
- Aligns with utility-backed emerging EV solutions.
- Future-ready for home battery storage integration.
- Enables renewable microgrids for resilience planning.

Conclusion

Conclusion: A Scalable Model for Other Utilities

- PG&E and TESCO's BPTM enhances backup power safety and reliability.
- Utility-managed solutions make it safer, more convenient, and cost-effective.
- Proven success demonstrates its effectiveness.
- Scalable for utilities nationwide.

Questions and Discussion

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TESCO Hospitality Suite

We would like you to join us in the TESCO Hospitality Suite for networking and more discussions about metering. The discussion will not be exclusively metering…….but we love metering and that is the most common topic.

TESCO Hospitality Suite 301 – Brighton Tower

Monday and Tuesday 8:00 PM – 10:00 PM

We Hope you Can Join Us!