The background features a stylized American flag with a warm, orange-to-yellow gradient. A red ECG line is overlaid at the bottom of the page.

NATIONAL CONTINUITY ASSESSMENT TOOLKIT

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Modern utilities are closely integrated, strengthening our economy and our society. But this growing connectivity has a price: Interdependencies among our tightly interwoven infrastructures have introduced a new national vulnerability. Emerging “Black Sky” hazards could cause subcontinent-scale, long duration blackouts, with cascading failures of all major infrastructures.

If operation of our lifeline infrastructures cannot be sustained or quickly restored, our nation, and the lives of millions, will be at risk.

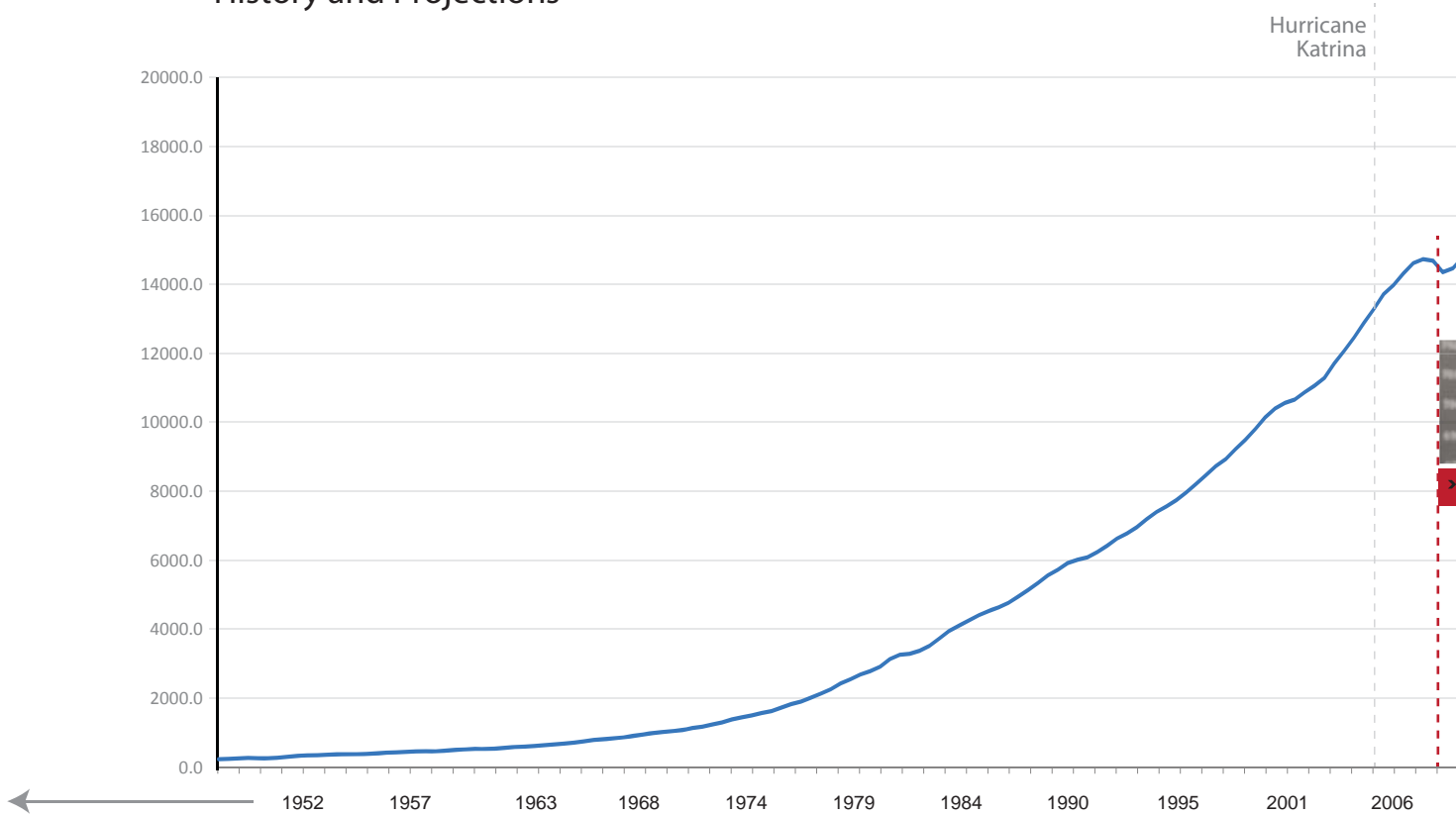
As a first step in addressing this risk, the NATIONAL CONTINUITY ASSESSMENT TOOLKIT provides metrics that can examine key elements of national continuity to Black Sky hazards.

THE NATIONAL CONTINUITY ASSESSMENT TOOLKIT

As the highest level metric in the "Toolkit," the National Continuity Assessment Tool examines overall readiness of the nation for sustained continuity in the aftermath of severe, wide area impacts from a Black Sky hazard.

Additional sector-specific Toolkit metrics review the status of key resilience investments and operational planning essential to ensure Black Sky continuity for that sector.

Gross Domestic Product - GDP (\$B) History and Projections

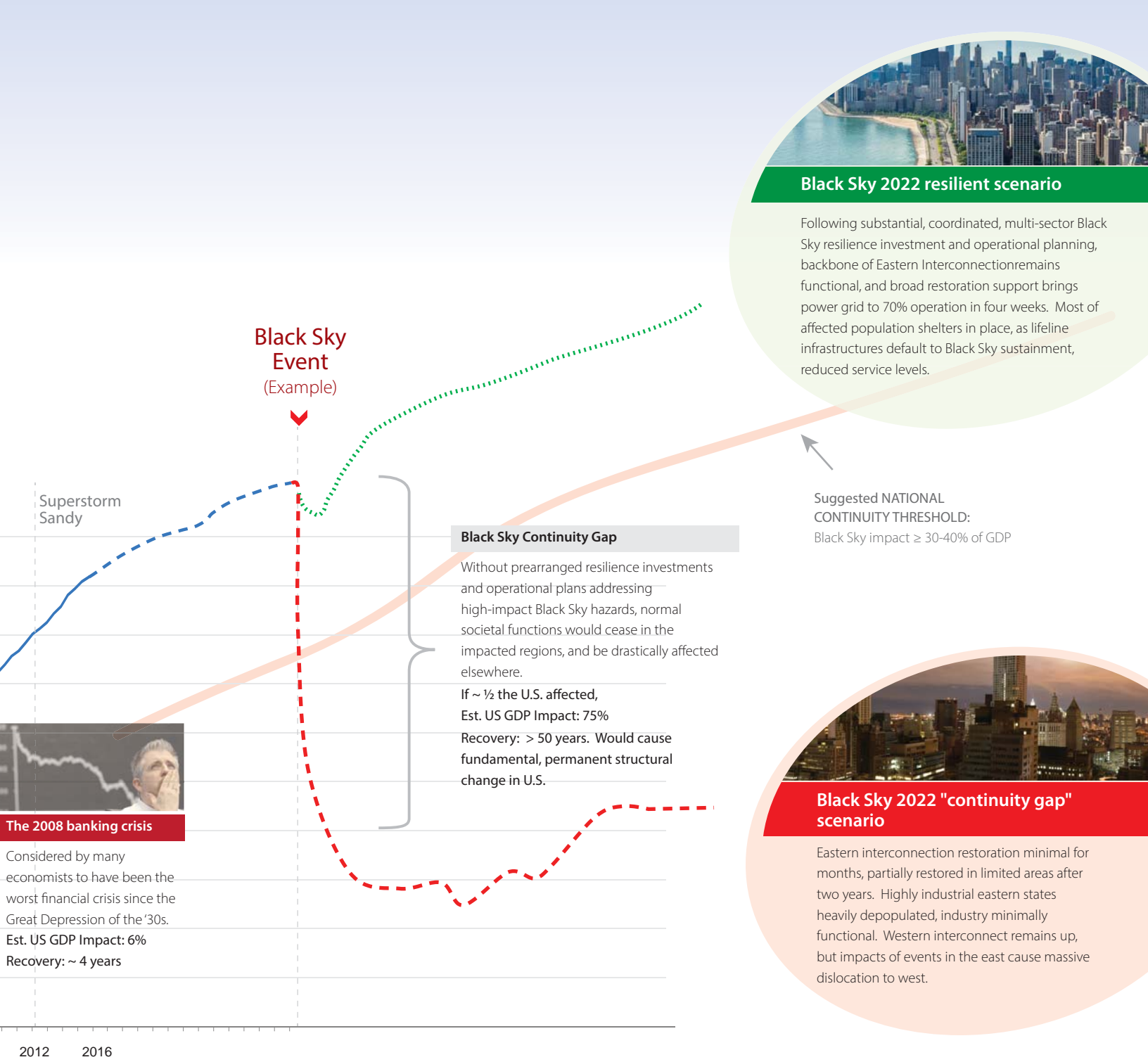


The Great Depression of the '30s

Severe worldwide economic depression. Worst financial crisis in modern times,

Est. Global GDP Impact: 15%

Recovery: ~10 years



Black Sky 2022 resilient scenario

Following substantial, coordinated, multi-sector Black Sky resilience investment and operational planning, backbone of Eastern Interconnection remains functional, and broad restoration support brings power grid to 70% operation in four weeks. Most of affected population shelters in place, as lifeline infrastructures default to Black Sky sustainment, reduced service levels.

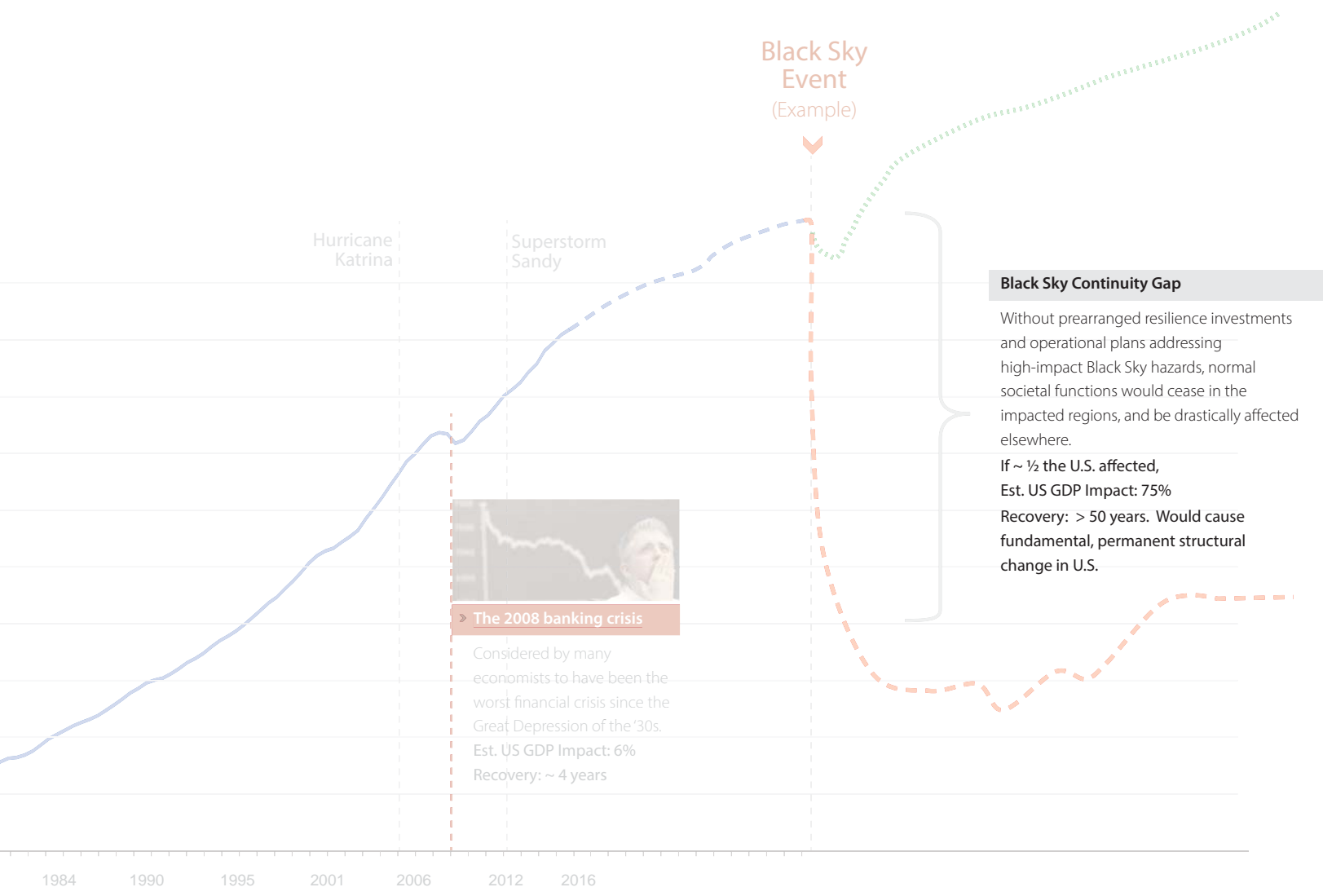


Suggested NATIONAL CONTINUITY THRESHOLD:
Black Sky impact \geq 30-40% of GDP



Black Sky 2022 "continuity gap" scenario

Eastern interconnection restoration minimal for months, partially restored in limited areas after two years. Highly industrial eastern states heavily depopulated, industry minimally functional. Western interconnect remains up, but impacts of events in the east cause massive dislocation to west.



Hurricane Katrina

Superstorm Sandy

Black Sky Event
(Example)

> The 2008 banking crisis

Considered by many economists to have been the worst financial crisis since the Great Depression of the '30s.
Est. US GDP Impact: 6%
Recovery: ~ 4 years

Black Sky Continuity Gap

Without prearranged resilience investments and operational plans addressing high-impact Black Sky hazards, normal societal functions would cease in the impacted regions, and be drastically affected elsewhere.

If ~ 1/2 the U.S. affected,
Est. US GDP Impact: 75%
Recovery: > 50 years. Would cause fundamental, permanent structural change in U.S.

1984 1990 1995 2001 2006 2012 2016

Filling the Gap:

Prearranged Black Sky Resilience Investments and Restoration Support Plans Needed to Maintain Nation Above National Continuity Threshold

- **All Sectors:**

- **Emergency Communication**, > 100,000 nodes deployed to all sectors, self-powered for > 30 days. Embedded situational awareness and decision support, using comprehensive infrastructure network optimization / resilience model (e.g., GINOM).
- **Emergency Management Expansion and Coordination:** Multi-level corporate / State + Federal Government / NGO coordination in place, with personnel trained in working cross-sector

- **Energy Sector** – Expanded resilience investments, Electricity / Oil and Natural Gas Interdependencies addressed: Grid backbone stays on, new diagnostics, expanded emergency labor support plans, pre-arranged spares allow for systematic restoration

- **Water Sector** – Expanded resilience investments, ops planning: Water, wastewater service sustained at minimal levels in most cities

- **Food and Pharmaceutical Sectors** – Prearranged resilience investments and new operational plans allow key elements of production, distribution to continue at basic levels

- **Transportation networks** operating for priority shipments





For more information, please write to:
info@eiscouncil.org

