Energy Systems and Enterprise Resilience

Course syllabus

Recorded and self-paced. Watch on your own schedule.
Available Friday, January 29, 2027.
About six hours of recorded instruction in nine sessions.
Awards the SSF Certificate of Completion, and counts toward the SSF Resilient Energy Certificate and the Comprehensive Certificate.

Taught by Joseph Fiksel, Ph.D.

Author of Resilient by Design. Former Vice President for Life Cycle Management at Battelle. Co-founder of the Center for Resilience and the Sustainability Institute at The Ohio State University.

Course overview

Most enterprises, including municipalities, depend on energy they do not fully control. Grid outages, fuel price shocks, cyber-attacks on pipelines and grid operators, and extreme weather events are increasingly impacting operations, supply chains, and balance sheets. Most organizations still carry energy as a facilities line item and discover their actual exposure in the midst of an outage.

This course integrates the concepts of risk management, business continuity, and enterprise resilience, with a focus on energy systems. It draws on Dr. Fiksel's proven design-for-resilience framework, and includes numerous case studies of leading organizations that have built up resilience against energy-related shocks and stresses.

The course distinguishes between operational resilience, the capacity to recover rapidly from disruptions, and strategic resilience, the capacity to anticipate and adapt to turbulent change in the business environment. It also elucidates the potential synergies and trade-offs among resilience, sustainability, and profitability, and demonstrates how resilience improvement has delivered measurable value for both shareholders and stakeholders.

Other courses in the program explain how electricity markets and distributed energy systems work. This course shows how decision-makers can deploy those energy systems effectively in a way that minimizes exposure to crises and enables them to adapt and flourish amidst global challenges.

Who should enroll

This course is designed for professionals who are responsible for decisions about risk, continuity, or capital investment in organizations that depend on reliable, affordable energy. No engineering background is required, and the course lays a foundation for deeper dives into specific energy technologies.

- Enterprise risk managers, business continuity planners, and crisis management leads
- Corporate sustainability officers reconciling decarbonization commitments with reliability
- Facilities, energy, and operations managers responsible for critical loads and deliverables
- Supply chain and procurement leaders exposed to energy disruptions among suppliers
- Finance and capital planning professionals balancing resilience with other investments
- Government officials responsible for operational continuity and mission achievement
- Consultants advising organizations on risk and resilience for climate and other hazards

- Educators updating their insights into energy resilience concepts and methods

Course organization

The course consists of nine sessions in three blocks.

- Block I establishes the concepts needed to manage energy continuity as an enterprise risk, and to balance energy resilience with sustainability and financial performance.
- Block II examines how select organizations actually performed under recent energy disruptions.
- Block III provides methods and tools for integrating resilience considerations into operations, investments, and governance, and closes with the business case.

BLOCK I

The Role of Resilience in Energy Systems

Mastering the risks and benefits associated with energy systems from a strategic perspective.

Session 1 · Turbulence, Complexity, and the Limits of Risk Management

- Why conventional enterprise risk management tends to understate the potential for rare events
- Operational resilience and strategic resilience: what each requires and why both are essential

Session 2 · Mapping Energy Vulnerabilities and Capabilities

- Sources of vulnerability: grid outages, fuel and price volatility, cyber intrusion, extreme weather, regulatory changes, supply chain failures, deliberate interference
- Resilience capabilities: flexibility, redundancy, visibility, adaptive capacity, organizational strength, and how they help to reduce vulnerabilities and ensure continuity

Session 3 · Systems Thinking: Energy, Economy, Society, and Environment

- The Triple Value framework, a tool for energy companies and their diverse customers to map the circular flows of resources, products, services, and economic value through the full life cycle
- Where sustainability and resilience reinforce each other, and where they may conflict; for example, maintaining backup capacity increases waste and emissions

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BLOCK II

Enterprise Resilience in Action

What recent energy disruptions reveal about how enterprises can flourish or falter.

Session 4 · Operational Resilience: When the Power Goes Out

- Case studies: industrial facilities during Winter Storm Uri, California public safety power shutoffs, Puerto Rico after Hurricane Maria, and the Lahaina polycrisis
- Identifying critical loads, planning continuity, and sequencing recovery

Session 5 · Supply Chain Resilience: When External Dependencies Falter

- Case studies: mutual assistance networks in the United States, the Colonial Pipeline ransomware shutdown, and the European industrial response to the 2022 natural gas crisis
- Energy system vulnerabilities beyond the fence line: fuel source fluctuations and supply chain logistics, including long-lead equipment such as transformers

Session 6 · Strategic Resilience: Anticipating Structural Shifts

- Data center load growth, electrification, carbon policies, and climate change as forces that are reshaping the economic and regulatory landscape
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Scenario planning for future challenges, early warning signals, and potential energy resilience strategies in a complex business environment

BLOCK III

Designing Resilience Into Enterprise Systems

Methods and tools for building resilience into operations, investments, and governance.

Session 7 · Design Principles for Energy Resilience

- Fundamental design principles and the stepwise methodology for designing inherent resilience into energy-related business processes
- How onsite generation, storage, microgrids, demand flexibility, and contract structure contribute to a portfolio of resilience capabilities

Session 8 · Analytic Tools for Quantifying Resilience

- Resilience indicators that an organization can track and report, and how these can be integrated with sustainability and financial performance metrics
- Stress testing and simulation, illustrated with Dow supply chain resilience, EPA New England policy development, and MIT dynamic energy modeling

Session 9 · The Business Case: Resilience and Shareholder Value

- Evaluating the cost of disruption and the potential business value of resilience interventions, including monetary gains and intangible benefits
- Presenting resilience strategy to senior leadership and embedding it into business processes, including capital investment and sustainability programs

About the instructor

Joseph Fiksel, Ph.D.

Author of Resilient by Design; former VP, Battelle; co-founder, Center for Resilience at Ohio State

Joseph Fiksel is one of the original thought leaders in the field of corporate design for sustainability and resilience. He has consulted for companies, government agencies, and nonprofit consortia in the United States and worldwide. He co-founded the Center for Resilience at The Ohio State University, now part of the Sustainability Institute, and wrote Resilient by Design, the seminal book in the field.

Much of Joseph's consulting work has focused on the energy sector, with clients ranging from the Electric Power Research Institute to major utilities such as American Electric Power, Duke Energy, and ComEd. At Ohio State he led the development of innovative tools for large-scale modeling of industrial and municipal energy and material flows, helping to identify strategic opportunities for decarbonization, circularity, and waste reduction. He has also worked with leading international organizations to apply resilience and sustainability principles to policy and strategy development.

What you will learn

- Why energy dependence is a ubiquitous risk, often overlooked in traditional risk management
- Opportunities to enhance both operational and strategic energy resilience in your organization
- How to assess key vulnerabilities and resilience capabilities, within and beyond the fence line
- Where sustainability and resilience goals align or conflict, and how to manage the trade-offs
- Recent energy disruptions that show why some enterprises recover more quickly than others
- How to apply design principles, resilience indicators, and simulation to energy decisions

- How to quantify the cost of disruption and build a resilience business case for senior leadership

AFTER THIS COURSE

You will be able to make a credible business case to senior leadership for energy resilience, and to lead the implementation of strategic initiatives to build resilience into your organization.

How the course runs

RECORDED AND SELF-PACED

Nine sessions recorded by Joseph Fiksel, released together when the course opens. Watch in order or go straight to the block you need, on whatever schedule suits you.

ENERGY BASICS 101 PRIMER

About 30 minutes, recorded, included with registration and available immediately. Covers the fundamentals of electricity, energy, and power for students with limited technical background. Optional, and no engineering background is required to take the course.

COURSE MATERIALS

Downloadable slide decks accompany each block.

PRACTITIONER WEBINAR SERIES

Ongoing access to the SSF Practitioner Webinar Series, which runs separately from the course and continues with no end date.

QUALIFYING QUIZ

A short end-of-course quiz confirms your working command of the material. Seventy percent is passing, with two retakes available. Passing the quiz releases your Certificate of Completion and credits the course toward the Resilient Energy and Comprehensive Certificates.

Credential from this course

You will receive the SSF Certificate of Completion, awarded after passing the qualifying quiz.

This course also counts toward the SSF Resilient Energy Certificate (any four of the seven program courses) and the SSF Resilient Energy Comprehensive Certificate (all seven). See the full program for the other courses and how the credentials work together.

$495

ssfworld.org/ssf-resilient-energy-certificate/enterprise-resilience/

Check the course page for current early-bird pricing.

PART OF A LARGER PROGRAM

The SSF Resilient Energy Certificate Program

This is one of seven courses in the SSF Resilient Energy Certificate Program. Each course stands on its own. Together, they cover the full working landscape of the U.S. energy sector, taught by senior practitioners in each domain.