

Torus Press Kit

About Torus

Torus is revolutionizing America's energy landscape through advanced solutions in energy storage, management, and security. Our innovative technologies are transforming energy systems across utilities, data centers, commercial and industrial facilities, defense installations, and residential communities.

- Founded in 2021 by Nate Walkingshaw and Gilbert Lee
- We design, engineer, and manufacture energy storage, management, and security
- We also install, maintain, and service our products
- Hybrid energy storage solutions with flywheel and chemical batteries
- Cyber defense technology built into every installation, 24/7 surveillance, safety and reliability monitoring
- Approved partner in the Rocky Mountain Power Wattsmart Battery Program
- Recipient of the Utah Manufacturers' Association Award of Safety Excellence
- Secured \$67 million in venture financing in April 2024
- Headquarters in South Salt Lake, Utah with 50,000 square feet of manufacturing and R&D facilities
- The total potential power generation from Torus signed contracts so far is 1 megawatt, equivalent to powering approximately 750 average American homes.

For more information, visit torus.co or contact press@torus.co.

The Grid and Energy Landscape

The electrical grid is undergoing a significant transformation as it adapts to new energy sources and increasing demand. This complex system, often called the largest machine in the world, is facing unprecedented challenges that require innovative solutions.

Understanding the Modern Grid

The grid consists of three main components:

1. **Main Transmission:** High-voltage lines that carry electricity over long distances from generation sources to substations. These sources include traditional power plants like coal, nuclear, and natural gas, as well as renewable sources such as hydro, solar, and wind farms.

2. **Sub-Transmission:** Medium-voltage lines that serve as a bridge between transmission and distribution, often connecting substations to large industrial customers or smaller distribution substations.
3. **Distribution:** Low-voltage lines that deliver electricity to end-users, including homes and businesses.

Torus primarily operates in the sub-transmission and distribution ranges, where our solutions can have the most immediate and significant impact on grid stability and efficiency.

The Growing Demand-Supply Gap

The gap between energy demand and supply is widening, putting immense pressure on our existing infrastructure. For example, in Utah, Rocky Mountain Power recently stated that they currently serve about 4 GW of demand. However, they have an additional 8 GW of potential projects waiting for approval – effectively tripling their current capacity. This backlog illustrates the growing pressure on our energy infrastructure and the urgent need for innovative solutions.

The Grid in Transition

The grid is evolving from a centralized, one-way system to a more distributed, bi-directional network. This transition is driven by several factors:

1. **Cybersecurity Challenges:** As the grid becomes more digitized and interconnected, it faces increased vulnerability to cyber threats, necessitating robust security measures to protect critical infrastructure.
2. **Data Center Demand:** The rapid growth of data centers, driven by cloud computing and AI, is creating significant new demands on the grid, particularly in terms of capacity and reliability.
3. **Renewable Energy Integration:** The increasing adoption of solar, wind power, and energy storage introduces variability and intermittency to the grid, requiring more flexible and responsive systems.
4. **Electrification:** The shift towards electric vehicles and electrified heating is significantly increasing demand, particularly at the distribution level.
5. **Distributed Energy Resources (DERs):** The proliferation of rooftop solar, battery storage, and other small-scale generation sources is changing the traditional flow of electricity and requiring new technologies to manage the grid.

6. **Smart Grid Technologies:** Advanced metering, sensors, and control systems are enabling more precise management of the grid but also introducing new complexities.
7. **Aging Infrastructure:** Much of the existing grid infrastructure is nearing the end of its operational life, necessitating upgrades and replacements.

These changes are putting pressure on all levels of the grid, particularly on sub-transmission and distribution networks, which were not originally designed to handle bi-directional power flows or the level of complexity introduced by DERs.

Solving Grid Challenges

Recognizing these challenges, Torus focuses on developing solutions for the sub-transmission and distribution levels of the grid. Our technologies are designed to:

- **Alleviate congestion** by providing strategically located energy storage and generation.
- **Improve grid stability and reliability** in the face of increasing renewable energy integration.
- Enable more efficient use of existing infrastructure, potentially deferring **costly upgrades**.
- Enhance grid resilience against **outages and cyber threats**.
- Facilitate the **integration of DERs** and enable new market models.

By addressing these critical areas, Torus is helping to bridge the gap between the grid of yesterday and the dynamic, resilient, and clean energy system of tomorrow.

What Sets Us Apart

Torus stands out in the energy sector due to several key factors:

- **Vertically Integrated Solutions:** We offer a full stack of software, hardware, and services, providing comprehensive end-to-end energy solutions. This integration allows for seamless compatibility between all components, optimized performance, and a single point of accountability for our customers. Our approach encompasses everything from energy generation and storage to advanced management software and cybersecurity, enabling a holistic solution to complex energy challenges.

- **American Manufacturing:** Our commitment to domestic production delivers the highest quality, security, and reliability while supporting U.S. jobs and energy independence. All Torus hardware is manufactured in our 50,000–square-foot facilities in South Salt Lake and Springville, Utah. This allows for rigorous quality control, reduces supply chain vulnerabilities, and ensures our products meet the highest standards of security for critical infrastructure. Our commitment to American manufacturing not only creates local jobs and fosters community collaboration but also secures reliable supply chains within the United States.
- **Innovative Technology:** Our suite of products, including the Torus Nova Spin™ Flywheel Energy Storage System and Torus Nova Shield™ security appliance, represent cutting-edge advancements in energy technology. The Nova Spin™, for instance, offers unparalleled rapid response capabilities with its ability to go from full charge to full discharge 10 times faster than traditional batteries, providing crucial grid stability services. Nova Shield employs advanced AI-driven threat detection to provide real-time protection against evolving cybersecurity risks.
- **Rapid Response and Reliability:** Torus systems switch to backup power within 250 milliseconds and offer 99% uptime, providing industry-leading outage protection. This near-instantaneous response time is critical for sensitive operations like data centers and industrial processes, where even momentary power interruptions can cause significant disruptions and financial losses.
- **Faster Deployment:** Unlike large-scale energy projects that can take years or even decades to complete, Torus solutions can be deployed rapidly. Our modular design allows for quick installation and scaling, with many projects going from concept to operation in a matter of months. This agility enables our customers to respond quickly to changing energy needs and market conditions.
- **Operations and Maintenance (O&M) Excellence:** Torus provides comprehensive O&M services that ensure optimal performance and longevity of our systems. Our advanced predictive maintenance algorithms, powered by AI and machine learning, can identify potential issues before they become problems, minimizing downtime and maximizing system efficiency. Remote monitoring and control capabilities allow for real-time adjustments and rapid response to any operational issues.
- **Sustainability Focus:** Our products are designed with sustainability in mind. The Nova Spin™, for example, is made with 95% recyclable materials and has a 25–year lifespan, significantly reducing environmental impact compared to traditional energy storage solutions.

Our innovative hybrid design configuration, which combines flywheels (Nova Spin™)

with chemical batteries (Nova Pulse™), allows us to double the lifespan of traditional battery systems. This not only reduces the need for frequent replacements but also minimizes the environmental impact associated with battery production and disposal.

By enabling more efficient use of renewable energy and reducing reliance on fossil fuel-based peaker plants, Torus systems contribute to substantial reductions in greenhouse gas emissions.

- **Advanced Microgrid Capabilities:** Torus excels in designing and implementing advanced microgrid solutions, which are particularly crucial for defense and critical infrastructure applications. Our microgrids can seamlessly integrate diverse energy sources, including renewables and generators, and operate in both grid-connected and islanded modes. For defense installations, this means enhanced energy security, improved resilience against grid outages or attacks, and the ability to maintain mission-critical operations under any circumstances.

This unique combination of vertically integrated solutions, domestic manufacturing, advanced technology, rapid response capabilities, fast deployment, excellent O&M services, a strong sustainability focus, and advanced microgrid capabilities positions Torus at the forefront of the energy transition. We are uniquely equipped to address the complex challenges of modern energy systems more effectively than traditional approaches, particularly in high-stakes environments like defense installations where reliability, security, and resilience are paramount.

Addressing Critical Energy Priorities

1. Transmission Congestion

Transmission congestion costs utilities an estimated \$35–45 billion in 2024. Torus's strategically located energy storage solutions help alleviate this problem by providing rapid response capabilities and efficient energy dispersion.

2. Grid Cybersecurity

With the increasing digitization of the grid, cybersecurity is more critical than ever. Torus Overwatch and Nova Shield provide robust, multi-layered security measures to protect against evolving cyber threats, ensuring the integrity and reliability of energy infrastructure.

3. Data Center Power Demand

Data centers are projected to account for 9% of total U.S. power demand by 2030. Torus offers solutions that allow these facilities to produce a significant portion of their required power on-site, while also providing crucial protection against outages and frequency issues.

4. Weather-Related Power Outages

Weather-related outages have increased by 78% over the past decade, costing U.S. businesses an estimated \$150 billion annually. Torus systems provide industry-leading outage protection, switching to backup power within 250 milliseconds.

5. Commercial Building Vacancy

In areas where local regulations allow, our innovative model gives building owners an opportunity to generate additional revenue by hosting our energy storage systems, while also attracting sustainability-minded tenants.

Our Products

Torus offers a suite of innovative products designed to address the complex challenges of modern energy systems:

1. Torus Nova Spin™

Torus Nova Spin™ is an advanced Flywheel Energy Storage System (FESS) offering rapid response capabilities for grid stability and backup power for commercial and utility customers. It is the most environmentally friendly battery in the world, made with 95% recyclable materials and has a 25-year lifespan. The Torus Nova Spin stores energy mechanically by spinning the rotor at high speeds and acts as a generator when discharging energy. When connected to the electrical grid, they offer several advantages:

- **High power density** by delivering large amounts of power over short periods, 10 times faster than traditional batteries with its higher C-rating.
- **Better integration with renewable energy** sources such as solar and wind by providing consistent power to the grid.
- **Load leveling and peak shaving** by storing energy during low-demand periods and releasing it during peak times, optimizing grid operations.
- **Lower leveled cost of storage** with its 25-year lifespan and its ability to extend the lifespan of chemical batteries by 2x.
- **Spinning reserve capabilities** lessen the reliance on standby generators that consume fuel and emit carbon emissions while idling.

2. Torus Nova Pulse™

Torus Nova Pulse™ is a scalable, modular advanced Battery Energy Storage System (BESS) designed for long-duration energy storage and grid support. Developed by Torus with lithium-iron phosphate battery technology, Nova Pulse is designed to operate in tandem with the Torus Nova Spin™ Flywheel Energy Storage System. Key features include:

- **Battery Technology:** Utilizes Lithium Iron Phosphate (LFP) cell chemistry with a round-trip efficiency of 90% to 95%.
- **Modular Design:** Features 270 kWh battery modules, scalable to desired capacity. System capacity is configurable from 135 kW to 5 MW.
- **Advanced Battery Management System (BMS):** Monitors cell voltage, current, temperature, State of Charge (SoC), and State of Health (SoH). Includes protection features such as overvoltage/undervoltage protection, overcurrent protection, and thermal shutdown mechanisms.
- **Comprehensive Communication:** Supports CAN bus, Modbus, and Ethernet protocols for seamless integration with existing systems.
- **Efficient Thermal Management:** Employs air cooling with redundant pumps and heat exchangers, maintaining temperature control within $\pm 2^{\circ}\text{C}$ of setpoint. HVAC systems provide enclosure climate control, including humidity and particulate filtration.
- **Robust Enclosure:** Housed in ISO-standard containers (20-foot, 40-foot options) with IP54 rating for dust and water ingress protection. Includes fire suppression systems and emergency ventilation and pressure relief mechanisms.
- **Versatile Integration:** Compatible with SCADA, DMS, OMS, and EMS platforms. Features coordinated control algorithms for seamless operation with Flywheel Energy Storage Systems (FESS).

3. Torus Nova Shield™

Torus Nova Shield™ is an advanced energy security technology stack engineered specifically to safeguard Battery Energy Storage Systems (BESS) and Flywheel Energy Storage Systems (FESS) from cyber threats and unauthorized access. Built by Torus, it is fully integrated across the entire Nova hardware, firmware, and software product line as well as Overwatch and Lasso. Nova Shield offers a comprehensive, multi-layered cyber defense solution tailored to meet the security demands of modern energy infrastructures.

- **Multi-Layered Defense:** Includes a security architecture based on the Purdue Reference Model modern firewalls, Intrusion Detection Systems (IDS), Intrusion Prevention Systems (IPS), and zero-trust principles.

- **Intrusion Detection & Prevention:** Real-time monitoring and proactive defense mechanisms to identify and mitigate threats swiftly and fully integrated with Overwatch
- **Segmented and Isolated Network Architecture:** Reduces attack surfaces and prevents lateral movement within networks.
- **Zero Trust Architecture:** Includes secure remote access, no internet-facing attack surface, no IP stacks utilized to command energy resources and the utilization of ICS Comms Protocols (RS485, CAN, Modbus).
- **Proprietary Anomaly Detection Software:** Employs advanced algorithms to detect unusual activities, with no listening on accessible ports, effectively eliminating remote attack vectors.
- **Risk Management:** Continuous vulnerability scanning and comprehensive risk monitoring across all assets.
- **Resilience and Redundancy:** Designed with fail-safes and backup systems to maintain uninterrupted operations during failures or emergencies.
- **Secure Internet Connection:** Nova Shield utilizes Starlink to access the internet.

4. Torus Overwatch™

Torus Overwatch™ is an advanced energy cybersecurity and Operations & Maintenance (O&M) platform designed to secure and optimize energy infrastructures for utility and C&I companies. Leveraging Torus's vertically integrated expertise in hardware, firmware, software, cybersecurity, and O&M, the platform provides a comprehensive solution that addresses the multifaceted challenges of modern energy systems.

- **Robust Cybersecurity:** Multi-layered security measures protect against evolving cyber threats targeting critical energy infrastructure.
- **Seamless Integration:** Interoperability with existing systems, including SCADA, DMS, and OMS, SIEM (Security Incident and Event Management) ensures cohesive operations without the need for extensive overhauls.
- **Reliability and Availability:** Real-time monitoring and predictive analytics enable informed decision-making and proactive maintenance, enhancing system safety, reliability and performance.
- **Scalability and Flexibility:** Modular architecture supports future expansion and integration with additional energy resources, ensuring the platform remains adaptable to changing needs.
- **Regulatory Compliance:** Built-in tools and features assist organizations in meeting stringent regulatory requirements, reducing compliance-related risks.

- **Performance Management:** through proactive, detective and reactive action, systems are safeguarded to perform at an optimal state.

5. Torus Lasso™

The Torus Lasso™ Energy Management Software is a modern, integrated software solution designed for utility companies and their wholesale generation desks to optimize energy asset operations using web-based and mobile applications. Torus Lasso offers features such as advanced scheduling and dispatch, robust cybersecurity measures, AI capabilities, and asset performance management across entire fleets of distributed energy resources (DER). Torus Lasso is designed to enhance grid reliability, operational efficiency, and improve scalability.

- **Advanced Scheduling and Dispatch**
 - **Multi-Asset Coordination:** Capable of coordinating multiple energy storage assets simultaneously and renewable energy sources, to optimize overall system performance.
 - **Real-Time Dispatch Adjustments:** The software supports dynamic re-dispatching capabilities, allowing it to adjust schedules in response to unplanned events like sudden demand spikes or generation outages. It achieves this through continuous monitoring and predictive analytics.
 - **AI Optimization:** Torus Lasso employs sophisticated optimization techniques, including time series machine learning and generative AI interfaces, to determine the most efficient charging and discharging schedules for energy assets. These algorithms consider real-time data inputs such as electricity prices, demand forecasts, asset availability, and operational constraints.
- **Support for Ancillary Services**
 - **Reserve Services:** Configures spinning and non-spinning reserves, ensuring immediate availability of power to respond to grid contingencies.
 - **Black Start Capability:** Coordinates startup sequences and synchronizes with grid parameters to facilitate black start operations in the event of widespread outages.
 - **Grid Code Compliance:** Ensures adherence to IEEE 1547, IEC 61850, and regional grid codes, facilitating seamless participation in ancillary service markets.

- **Asset Performance Management**
 - **Condition Monitoring:** Uses sensors and IoT devices to collect real-time data on asset health parameters such as temperature, pressure, vibration, and electrical characteristics.
 - **Predictive Analytics:** Applies machine learning algorithms to predict possible asset failures and schedule proactive maintenance.
 - **Lifecycle Management:** Tracks asset performance over time, providing insights into degradation patterns and informing battery replacement strategies.

- **AI and Machine Learning Capabilities**
 - **Solar Production Prediction:** Provides 7-day solar production prediction data for individual and fleet-wide Torus systems.
 - **Natural Language Processing (NLP):** GPT-like interface allows users to interact with the system using natural language queries.
 - **Machine Learning Algorithms:** Implements supervised and unsupervised learning for predictive analytics and anomaly detection.
 - **High Availability (HA):** Clustering and load balancing ensure continuous operation with minimal downtime.
 - **Disaster Recovery (DR):** Automated backups and geographically distributed data centers for redundancy.

6. Torus Community

[Torus Community](#) is an innovative program that enables residential and commercial customers to share clean power directly with their wider community when the grid is in need. This advanced energy-sharing platform uses Torus technology to create a more resilient, efficient, and sustainable local energy ecosystem. Key features and benefits include:

- **Intelligent Energy Sharing:** Torus installations act as mini power plants, generating and storing energy right where it's needed. During times of high demand, Torus can support the grid, helping to maintain stability and reduce stress on the overall system.
- **Home/Business Priority:** The system is designed to prioritize the energy needs of the individual home or business first. It ensures that your batteries are charged, loads are offset, and electric vehicles are powered before any excess energy is shared with the community.
- **Significant Grid Impact:** Even while prioritizing individual needs, Torus Community makes a substantial contribution to grid stability. For example, an average home

using the system could provide enough energy to completely support another home for up to 156 days in a year.

- **Partnership with Utilities:** Torus has partnered with major utilities like Rocky Mountain Power, demonstrating the real-world effectiveness of community participation in grid management. In 2024 alone, Torus systems successfully responded to 100+ demand response events with 8.7 second response time and 99.99% uptime.
- **Educational Tool:** Torus Community serves as a powerful educational platform, helping users visualize how their energy use and storage contribute to grid health. This fosters a collective understanding of each participant's crucial role in creating a sustainable energy ecosystem.
- **Ease of Use:** Users can simply live their lives while Torus manages their energy needs, ensuring both individual energy security and contribution to a stronger, more resilient grid for everyone.

Ways to Work With Us

Torus offers flexible engagement models tailored to the needs of different customer segments:

For Utilities (Wholesale):

1. Capacity via PPA or Tolling Agreements

- Utilities can access Torus's energy storage capacity to manage peak demand and grid stability.
- Power Purchase Agreements (PPAs) allow utilities to buy energy or capacity at a fixed rate over a set period.
- Tolling Agreements enable utilities to use Torus's energy storage assets for a fee, providing flexibility without capital investment.
- These arrangements help utilities defer costly infrastructure upgrades and improve grid reliability.

2. Capacity & Generation via PPA or Tolling Agreements

- In addition to storage capacity, utilities can access Torus's generation capabilities.
- This combined offering provides a comprehensive solution for managing both supply and demand.
- Ideal for utilities looking to integrate more renewable energy sources while maintaining grid stability.

- Helps utilities meet renewable energy targets and reduce reliance on fossil fuel peaker plants.

3. Build-Transfer Agreements

- Torus designs, builds, and commissions energy storage and generation assets, then transfers ownership to the utility.
- Allows utilities to leverage Torus's expertise in project development and advanced technology.
- Utilities benefit from turnkey solutions without the complexity of managing the development process.
- Can be customized to include ongoing maintenance and operational support from Torus.

For Commercial Customers (Retail):

4. Hardware Purchase

- Commercial entities can purchase Torus hardware for on-site installation.
- Solutions combine advanced Torus hardware and software with robust security measures, and ongoing operations and maintenance (O&M) support.
- Installing a Torus system lowers operating costs by an anticipated 30%, prevents downtime with AI-powered outage protection, and reduces CO2 emissions by up to 90%.
- We size your system to your building's exact power requirements, handle permitting and installation, and offer maintenance and monitoring, providing a seamless experience from end-to-end.

For Defense & Government:

5. Microgrid Solutions

- Torus designs and implements advanced microgrid systems for defense and government facilities.
- Provides energy security and independence, crucial for mission-critical operations.
- Integrates various energy sources, including renewables, for resilient and sustainable power.
- Features advanced cybersecurity measures to protect against both physical and digital threats.
- Includes sophisticated AI-driven control systems for optimal energy management.

- Can operate in both grid-connected and islanded modes, ensuring continuous power even during grid outages.
- Customizable to meet specific security and operational requirements of defense and government installations.

Each engagement model is designed to maximize the benefits of Torus's innovative technology while aligning with the specific needs and constraints of different customer types. Our team works closely with each client to determine the best approach, ensuring optimal performance, cost-effectiveness, and alignment with long-term energy goals.

Our Customers

Torus is designed to solve problems for a range of customers across various sectors, including:

- **Commercial & Industrial Buildings:** Torus is designed to lower operating costs by 30%, provide emergency backup, and reduce greenhouse gas (GHG) emissions by up to 90%. The [Torus partnership with the Gardner Group](#) demonstrates Torus' capabilities in large-scale commercial energy storage solutions. Torus is set to provide nearly 26 MWh of energy storage capacity across Gardner Group's commercial real estate portfolio, with more to come soon. The project is expected to significantly improve commercial operations, lower operating costs, provide emergency backup, and reduce greenhouse gas emissions for these large-scale property managers.

This project demonstrates intelligent energy management, demand response capabilities, and seamless integration with renewable energy sources. The implementation is expected to optimize energy usage, reduce carbon footprint, and provide enhanced value to tenants across multiple properties.

Torus is an excellent solution for large manufacturing facilities with Torus's Nova Spin™ and Nova Pulse™ systems along with the Lasso™ energy management software. This combination is designed to lower peak demand charges by 35%, provide critical backup power, and reduce overall energy costs by 30%. Additionally, the system's ability to optimize renewable energy usage helps reduce greenhouse gas emissions by 75%, significantly advancing its sustainability goals.

- **Utilities:** Torus reduces grid congestion, maintains frequency and voltage stability, and expands capacity with energy storage integration. Utilities can implement Torus's energy storage solutions at key substations, reducing transmission

congestion and enabling the integration of additional solar capacity. A Torus installation offers significant annual savings from avoided congestion costs in a typical installation, along with improved grid reliability during peak demand periods.

- **Data Centers:** Torus brings new facilities online with integrated energy generation, storage, management, maintenance, and security solutions. For cloud services providers, Torus offers a complete solution for a new data center, including on-site renewable generation, Nova Spin™ flywheels for rapid response, and Nova Pulse™ batteries for longer-duration storage. Torus reduces data centers' reliance on the grid, provides 99% uptime, and decreases overall energy costs compared to traditional solutions.
- **Defense & Government:** Torus powers facilities with secure, reliable microgrid solutions, capable of operating independently from the utility grid. Torus is an excellent solution for a comprehensive microgrid solution for a sensitive military installation. Torus integrates solar generation, Nova Spin™ flywheels, and Nova Pulse™ batteries, all managed by Torus Lasso™ software with Nova Shield security. The Torus microgrid can operate independently from the main grid for up to 72 hours, ensuring continuous power for mission-critical operations. Torus features advanced cybersecurity measures to thwart attempted cyber intrusions, maintaining the integrity of the installation's power system.
- **Residential Communities:** Provide every home in your community with reliable, affordable, green power. Torus's Community program integrates rooftop solar, community-scale Nova Pulse™ storage, and Lasso™ energy management software. A Torus Community is designed to achieve 80% energy self-sufficiency, lower electricity bills, and the ability to share excess power with the wider grid during peak times generates additional revenue for the community. A Torus Community system offers resilience to maintain power during severe weather events and outages.

Our Vision for the Future

"At Torus, we're not just creating products — we're building the foundation for a cleaner, more secure energy future. Our innovative approach gives customers control of their energy needs while contributing to a more stable and efficient grid." —Nate Walkingshaw, Torus CEO and Cofounder.

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