Heathrow's Energy Future

Powered by the CERBERUS CORE Power System (CCPS)

3-7

Days of Independent Energy Autonomy

This infographic explores the CERBERUS CORE Power System, a strategic initiative to revolutionize Heathrow Airport's energy resilience and achieve its net-zero ambitions. Discover the technology, impacts, and vision behind this groundbreaking project.

The Imperative for Change

Modern airports like Heathrow are vital hubs, yet highly vulnerable to power disruptions. The CCPS addresses these critical vulnerabilities, moving from reactive measures to proactive energy sovereignty.

Current Vulnerabilities

- Reliance on National Grid, prone to failures and external threats.
- Conventional backups offer limited capacity and duration for full operations.
- Risk of cascading failures: flight disruptions, safety issues, major economic losses.
- Growing sophistication of threats to energy infrastructure.

The CCPS Solution

- Establishes an islanded power system for 100% critical load.
- CCPS becomes primary power; National Grid serves as backup/opportunistic source.
- Military-grade physical and cyber hardening for maximum resilience.
- Ensures operational continuity and strategic energy self-sufficiency.

Introducing: CERBERUS CORE

The CERBERUS CORE Power System is a comprehensive energy solution designed for resilience, efficiency, and sustainability. Here are its defining features:

Military-Grade Resilience
Hardened subterranean vaults, EMP shielding, advanced cyber security.

Net-Zero Aligned
Carbon-neutral ultraclean JP-5 fuel, high efficiency, ULEZ compliance.

Intelligent & Efficient
AI-driven Grid Orchestrator (IGO), 60-65% combined cycle efficiency.

Powering the Future: Technology & Fuel

CCPS leverages cutting-edge technology and a strategic fuel choice to deliver unparalleled performance and reliability. This section dives into the core components that make CCPS a robust solution.

Advanced Power Generation Core

60-65%

Overall System Efficiency (Combined Cycle)

Utilizes aeroderivative turbines (e.g., GE LM2500 / Rolls-Royce MT30 class) for rapid start-up and high reliability. Modular design ensures scalability and N+2 resilience.

Strategic Fuel: Ultraclean JP-5/F-44

The choice of carbon-neutral ultraclean JP-5 (NATO F-44) is key. Compare its advantages for critical systems:

Feature	Ultraclean Synthetic JP-5/F-44 (CCPS)	Biomass-Derived Fuels (Generic)
Reliability	✅ Very High (Spec-controlled)	❌ Variable (Feedstock inconsistency)
Safety (Flash Point)	✅ High (≥60°C)	⚠️ Variable
Emissions (Combustion)	✅ 99% Cleaner (Near-zero soot/sulfur)	⚠️ Can produce PM, NOx
Net-Zero Lifecycle	✅ Certified (Carbon Capture & Synthesis)	⚠️ Challenges with "organic carbon stocks"

This approach prioritizes operational integrity, similar to fuel choices for strategic military assets, over biomass solutions which present unacceptable risks for critical baseload power.

Intelligent Control & Hardening

Intelligent Grid Orchestrator (IGO)
AI-driven system for adaptive control, predictive maintenance, geopolitical risk modeling, and seamless integration with airport demands & National Grid.

Hardened Infrastructure
Subterranean vaults (blast-proof, flood-sealed), EMP shielding, quantum-resistant communications, and AI-driven intrusion detection for comprehensive physical and cyber security.

Transformative Impacts of CCPS

CCPS delivers far-reaching benefits, enhancing Heathrow's resilience, sustainability, economic outlook, and strategic national importance. This section highlights the key advantages across these critical domains.

Unmatched Resilience & Autonomy

CCPS ensures 3-7 days of independent operation for 100% of critical systems, with rapid black-start capability minimizing any disruption.

Advancing Net-Zero Goals

NET-ZERO CERTIFIED FUEL

Utilizes carbon-neutral ultraclean JP-5 (DEFRA/ICAO certified lifecycle). Combined Heat & Power (CHP) and trigeneration further reduce overall carbon footprint and meet ULEZ standards.

Significant Economic Advantages

15-20%

Projected Energy Cost Reduction (10 Years)

High efficiency and waste heat utilization reduce operational costs. Crucially, CCPS avoids catastrophic financial losses from power disruptions.

Strengthening National Security

Identified as a "national security asset," CCPS enhances UK critical infrastructure resilience against diverse threats, ensuring Heathrow remains a reliable national gateway.

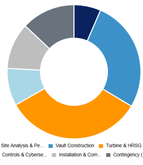
Phase I: Making It Real

The initial 12-month Phase I is pivotal for validating core CCPS concepts, constructing a pilot vault, and establishing a tangible foundation for full-scale deployment.

Phase I Timeline (12 Months)

This phase includes feasibility studies, engineering design, pilot vault construction (1x18MW turbine), fuel system setup (3-day autonomy for pilot), IGO integration, and regulatory approvals.

Phase I Budget Breakdown (£27.7M Total)



Key allocations: Turbine & HRSG System (£9.2M), Vault Construction (£7.5M), Contingency (£3.6M).

A Global Blueprint 🌍

CCPS is more than a solution for Heathrow; its innovative design for resilient, sustainable, and intelligent energy positions it as a scalable model for critical facilities worldwide, including major airports, military bases, and governmental centers.

> *"CCPS represents a world-first: an intelligent, clean, secure, and decentralized/islandized energy architecture built to face both future climate goals and present-day national security risks."*

By pioneering this new standard, Heathrow can lead the way in shaping the future of critical infrastructure energy.