
Practical Paths to Decarbonise Hospitals



Hospitals and health systems are exploring practical steps to reduce emissions, improve resilience and manage costs. A set of applied options combines generation, storage and efficiency with data-driven control. Siemens Financial Services' Digital Business Optimizer is a way to uncover high-value strategies to decarbonise facilities cost-effectively, linking technology choices with financing. The pathways range from solar and combined heat and power to green roofs, insulation, thermal storage, battery systems and integrated controls, each contributing to lower consumption and greater reliability.

Generate and Store Cleaner Energy

Solar power is framed as a cornerstone of decarbonising the power mix by replacing fossil fuel-based electricity with renewable generation. The document positions solar as advancing a green economy and cutting greenhouse gas emissions, with an emphasis on accelerating the transition to cleaner power. In parallel, battery storage is described as a rapidly expanding market, fuelled by significant reductions in battery pack prices since 2010. In healthcare and other commercial settings, pairing solar photovoltaic systems with storage enables the use of renewable energy on demand, improving operational continuity during outages and providing stability against energy price volatility and grid fluctuations.

Combined heat and power is presented as a high-reliability option for on-site electricity and thermal energy, with availability cited at nearly 98 percent. The approach supports microgrids and can replace backup generators, strengthening resilience and emergency preparedness by ensuring continuous supply during grid failures. In commercial buildings, CHP is linked to enhanced energy efficiency and continuity of critical utilities, positioning it as a practical tool for both decarbonisation and reliability in complex facilities.

Design Buildings that Waste Less

Measures that reduce building demand amplify the impact of cleaner supply. Green roofs are highlighted for stormwater management, mitigation of urban heat island effects and improved air quality through pollutant capture. They also contribute to energy efficiency by providing insulation that lowers heating and cooling needs, while extending roof membrane durability by limiting UV exposure and temperature swings. The document cites annual savings per square foot and notes research indicating that extensive green roofs can reduce daily summer air-conditioning energy demand by over 75 percent, emphasising how envelope and surface interventions translate into operational reductions.

Insulation upgrades are positioned as another high-leverage investment. By adding thermal barriers that limit energy leakage, buildings can reduce heating and cooling demand with potential savings of up to 35 percent compared with uninsulated structures. The narrative links these savings to improved comfort and long-term operating efficiency, noting that strategic placement and advanced techniques help maintain optimal indoor temperatures with less energy. These fabric-first measures align with broader goals to reduce consumption before sizing on-site generation and storage, improving the economics of a decarbonisation plan.

Thermal energy storage complements these reductions by shifting cooling or heating loads to off-peak periods and capturing otherwise wasted heat. Hot thermal storage is described as boosting efficiency by reusing excess heat and enhancing grid resilience with reliable on-demand power when renewable generation is intermittent. Cold thermal storage similarly delivers operating cost savings by utilising lower-cost off-peak energy and stabilising grid demand, contributing to lower emissions when combined with clean supply.

Recommended Read: [Driving Decarbonisation in Health Systems](#)

Orchestrate Demand with Smart Controls

Controls and analytics integrate disparate assets into a coordinated system. The document notes that advanced sensors and controls can reduce site energy consumption by approximately 29 percent when implemented in commercial buildings. Energy management dashboards centralise oversight across systems, providing real-time insights and enabling predictive analytics to support proactive maintenance and optimisation. In practice, this means operators can better match demand to available low-carbon supply, anticipate performance issues and sustain efficiency

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gains rather than relying on one-off projects.

Battery storage is again positioned as a cross-cutting enabler when tied to intelligent controls. By smoothing peaks and providing backup during outages, storage helps hospitals safeguard critical operations while making greater use of on-site renewables. The combination of controls, storage and flexible resources such as CHP or thermal storage underpins resilience strategies that maintain care continuity when external conditions are volatile. These measures are presented not as isolated investments but as elements of an optimised portfolio that the Digital Business Optimizer can help prioritise within financial constraints.

A practical sustainability pathway blends clean generation, storage and efficiency with integrated control. Solar and CHP improve the carbon and reliability profile of supply, while green roofs, insulation and thermal storage cut demand and shift loads. Battery systems and dashboards orchestrate these elements into a resilient whole. The approach described focuses on achievable steps that deliver operational benefits and emissions reductions, guided by tools to sequence investments for impact and cost-effectiveness. For healthcare providers, this translates into lower consumption, greater resilience and measurable progress toward decarbonisation without compromising service continuity.

Source: [Siemens Healthineers](#)

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Published on : Fri, 26 Sep 2025