

Improving campus buildings for enhanced energy efficiency

Revised December 2023
Mutah University
Maintenance and sustainable unit

Building Energy Management Vision

Recently, a heightened global focus has been on implementing more innovative and stringent measures to conserve and efficiently manage university energy resources. Mutah University's Energy Management Vision has gained significant attention from the university's management and technical staff in response to global and local energy crises. Various university departments and centers work together to realize this vision, as depicted in Figure 1

- Training, Consultation, and Communication Center
- **Maintenance and Sustainability Unit**
- Prince Faisal Center for Dead Sea, Environmental, and Energy Research
- Entrepreneurship Center
- Community and Development Center

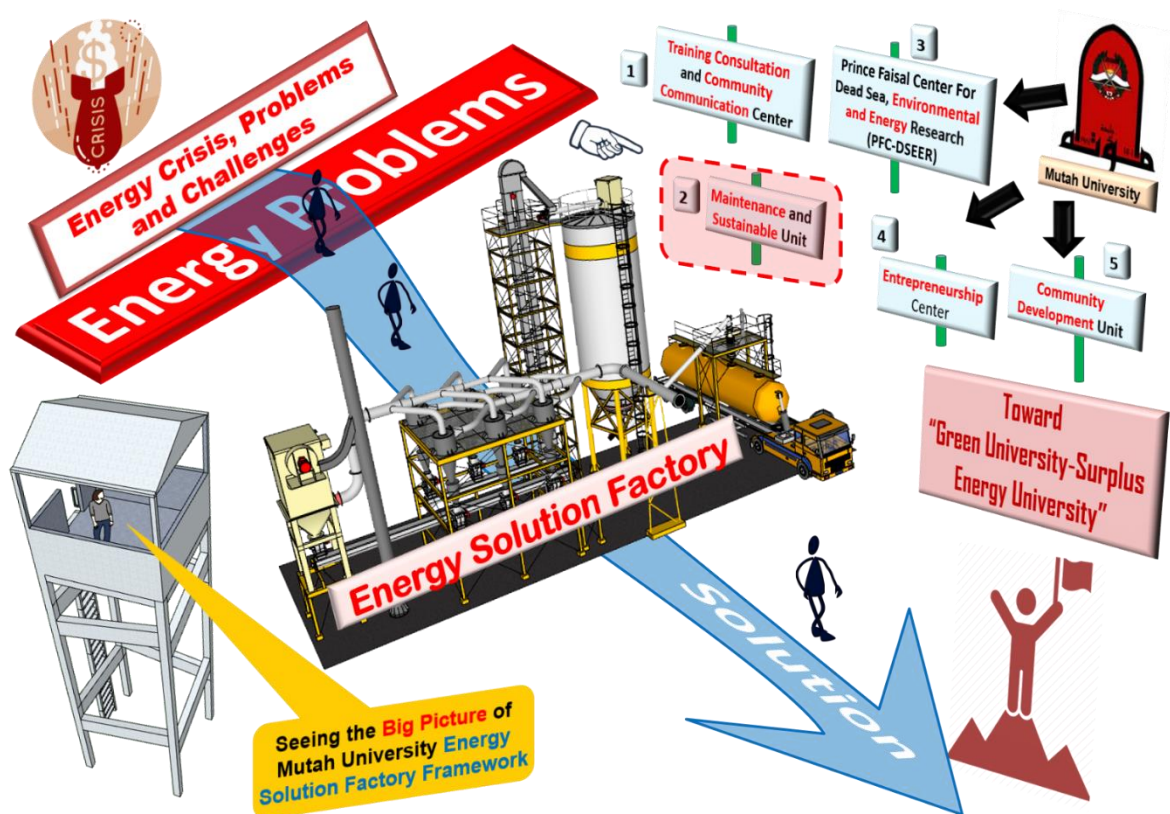


Figure 1: A Visual big picture of Mutah University Energy Management vision based on the Energy Solutions Factory Framework

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The effectiveness of energy management efforts at Mutah University has been limited by fragmentation and the absence of a unified vision to integrate various initiatives across multiple units and centers. The Energy Solution Factory Framework offers a crucial structure to align and streamline these energy management activities under a cohesive, adaptable approach, as shown in Figure 1. Academic institutions are widely recognized as centers for policy development, technological innovation, and knowledge creation, which can drive breakthroughs across numerous fields. Mutah University's Energy Management Vision embraces the concept of universities as "factories," capable of turning challenges into opportunities, facilitating the transfer of knowledge and technologies, and fostering innovative solutions, as depicted in Figure 1.

Integrated Picture of Mutah University Energy Management Activities

Integrating energy management practices is crucial in advancing Mutah University's evolving Energy Management Vision. This vision focuses on unifying the energy management efforts of the five key university centers and units into a cohesive framework, with the ultimate goal of transforming Mutah University into a sustainable, energy-surplus institution, as shown in Figure 2. Addressing the challenges posed by the fragmentation of these initiatives is essential to developing a comprehensive overview of the university's energy management activities. Achieving a holistic perspective on these collaborative efforts is vital to successful Energy Management Integration, as illustrated in Figure 2.

Constructing Far Reaching Road Map of Mutah University Energy Management Activities based on Seed to Fruit Framework

The earlier adoption of the Solution Factory Framework enabled the creation of a flexible template, standardizing all energy management initiatives into a format that can be easily adapted for implementation across different contexts, as illustrated in Figure 1. This shift toward a unified overview represented a pivotal change in our Energy Management approach, moving from a fragmented system to a more cohesive and continuous one, as shown in Figure 2. The focus has now shifted to a deeper level of integration, examining energy management activities from a foundational, growth-oriented perspective and categorizing them into four distinct types, as depicted in Figure 3:

- Seed Activities
- Root Activities
- Branch Activities
- Fruit Activities



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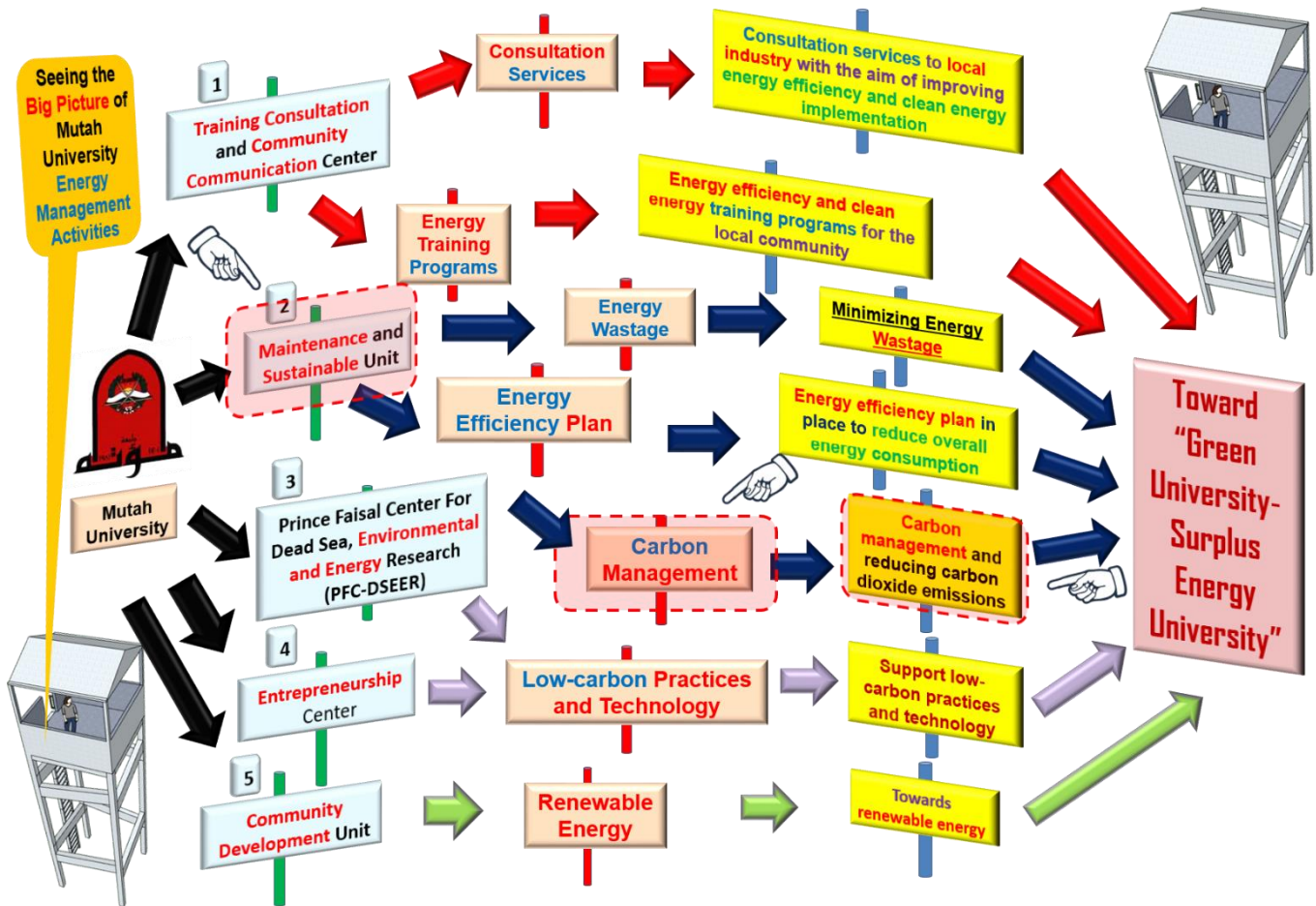


Figure 2: A Visual Big Picture of Mutah University Energy Management Activities

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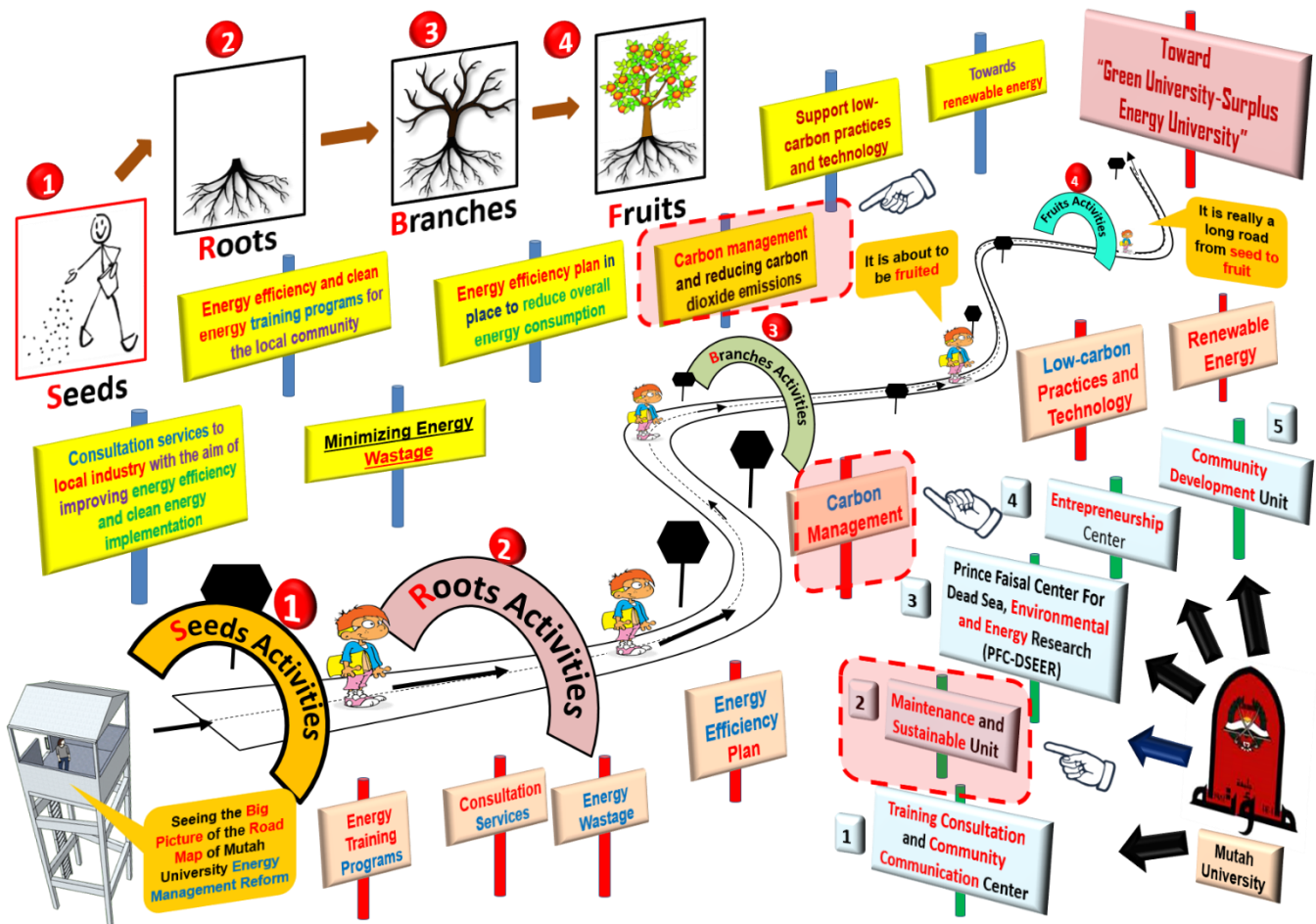


Figure 3: A Visual Road map of Mutah University Energy Management Activities based on Seed to Fruit Framework

The seed-to-fruit framework will establish an essential interconnection within this network of activity fragments, facilitating the transition of Energy Management Thinking towards an instrumental mode that imparts purpose to this intricate web of both sequential and parallel practices, as depicted in Figure 3

Maintenance and sustainable unit

The Maintenance and Sustainability Unit was founded in 1993 and encompasses the following departments:

- Maintenance Department
- Mechanical Department
- Electrical Department
- Follow-up and Field Control Department
- Communications Department
- Buildings Department

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Buildings department

The Buildings Department is responsible for managing the operations and safety of all university buildings, ensuring their functionality by overseeing various systems such as heating, cooling, lighting, and public safety. In addition, the department is leading efforts to transition buildings into energy surplus producers. These include implementing insulation systems, upgrading to energy-efficient double-glazed windows, replacing traditional lighting with LED systems, and introducing modern air circulation systems to optimize energy use for heating and cooling.

As part of Mutah University's building development plan, the department enhances energy efficiency through insulation, energy-saving glass, revolving doors, solar water heating, and advanced air circulation systems. The progress of transforming the university's buildings into high-efficiency structures is detailed in Table 1.

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