

What are urban energy systems?

Urban energy systems are those designed to cater the energy demand in cities and urban areas, and they gain from having an optimal scale for combining energy conservation programs with promising energy strategies [26].

Why do we need energy-efficient buildings in Sweden?

The development of sustainable and efficient energy systems for heating, cooling, and electricity supply and energy-efficient buildings is central to achieving these climate targets in the built environment. Since the 1990s, the National Government of Sweden has set energy use and carbon footprint objectives.

Why is research on energy systems in urban districts so important?

Additionally, it is likely that more attention is paid to research on energy systems in urban districts after 2003 due to i.e., European Directives on Energy, research calls, and the importance of the local level for the implementation of the Sustainable Development Goals. Another issue was the variation in the quality of the included articles.

Are urban energy systems climate resilient?

Assessing the climate resilience of urban energy systems is possible by considering a wide range of future climate projections and adopting a suitable framework to account for the different components that affect the energy flow in the urban scale, from generation to demand.

Which sector uses the most energy in Sweden?

In Sweden, the residential and service sector uses the most energy of all sectors which accounts for about 40 % of Sweden's total energy use. Half of the energy used in the residential and service sector is used for space heating and domestic hot water.

What is the relationship between urban energy conditions and climate?

The climate that affects citizens, buildings and energy systems in urban areas is urban climate, which is the altered version of the regional climate in a finer spatial scale and affected by the energy and material flows in the urban context. Figure 4 schematically explains the connection between urban energy conditions and climate.

Sweden; Linköping University; Energy Systems ; About. The vision of the Graduate School in Energy Systems at Linköping University is to contribute to the transformation of the energy system to be conducted in an ecologically, economically and socially sustainable direction, with good knowledge founded on interdisciplinary socio-technical ...

The island of Gotland has been chosen as a pilot region for Sweden's transition to a future sustainable energy

system. The main requirements for this transition are a safe, reliable energy supply that is both ecologically sustainable and economically competitive. Sweden has set a goal of achieving zero net emissions of greenhouse gases by 2045.

A case study analysis on urban energy systems, also based on Hammarby, was performed in Ref. [18]. Although the analyses mainly focused on district heating and heat pumps rather than PV systems, the research provided insights on modelling approaches and processes. ... This paper aims to offer an example for urban PV system planning in Sweden ...

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Image 06 Source - Energy Flow of District Heating System. The combined energy system in Malmo brought a lot of benefits to residents in city of Malmo. Geothermal heat pump system generates 5,800 MWh/year of heat and 5,000 MWh/year of cooling and 6,300 MWh/year of electricity, which can satisfy 80% of the energy needed in Malmo[5]. Besides, it ...

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Abstract During recent years, urban building energy modeling has become known as a novel approach for identification, ... Keirstead et al. [27] presented a formal definition for urban energy systems, incorporated both processes of

Urban energy system modeling frameworks (UESM), aiming at supporting decision making processes in formulating such strategies, ... provide a spatial Markov Chain model to estimate spatially resolved BEV charging demands for the city of Uppsala in Sweden.

Energy analysts have developed methods to measure and understand energy use since the 1970s. The accounting system keeps track of energy in, energy out, non-useful energy versus work done, and transformations within the system. The study of energy through an urban system is completed by considering its quality.

A range of barriers are constraining large-scale implementation of smarter urban energy systems. The lack of an enabling policy and regulatory environment can constrain action and the development of new business models.

Energy Efficiency, Urban Planning, Energy Production, Energy Sensors and AI Technology Provide Smarter Power Grid Maintenance and Troubleshooting In 2018, the electricity grid around Malå, Sweden, was fitted with a Smart Grid Surveillance system that detects and locates faults and deviations in the grid.

Hammarby Sjöstad, located in Stockholm, Sweden, is an exemplary model of sustainable urban

development. Initially, this area was an industrial zone, but in the early 1990s, the Stockholm City Council initiated an ambitious project to transform it into a modern, eco-friendly residential neighborhood.

Since the symbolic tipping point that occurred in 2007, humankind has become an urban species with more than half of its population living in urban areas (UN, 2014). Not surprisingly have cities become a focus in addressing the global issues of climate change and the related energy transition toward low-carbon, renewable, and efficient systems.

Urban areas currently accommodate over half of the world's population and over 70% of global energy-related CO₂ emissions, with these statistics expected to be even higher by 2050 [1]. As such, cities play a vital role in the global transition towards a low-carbon emission and sustainable energy future.

Urban areas and urban energy systems in Sweden Urbanization is a strong trend, both globally and nationally in Sweden where 88 % of the population lives in urban areas, which corresponds to 1.6 % of Sweden's entire land area [27]. Sweden has three major cities (Stockholm, Gothenburg, and Malmö), a few expanding ...

The 2015 Paris Agreement's goal of limiting global warming to 1.5°C drives Sweden's energy policy, targeting zero greenhouse gas emissions by 2045 and freedom from fossil fuels by ...

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The review of 70 journal and conference articles reveals seven research themes in the interdisciplinary nexus of energy systems and sustainability-profiled districts: (1) ...

The aim is also to see how participatory design methods can help to democratize the planning of the urban energy transition in Sweden by including its citizens. ... By actively participating in the design and decision-making process, residents can gain knowledge about energy systems, sustainable practices, and the built environment. ...

The Bo01 system produces 5,800 MWh of heat, 5,000 MWh cooling and 6,300 MWh electricity. It is designed to provide heat and electricity to 85,000 m² of living space. The system is ...

Researchers at LiU are to develop a platform that allows municipalities and urban areas to obtain support when making decisions about energy. The FlexSUS project lies under the EU Horizon 2020 programme, and ...

energy systems also requires reasonable estimations for the amount and variations of energy demand in the future, with suitable temporal and spatial resolutions. There are some works ...

Towards climate resilient urban energy systems: a review ... Department of Architecture and Civil Engineering, Chalmers University of Technology, Gothenburg 41258, Sweden; ³Institute for Future Environments (IFE), Queensland University of Technology (QUT), Brisbane 4000, Australia; ⁴Solar Energy and Building Physics Laboratory (LESO-PB), Ecole Polytechnique

The Urban Energy Systems Laboratory focusses on the development of methods, strategies and solutions to transform buildings, neighbourhoods and cities into energy efficient and decarbonized systems. With our research we seek for solutions that significantly contribute in reaching national and global emission targets. Our core competences lie in ...

This class is about figuring out together what cities and users can do to reduce their energy use and carbon emissions. Many other classes at MIT focus on policies, technologies, and systems, often at the national or international level, but this course focuses on the scale of cities and users. It is designed for any students interested in learning how to intervene in the energy use of ...

Cities are a major contributor to global CO₂ emissions, accounting for over 70% [1]. A large share of urban CO₂ emissions comes from the energy and transport sectors, which have mainly been relying on fossil fuels since decades ago [1]. In urban energy systems, the net-zero energy district or city concept has recently been promoted globally [2], [3] a net-zero ...

Sociotechnical ecology: Energy systems in urban areas with high sustainability ... The research project will examine the role of hydrogen in Sweden's energy system, focusing on both historical and contemporary conditions. The goal is to increase knowledge about hydrogen's technical and societal opportunities, risks, and conditions. ...

By situating this review of research on the energy systems in sustainability-profiled districts in Sweden, it is first necessary to provide a background of Swedish urban areas, urban energy systems, and urban ...

the economic and energy performance of PV or ST systems. While much of the previous literature has focused on the energy and / or the financial performance of solar energy systems of buildings within cities, only a few studies have looked on the actual implementation of solar energy in the urban planning process; in other words

Energy systems in sustainability-profiled districts in Sweden: A literature review and a socio-technical ecology approach for future research

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EcoDataCenter, Falun, 79170, Sweden Corresponding Author: xza@du.se; +46 (0) 23-77 87 89 ABSTRACT
As a large energy prosumer in the urban energy systems, on the one hand, datacenters consume a large amount of electricity to ensure the IT facilities and ...

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