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Conference Paper

ADAPTIVE CITIES IN A FRAGMENTED WORLD: STRATEGIES FOR ENERGY AND ECONOMIC RESILIENCE

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Abstract.

Urbanization has placed cities as the core of global transformation, as economic activity, energy use, and climate risk become concentrated. Cities produce more than 80% of global GDP and nearly 90% of private-sector jobs, and over 70% of greenhouse gas emissions and face rising exposure to extreme weather events. Rapid urban expansion in Southeast Asia undermines issues of fossil fuel dependence, infrastructure inadequacy and climate vulnerability, further highlighting the importance of resilience. This study applies qualitative content analysis to analyse policy frames, case studies and adaptation responses with a focus on two exemplar cities, Ho Chi Minh City and Hanoi. The results indicate that Ho Chi Minh City can be resilient by involving economics scale, private sector participation, and clean energy projects, and Hanoi highlights governance, planning, and institutional development. Comparative analysis highlights complementary pathways of adaptation across ASEAN, ranging of integrated urban planning, decarbonized mobility, smart infrastructure, and public-private-people partnerships. At the regional level, ASEAN supports resilience through cooperative platforms, yet further cross-border innovation and investment in clean technology remain critical. The study concludes that adaptive cities provide a foundation for both energy security and sustainable economic resilience in an increasingly fragmented world.

Keywords: adaptive cities; clean mobility; climate adaptation; energy security; smart infrastructure; sustainable urbanization

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Introduction

Cities stand at the heart of global transformation. More than half of the world's population, over 4 billion people, already live in urban areas, and this figure is projected to reach 70% by 2050 (1–3). This rapid urbanization places cities at the centre of economic, social, and environmental change. Cities generate about 80% of global GDP and create nearly 90% of private-sector jobs. At the same time, cities are responsible for more than 70% of global greenhouse gas emissions and face increasing exposure to climate risks like flooding, droughts, sea level rise, and heat waves. In Southeast Asia, where urban populations increase at unprecedented rates, sustainability and resilience are essential (4,5).

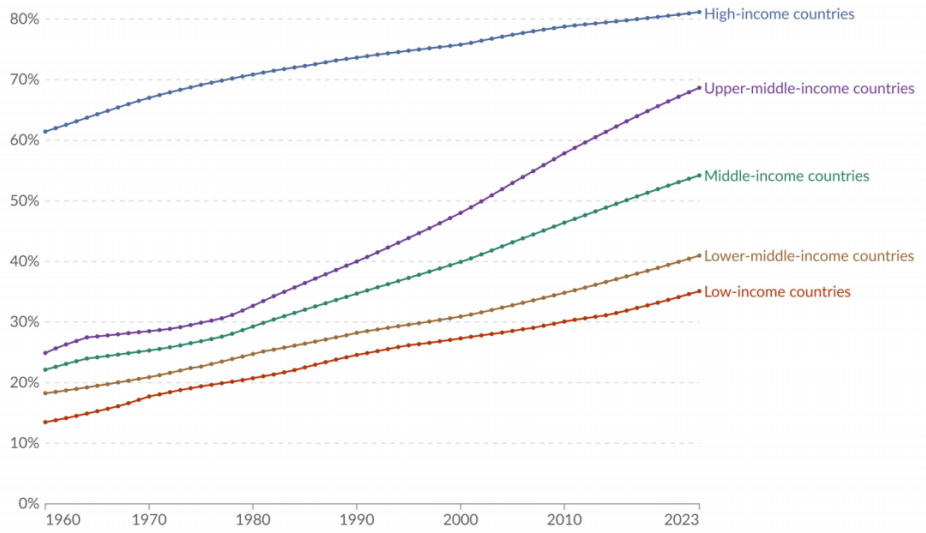

Figure 1. Share of Population Living in Urban Areas
Source: Le (2025)

The idea of adaptive cities stresses the capacity to resist shocks and the capacity to thrive in uncertainty environments (4,6). This paper analyses how Southeast Asian cities in Vietnam grapple with the overlapping challenges of energy security, climate vulnerability and economic transformation. The paper also discusses approaches, examples and regional partnerships that are paving the way for resilience.

Literature Review

Theoretical Studies

Urban resilience is the ability of a city to keep doing its important tasks and encourage new ideas while also being able to deal with and recover from disturbances (7,8). The disturbance can be things like floods or droughts that happen suddenly, while not having enough fund or not having enough infrastructure to take

mitigation. Resilience requires strong leadership from the government, active participation from the community, involvement from the commercial sector, and the use of technology and data systems. There are three main ideas that creates the theoretical framework for adaptive cities (2,3,9,10). The first is economic resilience, which makes sure that businesses are diverse, productive, and stable over the long run. The second is energy resilience, which means using fewer fossil fuels and making it easier for people to get clean, cheap energy. The third is social and institutional resilience, which focuses on inclusive governance, planning with input from everyone, and working together across sectors. These aspects should be synergized to make cities that able for handling disturbances from outside while working toward sustainable development.

Empirical Studies

ASEAN cities have six big problems, that are reliance on fossil fuels, growing too quickly, vulnerable to climate change, underfunded, governance issue, and lag in technology distribution (11,12). Cities are at risk of energy price fluctuation and supply problems. Cities frequently grow faster than their roads, which leads to traffic jams, power outages, and services that are too crowded. Climate threats are still quite high, and by 2050, 36% of ASEAN municipalities are expected to be flooded (2,3).

Vietnam shows both the good and bad sides of being able to deal with disasters in cities. Urbanization has changed the country. There are already 40 million people living in cities, and by 2050, 60% of the population is expected to live in cities. People move to get better employment, schools, and health care. Urbanization can helps the economy thrive in many ways, however also places a strain on infrastructure and energy systems (2,3).

Ho Chi Minh City, the country's largest economic hub, contributes 25% of national GDP but faces severe risks from sea level rise and flooding (13,14). In responses initiatives have been deployed, for example rooftop solar in public buildings and industrial zones, deployment of electric buses and green taxis, and smart city monitoring systems. The city also supports clean technology companies and vocational training for solar energy and electric vehicle (EV) services, which makes sure that the workforce is ready (2,3).

Hanoi, the political and regulatory capital, has pioneered resilient governance frameworks (15,16). The city joined the 100 Resilient Cities program and made sure that its plans aligned with Vietnam's net-zero 2050 target. Initiatives comprise of rooftop solar deployment, energy-efficient public buildings, bus rapid transit systems, and investment in green urban design and flood

management. Particularly, smart-city initiatives integrate IoT-based services, real-time monitoring, and smart lighting (2,3).

Methods

The study applied a qualitative content analysis for making valid inferences by the interpretation of textual material in terms of content, context, and the meaning of the words to this study (17,18). The study analyses policy approaches, urban development strategies and case studies in Ho Chi Minh City and Hanoi in Vietnam. Published literatures, plans at regional level ASEAN institutional reports, and academic research of the last two decades written material are the primary source for this study. Priority covers for urban resilience, energy security, climate adaption, sustainable economic development. The unit of analysis focuses on city-level projects and institutional responses to issues of rapid urbanisation, vulnerability to climate and transition of energy. Data validity is established using a triangulation of authorized documents, regional frameworks, and peer-reviewed studies complemented by international benchmarks on sustainable urbanization and climate resilience.

Results and Discussion

Comparative analysis reveals distinct strengths between Ho Chi Minh City and Hanoi (2,3,13–16). Ho Chi Minh City leads in economic scale, private-sector innovation, and clean energy markets, aligning closely with cities like Bangkok or Manila where market forces drive adaptation. Hanoi emphasizes governance, institutional frameworks, and pilot projects, resembling Jakarta in policy-driven resilience. Together, the two cities offer complementary models for adaptive strategies in ASEAN.

Table 1. Comparative Analysis between Ho Chi Minh City and Hanoi
Source: Le (2025)

	Hanoi	Ho Chi Minh City
Strength	Governance, planning, pilot projects	Economic scale, private-sector implementation
Focus	Institutional frameworks, smart city integration, climate planning	Mobility, clean energy markets, community-scale implementation
Master plan	**2024:** Initiated the **Hanoi Master Plan 2045–2065**, aiming to transform the city into a smart, ecological metropolis with integrated green infrastructure and economic zones.	**2023**: Developed a **comprehensive master plan towards 2030, with a vision to 2050**, focusing on sustainable growth, smart urban development, and enhanced energy resilience.
Comparative model	More aligned with **Jakarta (policy driver)**	More aligned with **Bangkok/Manila (market-driven transformation)**

Adaptation strategies across ASEAN countries are including integrated urban planning, decarbonized mobility, smart infrastructure, nature-based solutions, localized clean energy, and a mix of public-private-people partnerships (2,3,19,20). Efficient planning and a data-driven governance framework can support real-time responses to urban stress. Private sector participation is identified as an essential vehicle for innovation, technology transfer, and behavioural change. Donations include clean mobility and renewable energy offerings, public education campaigns and climate-resilient investments.

Sustainable urbanization has been promoted in ASEAN framework, for example the ASEAN Sustainable Urbanization Strategy and the ASEAN Smart Cities Network (21,22). These are tools for exchanging knowledge, training, and cooperation at regional level. But other ventures might stretch to clean mobility, digital infrastructure and hyper-local hubs of innovation. Investment in research capital for clean technology and development would increase resilience across countries (2,3).

Conclusion

Cities are where the world is changing and breaking down. In a world that is always changing, urban resilience is not a luxury, however necessity for survival and growth. Cities in Southeast Asia are dealing with several problems that are all connected, that are energy instability, fast urbanization, climatic vulnerability, and problems with governance. The problems necessitate the cities to adopt clean transportation, decentralized renewable energy, smart infrastructure, and inclusive governance. Ho Chi Minh City and Hanoi show two different but complimentary examples. one is based on economic dynamism and private-sector involvement, while the other is based on governance and institutional leadership. Both demonstrate that resilience requires active collaboration among governments, businesses, and communities. At the regional level, ASEAN has taken important steps to support resilient and sustainable urbanization, but stronger cross-border collaboration, innovation platforms, and investment in clean technology are needed. Building adaptive cities ensures that urban centres remain engines of economic growth and energy resilience while safeguarding the well-being of millions in an increasingly fragmented world.

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