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## Editorial

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### Lynne Chester

Curtin University,  
G.P.O. Box U1987, Perth WA, 6845, Australia  
E-mail: l.chester@curtin.edu.au

**Biographical notes:** Lynne Chester is a Senior Research Fellow at The John Curtin Institute of Public Policy, Curtin University in Perth, Australia. She has written extensively on the Australian electricity sector and energy security. Her current research focus is the outcomes arising from the structure and operation of markets for former public goods such as wholesale and end-use energy prices, energy poverty and generation adequacy.

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This issue of the *International Journal of Global Energy Issues* examines energy security. At the beginning of the second decade of the 21st century, energy security is high on the policy agenda of the developed and developing world, and supranational organisations such as the European Commission, the World Bank, the Organisation for Economic Co-operation and Development (OECD), the North Atlantic Treaty Organisation (NATO), the Asia Pacific Economic Forum (APEC), the World Economic Forum and the G8. The European Union (EU), the UK and Japan, to name a few, have spent considerable resources developing energy security strategies. Events such as a rapid escalation in oil prices, disruption of gas supplies to Europe during freezing winter temperatures, electricity blackouts following hurricanes or other severe natural disasters, tend to narrowly focus public and media attention on energy supply issues and measures taken by governments to overcome short-term supply disruptions. This also was the focus of energy security strategies following the oil disruptions of the 1970s. But today's energy supply systems are far more complex than a few decades ago.

Twentieth-first century access to energy sources depends on global markets and a vast infrastructure network of offshore platforms, pipelines, tankers, refineries, storage, generation capacity, and transmission and distribution systems. Cross-border pipelines and strategic transport channels are featured strongly; China and India have become major energy importers; there is a growing reliance on an ever-smaller group of oil and gas suppliers as the interdependence between industrialised countries and energy exporters has deepened; financial markets and energy markets are closely linked; and technology has created interdependencies between electricity and oil refining as well as natural gas processing. This complexity brings heightened risks of major supply disruption through political conflict or war, technical system failures, accidents, sabotage, extreme weather events or financial market turmoil.

Today's energy supply systems are vast complex networks from upstream to downstream, energy markets are exemplars of liberalisation, fossil fuels dominate our growing global energy dependence, most countries will never be energy self-sufficient, energy consumption contributes around 80% to global greenhouse gas emissions, and China's carbon emissions from energy use have surpassed those of the USA. Non-OECD energy consumption is dominating the growth in global energy demand, oligopolies

dominate the national gas and electricity sectors of many EU member countries, and coal remains the world's fastest growing primary energy fuel. Projections of global primary energy consumption – for example, by the International Energy Agency, US Energy Information Agency, European Commission, and the UN Interdepartmental Committee on Climate Change – show a strong upward trajectory without fundamental policy changes or major supply constraints. Heightened concerns about climate change have focused global attention on addressing the environmental consequences of unchecked use of fossil fuels.

This is the political, economic and social context leading to energy security's importance on the policy agenda. This context also foreshadows a myriad of energy security issues for each energy source and right along the supply chain. For example: What does energy security mean? Energy security for whom and when? What are the challenges for energy security in today's world compared to the 1970s? What role should governments and/or supranational organisations play? Can domestic energy policies pose risks to regional energy security? Can energy security and climate change policies support each other? Can energy efficiency contribute to energy security? Economic efficiency, competition and energy security – are all three objectives compatible? What are the implications for energy security of our dependence on fossil fuels? Can supply disruption in one market spillover into another energy market stimulating a major increase in demand?

As the articles in this special issue demonstrate, energy security has many possible meanings. It may be delineated through multiple dimensions and takes on different specificities depending on the country (or region), timeframe or energy source to which it is applied. The multiplicity of meanings that can be attributed to energy security mean, as the contributions to this special issue also demonstrate, that there is no 'one-size-fits-all' solution.

This special issue discusses the complexities and multi-dimensional nature of 21st century energy security, and posits a number of different policy responses to mitigate energy security risks. The collection of articles covers the conceptual and the empirical, utilising a range of methodological techniques to explore many dimensions of energy security and present a wide-ranging set of political, economic and policy scenarios for global, regional and national energy security.

Bilgin challenges us, in the opening article, to develop a far more comprehensive and holistic understanding of energy security, grounded in the complexity of the transition to the contemporary energy mix era but pertinent to local, regional, national and global levels. This transition generates economic, geopolitical and environmental antagonisms which need to be counterbalanced, according to Bilgin, by cooperation and governance to effectively manage 21st century energy security, and which can be harnessed by adopting the principles of feasibility, accessibility, sustainability and transparency.

Moving from the conceptual, the energy security perspective of the second article is focused on the primary energy source of oil and in particular, the implications of a peak in global oil production for a country which is 97% dependent on petroleum fuels for transport. Although an eventual peak in oil production is generally agreed, little analysis has been undertaken of the attendant implications. Using a partial equilibrium model, Graham and Reedman start to address this gap by providing quantitative estimates of possible outcomes for Australia if oil production peaks in the next decade. The outcomes considered, for both optimistic and pessimistic scenarios, include petroleum product prices, the demand for transport fuels and the production of alternative fuels and starkly

illuminate the potential issues to be faced by countries around the world with similar oil dependencies.

Another primary energy source provides the subject of the third article by Haselip, Morse and Al-shafai. This article examines the issue of the EU's high reliance on imports of natural gas from Russia and, using risk-based analysis, considers the likely role and importance of Qatar to diversify both the geographic sources for the EU's natural gas imports, and energy sources from natural gas to liquefied natural gas (LNG) given Qatar's fast-growing export capacity. This interesting analysis also shines a spotlight on the potential political and economic responses from Russia to EU endeavours at diversification further demonstrating the complexity of dimensions encompassed within energy security for a country, region, market and time period.

Cabalu, Manuhutu and Alfonso move the analysis of energy security issues across to Asia and consider the 13 countries – including China – comprising the Association of South East Asian Nations Plus Three (more commonly known as the ASEAN+3) region. They argue that a range of recent and existing initiatives in regional cooperation provide a strong basis for this regional bloc to gain greater resilience to energy security – through greater interdependencies in oil, gas, coal, and renewable energy.

The final two articles focus our attention on the USA but in two very different ways.

Vivoda's article considers the importance of US international oil companies (IOCs) for US energy security and his analysis suggests that historically they have played a very limited role, generally acting independently of the US Government except when their interests are congruent or under severe threat. Naughten, on the other hand, contends that US foreign energy policy can only be understood in the context of the changing, multi-dimensional role played by the USA in the global energy economy which has been driven, in the past, by an entrenched strategic objective of dominance or global hegemony. Global crises, including energy security, would – according to Naughten – be more appropriately addressed if the USA adopted a role of 'cooperative realism' underpinned by a liberal international economic regime but with greater recognition and respect for national sovereignties and not fixated with free international capital movements.

I hope that readers of this special issue will find it a useful contribution to the ongoing and wide-ranging debate about energy security. I thank the authors and referees for their time, effort and patience in putting this special issue together.