Energy Policy 37 (2009) 1423–1431

Contents lists available at ScienceDirect

Energy Policy

journal homepage: www.elsevier.com/locate/enpol

# Policy options when giving negative externalities market value: Clean energy policymaking and restructuring the Western Australian energy sector

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ARTICLE INFO

*Article history:*
Received 20 August 2008
Accepted 1 December 2008

*Keywords:*
Externalities
Policy
Australia

ABSTRACT

Uncertainty surrounds the choice of instruments that internalise fossil-fuel pollution at the local, regional and global level. This work outlines the considerable growth in the Western Australian (WA) energy sector and explores the available options and potential hazards of using specific instruments to internalise externalities. These core options are discussed with respect to liberalising energy markets, providing private investment certainty, and imparting commentary on the developments and consequences of reform in the WA context. As a large energy exporter, providing certainty for the WA energy sector investment and the community is necessary to maintain the current prosperity. Remarkably, in the decades of market reform progress, the absence of one essential element is evident: economic externalities. Policymakers are under increasing pressure to understand economic reform, new energy markets and the multifaceted repercussions they entail. With modern energy reform sitting squarely within the milieu of more efficient governments and climate policy, there are clear economic advantages to internalising negative and positive externalities and other market distortions during energy market developments. Ignoring market failures when commercialising government-owned energy utilities in de-regulated and competitive markets invites continued ad-hoc government interference that generates investment uncertainty in addition to a perplexed electorate.



## 1. Introduction

As externalities are a form of market failure, government interventions are justified in order to minimise their distortionary market influence and impact on the community (Gregory Mankiw et al., 2000; Foxon et al., 2005; Jaffe et al., 2005). The recent Western Australian (WA) gas crisis caused by the June 3 explosion at Varanus Island was an example of such an intervention. Lack of long-term energy supply security planning in the WA energy development decisions lead to this single mishap cutting State gas supplies by one-third. While technically not defined as an externality, energy supply security issues distort energy markets in a similar manner to externalities and should also be incorporated into energy market restructuring (Owen, 2004; Garnaut, 2008).

At this point in time, a policymaker should not be surprised by a lack of consensus with currently available research findings on externality estimates and should be mindful that externality studies provide limited guidance (Sundqvist, 2004). The resolution of external cost estimates available are often coarse and policymakers should tread carefully when navigating towards achieving specific policy outcomes. Nonetheless, the implementation of a sound internalisation strategy requires a scientifically robust and comprehensive quantification of external costs (Krewitt, 2002). There are several reasonable explanations of discrepancies among the results of externality studies including differences in fuel characteristics, variable regulatory frameworks, inconsistent research methods, different study scopes, and the basic assumptions of the research (Sundqvist, 2004). For example, it is currently common to omit external costs such as climate change or nuclear proliferation. While difficult to quantify, these issues have the potential to become large external costs, and therefore should not be neglected in energy policy risk assessments (Eyre, 1997). This work aims to present available energy policy instruments that attempt to internalise negative externalities and characterise the most useful and problematic components to policymakers in the context of the WA energy sector.

Including externalities and other distortionary influences into the design of competitive energy markets is a logical evolution of the responsibility governments have to their constituents. Private investors are understandably not lining up to invest in non-excludable and non-rival public goods, such as clean air that can be acquired for free (Longo and Markandya, 2005). Governments must therefore be responsible for introducing value to public goods by internalising market failures (Künzli et al., 2000; Sundqvist, 2004). The million-dollar question is: can policy

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doi:10.1016/j.enpol.2008.12.009

strategies be developed and delivered that adequately protect public goods while enhancing the efficiency of competitive markets in a politically elegant manner? (Longo and Markandya, 2005)

Historically, regulation has formed the backbone of mechanisms for maintaining the quality of the environment. Regulation involves the imposition of standards or bans regarding emission and discharges, products or processes through licensing and monitoring (Owen, 2004). Regulatory measures to internalise externalities involves passing a law or issuing an administrative order banning certain practices and prescribing others, which frequently become politically divisive (Longo and Markandya, 2005). Government responses to issues such as energy supply security concerns and local environmental pollution have been influenced by various social and health crises for centuries. One example is the banning of coal burning in London in 1352 (Owen, 2004). While these extreme interventions in the event of crises are often politically abrupt, although necessary in the short-term, these wider impacts of these crises are often preventable.

More flexible energy sector regulatory techniques include mandatory minimum standards on the adoption of low emission technologies, energy efficiency measures for buildings, and restricted natural resource management practices (Owen, 2004). However, where cleaner and more efficient technologies are available it is difficult to justify that excluding the worst performing and most damaging technologies will reduce economic efficiency (Diesendorf, 2007). The use of "command and control" regulations are often said to be less efficient than economic measures, although this simplistic view disregards the predictable, administratively simple, and clear planning frameworks that standards and regulation provide (Eyre, 1997). In reality, a precise distinction cannot be made between market and regulatory instruments as all market-based instruments exist in a regulatory and institutional setting (Diesendorf, 2007). In Australia, all of the most prominent competitive energy markets have major regulatory components, including the Mandatory Renewable Energy Target (MRET), the National Electricity Market (NEM), and the WA Wholesale Electricity Market (WEM) (International Energy Agency, 2001; Australian Greenhouse Office, 2003; Stewart, 2004; Western Australian Government Gazette, 2004; Independent Market Operator (Western Australia), 2006; Kent and Mercer, 2006; Outhred, 2007).

A major attraction of economic instruments is the potentially minor government involvement and the efficiency and flexibility they can provide to private firms. However, this potential depends on the appropriateness of the instrument for the unique conditions in individual markets (Longo and Markandya, 2005). Market-based economic instruments have been in use by the 1970s, and are designed to address market distortions with a mix of regulatory, economic, fiscal and financial incentives (Diesendorf, 2007). Two strengths of market-based economic measures are their economy-wide scope and compatibility with other measures (MacGill et al., 2006). Economic instruments allow a reduction in the overall costs of pollution mitigation to industry, creating a financial incentive for firms to continually decrease pollution and allow state governments to raise funds that can be used to finance cleaning up pollution or to replace existing taxes and subsidies (Longo and Markandya, 2005). However, even amongst neoclassical economists, no unanimity exists on how to remedy the external effects of market transactions (Antheaume, 2004).

When policymakers choose the instruments to internalise the externalities in the energy sector, they must strive to find a solution that gives the best outcome in terms of: efficiency; cost minimisation; impact on the job market; security of energy supply; equity of the instrument; time-based closed-ended commitments; administrative ease; intellectual property innovation; certainty of the level of internalisation, and; equity of the instrument. Governments must also continually review the outcome of such solutions (Longo and Markandya, 2005). It is also important to acknowledge the limitations of externality methodologies to identify an optimal level of policy intervention (Krewitt, 2002). While there are many assumptions and limitations involved in full external cost accounting methods and instruments, making use of them is preferable to ignoring such costs (Antheaume, 2004).

Using precautionary principals and a knowledge of the strength and weaknesses of externality estimation methodologies allow policymakers to balance investment outcomes and navigate the spectrum of available polices that internalise energy pollution and other external costs. These decisions involve high political risk in WA, as the economy is highly dependent on energy and energy intensive exports. The WA energy sector provides a useful microcosm for studying the possible options and consequences of competitive energy market development with significant political, economic, social and environmental stakes for the Australian nation and the wider Pacific region.

## 2. WA: major energy user and exporter policymaking

With a population of slightly over 2 million, the state of Western Australia produces and uses a disproportionately large amount of energy. Politically, energy reform in a small state with large energy industries can be a hazardous exercise, depending on the reform agenda. To appreciate the magnitude of the highly charged reforms undertaken in WA, the author has provided a snapshot of the energy industry trends in terms of production and value. WA exports over 50% of the total primary energy produced (see Fig. 1). Unsurprisingly, the WA economy relies heavily on export income, with merchandise exports accounting for 39% of gross state product between 2001–2002 and 2005–2006 (Australian Bureau of Statistics, 2007).

The export dependent nature of the sector is illustrated by the obvious dip in primary energy production in 2003–2004 in Fig. 1. This contraction was due to the increase in the value of the Australian dollar, which lead to less demand and weaker export earnings (Australian Bureau of Statistics, 2007). Between 2001–2002 and 2005–2006 the total primary energy production in WA has increased from 1740 to 1850 PJ. Over the same period primary energy use has increased from 727.4 to 808.3 PJ (Parliament of Western Australia, 2007). Between 2001–2002 and 2005–2006, crude petroleum oil and natural gas represented 12.7% and 8.1% of the total value of WA's export commodities. The value of exports from the oil and gas extraction industry has increased from $7389 million to $10,072 million over the period. Due to the relatively poor quality of WA coal reserves, the WA coal industry exported only $3,00,000 of coal in 2005–2006 and produced a total of only 6 Mt. This is in contrast to the petroleum refining exports of $567.4 million for the same year (Australian Bureau of Statistics, 2007). The total annual value of WA's petroleum product production (petroleum condensate, crude oil, liquid natural gas (LNG), and natural gas) increased from $9492 million in 2001–2002 to $14,555 million in 2005–2006. Over that period, WA's total production of crude oil and LNG was valued at $24,000 million and $18,000 million, respectively (Australian Bureau of Statistics, 2007).

These large production values also correspond to sizable royalty receipts for WA. The WA State Government royalty receipts from petroleum and gas for each financial year between 2001–2002 to 2005–2006 was $428.3 million, $488.6 million, $416.3 million, $549.7 million, 678.8 million, respectively