



Australian Government
Productivity Commission

Carbon Emission Policies in Key Economies

Productivity Commission
Research Report

May 2011

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The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au) or by contacting Media and Publications on (03) 9653 2244 or email: maps@pc.gov.au

Foreword

The Australian Government commissioned this report to help it, and the Multi-Party Climate Change Committee, assess the extent to which key economies are taking action to address climate change. It provides a stocktake of the large number of policy measures in the electricity generation and road transport sectors of the countries studied. And it provides estimates of the burdens associated with these policies in each country and the abatement achieved. While the results are based on a robust methodology, data limitations have meant that some estimates could only be indicative.

In conducting the study, the Commission consulted with government agencies responsible for emissions-reduction policies in China, Germany, India, Japan, New Zealand, South Korea, the United Kingdom and the United States, as well as Australia. The Commission received information and data from a number of expert bodies internationally, including the Institute of Energy Economics in Japan. The Department of Foreign Affairs and Trade and its overseas embassies provided invaluable assistance in facilitating contact with governments and organisations in the study countries. The Commission also hired a number of firms in Australia and internationally to assist with the acquisition of information on emissions-reduction policies.

The timeframes and the nature of the exercise precluded the wide community involvement typical of the Commission's public inquiries. That said, the Commission was able to obtain a range of input and feedback on both the methodology and data through a workshop, exposure drafts sent to experts and study countries, and various meetings with stakeholders during the course of the study. The Commission is very grateful to all those who provided information and analytical input.

The study was prepared by a research team from the Commission's Melbourne office, headed by Paul Belin. In overseeing the project, I was assisted by Commissioner Warren Mundy.

Gary Banks AO
Chairman
May 2011

Terms of reference

Study into Emissions Reduction Policies in Key Economies

Productivity Commission Act 1998

I, Bill Shorten, pursuant to Parts 2 and 4 of the Productivity Commission Act 1998 hereby request the Productivity Commission to undertake a research study on effective carbon prices that result from emissions and energy reduction policies in place or committed in Australia and other key economies.

This work is intended to provide accurate and timely information on the extent of climate action in key economies and sectors.

Context

Reducing greenhouse gas emissions to mitigate the worst effects of climate change is a global challenge. Various mitigation policies are available, though not all impose explicit carbon prices on businesses and households. While some policies such as carbon taxes or emissions trading schemes will involve explicit carbon prices others, such as direct regulation of technologies, renewable energy targets, or subsidies for low emissions technology, impose less transparent carbon prices.

Given this, comparing the impact of different policies on a given sector across economies can be difficult as their scope can vary considerably and their impacts are not always clear. In this context it is important to develop a methodology for aggregating sectoral impacts across policies, and for making comparisons across key economies.

Against this background, the Commission is requested to provide advice on the effective carbon prices that result from emissions reduction and other relevant policies in key economies, where effective carbon prices include both explicit carbon prices, such as taxes or emissions trading schemes, and implicit carbon prices.

Scope of the Study

The Commission is requested to:

- examine and detail emissions reduction policies, either in place or committed in Australia and in other key economies such as the UK, the USA, Germany, New Zealand, China, India, Japan and South Korea

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- estimate the effective carbon price per tonne of CO₂-e faced by the electricity generation sectors in these economies, and selected industries drawn from manufacturing and transport sectors in these and other countries where relevant and data permitting
 - report on the methodology, assumptions and data sources used, so as to inform further analysis in this area.

Key Considerations

In conducting the study and making recommendations the Commission would:

- consult with the business sector, government agencies and other interested parties as appropriate in Australia and internationally
- draw on credible evidence both nationally and internationally, including by utilising local research expertise in economies being examined.

The Commission is to report to the Government by the end of May 2011. The report will be published.

Bill Shorten

Assistant Treasurer

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The following appendixes are not included in this report. They are available on the Commission’s website (www.pc.gov.au/projects/study/carbon-prices)

D	Australia’s electricity generation sector
E	China’s electricity generation sector
F	Germany’s electricity generation sector
G	Japan’s electricity generation sector
H	New Zealand’s electricity generation sector
I	South Korea’s electricity generation sector
J	The United Kingdom’s electricity generation sector
K	The United States’ electricity generation sector
L	Demand-side analysis for electricity
M	Road transport fuels
N	Supply-side analysis for road transport
O	Demand-side analysis for road transport
P	Country stocktakes

Abbreviations

ACT	Australian Capital Territory
AEMO	Australian Electricity Market Operator
CAFE	Corporate Average Fuel Economy
CARB	California Air Resources Board
CARD	Center for Agricultural and Rural Development
CCL	Climate Change Levy
CCS	Carbon capture and storage
CER	Certified Emissions Reductions
CFGS	Cleaner Fuels Grants Scheme
CHP	Combined heat and power
CHP Act	Combined Heat and Power Act
CNY	Chinese Yuan
CO ₂	Carbon dioxide
CO ₂ -e	Carbon dioxide equivalent
CSI	California Solar Initiative
DCCEE	Department of Climate Change and Energy Efficiency
DECC	Department of Energy and Climate Change (UK)
E10	Mixture of 10 per cent ethanol and 90 per cent petrol
E85	Mixture of 85 per cent ethanol and 15 per cent petrol
EIA	Energy Information Administration (US)
EPBB	Expected performance-based buydown
EPG	Ethanol Production Grants
ERI	Energy Research Institute (China)
ERP	Emerging Renewables Program

ETS	Emissions trading scheme
EUA	European Union Allowance
FIT	Feed-in tariff
FY	Fiscal year
g	Gram
GDP	Gross Domestic Product
GEC	Gas Electricity Certificate
GGAS	Greenhouse Gas Reduction Scheme
GSI	Global Subsidies Initiative
GST	Goods and Services Tax
GW	Gigawatt (equal to one thousand megawatts)
GWh	Gigawatt hour (equal to one thousand megawatt hours)
IEA	International Energy Agency
IEEJ	Institute of Energy Economics, Japan
ISO	Independent system operator
ITC	Investment Tax Credit
KCER	Korea Certified Emission Reduction
KEEI	Korean Energy Economics Institute
KEPCO	Korean Electric Power Corporation
kt	Kilotonne (equal to one thousand tonnes)
KRW	South Korean Won
kW	Kilowatt (equal to one thousand watts)
kWh	Kilowatt hour (equal to one thousand watt hours)
L	Litre
LCA	Life-cycle assessment
LEC	Levy Exemption Certificate
LNG	Liquefied natural gas
LPG	Liquefied petroleum gas
LRMC	Long-run marginal cost
LSS	Large Substitute for Small

MAC	Marginal Abatement Cost
MED	Ministry of Economic Development (New Zealand)
MEPS	Minimum energy performance standards
MMA	McLennan Magasanik Associates
MPCCC	Multi-Party Climate Change Committee
Mt	Megatonne (equal to one thousand kilotonnes)
ML	Megalitre
MJ	Megajoule
MW	Megawatt (equal to one thousand kilowatts)
MWh	Megawatt hour (equal to one thousand kilowatt hours)
NDRC	National Development and Reform Commission (China)
NEDC	New European Drive Cycle
NEM	National Electricity Market
NGAC	NSW Greenhouse Abatement Certificate
NSEP	National Scheme of Extensive Pilot Projects on Bioethanol Gasoline for Automobiles
NSHP	New Solar Homes Partnership
NSW	New South Wales
NYSERDA	New York State Energy Research and Development Authority
NZU	New Zealand Unit
OECD	Organisation for Economic Co-operation and Development
PBI	Performance-based incentive
PC	Productivity Commission
PTC	Production Tax Credit
PV	Photovoltaic
REC	Renewable Energy Certificate
RES	Renewable Energy Standard
RES Act	Renewable Energy Sources Act
RET	Renewable Energy Target
RFS	Renewable Fuel Standard

RGGI	Regional Greenhouse Gas Initiative
ROC	Renewable Obligation Certificate
RPS	Renewable Portfolio Standard
RTC	Renewable Tax Credit
RTFO	Renewable Transport Fuels Obligation
RTO	Regional transmission operator
SGIP	Self Generation Incentive Program
t	Tonne
TGP	Terminal gate price
TWh	Terawatt hour (equal to one thousand gigawatt hours)
USEPA	United States Environmental Protection Agency
VAT	Value-added Tax
VIU	Vertically-integrated utility
W	Watt
WCI	Western Climate Initiative
WEP	Wholesale electricity price