



By complying with the Kyoto Protocol, a nation's trustworthiness, prestige, influence, international honour and reputation, at the global level, is maintained. Ferrey, S (2004) *Environmental Law. Examples and Explanations*, 3rd Ed., Aspen Publishers, New York, USA.

Have the Kyoto Protocol National Measures that Promote Sustainable Development Been Effectively Evaluated as the Primary Global Means to Reduce GHG Emissions?

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Summary

- 1.0 The need for global action to reduce CO₂ emissions is clearly evident. The Kyoto Protocol expires in 2012. A new international framework will then need to be negotiated and ratified.
- 2.0 But have the Kyoto Protocol “national measures” been effectively evaluated as the primary means to reduce GHG emissions?
- 3.0 A pathway based on a mix of Kyoto Protocol “national measures” to reduce CO₂ emissions - and that “promoted sustainable development” – should be seen as a fairly logical, pre-requisite first step in the transition to a low-carbon economy in the years to come.
- 4.0 The mix of Kyoto Protocol “national measures” should incorporate regulatory control of CO₂ emissions - by adopting the model of the United States EPA - to become an additional measure for “enhancing energy efficiency”.
- 5.0 As emission reduction targets are increased over time, the case may arise that a sustainable solution based on a mix of Kyoto Protocol “national measures” may be unlikely to reduce CO₂ emissions sufficiently to achieve a prescribed reduction target. In this situation, the mix of Kyoto Protocol “national measures” could be combined with “additional means” under the Protocol (e.g. an ETS or CDMs) to become the second step for moving to a low-carbon economy.
- 6.0 A methodology for finding a sustainable solution to reduce CO₂ emissions, for moving to a low-carbon economy, is outlined. It links accepted principles of conflict resolution to the use of a science-based environmental decision-making aid - “Multi-Objective Analysis” - to evaluate and balance the competing *ecological, economic, social and cultural objectives* of sustainable development.

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Introduction

1.0 The Kyoto Protocol sets GHG targets for 37 industrialized countries and the European Community to reduce emissions by an average of 5% against 1990 levels over the five-year period 2008-2012.

SOURCE: United Nations Framework Convention on Climate Change: Text of the Kyoto Protocol.
http://unfccc.int/key_documents/kyoto_protocol/items/6445.php

2.0 Under the Kyoto Protocol , countries must meet their targets to reduce or limit GHG emissions primarily through “national measures”. However, the Kyoto Protocol offers countries an “additional means” of meeting their targets by way of three market-based mechanisms, which include the Emissions Trading Scheme (“ETS”) – known as ‘the carbon market’ - and Clean Development Mechanisms (“CDMs”).

- ☑ **The “national measures” are required “to promote sustainable development” (at Article 2).**

SOURCE: United Nations Framework Convention on Climate Change home page: Kyoto Protocol.
http://unfccc.int/kyoto_protocol/items/2830.php/

- ☑ **The predominant global approach taken for reducing CO₂ emissions is the ETS.**
- ☑ **The Kyoto Protocol expires in 2012. A new international framework will then need to be negotiated and ratified.**

The transition to a low-carbon economy: Australia

- ☑ The focus of the Federal Government is a carbon-trading system that uses a two-stage pathway for pricing carbon;
- ☑ The first stage will be the three-year period, commencing 1 July 2012, when the price of carbon will be fixed as a “carbon tax”. The price of carbon will commence at \$23 for each tonne of CO₂; and
- ☑ After 3 years , the carbon tax pricing mechanism will transition to an ETS where the carbon price will be determined by the market:
SOURCE: Putting a Price on Carbon Pollution: Prime Minister of Australia.
<http://www.pm.gov.au/press-office/putting-price-carbon-pollution>
- ☒ *But there has been little constructive global debate whether a “sustainable solution” is an environmentally effective and cost efficient alternative to the carbon tax/ETS for moving to a low-carbon economy.*

The transition to a low-carbon economy: the United States

- ◆ In a landmark climate law decision in April 2007 (*Massachusetts et al. v EPA*), the Supreme Court of the United States ruled that the GHG came within the meaning of “air pollutant” as this term is defined in the ‘*Clean Air Act*’ (42 U.S.C.); and that the US Environmental Protection Agency had the power to control GHG emissions.
- ◆ In April 2009, the Obama Administration took a dramatic policy shift to implement the USA Supreme Court decision by undertaking to regulate GHG emissions - for the first time - at the Federal level.
- ◆ Power plants, refineries, and cement production facilities produce about 70% of the total GHG emissions from stationary sources in the United States.
- ◆ The US Environmental Protection Agency then commenced public meetings and consultation with industry , on developing proposed GHG national emission standards.

The transition to a low-carbon economy: the United States(Continued)

- ◆ In March 2012, the United States EPA proposed a rule that will limit CO₂ emissions from new power plants to be built in the future. Regulatory control by the United States EPA through national emission standards aims to limit emissions from new power plants by around 45-50% of modern coal-fired plants.
- ◆ The proposed rule does not apply to existing coal-fired power plants or power plants where construction will commence over the next 12 months.
- ◆ The EPA also announced that a second proposal, later in 2012, will address existing power plants. There are about 500 coal-fired power plants in the United States.

SOURCES: *EPA Proposes First Carbon Pollution Standard for Future Power Plants.* <http://epa.gov/carbonpollutionstandard/>

US EPA Proposes Mandatory Emissions Cap For New Power Plants.

http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=8989§ion=news_articles&eod=1

What are some of the concerns raised about the carbon tax/ETS pathway?

Polarisation of scientific and public opinion in Australia over climate change has clouded constructive public debate on the appropriate action for moving to a low-carbon economy.

Environmental action to reduce CO₂ emissions has collided with concerns over potential adverse socio-economic impacts. The conflict remains unresolved. Needs and concerns relate to:

- i. Reductions in overseas exports;*
- ii. Significant increases in power costs for the manufacturing sector and the community;*
- iii. Job losses in regional Australia;*
- iv. An increase in the cost of living;*
- v. Possible closure of mines and flow on effects on the regional, State and national economy; and*
- vi. Maintaining international competitiveness.*

Observations on the carbon price /ETS and CO₂ emission targets

- ◆ Australia's contribution to global CO₂ emissions is only around 1.3% . Australia's initial prescribed target is to reduce CO₂ emissions by 2020 by at least 5%, compared with 2000 levels. This represents a small step in the pathway to a low-carbon economy . The initial carbon price in Australia from 1 July 2012 will be \$23 for each tonne of CO₂.
- ◆ In contrast, Australia's long-term legislative target - to reduce CO₂ emissions by 80% below 2000 levels by 2050 - represents real action for achieving a low-carbon economy. Depending on the underlying assumptions, two carbon price modelling studies in 2011 project a carbon price in the range of \$135-275 (*Australian Treasury*) or \$200-500 (*Dr Elizabeth Stanton, USA*) for achieving substantial emission reduction targets.
- ◆ **REFERENCES:** "Strong Growth Low Pollution. Modelling a Carbon Price" *Chart 5.1, Australian Carbon Price*, at p. 90. © Treasury, Commonwealth of Australia (2011). ISBN 978-0-642-74724-2.
Source: Licensed From The Commonwealth of Australia Under a Creative Commons Attribution 3.0 Australia Licence.
"The Social Cost of Carbon". Dr Elizabeth Stanton (2011). <http://sei-us.org/publications/id/416>

Observations on the carbon price /ETS and CO₂ emission targets (Continued)

The very large differences between the carbon price to achieve minimal and substantial CO₂ emission reduction targets justifies closer review and evaluation by government for the following key issues:

- ◆ *Will a carbon tax/ETS continue to be the most cost-efficient and environmentally-effective means for moving to a low-carbon economy future, regardless of carbon price?*
- ◆ *Have all possible actions – including sustainable solutions - for reducing CO₂ emissions been identified and evaluated to meet Kyoto Protocol obligations?*
- ◆ *What action(s) for moving to a low-carbon economy should government now take for setting long-term emission targets to ensure that future generations are not faced with most of the costs for reducing emissions?*

What are the main differences between the ETS and sustainability for moving to a low-carbon economy?

- ◆ The ETS is heavily weighted towards economics.
- ◆ In contrast, a sustainable solution balances the multiple and competing objectives for sustainability - *ecological, economic, social and cultural* – equitably.
- ◆ An ETS can lead to substantial reductions in GHG emissions. But the outcome may not be consistent with the “fair treatment” element of environmental justice.

SOURCE: Re The elements of environmental justice (the United States EPA):

<http://www.epa.gov/compliance/environmentaljustice/basics/index.html>

- ◆ An ETS may lead to an inequitable outcome as it may result in many winners and losers.
- ◆ On the other hand, a sustainable solution secures as much available value as possible for Government, industry and the community.

Why sustainability? What are some of its objectives?

- ◆ *Conserving and enhancing the resource base;*
- ◆ *Meeting essential needs for jobs, food, energy, water and sanitation;*
- ◆ *Ensuring a sustainable level of population;*
- ◆ *Reorienting technology and managing risk;*
- ◆ *Merging environment and economics in decision-making;*
- ◆ *Maintaining or enhancing international competitiveness; and*
- ◆ *Changing the quality of growth.*

SOURCE: World Commission on Environment and Development (1987), *Our Common Future*, Oxford University Press, Oxford, UK.

What are the origins of the concept of sustainability?

- ◆ The release of “*Our Common Future*” by the World Commission on Environment and Development in 1987 (the “Brundtland Report”) followed by its subsequent acceptance by the United Nations General Assembly.
- ◆ The United Nations Conference on Environment and Development, Brazil, 1992 and the two texts that emerged:
 - (i) The ‘*Rio Declaration on Environment and Development*’ that set out universally applicable principles to facilitate global action for sustainable development; and
 - (ii) ‘*Agenda 21*’ – the plan of action for sustainable development based largely on the Rio Declaration principles.

What is the connection between sustainability and reducing or limiting CO₂ emissions?

The connection is that the treaties - the *United Nations Framework Convention on Climate Change (1992)* and the *Kyoto Protocol (1998)* - include an obligation that policies or measures to reduce or limit GHG emissions, are either consistent with - or promote - sustainable development.

Why is the concept of sustainability significant for decision-making for a low-carbon economy?

“[A] fundamental bottom line has emerged: A country cannot achieve economic development when its environment is degraded; nor can it restore its environment in the absence of economic development” .

SOURCE: Halpern, S. (1992), ‘The United Nations Conference on Environment and Development: Process and Documentation’, Academic Council for the United Nations System. <http://www.ciesin.org/docs/008-585/unced-intro.html>

What action has Australia taken to pursue sustainability as a national goal?

- During the “Hawke-Keating era” as Prime Ministers, Australia led the world by introducing a draft policy for sustainable development in 1989 - followed by an innovative, national environmental policy for sustainable development in December, 1992.

SOURCE: Australia's *National Strategy for Ecologically Sustainable Development* (December, 1992).
<http://www.environment.gov.au/about/esd/publications/strategy/index.html>

- *Environmental policy on sustainability was subsequently incorporated into domestic environmental protection legislation, introduced throughout Australia, from 1993.*

Is sustainability a feature of the *Clean Energy Act 2011 (Cth)* in Australia?

✓ The *Clean Energy Act* was assented to by the Federal Parliament on 18 November 2011; its commencement date is 2 April 2012.

✓ The *Clean Energy Act's* first object is: -

“...to give effect to Australia’s obligations under:

- (a) the UN Framework Convention on Climate Change; and
- (b) the Kyoto Protocol”

SOURCE: See section 3(a)(i)(ii)

Sustainability and the *Clean Energy Act* in Australia

As the first object of the *Clean Energy Act* is to give effect to Australia's obligations under the *United Nations Framework Convention on Climate Change* and the *Kyoto Protocol*:

it could be implied, as a matter of statutory construction, that in Australia's case, actions taken under the *Clean Energy Act* to reduce or limit GHG emissions are required to promote, or be consistent with, sustainability.

What “*national measures*” to “*promote sustainable development*” does the Kyoto Protocol provide to limit or reduce CO₂ emissions?

Kyoto Protocol, Article 2: “*Each Party ..., in achieving its quantified emission limitation and reduction commitments..., in order to promote sustainable development shall implement ... policies and measures in accordance with its national circumstances, such as*”:

- ☑ Enhancing energy efficiency in relevant sectors of the national economy;
- ☑ Promoting sustainable forest management practices e.g. afforestation and reforestation; and
- ☑ Research, promotion, development and increased use of:
 - new and renewable forms of energy;
 - carbon dioxide sequestration technologies; and
 - advanced innovative environmentally sound technologies.
- ☑ ...

SOURCE: United Nations Framework Convention on Climate Change: Kyoto Protocol.
http://unfccc.int/kyoto_protocol/items/2830.php/

Examples of Kyoto Protocol “*national measures*” to reduce or to limit CO₂ emissions and promote sustainability

1. Enhanced Energy Efficiency

- ▶ Commencing in 1992, the ENERGY STAR joint initiative of the United States EPA and the United States Department of Energy is an excellent example of an innovative programme that promotes energy efficient products and practices in homes and businesses. There are now some 20000 partnerships with private and public sector organizations.

SOURCE: History of ENERGY STAR. <http://www.energystar.gov/>

- ▶ **Regulatory control**, as one measure for enhancing energy efficiency, first emerged in the USA in 2007. But, it was not part of the Kyoto Protocol's national measures at the time of its adoption in 1997. *Regulatory control is based on the “polluter pays” principle. The costs of pollution are borne by those who are responsible.*

SOURCE: EPA Proposes First Carbon Pollution Standard for Future Power Plants. <http://epa.gov/carbonpollutionstandard/>

Regulatory control as a “*national measure*” to enhance energy efficiency
Does the US model for regulatory control have wider global applications?

- ☑ **The US statute, the *National Environmental Policy Act of 1969* ("NEPA") has been described as possibly the most successful legal export in history, as it has been a model for the environmental impact assessment process in more than 100 countries.**
- ☑ **Could it be possible for the decision of the US Supreme Court in *Massachusetts v. EPA* to fulfil a similar role as NEPA by having wider global application? That is, as a Kyoto Protocol “national measure” that enhances energy efficiency by limiting and reducing CO₂ emissions and promoting sustainable development?**

Regulatory control as a “*national measure*” to enhance energy efficiency
**Can the US model for regulatory control be adopted by
Australia?**

- ◆ Legislative amendment is required to prescribe CO₂ as a substance or pollutant, that comes within the legal meaning of “environmental harm”, as this term is defined in the environmental protection statute for each State and Territory – not whether CO₂ causes climate change.
- ◆ The States and Territories would then have the authority to regulate CO₂ emissions through a uniform national standard under the existing Commonwealth legislative framework as a “*National Environmental Protection Measure*”.
- ◆ National air quality emission standards already exist under this framework for carbon monoxide, nitrogen dioxide, ozone, sulphur dioxide, lead and particulates.

SOURCE: Regulatory Control as a National Measure Under the Kyoto Protocol to Limit Carbon Dioxide Emissions.

http://www.environmentadr.com/uploads/LexisNexis%20Blog_Climate%20Change_Reg.%20Control.pdf

Regulatory control as a “*national measure*” to enhance energy efficiency

Benefits for the Coal Industry & Government

- i. **Maintenance and operation of coal-fired power stations by the energy industry could continue - subject to compliance with the national air emission standard.**
- ii. **Flexibility for Government to change the target set for reducing emissions though regulatory control as research into clean coal technology could be applied to reduce CO₂ emissions.**
- iii. **Validation of research into clean coal technology confirming it as being environmentally sound would act as a trigger for Government to increase the emission reduction target over time.**
- iv. **Scientific research into clean coal technology would have more effective timelines. The link between scientific and policy needs would be optimized.**

Examples of Kyoto Protocol “*national measures*” to reduce or to limit CO₂ emissions and promote sustainability?

2. Sustainable Forest Management

- ❖ Reafforestation has long been advocated and used as a desirable strategy to offset CO₂ emissions e.g. in 1988, a new coal fired power station in the USA funded a reafforestation project, over an area of 1000 square kilometres in Guatemala, to absorb its CO₂ emissions;
- ❖ *Estimates for the area of land required to stabilise the total CO₂ emissions for Australia are simply enormous;*
- ❖ Reafforestation should be seen as a sound cost-effective option for reducing emissions – but only as part of any sustainable solution.

SOURCE: See Christie, E. ‘The greenhouse gases and environmental law’ (1990) *Environmental and Planning Law Journal* 7, 114-126.

Examples of Kyoto Protocol “*national measures*” to reduce or to limit CO₂ emissions and promote sustainability?

3. Renewable Energy

- It is clear that the future will see an increased energy generation based on ‘renewables’ *e.g. solar, wind, geothermal and tidal energy* . Renewables will have a key role as part of any sustainable solution to reduce CO₂ emissions.
- The spatial dimension is significant as locations of land need to be both technically and commercially feasible for large scale renewable energy generation.
- *Litigation risk over potential impacts on threatened species and biodiversity - as well as public health concerns - following decision-making for proposed renewable energy sites is real.*

SOURCES: Green v. Green: Litigation For and Against Solar Power in California.

<http://blogs.law.columbia.edu/climatechange/2011/05/18/green-vs-green-litigation-for-and-against-solar-power-in-california/>

See *Erickson v. Director, Ministry of the Environment* (18 July 2011), Environmental Review Tribunal, Toronto, Ontario, Canada.

<http://www.ert.gov.on.ca/files/201107/00000300-AKT5757C7CO026-BGI54ED19RO026.pdf/>

Examples of Kyoto Protocol “*national measures*” to reduce or to limit CO₂ emissions and promote sustainability?

3. Innovative & Environmentally Sound Technologies

- ◆ **Clean coal technology such as “*Carbon Dioxide Capture and Permanent Geological Storage*” (or “*CCS*”) has the potential to enhance regulatory control as a “national measure”. It could provide industry with the means for achieving greater future reductions in CO₂ emissions.**
- ◆ **The capture, or separation of CO₂ are not in issue. But there is an element of uncertainty – the long-term fate of CO₂ following geological storage .**
- ◆ ***Agreement on introducing any new advanced and innovative environmental technology, such as CCS becoming part of any sustainable solution to tackle climate change, should depend on any scientific uncertainty and environmental risk associated with its use being resolved and validated.***

Examples of Kyoto Protocol “*national measures*” to reduce or to limit CO₂ emissions and promote sustainability?

4. Further Alternatives

- i. **“Bio-char Technology” (or *biosequestration*) has been advocated as having significant potential to reduce CO₂ emissions. Some form of cost/benefit analysis (*for global warming and food security*) would be advantageous for identifying soil types and land areas e.g. within Australia, where bio-char would be feasible as part of any future, sustainable solution for moving to a low-carbon economy.**
- ii. **LNG and nuclear energy are also future alternative energy sources and warrant constructive debate as part of a sustainable solution. However, they must satisfy the Kyoto Protocol requirement as representing “*new and innovative environmentally sound technologies*”.**

Methodology for finding a sustainable solution for a low-carbon economy: conflict resolution & science

- ☑ **Applying established concepts and principles for conflict resolution AND environmental decision-making is the foundation of the methodology.**
- ☑ **Two key elements of “Principled Negotiation” are crucial for conflict resolution:**
 - (i) Constructing a number of creative scenarios for mutual gain; and**
 - (ii) The use of the same objective criteria to evaluate all of the scenarios *e.g. based on standards such as scientific merit or fairness that are independent of each side’s will; legitimate and practical standards.***

SOURCE: Fisher, Roger, William Ury and Bruce Patton (1991), *Getting to Yes: Negotiating an Agreement Without Giving In (2nd Edition)*, Century Business, London, UK.
- ☑ **These elements of “Principled Negotiation” are linked to the use of the science-based “Multi-Objective (*ecological/economic/social /cultural*) Analysis” as an environmental decision-making aid for finding a sustainable solution for moving to a low-carbon economy.**

SOURCE: Finding Solutions for Environmental Conflicts: Power and Negotiation (2008) @ Chapter 5.
[http://books.google.com.au/books?id=RTQNCp6EeQC&pg=PA8&lpg=PA8&dq=finding+solutions+for+environmental+conflicts"&source=bl&ots=CN629SXbx7&sig](http://books.google.com.au/books?id=RTQNCp6EeQC&pg=PA8&lpg=PA8&dq=finding+solutions+for+environmental+conflicts)

The Conflict Resolution Process: Part 1

Constructing creative scenarios for mutual gain for moving to a low-carbon economy

- ◆ The conflict resolution methodology requires a number of *creative scenarios* to be defined along a continuum of sustainability.
- ◆ A *scenario* is a hypothetical construction of different mixes of Kyoto Protocol “national measures” that will meet the target for reducing CO₂ emissions prescribed by government.
- ◆ An additional scenario, quite independent of Kyoto Protocol “national measures”, would be one based entirely on carbon market mechanisms i.e. the ETS.
- ◆ The CO₂ emission reduction target - for a prescribed period of time – is set by each country’s legislation or policy – or an International Treaty - and is applied to all scenarios.

The Conflict Resolution Process: Part 1 (Continued)

Constructing creative scenarios for mutual gain

- ◆ An innumerable number of scenarios could be constructed. But the process requires a finite number of scenarios - with one proviso: all feasible Kyoto Protocol “national measures” for reducing CO₂ emissions are to be included in at least one scenario.
- ◆ All scenarios constructed must meet the prescribed target set by Government - for each defined time period - to reduce CO₂ emissions.
- ◆ Measures where *scientific uncertainty* exists e.g. CCS and bio-char technology, would only be included in a scenario when the uncertainty/environmental risk on their application had been resolved.
- ◆ *The continuum of scenarios is not fixed - but may change after evaluation commences.*

Examples of possible scenarios for moving to a low-carbon economy
Scenario 1: Status Quo – *No action taken to limit CO₂ emissions*

- ◆ The “status quo” is the reference point (year) - or baseline - for applying CO₂ emission reduction targets for all the other scenarios. In Australia’s case, this would be the year 2000.
- ◆ As this is a “do nothing” scenario, CO₂ emissions would increase over time - compared to a decrease in all the other scenarios.
- ◆ This scenario then becomes the “benchmark” for a comparative evaluation on the potential ecological, economic, social and cultural impacts with all the other scenarios for which emission reduction targets, over time, have been set.
- ◆ ...

Examples of possible scenarios for moving to a low-carbon economy
Scenario 2: The rights of one option to prevail over all others

- ◆ **Regulatory control to predominate through adherence to a national CO₂ emission standard – draft or prescribed – specific for existing coal-fired power plants and high scale industrial emitters.**
Example 1: In the case of Australia , the 500 companies that account for 60% of Australia's CO₂ emissions.
Example 2: In the case of the United States, power plants, refineries, and cement production facilities that produce about 70% of the total GHG emissions from stationary sources.
- ◆ **Limited use of the renewable energy and reforestation options.**
- ◆ **Enhanced energy efficiency measures in industrial buildings.**
- ◆ **...**

Examples of possible scenarios for moving to a low-carbon economy
Scenario 3: *Steady growth in the use of all options over time*

- ◆ **Regulatory control through a national CO₂ emission standard that applies to new power plants - where construction commences from 2012 - only.**
- ◆ **Regulatory control through adherence to a national CO₂ emission standard for all new motor vehicles.**
- ◆ **The reduction in the regulatory control measure in Scenario 2 is balanced by:**
 - (a) greater use of the renewable energy and reforestation measures; and**
 - (b) enhanced energy efficiency measures in commercial buildings and domestic homes.**
- ◆ **...**

Examples of possible scenarios for moving to a low-carbon economy

Scenario 4: Alternative options to fossil fuels as an energy source to prevail

- ◆ **Burning of fossil fuels as an energy source is prohibited.**
- ◆ **All locations of land, that are technically and commercially feasible, to be used for large scale renewable energy generation.**
- ◆ **Increased reforestation. Reforestation programmes provided through financial incentives by Government - or through private investment in “carbon forest sink” contracts.**
- ◆ **All new industrial/energy producing facilities to be LNG based.**
- ◆ **Use of nuclear energy.**
- ◆ **...**

Examples of possible scenarios for moving to a low-carbon economy

Scenario 5: Reliance on the Carbon Tax/ETS

- ◆ The carbon tax/ETS applied to all stationary sources that account for the majority of a country's CO₂ emissions.
- ◆ Financial assistance or incentives for the most polluting electricity generators to facilitate reductions in their CO₂ emissions.
- ◆ Financial assistance to the coal mining industry in the transition to a low-carbon economy i.e. to provide mine operators time to investigate and implement abatement opportunities to ease the transition.
- ◆ Financial assistance to compensate low and middle income families for any increased domestic power costs.
- ◆ ...

The Conflict Resolution Process: Part 2

Evaluating all scenarios with the same objective criteria

- ◆ Scenarios for reducing or limiting CO₂ emissions having different mixes of Kyoto Protocol “national measures” – and the “ETS scenario” - are systematically evaluated, in order to identify their compatibility with the specific and competing objectives for sustainable development: *ecological, economic, social and cultural*.
- ◆ The same objective criteria are used to evaluate all scenarios.
- ◆ Selection of the criteria to evaluate each of the four objectives is crucial. Problems that must be avoided are using unnecessarily complex criteria ; or criteria that cannot be measured or quantified; and, of overriding importance, criteria that cannot be evaluated because of the absence of a suitable information base.
- ◆ The evaluation of the scenarios must be based on each objective, and all of the criteria, having equal weight.

SOURCE: Finding Solutions for Environmental Conflicts: Power and Negotiation (2008) @ Chapter 5.

Evaluation of possible scenarios for promoting sustainable development

Ecological Objectives

Some examples for possible objective criteria for evaluating all scenarios, because of a non-acceptable risk of climate change, include:

- ☑ Ecological Objective (*Primary Production/Agriculture*): Impacts on food security;
- ☑ Ecological Objective (*Resource Management*): Impacts on (i) biodiversity (ii) ecologically critical habitat of threatened species;
- ☑ Ecological Objective (*Heritage Preservation*): Protection and maintenance of (i) World Heritage Listed Properties (ii) cultural heritage sites;
- ☑ ...

Evaluation of possible scenarios for promoting sustainable development

Economic Objectives

Some examples for possible objective criteria for evaluating all scenarios include:

- ☑ Economic Objective (*National and State*): Impacts on (i) gross domestic product (ii) balance of payments of nation (iii) mineral exports;
- ☑ Economic Objective (*Regional*): Household income; employment/unemployment; range of employment options;
- ☑ Economic Objective (*Fiscal Consequences*): Net fiscal consequences for Government and industry;
- ☑ ...

Evaluation of possible scenarios for promoting sustainable development

Social and Cultural Objectives

Some examples for possible objective criteria for evaluating all scenarios include: :

- ☑ **Social Equity Objective: Meaningful community involvement in decisions that affect them;**
- ☑ **Social Well-Being Objective: Continuity of production and costs of energy for the community;**
- ☑ **Social Objective (*National Security*) : Probability of catastrophic bush fires or severe climatic events;**
- ☑ **Cultural Objective: Promotion of Indigenous traditional knowledge on biodiversity and natural resource management.**
- ☑ ...

Conclusion: The preferred scenario for moving to a low-carbon economy

- ◆ The '*Preferred Scenario*' is one that most effectively balances the multiple and conflicting objectives for sustainability and which secures as much available value as possible for Government, industry and the community.
- ◆ It may be one of the original scenarios evaluated.
- ◆ But, it is possible that no single scenario may be clearly superior for moving to a low-carbon economy, when all the multiple objectives for sustainability are evaluated and balanced.
- ◆ In this situation, a new scenario could be constructed based on the best features of one, or more, or all of the scenarios evaluated.
- ◆ If a new scenario is constructed to become the preferred scenario, it must then be evaluated with the same objective criteria used for the original scenarios to determine its compatibility with sustainable development.