Carbon Pricing for South Africa
Impact on the economy

Thought Leadership
03 November 2011

ITTCC
Industry Task Team on Climate Change
AGENDA

- The ITTCC
- Carbon pricing - Key design considerations
- Job creation and protection
- Carbon abatement
- Practical and fact based policy
The ITTCC are..
Supportive of a suite of integrated climate policy instruments

▪ Committed to:
  – Strong jobs growth
  – An attractive investment environment
  – Equity and social cohesion
  – Climate resilience

▪ Acknowledge:
The high potential for climate change to extensively and adversely impact our quality of life in South Africa and fully support national efforts to manage the required adaptation and proportionately contribute to reducing global carbon emissions

▪ Support:
Governments efforts to implement practical climate change policy which would include carbon pricing as part of an integrated suite of policy instruments founded on robust fact and rigorous analysis
Our principles for designing a carbon policy

<table>
<thead>
<tr>
<th>Our starting position ...</th>
<th>... is based on the ITTCC principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job protection &amp; creation</td>
<td>▪ Development focused</td>
</tr>
<tr>
<td></td>
<td>▪ Revenue neutral</td>
</tr>
<tr>
<td></td>
<td>▪ Trade competitive</td>
</tr>
<tr>
<td>Emissions reduction</td>
<td>▪ Broad based</td>
</tr>
<tr>
<td></td>
<td>▪ Sending a clear price signal</td>
</tr>
<tr>
<td></td>
<td>▪ Supportive of technology</td>
</tr>
<tr>
<td>Practical &amp; fact-based policy</td>
<td>▪ Predictable and gradual</td>
</tr>
<tr>
<td></td>
<td>▪ Simple and effective</td>
</tr>
</tbody>
</table>

SOURCE: Team Analysis
These ITTCC principles are largely in line with the recently published White Paper

<table>
<thead>
<tr>
<th>Job protection &amp; creation</th>
<th>ITTCC principles</th>
<th>White paper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reinforce local development priorities: create work, economic/social uplift</td>
<td>Adapt to climate change through sustainable development, job creation, poverty eradication</td>
</tr>
<tr>
<td></td>
<td>Ensure local industries retain their international competitiveness</td>
<td>SA may be vulnerable to GHG reduction measures – especially those industries which are emission-intensive trade-exposed</td>
</tr>
<tr>
<td></td>
<td>Encourage investment in low carbon technologies, a sustainable energy supply and a new green sector</td>
<td>Support green sector, finance climate R&amp;D and knowledge building, procure sustainable technologies</td>
</tr>
<tr>
<td></td>
<td>Policy must be planned in advance, simple to implement and integrated with a coherent set of policies</td>
<td>Overall strategic approach for SA’s climate change strategy is dynamic, evidence-based, integrated and aligned</td>
</tr>
</tbody>
</table>

National Treasury has a very challenging task ahead

Designing climate policy entails complex interlinked issues

- Interplay between climate policies, job creation policies and industrial and power sector regulation

Climate policy has a fundamental impact on SA

- Job loss due to closure of existing businesses affected by the tax
- Green jobs may not materialise soon enough
- Cost pass-through and resulting inflation in the wider economy

There are limited data on emissions and abatement available

- Conceptual abatement curve for SA
- Not sufficient data from SA companies on their emissions
- Available data can be inconsistent (IEA, CDP, PPD)

Well designed international examples are limited

- Few international examples of well designed and functioning carbon policy
- Countries that have implemented carbon pricing have different characteristics (economic, political, fuel mix, etc)

There is little clarity on likely action in other countries

- Potential retaliation from trade partners on border adjustment efforts
- Uncertainty about domestic carbon pricing approach of competitor countries
AGENDA

- The ITTCC
  - Carbon pricing - Key design considerations
- Job creation and protection
- Carbon abatement
- Practical and fact based policy
**Carbon pricing - Key design considerations**

<table>
<thead>
<tr>
<th>Job creation and protection</th>
<th>Carbon abatement</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Transitional support for SA means export exemptions, import adjustments and other domestic exemptions</td>
<td>▪ A suite of climate instruments is needed to achieve an optimum economic and environmental outcome</td>
</tr>
<tr>
<td>▪ Targeted, non-price policy will be needed for the power sector</td>
<td>▪ Offsets create jobs and provide the abatement necessary to meet emission pledges</td>
</tr>
<tr>
<td>▪ Full revenue recycling is needed to protect and create jobs</td>
<td></td>
</tr>
</tbody>
</table>

**Practical and fact based policy**

- A carbon price can be applied either **midstream or upstream**
- There are many **other considerations**. Chief among them is the need for better information on policy implications. An abatement cost curve, a macroeconomic model and further analysis of policy integration and timing are all required
AGENDA

- The ITTCC
- Carbon pricing - Key design considerations
  - Job creation and protection
- Carbon abatement
- Practical and fact based policy
Job creation and protection

A Just Transition to a lower carbon economy

Limiting the adverse unintended consequences

**Decision for carbon pricing mechanism**

~5 Years

- COP15: emission reduction pledge
- Industry agrees with long-term signal, but requires alignment between rate of introduction and rate of re-investment
- Comprehensive fact base, macro- and micro-economic analyses required

**Transitional support**

+20 Years

- Jobs should be protected in local industry
  - Export industries will be less competitive when competing in global markets, leading to closures or lack of growth
  - Local manufacturers must be protected against cheap imports which do not reflect the cost of carbon
- Carbon leakage / off shoring of carbon increases the risks from climate change
  - Energy intensive steps move offshore to regions without carbon pricing
  - Imports of high carbon-content goods increases
- Companies should not be punished retroactively for historical investment decisions encouraged by government
- Transition should be gradual to avoid economic shock from carbon prices passing through the economy

**Lower Carbon Economy**

- Transitional support phased out over time, taking competitor country actions into account
- Green industries and jobs evolve over time
Job creation and protection

Pace of carbon pricing should match domestic re-investment cycles to allow industry to make an orderly transition and retain jobs

<table>
<thead>
<tr>
<th>Asset investment cycles must be considered...</th>
<th>...taking timing, sectors and asset characteristics into account</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Most energy intense assets have a 20-40 year re-investment cycle</td>
<td>▪ A number of options exist for enabling an orderly transition to more carbon-efficient assets</td>
</tr>
<tr>
<td>▪ Much of South Africa’s heavy industry was encouraged by government</td>
<td>– Grandfathering</td>
</tr>
<tr>
<td>▪ New assets must be able to compete with old assets</td>
<td>– Phased exemption</td>
</tr>
<tr>
<td></td>
<td>– Free permits or allocation</td>
</tr>
<tr>
<td></td>
<td>▪ These can be phased out over time</td>
</tr>
<tr>
<td></td>
<td>– Remaining asset life</td>
</tr>
<tr>
<td></td>
<td>– Required rate of improvement</td>
</tr>
<tr>
<td></td>
<td>– In line with international progress</td>
</tr>
<tr>
<td></td>
<td>▪ Requirements are likely to vary by sector and even individual assets / installations</td>
</tr>
<tr>
<td></td>
<td>▪ Similar instruments will be required for new investments</td>
</tr>
</tbody>
</table>

SOURCE: Team analysis
### Job creation and protection

**Revenue recycling is needed to compensate affected sectors and individuals and incentivise green development**

<table>
<thead>
<tr>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compensation</strong></td>
</tr>
</tbody>
</table>
| - Compensate affected individuals  
  - Grants for individuals losing their jobs, or being affected by high power prices  
  - Community services, e.g. RDP-housing projects for communities nearby abandoned mines and industry facilities  
  - Increase threshold for free basic water and electricity |
| - Compensate affected sectors  
  - Through general tax reliefs or free emission permits for industry and mining sector  
  - Government “soft loans” to reduce cost of adapting to carbon tax to support transition |
| **Incentives for green development** |
| - Incentivise green improvement programmes in affected industries  
  - Subsidies for energy efficiency measures, both conventional (e.g. lighting) and new solutions  
  - Support CCS development and renewable energy |
| - Promote growth in green industries  
  - Promote development of less emission-intensive industries |
| **General social needs** |
| - Initiatives to address social needs  
  - Support initiatives to address social needs, such as education, health, housing projects, free basic electricity and water, etc |

*SOURCE: Team analysis*
Job creation and protection
For South Africa Energy, Climate Change and Carbon Pricing are HIGHLY INTERDEPENDENT

South African GHG emissions (2010)
Mt CO2e, 100% = 463Mt CO2e

Agriculture 3
Buildings 3
Waste 3
Other
Transport 3
Industry 2
Coal to Fuel 1
Power Generation 1

1 Company data, 2010
2 Carbon Disclosure Project, 2010; team analysis
3 IEA, 2008 / 2005
SOURCE: IEA; company reports; Carbon Disclosure Project; team analysis
Job creation and protection
South Africa could out price itself!

2011 Accumalative Sales by Increasing Average Prices RSA vs. USA c/kWh ZAR

Source: Eskom and The U.S. Energy Information Administration (EIA)
Job creation and protection
South Africa needs a transparent Affordable Price

Average Industrial Prices (2009 REAL)

Area of Industrial Prices China and India

South Africa’s Price Cone??

IRP Includes an Implicit carbon price
ZAR/tCO2

<table>
<thead>
<tr>
<th>Year</th>
<th>IRP 2010-2030</th>
<th>Environmental levy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>115</td>
<td>27</td>
</tr>
<tr>
<td>2030</td>
<td>142</td>
<td>27</td>
</tr>
</tbody>
</table>

Even at the current actual price of 50c/kWh South Africa is starting to exceed international industrial prices in particular the more energy intense industries.

Sources: IRP2010, Eskom, Frost & Sullivan, EIUG
Job creation and protection
The cost to transition to a new generation mix

<table>
<thead>
<tr>
<th>Technology</th>
<th>Levelised cost of electricity ZAR/MWh</th>
<th>Carbon price required to compete with coal</th>
<th>Non-price barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>485</td>
<td>7.3</td>
<td>▪ Large environmental risks</td>
</tr>
<tr>
<td>Gas (Shale)¹</td>
<td>489</td>
<td>7.3</td>
<td>▪ Infrastructure needed</td>
</tr>
<tr>
<td>Gas (LNG)²</td>
<td>834</td>
<td>637</td>
<td>▪ Infrastructure needed</td>
</tr>
<tr>
<td>Nuclear³</td>
<td>700</td>
<td>233</td>
<td>▪ Long lead times</td>
</tr>
<tr>
<td>Wind</td>
<td>642</td>
<td>170</td>
<td>▪ Risks of cost over-run</td>
</tr>
<tr>
<td>Solar PV</td>
<td>1,065</td>
<td>628</td>
<td>▪ Intermittency</td>
</tr>
<tr>
<td>Solar CSP</td>
<td>1,383</td>
<td>972</td>
<td>▪ Low installation world-wide – slow learning curves</td>
</tr>
</tbody>
</table>

1 Assumed gas price 7.5 USD/mmbtu
2 Assumed gas price 13 USD/mmbtu
3 Adjusted upwards post Fukushima

SOURCE: IRP 2010-2030; Eskom; Team analysis
AGENDA

- The ITTCC
- Carbon pricing - Key design considerations
- Job creation and protection
- Carbon abatement
- Practical and fact based policy
Cost of Abatement – What Can we do?

1st

Key Sources of GHG emissions 2000
100% = 461 Million tons CO₂e

- Energy: 88%, 89%
- Agriculture: 7%
- Industry: 4%
- Other: 1%

2nd

Science of anthropogenic climate change

3rd

A Key Focus Area of the White paper

Socio/Econ Impact Assessments

Policy Options

South Africa's Abatement Fact base

Country

Abatement Opportunities

Sector

Abatement Opportunities

Activity

Abatement Opportunities

Facility

Abatement Opportunities

Lessons learnt and leading practices from other countries
Fact Base...Maximum Abatement Potential
Detailed fact bases in order to better understand the abatement opportunities, costs and investments required of the opportunities with costs to inform policy choices.

Fact base allows policy to be designed and sequenced to minimise cost to the country.
We have been working hard for a long time & will continue to do so
AGENDA

- The ITTCC
- Carbon pricing - Key design considerations
- Job creation and protection
- Carbon abatement
- Practical and fact based policy
Each part of the abatement cost curve has different obstacles to realisation and therefore needs to be addressed differently

Conceptual SA carbon emission abatement cost curve

- **Abatement real cost**
  - ZAR/tCO₂e

- **Obstacles**
  - Agency issues
  - Lack of awareness
  - Fragmented opportunities
  - Lack of capacity
  - Negative NPV
  - Technical feasibility
  - Negative NPV
  - Very high capital cost, including imported technology
  - Lack of regulatory framework
  - Political uncertainty risk
  - Technical feasibility (CCS)

1 Estimated based on Global GHG Abatement Cost Curve v2.1 and other country cost curves, with transport adjusted for petroleum CCS
2 SA proposed carbon tax of ZAR75 – ZAR200/tCO₂e in 2005 terms (~ZAR100-300 today); EU carbon price EUR13/tCO₂e
SOURCE: McKinsey Global GHG Abatement Cost Curve v2.1; Abatement cost curves from Australia, India, Mexico etc.; team analysis
A carbon price only influences ~1/3 of the total abatement potential in other countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Net savings opportunities</th>
<th>Moderate cost opportunities</th>
<th>High cost opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>9%</td>
<td>14%</td>
<td>13% 36%</td>
</tr>
<tr>
<td>Mexico</td>
<td>13%</td>
<td>10%</td>
<td>7% 29%</td>
</tr>
<tr>
<td>India</td>
<td>10%</td>
<td>11%</td>
<td>4% 26%</td>
</tr>
<tr>
<td>Russia</td>
<td>13%</td>
<td>8%</td>
<td>5% 26%</td>
</tr>
<tr>
<td>China</td>
<td>12%</td>
<td>6%</td>
<td>5% 20%</td>
</tr>
</tbody>
</table>

South Africa???

1 Levers with cost ZAR 0-200/tonne
2 Levers with cost ZAR 200-900/tonne

SOURCE: McKinsey Global GHG Abatement Cost Curve v2.1, McKinsey country level abatement cost curves
There are 7 broad categories of climate policy instruments:

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
</table>
| Trading & crediting             | ▪ Capping of CO₂ emissions and trading of the emission permits on the open market  
                                  ▪ Industry players required to provide permits that match their actual annual emissions                                                                 | Explicit carbon price                                                                 |
| Carbon tax                      | ▪ Carbon tax that is charged either  
                                  – To the consumer at the point of emissions or point of final sale of fuels (e.g. at the gas tank), or  
                                  – To the producer as a direct tax on carbon-intensive fuels paid at the point of production (e.g. by coal mining/oil production company) |  |
| Capital provision               | ▪ Provision of capital to support abatement opportunities (either directly or indirectly)                                                                                                                  Implicit carbon price                                                             |
| Standards and regulation        | ▪ Targeted legal restrictions / requirements to use specific low-carbon technologies or to achieve a well-defined efficiency standard  
                                  ▪ Supported by threat of sanctions or fines                                                                                                                                                         |
| Education/information           | ▪ Provision of information thereby removing transaction costs  
                                  ▪ Promotion of education to change consumer habits                                                                                                                                                      |
| Direct action                   | ▪ Government takes unilateral action to reduce emissions including compensation for those impacted                                                                                                           |
| Tax incentive/co-investment     | ▪ Tax incentives, tax breaks for specific clean technologies or energy efficiency measures  
                                  ▪ Could be as part of a co-investment scheme to use market efficiency                                                                                                                                   |

SOURCE: Team analysis
Collaboration is key and..
We are committed to support a positive outcome for South Africa

<table>
<thead>
<tr>
<th>Contribution</th>
<th>How the ITTCC could assist</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drive abatement</strong></td>
<td>- Designing MRV protocols</td>
</tr>
<tr>
<td></td>
<td>- Developing fact base, specific relevant policy pieces (MACC)</td>
</tr>
<tr>
<td></td>
<td>- Piloting low carbon technologies in SA &amp; share learning’s</td>
</tr>
<tr>
<td></td>
<td>- Continuing with</td>
</tr>
<tr>
<td></td>
<td>- energy efficiency initiatives &amp; share learnings</td>
</tr>
<tr>
<td></td>
<td>- piloting CCS &amp; solar thermal &amp; possible transfer to SA</td>
</tr>
<tr>
<td></td>
<td>- Assisting host communities to adopt energy efficient technologies</td>
</tr>
<tr>
<td><strong>Develop adaptation opportunities</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Improving understanding of local climate change impacts</td>
</tr>
<tr>
<td></td>
<td>- Identifying adaptation challenges on a regional/location basis</td>
</tr>
<tr>
<td></td>
<td>(infrastructure, operational and community)</td>
</tr>
<tr>
<td></td>
<td>- Assisting host communities to practically adapt to climate change</td>
</tr>
<tr>
<td></td>
<td>- Assisting regions to understand water balance</td>
</tr>
<tr>
<td></td>
<td>- developing and implementing comprehensive management plans</td>
</tr>
<tr>
<td></td>
<td>- Treating and distributing excess U/G mine water to adjacent municipalities for domestic and agricultural use</td>
</tr>
<tr>
<td><strong>Improve Energy Security</strong></td>
<td>- Exploring self-generation and the feeding of excess generation capacity into the national grid</td>
</tr>
<tr>
<td></td>
<td>- Moving truck fleets to Liquid Natural Gas (LNG) or clean electricity</td>
</tr>
<tr>
<td></td>
<td>- Exploiting renewable power where economically feasible</td>
</tr>
</tbody>
</table>
END