CO\textsubscript{2} PRICING IN SHELL

January 2015

Angus Gillespie, VP CO\textsubscript{2}
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The energy challenge is formidable... near zero emissions of CO$_2$ by the end of the century.
Climate change presents a significant Shell business risk
Shell’s CO₂ management strategy

**Mission**

To ensure Shell is competitively advantaged in a world that needs more energy but less CO₂

**Objectives**

- To minimize risks to Shell’s assets and activities
- To maximize CO₂ related opportunities for Shell
- To build new CO₂ management competencies

**Activities**

- Drive CO₂ robustness in carbon critical projects and assets
- Shape emerging CO₂ legislation
- Create support for new mitigation technologies
- Develop demand for new products and services
- Develop businesses’ CO₂ understanding and skills
- Underpin CO₂ change management process
Many years working with a CO₂ Project Screening Value (PSV)

A journey… with lessons

1995

Internal trading

Started; two values

2000

Regional values

2005

Single value

Shared publicly

2010

Defined sensitivities

Tax treatment

2015

Coordinated process

Domestic gas PSVs

Operating cost outlook

Upstream PSVs

Inflation and exchange rate

Coal PSV

Capital cost outlook

Downstream DSVs

Electricity PSVs

CO₂ PSV

Team interactions

CO₂ PSV is an input
$40/tonne CO$_2$ PSV key to ensuring a CO$_2$-resilient portfolio

Intent is to:

- Quantify long-term explicit and implicit cost signals from governments.
- Prompt a deeper discussion on risk with most exposed projects.
- Drive design choices to develop a resilient portfolio ...and assure investors of that.

<table>
<thead>
<tr>
<th><strong>What it is</strong></th>
<th><strong>What it is not</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure portfolio is resilient</td>
<td>Price forecast</td>
</tr>
<tr>
<td>Mandatory in base case economics</td>
<td>Optional sensitivity case</td>
</tr>
<tr>
<td>Risk of our assets’ operations</td>
<td>Risks from our products</td>
</tr>
<tr>
<td>Owned by Group CO$_2$</td>
<td>Negotiable by projects</td>
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</table>
Peers use similar CO₂ values in their project economics

Internal CO₂ costs used by peers (US$/tonne)

- Disclosed single value
- Disclosed range of values
- Estimated range of values

Note 1: Apache, Encana, Eni, Hess, OMV, others also use proxy CO₂ costs, but don’t disclose values.
Note 2: Companies using 'range of values' vary these based on time and/or region.

Sources: Carbon Disclosure Project, 2013; Exxon Outlook, 2014; interviews with company reps.
Four essential stages to derive the Shell CO₂ PSV

1. Regional CO₂ cost analysis

2. Aggregated CO₂ cost profiling

3. “Stylized” CO₂ cost profiling

4. Normalized CO₂ cost profiling

- **Regional CO₂ cost analysis**
  - Forecast: $ per tonne of CO₂
  - “Backcast”

- **Aggregated CO₂ cost profiling**
  - Region A
  - Region B
  - Region C

- **“Stylized” CO₂ cost profiling**
  - Region C
  - Region B
  - Region A

- **Normalized CO₂ cost profiling**
  - Global: $40
Impact of the CO\textsubscript{2} PSV in practice

• “Prices in” CO\textsubscript{2} mitigation options in the absence of CO\textsubscript{2} regulation

• Quantifies the CO\textsubscript{2} risk and so makes more “business friendly”.

• Helps monitor and report on CO\textsubscript{2} exposure.

• Identifies most CO\textsubscript{2} exposed projects and assets .... the “tall poppies”.

• Helps in screening new opportunities.
### What the CO$_2$ PSV does not affect but is otherwise covered

<table>
<thead>
<tr>
<th>Not affected</th>
<th>Practical alternative</th>
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<tbody>
<tr>
<td><strong>Operating assets</strong></td>
<td>• Greenhouse Gas and Energy Management Plans</td>
</tr>
<tr>
<td></td>
<td>• CO$_2$ intensity aspirations</td>
</tr>
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<td></td>
<td>• Adaptation</td>
</tr>
<tr>
<td></td>
<td><strong>Non-operated ventures</strong></td>
</tr>
<tr>
<td></td>
<td>• Shell economics mandatory inclusion of CO$_2$ PSV, etc.</td>
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<tr>
<td></td>
<td>• Relationship management</td>
</tr>
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<td>• CO$_2$ management training</td>
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Focus on projects and asset classes with most CO$_2$ exposure
**CO₂ performance standards for most exposed asset classes**

- **High direct costs**
  - LNG
  - Unconventional gas
  - Light tight oil

- **Most vulnerable assets**
  - Heavy oil
  - Gas to liquids
  - Contaminated gas
  - Enhanced oil recovery

- **Least vulnerable assets**
  - Conventional gas

- **Demand substitution risk**
  - Conventional oil

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*Product risk that is not covered by the CO₂ PSV*
**CO₂ PSV used to gain functional support for key projects**

**CO₂ critical projects**

- Integrated gas
- Deepwater
- Heavy oil
- Downstream

**Functional support**

- Project economics

**Low NPV impact**

- Upside sensitivities
  - Cost pass through

**High NPV impact**

- Downside sensitivities
  - Most-likely scenarios
  - Product risks
  - Stranded asset risks

**Additional tools**

- Options thinking
- Stranded assets
- Value erosion calculator
- Performance standards
### Key take-aways

<table>
<thead>
<tr>
<th>Impact of climate change is a major business risk</th>
<th>CO\textsubscript{2} pricing is key in managing the CO\textsubscript{2} risk.</th>
<th>But is just one of several CO\textsubscript{2} risk mgt practices</th>
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<tbody>
<tr>
<td>• Acknowledgment of the issue inside Shell</td>
<td>• Flat $40/tonne for all projects in all regions</td>
<td>• Focus on largest CO\textsubscript{2} exposure projects</td>
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<td>• Dedicated CO\textsubscript{2} team with cross-Shell remit</td>
<td>• Reflects portfolio risk tolerance</td>
<td>• CO\textsubscript{2} aspirations for operating assets</td>
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<td>• Robust assets and competitive products</td>
<td>• Helps “price in” mitigation activities</td>
<td>• Adaptation supports mitigation work</td>
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January 2014