



**PARTNERSHIP FOR MARKET READINESS (PMR)**

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**CARBON LEAKAGE: THEORY, EVIDENCE AND POLICY**

**Summary of 14<sup>th</sup> PMR Technical Workshop**

**Tuesday 27 October, 2015**

**Sweimeh (Dead Sea), Jordan**

## INTRODUCTION

1. This note summarizes the presentations and discussions from the PMR Technical Workshop '*Carbon Leakage: Theory, Evidence and Policy*', which took place in Jordan on October 27, 2015. Approximately 80 PMR Participants attended the workshop, as well as a number of international experts. The workshop provided participants an opportunity to discuss issues around carbon leakage, which occurs if differences in emission costs lead to the relocation of carbon-intensive activities and the related emissions from jurisdictions with more stringent carbon pricing policies to jurisdictions with less stringent carbon price. Participants discussed ways in which these issues could best be addressed, drawing on experience from around the world. The recently released [PMR technical note on carbon leakage](#) provided material for the workshop.

2. The workshop agenda, list of participants, and all presentations are accessible from the [PMR website](#).

## DETAILED SUMMARY OF THE WORKSHOP

### 1. Introductory session

3. The workshop was opened by Mr. Venkata Ramana Putti, Program Manager of Carbon and Climate Finance at the World Bank Group. In his remarks, Mr. Venkata Ramana Putti outlined that carbon prices are intended to have an efficient and fair impact on the relative competitiveness of firms. He also explained how carbon pricing can lead to structural transformation and more efficient allocation of resources across our economies. However, this transformational economic impact can be skewed if the stringency of carbon price policy differs significantly between jurisdictions. Variance in emission costs can lead to relocation of production, therefore causing an increase of emissions in jurisdictions that do not have equivalent emissions reduction policies, resulting in carbon leakage. Mr. Venkata Ramana Putti pointed out that if this occurs, carbon leakage has the potential to have undesirable environmental, economic, and political consequences. Experience has shown us that carbon leakage is one of the most controversial and important aspects when considering the design of carbon pricing mechanisms.

4. Mr. Venkata Ramana Putti announced that the technical note, which provides an overview of the issue of carbon leakage, discussing the theory, evidence and policy design, had been released and was available on the [PMR website](#). The technical note draws lessons from policymaking experience and academic evidence, to provide guidance on how to address concerns of carbon leakage.

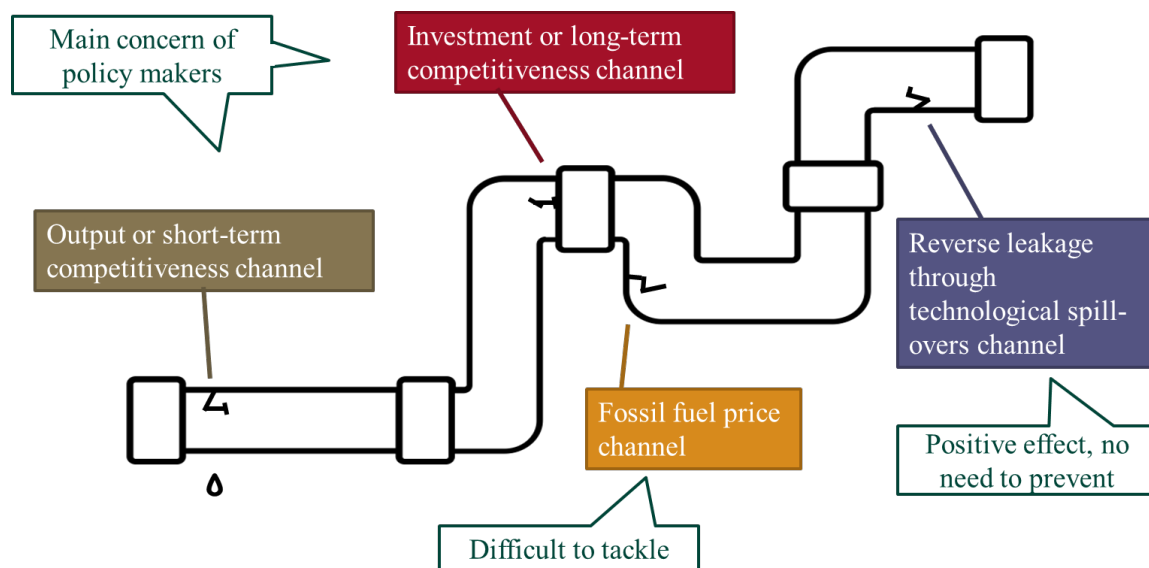
5. Finally, Mr. Venkata Ramana Putti introduced the agenda for the day, and encouraged participants to actively engage.

### 2. Understanding the concept of carbon leakage: theory and evidence

6. This session provided an introduction to carbon leakage, and gave an overview of the theory and evidence around the concept. The concept of carbon leakage and key drivers was explained. Different approaches to assessing carbon leakage and the related empirical evidence were also discussed. Mr. Grzegorz Peszko (World Bank Group) moderated the session, in which Mr. Jason Eis (Vivid Economics) presented an overview of the theory and evidence of carbon leakage that was followed by a panel discussion with three experts including Ms. Mary Jane Coombs (California Air Resources Board),

Ms. Hana Huzjak (European Commission), and Ms. Sharlin Hemraj (South African National Treasury). A summary of discussions is provided below.

7. [Mr. Jason Eis](#) provided a basic definition of carbon leakage, which is driven by the circumstance in which competing firms face different carbon costs, thus resulting in the transfer of production and emissions. He highlighted four main channels of carbon leakage: (1) output/short-term competitiveness; (2) investment/long-term competitiveness; (3) fossil fuel price; and (4) reverse leakage through technological spill-overs.



8. Mr. Jason Eis also described approaches to assessing the existence and the extent of carbon leakage from both theoretical (ex-ante) as well as empirical (ex-post) perspectives, which involved different modeling and statistical techniques.

9. During this session, a participant inquired how issues such as differentiation between cross-country and in-country impacts, life-cycle emission, and rebound effect can be addressed in the presented framework. Mr. Eis responded that there are different modeling techniques that could be used and should be complemented by other qualitative input and consultation.

10. Another participant asked if there is a critical level of carbon price that will cause serious carbon leakage. Mr. Eis responded that there is unlikely to be a single carbon price level for all countries because the answer depends on the structure of the economy and trade patterns between sectors.

11. During the panel discussion, Ms. Mary Jane Coombs (California Air Resources Board) shared that California has an on-going ex-post study on the Impact of energy prices on sector production and competitiveness (forthcoming in the next few months).

12. Ms. Hana Huzjak (European Commission) encouraged the participants to think about carbon leakage as a risk, and gave examples of how to best manage this risk, as policies and the environment evolve. In the case of EU ETS, stakeholder consultation was based on facts and figures, together with

impact assessment of different options using modeling approaches undertaken as ex-ante, as well as ex-post analysis (on phase 1 and 2 of ETS).

13. Ms. Sharlin Hemraj (South African National Treasury) shared that South Africa has taken quite a different approach to carbon tax policy. It is important to consider how to design the instrument and complementary measures in the way that addresses adverse distributional and competitiveness impacts. In the South Africa's case, the first step was to look at international experience through qualitative assessment, in addition to extensive consultations. On the modeling front, CGE modeling was conducted by the government to analyze the implications of carbon taxes on the sectors. The industry had also undertaken its own modeling exercises.

14. California, the European Commission, and South Africa took similar approaches in terms of providing transparent analysis and design, and made them available to the public for consultation.

### **3. Policy responses to carbon leakage**

15. This session provided an overview of the policy responses that countries have implemented or are preparing, to address the risk of carbon leakage, drawing on experience from around the world. It covered two broad issues that policy makers need to consider when designing leakage prevention measures: (1) the sectors or activities that will be supported; and (2) the form that such support will take. Ms. Pauline Kennedy, PMR Secretariat, moderated the session where Mr. Jason Eis, Vivid Economics, presented an overview of the different policy options that have been used for leakage prevention and the key design choices. Following the session, participants broke out into small groups, to explore different real world case studies of leakage prevention measures.

16. In his overview presentation, Mr. Jason Eis recapped the motivations for policy makers to include leakage prevention measures in their carbon pricing policies, to safeguard carbon abatement and cost-effectiveness of the carbon pricing regime; and to respond to concerns from affected firms and industries. He then explained that the challenge for policy makers is to find the right balance, addressing the risk of inefficient carbon leakage while at the same time not undermining the intended impact of the carbon price. He continued to explain that there are two broad questions for policy makers to consider: which sectors to target with leakage prevention measures, and what form leakage prevention measures would take.

17. Mr. Jason Eis explained that there are three key considerations in deciding which sectors to target: (1) whether to support electricity generators (high carbon intensity but low exposure to trade); (2) whether to support all other entities or a sub-set thereof; and (3) whether to provide support on a uniform basis, or provide tiered assistance that increases with an assessment of leakage risk. Policy makers have often used measures of emissions intensity and trade exposure to determine the eligibility for leakage prevention measures.

18. Mr. Jason Eis then explained the different forms that leakage prevention measures can take, including free allowance allocation (in emission trading schemes), administrative exemptions, rebates and border tax adjustments. He described the pros and cons of these different measures as summarized in table 1.

**Table 1: Summary of different leakage prevention measures**

	Grandfathering	FSB	OBA	Exemption	Rebates	BCA
<b>Leakage prevention</b>	Weak, unless closure rules and updating included	Weak, unless closure rules and updating included	Strong	Strong	Depends on design	Strong
<b>Incentives to improve emissions intensity</b>	In principle strong, but diluted when updating included	Preserved	Preserved	Not preserved	Preserved	Preserved
<b>Demand-side abatement incentives</b>	Preserved	Preserved	Dulled, especially if applied too broadly	Removed	Depends on design	Preserved
<b>Administrative complexity</b>	Easy to implement	Some complexity in establishing benchmarks	Some complexity establishing benchmarks, collating output data	Easy to implement	Some complexity	Very complex
<b>Risk of windfall profits</b>	Some risk	Some risk	No	No	No	No
<b>Risk to environmental outcome</b>	No	No	Some risk, depending on design	Yes, exempt emissions uncapped	Depends on design	No
<b>Political and legal challenges</b>	No	No	No	No	No	Yes

19. Following the presentation, participants broke into small groups to discuss in more detail, the leakage prevention measures in one of four case studies. The case studies included [California](#), the [European Union](#), [New Zealand](#) and [South Africa](#). Each case study provided a summary of the leakage prevention measures taken in the respective jurisdiction, and explained some of the important circumstances and rationale behind these policy choices. Groups were encouraged to explore the case study through a set of questions. They had an opportunity to ask specific questions from an expert in each of the case studies.

#### **4. Next steps and closing remarks**

20. The meeting was closed with remarks from Mr. Venkata Ramana Putti, Program Manager of Carbon and Climate Finance at the World Bank Group. He encouraged participants to read the technical note and inform the PMR Secretariat of ideas and requests for specific follow-up activities.