ERCST

August 29, 2019 | Santiago Chile

Reporting on Response Measures under Biennial Update Reporting – Case Study on Chile

ERCST Stakeholder consultation

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Background on response measures

- We are in a period of transition towards a low GHG economy that needs to be managed
- Measures to undertake include mitigation measures that may have:
  - Intended impacts
    - GHG reductions, carbon costs, increased energy/fuel costs etc
  - Unintended impacts
    - employment changes, carbon leakage, changes in trade and investment patterns etc

Background on response measures

- The unintended impacts can be *positive or adverse* and will affect all 3 pillars of sustainable development
  - Economic
  - Social
  - Environmental
- RM can be *domestic* (in the jurisdiction itself) and *international* (in other jurisdictions or global)

Background on response measures

Economic impacts	• Trade or production impacts, growth/reduction in different sectors, competitiveness, carbon leakage, cost structures etc.
Social impacts	• Job losses/gains, need for retraining, democratic/political aspects, health impacts etc.
Environmental impacts	• Non-GHG emissions, water use, water pollution, biodiversity, air quality, deforestation, land use change etc.

Background on response measures

- A few examples of potential impacts:
  - Impacts on tourism industry in the Maldives due to levies on international aviation
  - Increased costs of imports and exports due to measures on international maritime transportation (Ghana and Maldives)
  - Loss of competitiveness for agricultural producers due to climate-related food labeling in importing jurisdictions

Taxonomy of International Response Measures: Part 1

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
Carbon taxes	decreased demand for carbon-emitting goods; increased demand for low-carbon emitting goods	• Negative effects: fossil fuel producers. • Positive effects: low-carbon goods (e.g., renewable energy/EV components)	•Effects on low-carbon goods exports?
Subsidies			
for low-carbon transport	decreased demand for goods associated with internal combustion engines.	• Negative effects: producers of fossil fuels, lead. • Positive effects: producers of EVs, cobalt, lithium, vanadium.	•Ex: Effect on Chile as a lithium exporter: continue to export raw materials like lithium? Is Chile looking to become a downstream manufacturer of batteries?
for low-carbon energy production	decreased demand for thermal fuels	• Negative effects: coal, natural gas, oil producers. • Positive effects: low-carbon energy technology (e.g., PV solar cells)	
removal of, for fossil fuel production	decreased production of fossil fuels	• Positive effects: fossil fuel producers. • Negative effects: fossil fuel consumers.	
removal of, for fossil fuel consumption	decreased consumption of fossil fuels	• Negative effects: fossil fuel producers. • Positive effects: fossil fuel consumers.	
for energy efficiency in buildings	decreased energy consumption	Effects depend on fuel source used in implementing country buildings. If fossil fuels used: • negative effects on producers; • positive effects on consumers.	

Taxonomy of International Response Measures: Part 1

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
Green procurement			
of energy	decreased demand for thermal fuels	• Negative effects: coal, natural gas producers. • Positive effects: coal and natural gas consumers.	
of automobiles	decreased demand for goods associated with internal combustion engines.	• Negative effects: fossil fuel producers. • Positive effects: cobalt, lithium, vanadium producers, EV producers.	•Same question on lithium export + manufacture of batteries?
Cap and trade schemes	decreased demand for carbon-emitting goods; increased demand for low-carbon emitting goods	• Negative effects: fossil fuel producers. • Positive effects: renewable energy/EV components producers; fossil fuel consumers.	
Liberalization of trade in environmental goods	boost in consumption of green goods	• Positive effects: producers of covered environmental goods	

Taxonomy of International Response Measures: Part 1

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
Border carbon adjustment	decreased demand for high-carbon goods	Depends on carbon intensity, and regime details, but likely: • Negative effects: aluminum, steel, cement, plastics, pulp & paper. • Positive effects for low-carbon producers.	•For example: Energy efficiency of copper + wood pulp production in comparison with that of other global players?
Standards and labelling requirements			
for agricultural goods, involving GHG emissions	depends on details of the scheme, but likely loss of market share for non-certified air-frieghted goods, inter alia	Depends on details of the scheme, but possible: • Negative effects: perishable fruits such as berries, high-value horticulture	•What sorts of environmental standards and labelling present market access barriers for Chilean agricultural exports?
mandatory efficiency performance standards for consumer goods, industrial equipment	restricts the market to high-efficiency products; reduces demand for fuel	• Negative effects: fossil fuel producers; producers of low-efficiency consumer goods and industrial equipment. • Positive effects: fossil fuel consumers; producers of high-efficiency goods/equipment	

Taxonomy of International Response Measures: Part 1

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
International aviation levies	reduction in air travel consumed	• Negative effects: flight-based tourism sectors (e.g., hotels, restaurants)	•For example: In the agricultural sector, what goods tend to be air freighted? Possible changes and/or trends? •Possible effects on tourism?
International maritime levies	increase in shipping costs	• Negative effects: increased costs of imports and exports using maritime transport	•Which agricultural goods are shipped? Possible changes/trends?

Background on response measures

- In UNFCCC negotiations the issue of trans-border impacts of climate change mitigation measures is known as response measures.
  - The Kyoto Protocol in Article 2.3 states that Annex I parties *"shall strive to implement policies and measures (...) in such a way as to minimize (...) effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties."*

Background on response measures (2)

- Currently, there has been considerable debate on how to achieve this, however there is:
  - a lack of methodologies to report on the impact of response measures,
  - no data to present impacts of policies in an empirical way, and therefore
  - a lack of empirical studies to provide substance to the UNFCCC discussions on response measures.

Background on response measures (3)

- Till 2024: Biennial Update Reporting (BUR):
  - Allows for reporting on economic and social consequences of RM by non-Annex I Parties
    - Decision 2/CP.17 Annex III contains the guidelines on reporting for BUR
- From 2024: Biennial Transparency Reporting (BTR):
  - "Each Party is encouraged to provide detailed information, to the extent possible, on the assessment of economic and social impacts of response measures."
    - Annex III.D.90 of Modalities, procedures and guidelines for the transparency framework

Project objectives

1. To design and create a methodology on response measures (RM) under Biennial Update Reporting.

2. To test this methodology through a case study on a country which has the available data, looking to see if the methodology works with the available data.

Overview: ERCST RM methodology

Step 1: Country description (**DONE**)

Step 2: Identify the top 100 sectors in terms of value added. (**DONE**)

Step 3: Collect data on characteristics of top 100 sectors. (**DONE**)

Step 4: Building on Steps 2 and 3, identify sectors vulnerable to:

» **International RM**

» **Domestic RM**

(**DONE**)

Identifying the vulnerable sectors

Overview: ERCST RM methodology

Step 5: ***Stakeholder input to identify anything which was missed in Step 4.***

Step 6: Identify the response measures that might impact sectors from Step 4. (Country-level discretion whether to include positive as well as negative impacts.) (**DONE**)

Step 7: ***Once completed further employing stakeholder input, to identify RM identified in Step 6.***

Step 8: Assess the impacts of response measures on identified sectors.

Step 9: Look at possible domestic and international tools and support which may be needed to address the impacts.

This workshop: Step 5 and 7

- Main objective of this workshop is to ***gather feedback from you***, on two tracks:
  - International track
  - Domestic track

International Track

- We have identified a list of 10 Chilean sectors through our methodology as most vulnerable to the impacts of response measures implemented in other jurisdictions and internationally

- We have identified policies in other countries and internationally which could impact the 10 identified Chilean sectors
  - Identifying all potential policies globally is not useful, so we focus on:
    - Top 5 countries Chilean sector exports to
    - International overreaching policies (international transportation – ICAO and IMO)

International Track (2)

- We need your feedback on:
  - The list of sectors vulnerable to international RM
  - The list of international policies

Have we missed something?

Domestic Track

- We have identified a list of 10 Chilean sectors through our methodology as most vulnerable to the impacts of response measures implemented in Chile

- We have identified policies in Chile which could impact the 10 identified Chilean sectors

Domestic Track (2)

- We need your feedback on:
  - The list of sectors vulnerable to domestic RM
  - The list of domestic policies

Have we missed something?

International

Assessment of international response measures and vulnerable sectors

International: identifying *vulnerable sectors*

- We started with the top 100 Chilean sectors in terms of domestic value added
  - Using 2016 Annual National Accounts of the Central Bank of Chile
- We then used two filters on those top 100 sectors
  - Is the sector internationally traded?
    - Some sectors are not traded (such as ISIC code 85: Public education)
  - Does the sector have significant greenhouse gas emissions?
    - Some sectors had no GHG emissions reported in the Chilean National GHG Inventory (2016) (such as ISIC 86: Public human health activities)
  - A sector that is not traded, and/or has no GHG emissions is deemed *less vulnerable* to international response measures due to limited international competition and limited impacts from climate change mitigation policies
- This reduced the list to 31 sectors

International: identifying *vulnerable sectors (2)*

- To further narrow the list down we used two methods:
  - Method 1 Thresholds: using thresholds for three variables to drop sectors
  - Method 2 Weighted scores: scoring sectors for three variables and picking sectors that pass (score 50 or above)
  - Three variables:
    - "trade intensity" (exports/gross domestic production)
    - "importance for Chilean economy" (value added as a % of GDP)
    - "GHG intensity" (gCO2e/USD value added)
- Both methods are subjective:
  - we choose thresholds and weights for scoring sectors

International: identifying *vulnerable sectors (3)*

- To limit subjectivity we performed robustness checks
  - 4 scenarios were used, with variations on the weight given to each variable
    - Scenario 1: 'Importance' given more weight/higher threshold
    - Scenario 2: 'GHG intensity' given more weight/higher threshold
    - Scenario 3: 'Trade intensity' given more weight/higher threshold
    - Scenario 4: All three variables lower threshold and more 'even' weight
  - 4 scenarios and 2 methods in each makes eight tests
- Sectors that passed 6 or more out of 8 tests were deemed *most vulnerable* to the impacts of response measures
  - 9 sectors passed 6 or more tests
  - 10th sector (tourism) was added on a qualitative basis

International: identifying *vulnerable sectors (4)*

- Main problem faced during international sector selection was the lack of comparable sectoral data
  - GHG emissions are reported at high level of aggregation. Every agriculture sector therefore was considered to have the same emission intensity – obviously not the case in the real world
  - Tourism sector data (both emissions and trade intensity) problematic;
    - Sector does not report data in manner comparable to others (ISIC or HS codes)
    - sector was deemed vulnerable through a qualitative assessment
    - 'main trading partners' are Europe and Americas
  - Not all 'sectors' are defined at the same level of aggregation
    - ISIC 4 digit level, 3 digit level and 2 digit level (both partial and complete)
    - Ideally we would have only worked with sectors defined at ISIC 4 digit level
      - This principle could not be maintained due to lack of data

International: identifying *vulnerable sectors (5)*

- The list itself (sectors not ranked in this table):

ISIC code	Sector Description
0729	'Mining of copper'
0122-0126	'Cultivation of other fruit' (e.g. tropical and subtropical fruits, citrus fruits, pome fruits and stone fruits, other tree and bush fruits and nuts, oleaginous fruits)
17	'Manufacture of paper and paper products'
2011	'Manufacture of basic chemicals'
19	'Manufacture of coke and refined petroleum products'
0121	'Cultivation of grapes'
1102	'Manufacturing of wines'
032	'Aquaculture'
031	'Fishing'
WTO 1.33 and 1.36	Tourism

International: identifying *response measures*

- We built a list of policies and measures in other jurisdictions and on the international level for each of the 10 sectors.
- For each sector, we looked at:
  - the top 5 countries exported to, and
  - International transportation policies (aviation and maritime transportation)

International: identifying *response measures (2)*

- This gave us a list of 15 countries to look at:
  - People's Republic of China
  - Japan
  - United States of America
  - Republic of Korea
  - Brazil
  - India
  - Russian Federation
  - Spain
  - The Netherlands
  - Belgium
  - Colombia
  - 'Other Asia'
  - Peru
  - Argentina

International: identifying *response measures (3)*

- Main sources for policies:
  - European Environmental Agency policy database on climate change mitigation policies and measures in Europe
  - OECD Database on Policy Instruments for the Environment
  - UNFCCC NDCs registry and IGES NDC database
  - ICAP Carbon market database
  - World Trade Organisation Environmental Database
  - International Energy Agency/IRENA Joint Policies and Measures database
  - Food and Agriculture Organisation FAOLEX Database
  - International Trade Centre Sustainable and Standards Map
  - International Civil Aviation Organisation policy factsheets
  - International Maritime Organisation policy factsheets
  - London School of Economics and Political Sciences Climate Change Laws of the World database (largely overlapping with others above)
  - UNFCCC Response Measures Synthesis Report (less useful)
  - International Energy Agency Building Energy Efficiency Policies Database (less relevant)

International: identifying *response measures (4)*

- List of potential policies for each country was extremely long:

Country	Preliminary numbers for possible measures of top trade partners of vulnerable sectors
China	2332
Japan	441
USA	3304
Rep. Of Korea	516
Brazil	1901
India	567
Russian Federation	3745
Spain	2352
Netherlands	453
United Kingdom	2646
Belgium	1497
Colombia	1706
Other Asia, nes	N/A.
Peru	3059
Argentina	2128

Other Asia, nes: not available in most databases – had to be left out

International: identifying *response measures (5)*

- Narrowed down extensive list by labour intensive policy-by-policy check on several criteria:
  - *Deleting duplications* between databases
  - Can it be considered a *climate change mitigation policy*
    - Direct policy: policy is meant to limit GHG emissions
    - Indirect policy: policy can have significant GHG mitigation co-benefits
  - Policy has an *international perspective* through which Chilean sectors could be impacted
  - Policy is *enacted in the sector* (or a closely related sector) to one of the identified 10 Chilean sectors, in one of the main 5 export countries

International: identifying *response measures (6)*

- For each sector we therefore have a list of policies:
  - that are climate change related
  - for each of the 5 main export countries
    - Tourism: policies in main sources of tourists
      - Europe and Americas
  - for international transportation measures
  - that could have impacts on the identified Chilean sectors of the economy

International: Sectors and policies

- **International sector 1: Mining of Copper (ISIC Rev 0729).** Main products are copper ores and concentrates

China	Japan	Republic of Korea	India	Spain
National ETS	Grants and direct payments to renewable energy producers	Act on Encouragement of Purchase of Environment-Friendly Products.	Rajasthan - VAT exemption for generation of electricity from renewables	EU ETS
Subnational ETS pilots		Act on Encouragement of Purchase of Green Products.	Solar Photovoltaics, Systems, Devices and Components Goods (Requirements for Compulsory Registration) Order, 2017	Royal Decree No. 287/2015 - Regulates the direct granting of subsidies for the purchase of electric vehicles within the framework of the Comprehensive Strategy for the promotion of electric vehicles in Spain 2010-2014 (MOVELE Program 2015).
13th Five-Year comprehensive energy-saving and emission reduction work plan.		Enforcement Decree of the Framework Act on Low Carbon, Green Growth (Presidential Decree No. 22124 of 2010).	State level solar and wind power polices and strategies	Directive 2009/28/EC on the Promotion of Electricity Produced from Renewable Energy Sources
China National Plan for Tackling Climate Change (2014-2020).		Regulation on Energy Efficiency Labelling and Standards	National Action Plan on Climate Change.	Renewable Energy Road Map - Renewable energies in the 21st century: building a more sustainable future
Industrial Green Development Plan (2016-2020).		Act on the Promotion of Saving and Recycling of Resources	National wind-solar hybrid policy	Development plan of electrical energy transport network 2015-2020

International: Sectors and policies

- **International sector 1: Mining of Copper (ISIC Rev 0729).** Main products are copper ores and concentrates (2)

China	Republic of Korea	India	Spain
Measures for the management of the energy-saving low-carbon-emission product certification.	Framework Act on Low Carbon, Green Growth.	Comprehensive Policy on Decentralized (Off-grid) Energy Generation Projects based on New and Renewable Energy (Non-Conventional) Energy Sources – 2016	Renewable Energy Plan 2011 - 2020
Renewable Electricity Quota and Assessment Method (Draft for Opinions) - Planned	Regulation on Energy Efficiency Labelling and Standards (MKE's Notification 2011-263)	India 175 GW Renewable Energy Target for 2022	National Renewable Energy Action Plan 2011-2020
Action Plan for the Development of Smart Photovoltaic Industry		National Renewable Energy Law 2015 - DRAFT	Spanish Strategy on Climate Change and Clean Energy 2007-2012-2020
Renewable Energy Green Certificate and Trading Mechanism		Pilot Emissions Trading Systems	
The Twelfth Five-Year Plan for Renewable Energy			
China 13th Solar Energy Development Five Year Plan (2016-2020)			
China's National Climate Change Programme			
Renewable Energy Law of the People's Republic of China			

International: Sectors and policies

- **International sector 2: 0122-0126 Cultivation of other fruit.** Main products are nuts and fresh fruit, including: coconuts, cherries, brazil nuts, cashew nuts, almonds, hazelnuts etc

China	USA	Netherlands	United Kingdom	Columbia	International transport
Measures for the Administration of Organic Product Certification.	U.S. Fish and Wildlife Service Mitigation Policy.	Sectoral emission trading system in horticulture	Common Agricultural Policy (CAP) Greening	Resolution No. 3.002 - Provisions on the labeling of agricultural inputs.	CORSIA (for air freight)
Rules of the Environmental Protection Administration of the Executive Yuan governing the environmental protection labeling product application and review.	Federal and state level organic food labelling initiatives	Common Agricultural Policy (CAP) Greening	Food (Provisions relating to Labelling) (England, Wales, NI) Regulations 2003 (S.I. No. 2647 of 2003).		IMO climate change related measures
			The England Rural Development Programme		
			Organic Products Regulations 2001 (S.I. No. 430 of 2001).		

International: Sectors and policies

- **International sector 3: 19 Manufacture of coke and refined petroleum products.** Main products is calcinated petroleum coke (input for aluminium, steel and titanium smelting industry)

China	USA	India	Peru	Argentina
National ETS	The President's Climate Action Plan.	National Action Plan on Climate Change.	Decree Nº 011-2015-MINAM – National Stategy on climate change (ENCC).	Renewable energy and rational use of energy law
Subnational ETS pilots	Clean air act			
13th Five-Year comprehensive energy-saving and emission reduction work plan.	United States Mid-Century Strategy for Deep Decarbonization.			
China National Plan for Tackling Climate Change (2014-2020).	Carbon pricing initiatives (RGGI, California ETS)			
Industrial Green Development Plan (2016-2020).				

International: Sectors and policies

- **International sector 4: 17 Manufacture of paper and paper products.** Main products include: multi-ply paper and paperboard, unbleached sack kraft paper, newsprint, self-adhesive paper and paperboard (top 4 account for nearly 95% of exports)

China	Republic of Korea	Netherlands	Japan	'Other Asia'
National ETS	Act on Encouragement of Purchase of Environment-Friendly Products.	CO2 Emission Trading System (ETS)	N/A	N/A
Subnational ETS pilots	Act on Encouragement of Purchase of Green Products.	International co-operation actions in industry		
13th Five-Year comprehensive energy-saving and emission reduction work plan.	Enforcement Decree of the Framework Act on Low Carbon, Green Growth (Presidential Decree No. 22124 of 2010).	Decree No. 183 containing rules relative to packing, packing waste, paper and cardboard.		
China National Plan for Tackling Climate Change (2014-2020).	Act on the Promotion of Saving and Recycling of Resources			
Industrial Green Development Plan (2016-2020).	Framework Act on Low Carbon, Green Growth.			

International: Sectors and policies

- **International sector 5: 2011 Manufacture of basic chemicals.** Many products, top 10 cover 90% of exports, including: lithium carbonates, iodine, nitrate of potassium, molybdenum oxides and hydroxides, methanol, lithium oxide and hydroxide and fungicides

China	USA	Republic of Korea	Brazil	Belgium
13th Five-Year comprehensive energy-saving and emission reduction work plan.	The President's Climate Action Plan.	Enforcement Decree of the Framework Act on Low Carbon, Green Growth (Presidential Decree No. 22124 of 2010).	National Plan on Climate Change (PNMC)	IP-A02 : Long Term Energy/CO2 efficiency Agreements in the industrial sector. Stage 2
National ETS	Clean air act	Framework Act on Low Carbon, Green Growth.	Possible Brazil ETS	EU ETS
China National Plan for Tackling Climate Change (2014-2020).	Environmental protection (ICS 13.020), Products of the chemical industry (ICS: 71.100)	Korea ETS		
Industrial Green Development Plan (2016-2020).	Carbon pricing initiatives (RGGI, California ETS)			
Subnational ETS pilots				

International: Sectors and policies

- **International sector 6: 0121 cultivation of grapes.** Includes fresh and dried grapes – fresh grapes accounts for nearly 90% of exports in this sector

China	USA	Republic of Korea	Netherlands	United Kingdom	International transportation
Measures for the Administration of Organic Product Certification.	Federal and state level organic food labelling initiatives	Act on Promotion of Environment-friendly Agriculture and Fisheries, and Management and Support for Organic Foods	Common Agricultural Policy (CAP) Greening	Common Agricultural Policy (CAP) Greening	CORSIA (for air freight)
Rules of the Environmental Protection Administration of the Executive Yuan governing the environmental protection labeling product application and review.	U.S. Fish and Wildlife Service Mitigation Policy.	Support for quality certification of eco-friendly agricultural products; import and safety control of LMO; origin control; grading of livestock products; traceability system		Food (Provisions relating to Labelling) (England, Wales, NI) Regulations 2003 (S.I. No. 2647 of 2003).	IMO climate change related measures
		Improved regulations on labelling of environmentally friendly agricultural product		Organic Products Regulations 2001 (S.I. No. 430 of 2001).	
				The England Rural Development Programme	

International: Sectors and policies

- **International sector 7: 1102 manufacture of wines.** Products include: wine of fresh grapes, wine in various container sizes and sparkling wine.

China	Japan	USA	Brazil	United Kingdom
Announcement No. 63 of 2008 of Ministry of Environmental Protection promulgating the cleaner production standard for wine industry.	Technical criteria of Certification of Importer concerning the Organic Agricultural Products and the Organic Agricultural Processed Foods (Notification No. 821).	Federal and state level organic food labelling initiatives	Law No. 7.465 on the obligation of using biodegradable packaging.	Food (Provisions relating to Labelling) (England, Wales, NI) Regulations 2003 (S.I. No. 2647 of 2003).
China National Plan for Tackling Climate Change (2014-2020).		The President's Climate Action Plan.	National Plan on Climate Change (PNMC).	CAP - wines amendments Wales and Scotland
Measures for the Administration of Organic Product Certification.		Clean air act	Possible Brazil ETS	Organic Products Regulations 2001 (S.I. No. 430 of 2001).
Rules of the Environmental Protection Administration of the Executive Yuan governing the environmental protection labeling product application and review.		Carbon pricing initiatives (RGGI, California ETS)		

International: Sectors and policies

- **International sector 8: 032 aquaculture.** Many products, but top 10 account for just under 90% of exports. Main products include: fillets of pacific salmon, atlantic salmon, frozen pacific salmon etc.

China	Japan	USA	Russian Federation	Brazil
Directions on Issuing the Organic Labeling Approval Operations Document of Imported Aquatic Products and Aquatic Processed Products.	Technical criteria of Certification of Importer concerning the Organic Agricultural Products and the Organic Agricultural Processed Foods (Notification No. 821).	Federal and state level organic food labelling initiatives	N/A	Law No. 7.465 on the obligation of using biodegradable packaging.
China National Plan for Tackling Climate Change (2014-2020).	Aviation fuel tax			
Measures for the Administration of Organic Product Certification.				
Rules of the Environmental Protection Administration of the Executive Yuan governing the environmental protection labeling product application and review.				

International: Sectors and policies

- **International sector 9: 031 fishing.** Many products, main 10 products cover just under 90% of exports. Main products include: pacific salmon (fresh, chilled or frozen), atlantic salmon (fresh, chilled or frozen), fillets of trout etc.

China	Japan	USA	Russian Federation	Brazil	International transportation
Directions on Issuing the Organic Labeling Approval Operations Document of Imported Aquatic Products and Aquatic Processed Products.	Aviation fuel tax	Federal and state level organic food labelling initiatives	N/A	Law No. 7.465 on the obligation of using biodegradable packaging.	CORSIA (for air freight)
Rules of the Environmental Protection Administration of the Executive Yuan governing the environmental protection labeling product application and review.	Technical criteria of Certification of Importer concerning the Organic Agricultural Products and the Organic Agricultural Processed Foods (Notification No. 821).				IMO climate change related measures
Directions on Issuing the Organic Labeling Approval Operations Document of Imported Aquatic Products and Aquatic Processed Products.					

International: Sectors and policies

- **International sector 10: WTO 1.33 and 1.36 Tourism**. Main items are: Travel and expenditure on various categories. Europe and Americas account for more than 90% of arrivals.

USA	Spain	Peru
Federal and state level aviation fuel taxes (at least 28 States have aviation fuel levies)	National policy on alternative energy in transport	Supreme Decree No. 013-2016-MINAM – Creates a Multisectoral Working Group in charge of proposing measures to improve air quality at the national level linked to vehicle emissions and establishes provisions on air quality.
The President's Climate Action Plan.	Airport carbon footprinting accreditation	Resolution Nº 202/07 / CONAM - Maximum permissible emission limits for motor vehicles.
Clean air act	EU ETS - aviation	Supreme Decree No. 003-2017-MINAM – Approves Environmental Quality Standards (ECA) for Air.
Carbon pricing initiatives (RGGI, California ETS)	Regional taxes on aviation	Decree Nº 011-2015-MINAM – National Stategy on climate change (ENCC).
		Supreme Decree No. 100/11 / PCM - Modifies Supreme Decree No. 047/01 / MTC, Maximum Permissible Limits of polluting emissions for motor vehicles that circulate in the road network.
		Supreme Decree No. 211/07 / EF - Selective Consumption Tax considering the criterion of proportionality to the degree of harmfulness of fuels.
		Biofuel Production and Commercialisation Law with amendments

International: Sectors and policies

- **International sector 10: WTO 1.33 and 1.36 Tourism**. Main items are: Travel and expenditure on various categories. Europe and Americas account for more than 90% of arrivals.

Russian Federation	Netherlands	United Kingdom	Belgium	Argentina	International aviation policies
N/A	Emission Trading System (EU ETS)	Emission Trading System (EU ETS)	Emission Trading System (EU ETS)	Taxes on petrol and gasoline	CORSIA
		Duty on hydrocarbon fuels		Decree Nº 543/2016 – Mandated bioethanol percentage	
				Law Nº 26.093 and others on promotion of production and consumption of biofuels	

International: transportation

- International transportation is a reoccurring issue
  - International maritime transport
    - IMO
    - Mainly significant for
      - Fresh/perishable goods
  - International aviation
    - ICAO
    - Mainly significant for
      - Fresh/perishable goods
      - Tourists
  - Less an issue for non-perishable goods

International: maritime transportation

- IMO 2020 regulations on use of bunker fuel, lowering sulfur content
- Arctic black carbon regulations are being developed
- Energy Efficiency Design Index (EEDI) and Ship Energy Efficiency Management Plan (SEEMP)
  - Could have an effect on the cost of marine freight shipping for the fresh fruit goods in this sector.
  - Phase 3 of EEDI has been moved up to 2022 for certain types of ships, including container ships; general cargo ships.
    - Could be a positive impact
- Potential future regulation related to speed of ships could also have a significant impact due to the perishable nature of goods
  - Limiting potential export markets that can be supplied

International: air transportation

- CORSIA (ICAO) could be relevant due to the possible increase in costs for air freight and air transport
  - However, CORSIA's design is not yet finalized and published
  - Pilot and then volunteer Phases to start after 2021.
- Effect on tourism potentially limited due to relatively small potential increase in flight prices

Domestic

Assessment of domestic response measures and vulnerable sectors

Domestic: identifying *vulnerable sectors*

- Very similar process as for international track
- We started with the top 100 Chilean sectors in terms of domestic value added
  - Using 2016 Annual National Accounts of the Central Bank of Chile
- We then used one filter on those top 100 sectors
  - Does the sector have significant greenhouse gas emissions?
    - Some sectors had no greenhouse gas emissions reported in the Chilean National GHG Inventory (2016) (such as ISIC 86: Public human health activities)
  - A sector that has no GHG emissions is deemed less vulnerable to domestic response measures due to limited from climate change mitigation policies
- This reduced the list to 34 sectors

Domestic: identifying *vulnerable sectors (2)*

- We used two methods to further narrow the list down:
  - Method 1: using thresholds for two variables to drop sectors
  - Method 2: scoring sectors for two variables and picking sectors with highest scores
  - Two variables:
    - "importance for Chilean economy" (value added as a % of GDP)
    - "GHG intensity" (gCO2e/USD value added)
- Both methods are subjective:
  - we choose thresholds and weights for scoring sectors

Domestic: identifying *vulnerable sectors (3)*

- To limit subjectivity we performed robustness checks
  - 3 scenarios were used, with variations on the weight given to each variable
  - 3 scenarios and 2 methods in each makes 6 tests
- Sectors that passed 4 or more out of 6 tests were deemed most vulnerable to the impacts of response measures
  - 9 sectors passed 4 or more tests
  - Tourism added through qualitative assessment

Domestic: identifying *vulnerable sectors (4)*

- Main problem faced during domestic sector selection was the lack of sectoral data at comparable level
  - GHG emissions are reported at high level of aggregation. Every agriculture sector therefore was considered to have the same emission intensity – obviously not the case in the real world
  - Tourism
    - Sector does not report data in manner comparable to others (ISIC or HS codes)
    - sector was deemed vulnerable through a qualitative assessment
  - Not all 'sectors' are defined at the same level of aggregation
    - ISIC 4 digit level, 3 digit level and 2 digit level (both partial and complete)

Domestic: identifying *vulnerable sectors (5)*

- The list itself (sectors not ranked in this table):

ISIC code	Sector Description
3510	'Electric power generation'
4923	'Freight transport by road'
17	'Manufacture of paper and paper products'
51	'Air transport'
19	'Manufacture of coke and refined petroleum products'
2011	'Manufacture of basic chemicals'
0729	'Mining of copper'
1020	'Processing and preserving of fish, crustaceans and molluscs'
0122-0126	'Cultivation of other fruit'
WTO 1.33 and 1.36	Tourism

Domestic: identifying *response measures*

- We built a list of policies and measures in Chile for each of the 10 sectors.
- Main sources:
  - Websites of main line ministries
    - Ministry of the Environment (including digital climate database)
    - Ministry of Energy
    - Ministry of Transport
  - Third BUR of Chile (2018)
  - London School of Economics and Political Sciences Climate Change Laws of the World database
  - OECD Database on Policy Instruments for the Environment
  - Desk research

Domestic: identifying *response measures (5)*

- Narrowed down by labour intensive policy-by-policy check on several criteria:
  - *Deleting duplications* between databases
  - Can it be considered a *climate change mitigation policy*
    - Direct policy: policy is meant to limit GHG emissions
    - Indirect policy: policy can have significant GHG mitigation co-benefits
  - Policy is *enacted in the sector* (or a closely related sector) to one of the identified 10 Chilean sectors
- This process is also subjective in nature
  - Researcher used own judgement to determine which policies stay on the list

Domestic: identifying *response measures (6)*

- For each sector we therefore have a list of policies:
  - that are climate change related
  - that could have impacts on the identified Chilean sectors of the economy

Domestic: Sectors and policies

- **Domestic sector 1: 3510 Electric power generation**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to energy efficiency and renewable energy promotion
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on electricity generation and consumption
Coal phase out pledge	Pledge made in June 2019 – relevant due to impacts on electricity generation. Linked to carbon neutrality pledge
Law 19.657	Geothermal energy
Law 19.940	Allowing for non-conventional RE plants to be connected to the grid
Law 20.780	C02 tax for stationary installations
Law 20.698	Incentives for non-conventional RE
Law 20.571	Green tax on stationary installations above 50MW thermal power capacity, allows for very small RE to provide power to the grid
Law 20.257	Non-conventional RE quota for utilities
Law 20.365	Tax exemptions for solar thermal systems
Solar strategic program	Strategy for development of solar RE

Domestic: Sectors and policies

- **Domestic sector 1: 3510 Electric power generation (continuation)**

Main Chilean policies and measures	Short description
Energy roadmap 2018-2022	Short term energy roadmap
Coal phase out pledge	Pledge made in June 2019 – relevant due to impacts on electricity generation. Linked to carbon neutrality pledge
National energy agenda (Energia 2050)	Energy related targets (30% reduction in marginal cost of electric energy by 2018, 20% energy matrix non-conventional renewables by 2025, reduction in energy consumption by 2025)
Net billing law	Net billing law
Energy efficiency action plan (PAE2020)	Short term energy efficiency action plan
Energy efficiency program in public buildings (PEEP)	Program for promoting energy efficiency in public buildings
Energy strategy 2015	RE target of 60% by 2035 and 70% by 2050 *(superseded by pledges?)*
Mitigation plan for the energy sector	Enshrining targets made in energy strategy 2015
Renewable energy for self-consumption	Promotion of small-scale RE for households and industry

Domestic: Sectors and policies

- **Domestic sector 2: 4923 Freight transport by road**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to decarbonization of transportation
Labelling of new vehicles	Includes carbon intensity/fuel efficiency features in labelling of new vehicles
2014-2018 Atmospheric decontamination strategy	Targets black coal (diesel transportation)
Infrastructure projects	Including expansion of Santiago subway and construction of new railway infrastructure
Green zone for transportation in Santiago	Development of a green transportation zone in Santiago
Law 20.780	Tax on sale of lightweight vehicles
E-mobility strategy	Includes e-mobility targets, such as 40% of private cars and 100% of public transportation electric by 2050
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on transport emissions

Domestic: Sectors and policies

- **Domestic sector 3: 17 Manufacture of paper and paper products**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to re/afforestation and forest management implications
Sustainable forest management scheme	Sustainable development and recovery of 100,000 hectares of forest land - Part of NDC
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on LULUCF
National strategy on climate change and vegative resources	Strategy on LULUCF and climate mitigation
Energy efficiency policy	Likely to include energy efficiency targets for all industrial sectors
Native Forest Law	Policy on forest management

Domestic: Sectors and policies

- **Domestic sector 4: 51 Air transport**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to coverage of transport emissions
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on transport emissions
Emissions reduction plan in the aviation industry	Policy on reducing emissions in the aviation sector

Domestic: Sectors and policies

- **Domestic sector 5: 19 Manufacture of coke and refined petroleum products**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to coverage of process emissions
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on process emissions
Clean production agreement	Likely relevant – more research necessary
Energy efficiency policy	Likely to include energy efficiency targets for all industrial sectors

Domestic: Sectors and policies

- **Domestic sector 6: 2011 Manufacture of basic chemicals**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to coverage of process emissions
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on process emissions
Clean production agreement	Likely relevant – more research necessary
Energy efficiency policy	Likely to include energy efficiency targets for all industrial sectors

Domestic: Sectors and policies

- **Domestic sector 7: 0729 Mining of copper**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to coverage of process emissions
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on process emissions
Clean production agreement	Likely relevant – more research necessary
Energy efficiency policy	Likely to include energy efficiency targets for all industrial sectors

Domestic: Sectors and policies

- **Domestic sector 8: 1020 Processing and preserving of fish, crustaceans and molluscs**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to coverage of process emissions
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on process emissions
Clean production agreement	Likely relevant – more research necessary
Energy efficiency policy	Likely to include energy efficiency targets for all industrial sectors

Domestic: Sectors and policies

- **Domestic sector 9: 0122-0126 Cultivation of other fruit**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to coverage of LULUCF emissions
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on LULUCF emissions
Clean production agreement	Likely relevant – more research necessary
Carbon sequestration through sustainable soil management	Promotion of soil management in LULUCF sector to enhance carbon sequestration
National strategy on climate change and vegative resources	Strategy on LULUCF and climate mitigation

Domestic: Sectors and policies

- **Domestic sector 10: WTO 1.33 and 1.36 Tourism**

Main Chilean policies and measures	Short description
National climate change plan 2017-2022 (PANCC 2017-2022)	National short term plan, mainly relevant due to coverage of transport emissions
Carbon neutrality pledge	Pledge made in June 2019 – relevant due to impacts on transport emissions
2014-2018 Atmospheric decontamination strategy	Targets black coal (diesel transportation)
Emissions reduction plan in the aviation industry	Policy on reducing emissions in the aviation sector

Next steps for the project

Step 8: Assess the impacts of response measures on identified sectors.

- In this step we would seek to assess impacts, ***both qualitative and, as far as possible, quantitative***
- **We are looking for partners with modelling experience for the latter**

Next steps for the project

Step 8: Assess the impacts of response measures on identified sectors.

- Modelling
  - International:
    - Models that could be used would need to cover trade impacts of foreign measures on the Chilean economy. As such they should be based on the Chilean social accounting matrix, and would need to include international trade. Adapted GTAP models, for example, might be used.
  - Domestic:
    - Models would cover domestic impacts of domestic policies

Next steps for the project (2)

Step 9: Look at possible domestic and international tools and support which may be needed to address the impacts.

- Potential domestic measures include:
  - cost alleviation domestic safety nets, worker training/retraining and adjustment programmes and economic diversification efforts
  - We would also look at the need for capacity building and capacity building to develop and maintain these tools
- Potential international cooperative approaches would also be assessed
  - Tools and approaches may operate at a regional or global level. Examples of such tools and approaches are the Technology Mechanism, the Green Climate Fund, the Adaptation Committee, the Capacity Building Framework and the REDD+ Framework.

Conclusions

- Overall number of important domestic and international RM is:
  - Relatively limited
  - Concentrated in a limited number of sector
- Limited number of policies could impact many sectors
  - Domestic: industrial sectors under same policies
  - International: international transportation

- Assessing whether impacts follow this pattern as well will be our next task

- We'd like to send sector specific questions to each of you
  - List of identified RMs – are these relevant for you, are any missing?
  - Your chance to tell us which policies concern your sector!

Conclusions (2)

- We would like to send sector specific questions to you by email
- Did our list miss a sector that should be deemed most vulnerable?
  - Why should any additional sectors be included?
- Did we miss any major international/domestic policies?
  - Which are the top 3-5 international policies which are a concern (in terms of impact) to your sector?
  - Are there any in the pipeline that you are concerned about?
- <u>Your chance to tell us which policies are a concern for your sector!</u>

Back up methodology slides

Step 4: Using the two methods below, determine which are the vulnerable sectors

- Step 2 identified the most significant sectors for the country, describing some of their relevant characteristics.
- Step 4 acts as a filter to identify the sectors which are:
  - vulnerable to response measures, and
  - significant to the national economy.

  These are the sectors which will be focused on in the study.
- There are two possible methods to do so:
  - Method 1: Threshold method
  - Method 2: Weighted scores method

Step 4: Method 1: Thresholds

- This method involves testing whether a sector passes each of the three listed threshold conditions.
  - If it does pass the three thresholds, the sector will be considered vulnerable to RMs.
- The thresholds are to be considered to be in series giving them equal weight.
- The first two determine vulnerability, and the third determines significance.
- This method therefore incorporates a process of elimination from the very first threshold, allowing for more efficient gathering and analysing data

Step 4: Method 1: Thresholds

- The three sectoral thresholds are:
  1. Trade intensity
     - First we look at trade exposure of the sectors by calculating the level of trade intensity:

$$Trade\ intensity = \frac{\text{exports}}{\text{domestic production}}$$

     - The higher the trade intensity, the higher the relevance and vulnerability of the sector for our analysis
       - Higher than 19%: high trade intensity
       - Between 10 and 19%: medium trade intensity
       - Lower than 10%: low trade intensity: sector does not pass the threshold

Step 4: Method 1: Thresholds

- The three sectoral thresholds are (continued):
  2. Energy cost per unit of value added
     - Proxy for GHG intensity of the sector.
     - The suggested threshold will be 5 %.
  3. Value added as a percentage of GDP
     - Importance of the sector in the economy of the country.
     - If greater than 1%: sector passes third threshold

- Thresholds might need to be adjusted depending on the country being assessed
  - For example, due to differences in structure of economies between developed and developing countries.

Step 4: Method 2: Weighted scores

- The second method, the **weighted scoring method** provides a systematic process for selecting the vulnerable sectors based on the same three criteria seen above:
  - trade intensity (calculated through trade intensity: exports/domestic production),
  - energy costs per unit of value added, or GHG intensity (grams of $C0_2e$/value added), depending on the available data, and
  - national sectoral significance, which will be calculated by looking at the value added relative to GDP.
- Whereas in Method 1 these values were categorised as thresholds, in this Method the values are used in a weighted average formula.

Step 4: Method 2: Weighted scores

- Each criterion is assigned a weight based on its level of importance to calculating the sector's vulnerability to RM.
  - Trade intensity and energy costs per unit of value added are each assigned a weight of 40%.
  - National sectoral significance through value added relative to GDP is assigned a weight of 20%.
- For a sector to be classified as vulnerable to RMs, it must achieve a certain cut-off score (***TBD***) in this weighted assessment.
- Possible to define a minimum score range to determine whether a sector should be perceived as relevant or not.

Step 4: Method 2: Weighted scores

Tabular overview of the weighted scoring method

Trade intensity (trade intensity: exports/domestic production). Scored zero to 100, derived by multiplying number by 4, cap at 100.	**40%**
Energy costs per unit of value added, or GHG intensity (grams of $C0_2e$/value added), depending on data availability. The figures will be normalized to a score between zero and 100.	40%
National sectoral significance: value added relative to GDP. Scored zero to 100, derived by multiplying number by 50, cap at 100.	20%

Step 4: Method 2: Weighted scores

- Method 2 provides a clear overview for each sector.
  - Method 1 does not provide this general overview, as the criteria are incorporated as automatic elimination thresholds
- Method 2 allows for incorporation of weight differentiation for the criteria.
  - Method 1: all thresholds are equally important
- Research and administrative burden for Method 2 will be higher due to the lack of elimination process.
- Method 2 cut-off score may have to be adjusted once seeing the results (for example, 0 sectors pass)
  - Allows for an added level flexibility beyond Method 1

Step 5: Stakeholder input to identify anything which Step 4 missed.

- Stakeholder consultations will supplement the above methods.
- Consultations will be designed to capture sectors of concern that the methodologies may have missed.
- Where missing sectors of concern are identified, the team will review the methodology for revisions that might help avoid such misses in future.

Step 6: Identify the response measures

Four-part procedure:

1. For the vulnerable sectors identified in Step 4, identify top 3 importers (top export destinations)
2. For the vulnerable sectors, identify the types of response measures likely to impact (country-level discretion whether to include positive as well as negative impacts)
3. Search in identified trading partners for identified types of response measures
4. Search international initiatives for identified types of response measures

Step 6: Identify the response measures
Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
Carbon taxes	decreased demand for carbon-emitting goods; increased demand for low-carbon emitting goods	• Negative effects: fossil fuel producers. • Positive effects: low-carbon goods (e.g., renewable energy/EV components)	•Effects on low-carbon goods exports?
Subsidies			
for low-carbon transport	decreased demand for goods associated with internal combustion engines.	• Negative effects: producers of fossil fuels, lead. • Positive effects: producers of EVs, cobalt, lithium, vanadium.	•Ex: Effect on Chile as a lithium exporter: continue to export raw materials like lithium? Is Chile looking to become a downstream manufacturer of batteries?
for low-carbon energy production	decreased demand for thermal fuels	• Negative effects: coal, natural gas, oil producers. • Positive effects: low-carbon energy technology (e.g., PV solar cells)	
removal of, for fossil fuel production	decreased production of fossil fuels	• Positive effects: fossil fuel producers. • Negative effects: fossil fuel consumers.	
removal of, for fossil fuel consumption	decreased consumption of fossil fuels	• Negative effects: fossil fuel producers. • Positive effects: fossil fuel consumers.	
for energy efficiency in buildings	decreased energy consumption	Effects depend on fuel source used in implementing country buildings. If fossil fuels used: • negative effects on producers; • positive effects on consumers.	

Step 6: Identify the response measures
Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
Green procurement			
of energy	decreased demand for thermal fuels	• Negative effects: coal, natural gas producers. • Positive effects: coal and natural gas consumers.	
of automobiles	decreased demand for goods associated with internal combustion engines.	• Negative effects: fossil fuel producers. • Positive effects: cobalt, lithium, vanadium producers, EV producers.	•Same question on lithium export + manufacture of batteries?
Cap and trade schemes	decreased demand for carbon-emitting goods; increased demand for low-carbon emitting goods	• Negative effects: fossil fuel producers. • Positive effects: renewable energy/EV components producers; fossil fuel consumers.	
Liberalization of trade in environmental goods	boost in consumption of green goods	• Positive effects: producers of covered environmental goods	

Step 6: Identify the response measures
Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
Border carbon adjustment	decreased demand for high-carbon goods	Depends on carbon intensity, and regime details, but likely: • Negative effects: aluminum, steel, cement, plastics, pulp & paper. • Positive effects for low-carbon producers.	•For example: Energy efficiency of copper + wood pulp production in comparison with that of other global players?
Standards and labelling requirements			
for agricultural goods, involving GHG emissions	depends on details of the scheme, but likely loss of market share for non-certified air-frieghted goods, inter alia	Depends on details of the scheme, but possible: • Negative effects: perishable fruits such as berries, high-value horticulture	•What sorts of environmental standards and labelling present market access barriers for Chilean agricultural exports?
mandatory efficiency performance standards for consumer goods, industrial equipment	restricts the market to high-efficiency products; reduces demand for fuel	• Negative effects: fossil fuel producers; producers of low-efficiency consumer goods and industrial equipment. • Positive effects: fossil fuel consumers; producers of high-efficiency goods/equipment	

Step 6: Identify the response measures
Part 2: Search for vulnerable sectors in third column

Response measures	Impacts in country undertaking the response measure	Possible impacts in other countries	Questions on possible impacts on Chile?
International aviation levies	reduction in air travel consumed	• Negative effects: flight-based tourism sectors (e.g., hotels, restaurants)	•For example: In the agricultural sector, what goods tend to be air freighted? Possible changes and/or trends? •Possible effects on tourism?
International maritime levies	increase in shipping costs	• Negative effects: increased costs of imports and exports using maritime transport	•Which agricultural goods are shipped? Possible changes/trends?

Step 6: Identify the response measures

Parts 3 & 4: Where to look for response measures

Looking at domestic measures from international trading partners, as well as international measures at the end from ICAO and IMO:

- EEA database: climate change mitigation P&Ms in Europe
- OECD database of environmental measures
- Party NDCs
- WTO environmental database
- IEA Building Energy Efficiency Policy Database
- ICAP carbon market database
- FAOLex database of food and agriculture laws and regs
- Global Climate Legislation Database
- IEA/IRENA Joint Policies and Measures Database
- ITC Sustainability Map, Standards Map
- UNFCCC compilation report on response measures
- ICAO and IMO climate actions

Step 7: Once completed further employing stakeholder input, to assess RMs identified in Step 6.

- Stakeholder consultations assess:
  - whether any relevant RMs have been missed, or
  - whether too many RMs have been listed as relevant for the list of sectors.
- The research team will contact key sectoral stakeholders (business, government and unions) to identify policies and impacts and verify our findings.
- To be carried out through workshops where the methodology and the main findings are presented, followed by requests for input and feedback, as well as inviting stakeholders to identify other policies (out-of-jurisdiction and international) and other negative impacts on their sector.

Step 8: Assess impacts of response measures

- Assessing the impacts of the identified response measures.
  - Finding quantitative data where available and developing any additional data where feasible.
  - Quantitative data would be sourced from policies, impact assessments and other available studies related to any environmental, economic and social impacts, looking at:
    - Type of impact (positive or negative, economic, social or environmental)
    - Size of impact
    - Timeline of impact
    - Possible contributing factors that might compound the problem.
- Each of the impacts identified above needs an in-depth discussion.
- A central issue is the quantification of impacts
  - Dependent on available information and methodologies!

Step 8: Assess impacts of response measures

Quantitative and Qualitative Assessment

- The nature, and extent of vulnerability will be analysed through quantitative and qualitative assessment, looking at economic, social and environmental factors.
- Depending on the data and resources available, quantitative analysis could be carried out through ex post empirical work by concentrating on the data series of the economic activity of the sector before, and after the operationalization of the RM.
- Qualitative overview will concentrate on a basic description of vulnerability, and the causal chain, including positive or negative, and intended or unintended impacts. Challenges/barriers to addressing vulnerability will also be looked at.

Impacts on Government Revenue

- The impacts will also be assessed by looking at royalties, corporate income taxes, and concession fees.
- This method will only be relevant for extractive sectors and other primary sectors, such as mining, oil and gas, and possibly forestry and fisheries.

Step 9: Look at possible tools and support which may be needed to address the impacts.

- Domestic measures:
  - cost alleviation domestic safety nets, worker training/retraining and adjustment programmes and economic diversification efforts.
  - Support and capacity-building, which are central issues for various mitigation tools.
- Possible international cooperative approaches.
  - International approaches could play a large role in light of their characteristics and ability to assist countries in tackling negative impacts from outside of their own jurisdiction.
- These tools and approaches may operate at a regional or global level.
  - Examples of such tools and approaches are the Technology Mechanism, the Green Climate Fund, the Adaptation Committee, the Capacity Building Framework and the REDD+ Framework.