Mobilizing Resources for Climate Finance

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The equity case

- Need for an energy-industrial transformation in the next few decades to manage the risks of climate change
- GHG emissions need to decrease by a factor of 2.5 in 40 years and emissions per unit of output by a factor of 7-8 to give a 50-50 chance of holding to a 2 deg C
- Rich countries are wealthier, better equipped technologically and have emitted around 75% of cumulative global GHG emissions since the mid-19th century
- A climate change agreement will need to involve substantial support by the rich countries for the mitigation and adaptation investment which is necessary in poorer countries

Source Romani and Stern (2011)

The politics

- The conclusions of Copenhagen, Cancun and Durban indicate that action on reducing emissions will need to be taken globally, but poorer countries need to be assured, through financial support, of equal access to sustainable development
- This is the reasoning behind the Copenhagen $100bn a year commitment and of the establishment of the GCF
- The commitment is for public and private. The equity case sketched above provides a strong argument for significant part of the funds being grants and public, since private flows require repayment and come with other obligations
- This was the background to the AGF work, commissioned by the UN SG to identify sources of finance to meet the Copenhagen commitments

The current economic crisis

- Even before the current crisis, there was consensus that more effective ways of deploying the world's savings were required, given the enormous needs for investments to promote development
- Finance for low-carbon technologies in the context of the COP process, should thus be seen not only as part of an equitable agreement, but also as:
  - more sound and efficient global allocation of investment
  - Step towards a more stable long-run macroeconomic framework

The COP process and funding the Fund

- The Green Climate Fund, part of the Durban Platform for Enhanced Action, was created to provide a solution in terms of channeling funds to developing countries for mitigation and adaptation finance
- Its governance and scope is uncertain, and little has been done to 'fund the Fund'.
- The AGF report, together with the G20-WB-OECD report, remain the most coherent, well-founded description of sources available. What emerges is that:
  - It is feasible to raise $100bn a year by 2020
  - What's needed is a reliable and principle-based bundle of sources of finance
  - It must involve public and private instruments
  - Funds should be scalable to the adaptation and mitigation financing needs
  - Sources should provide incentives for production and consumption consistent with the overall move to the low-carbon economy.
  - It will take time to build the crucial elements of taxation based on economic principles, in particular in relation to the GHG externalities: we need to start now to fill in the Fund by 2020.
  - We should recognize that in the interim there will need to be initial financial flows based on existing sources.

Source: AGF Report (2011)

What is actually happening

- CPI estimates that climate funds are about $100bn a year
- ~$50bn are public
- ~$20bn are actual grants, the rest are loans by multilateral banks
- Only $2bn are carbon markets related
- $50bn are private. These are projected to be over ~$200bn by 2020

So, are we done with the Copenhagen pledge? No:

  - Copenhagen commitments are for *additional* funds
  - These flows represent total investment, not *incremental* investment
  - *Gross* flows, i.e. including the full amount of loans that carry obligations for repayment; they are not in this sense net contributions.
- However, the figures indicate that there are already significant flows of climate finance to developing countries
- Investors are increasingly realizing that the future of economic growth is in the low-carbon economy and are investing accordingly.

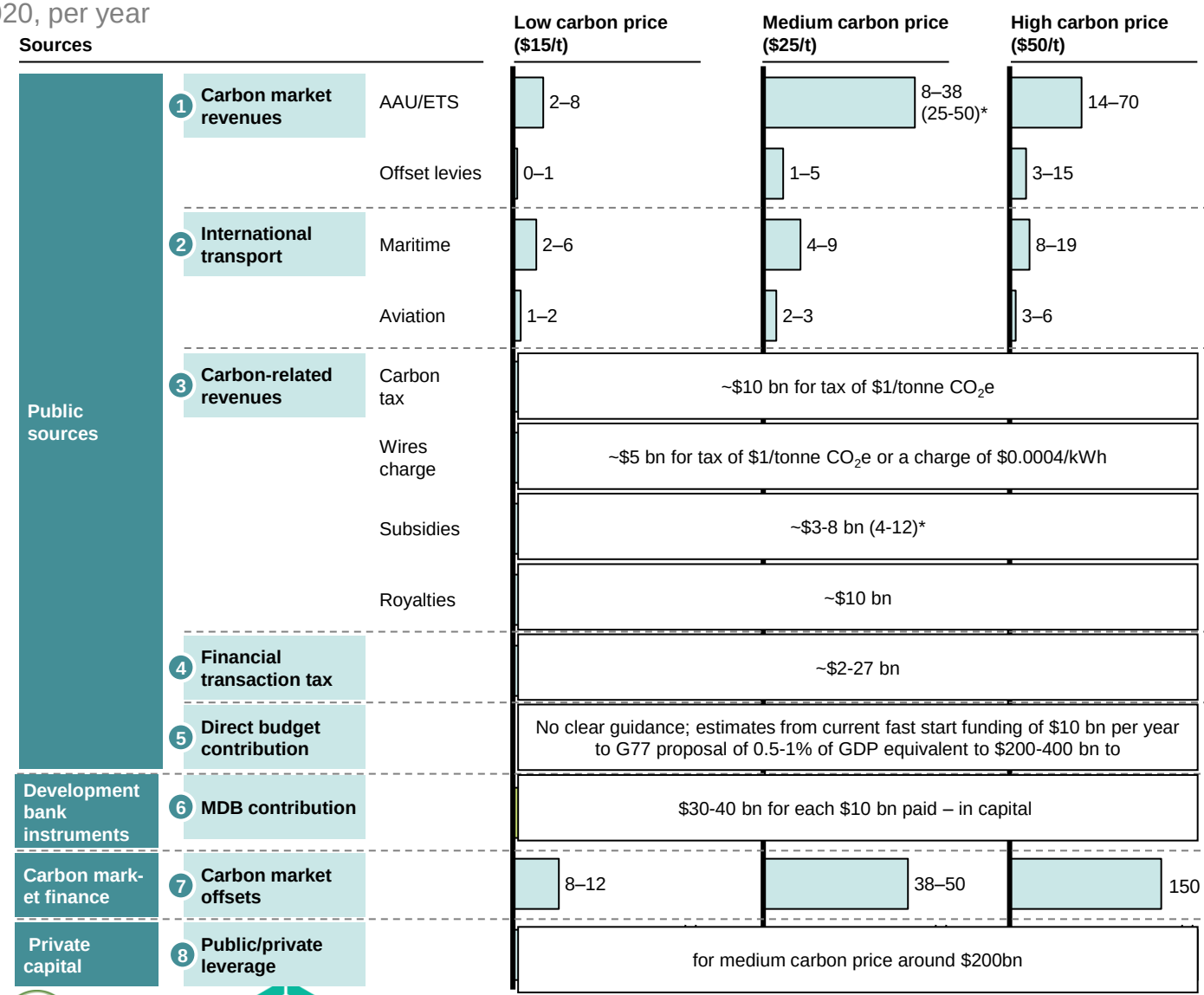
Source Climate Policy Initiative (2011). The Landscape of Climate Finance.

Sources of finance: the principles

1. Taxing the bad
2. Additionality as new-ness or innovative finance
3. Incidence on rich countries
4. Public sources needed for adaptation and market failures
5. Scalability and robustness
6. Raising domestic revenues in developed countries

Sources of finance: individual sources

$bn, 2020, per year



** Estimates in parenthesis are from World Bank (2011). Mobilizing Climate Finance. Washington DC*
Note: The figures in this table refer to the flows available for international climate finance using AGF and World Bank assumptions. A substantial amount of revenues, not accounted for in this table, would be retained in national budgets. For example, the AGF assumes that 90% of auction revenues and 50- 75% of travel would be retained domestically

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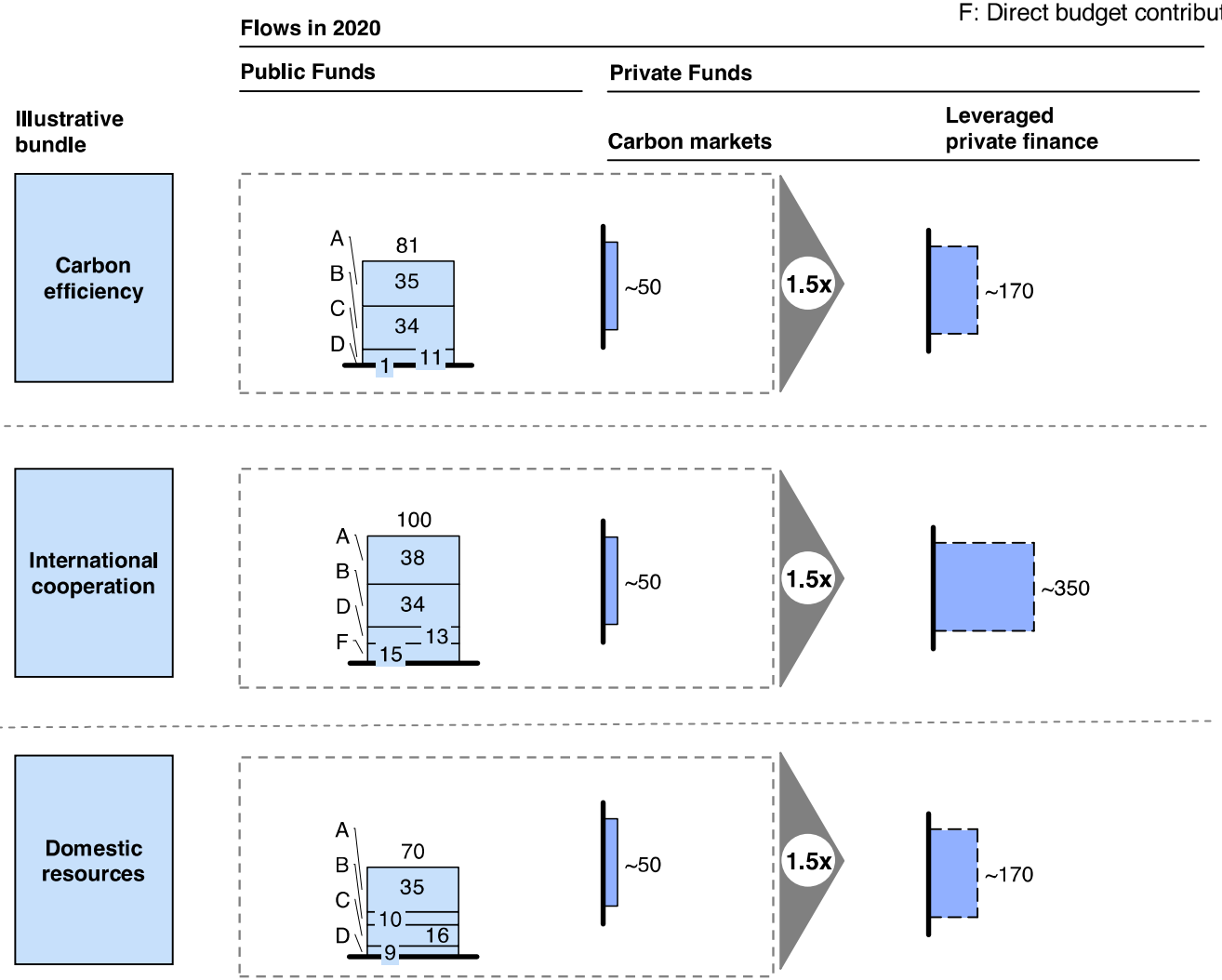
Sources of finance: the bundles

- 'Bundles' of mutually supportive and consistent financial sources is particularly attractive:
  - Provides source countries with flexibility in choosing domestic sources according to countries' preferences.
  - Allows for the spreading of the risks associated with individual sources not delivering the expected flows increasing reliability
  - Different sources can reinforce each other, strengthening arguments for their joint inclusion in any package or bundle.
- Some sources will overlap with each other, the overall revenue potential of a bundle, therefore, is not necessarily the sum of its parts. I
- The dynamic relationship between the sources, and the potential for mutual reinforcement in the wider context of a move towards a low-carbon economy, that matters here.
- The portfolio approach pursued by the AGF Report attempts to move the debate on sources from picking individual sources in isolation, "a menu approach" to reliable, self- reinforcing bundles of sources.

Illustration of potential combinations

$ Billions

A: Carbon market public revenues
B: International transport
C: Carbon related revenues
D: IFIs
E: Financial transactions tax
F: Direct budget contributions



Source Romani and Stern (2011)

A ‘carbon efficiency’ bundle

- Particularly attractive: bundle of sources built around the principle of carbon efficiency + strong international cooperation
- Such a bundle could deliver:
- – ~$30 billion p.a. in net public funds from the emissions trading/taxing, depending on the level of ambition and commitment of developed countries
- – ~$30 billion p.a. in net public funds from taxing international transport and removing fossil fuel subsidies
- – ~$20 billion p.a. in gross flows in the form of loans from IFIs, by investing an additional $5 billion p.a. to their capital base
- – ~$250-300 billion p.a. in gross private flows generated by using the leverage potential of public funds
- ~ $150-200 billion p.a. in national treasuries as additional non-hypothecated revenues

All bundles are dependent on the political willingness of individual countries to have a carbon price and emission reduction commitments in line with pledges

Source Romani and Stern (2011)

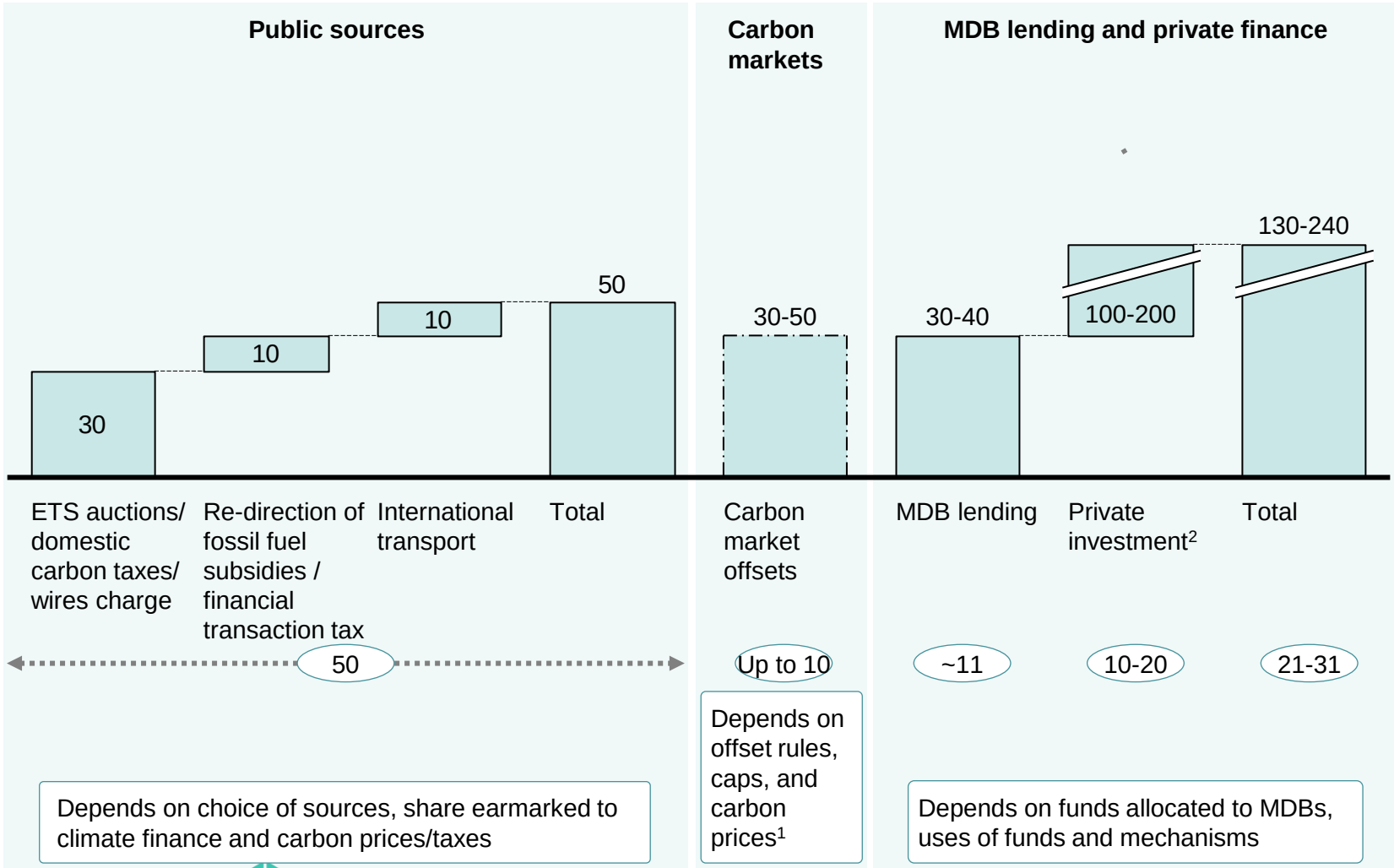
Conclusions: challenges ahead

- Overall lack of momentum in developed coutnries, mostly due to US politics and Euro crisis. But the list of priorities is clear:
  - Removal of fossil energy subsidies in developed countries, particularly phasing out production subsidies – G20 is taking the lead but political feasibility is low
  - International transport taxes: current work within the IMO Intersessional GHG Working Group is very important but not moving. EU move on aviation is in the right direction
  - Revenues from emission trading schemes through auctions are possible within a short period of time in some jurisdictions – this should be pursued again through G20
  - The reforms of carbon markets to expand scope and depth is a critical ongoing task
- The IFIs have a key role to play in financing climate actions and in crowding in other finance. The current scale and mode of operation is not suited to the needs. A new development bank financed by emerging and developing countries could make a significant different in terms of leveraging private finance
- The GCF must demonstrate it can deliver quickly. Funding the fund and starting operations with some early success examples is crucial

Back up

Approximately $50bn could be raised from public sources

$bn, 2020, per year

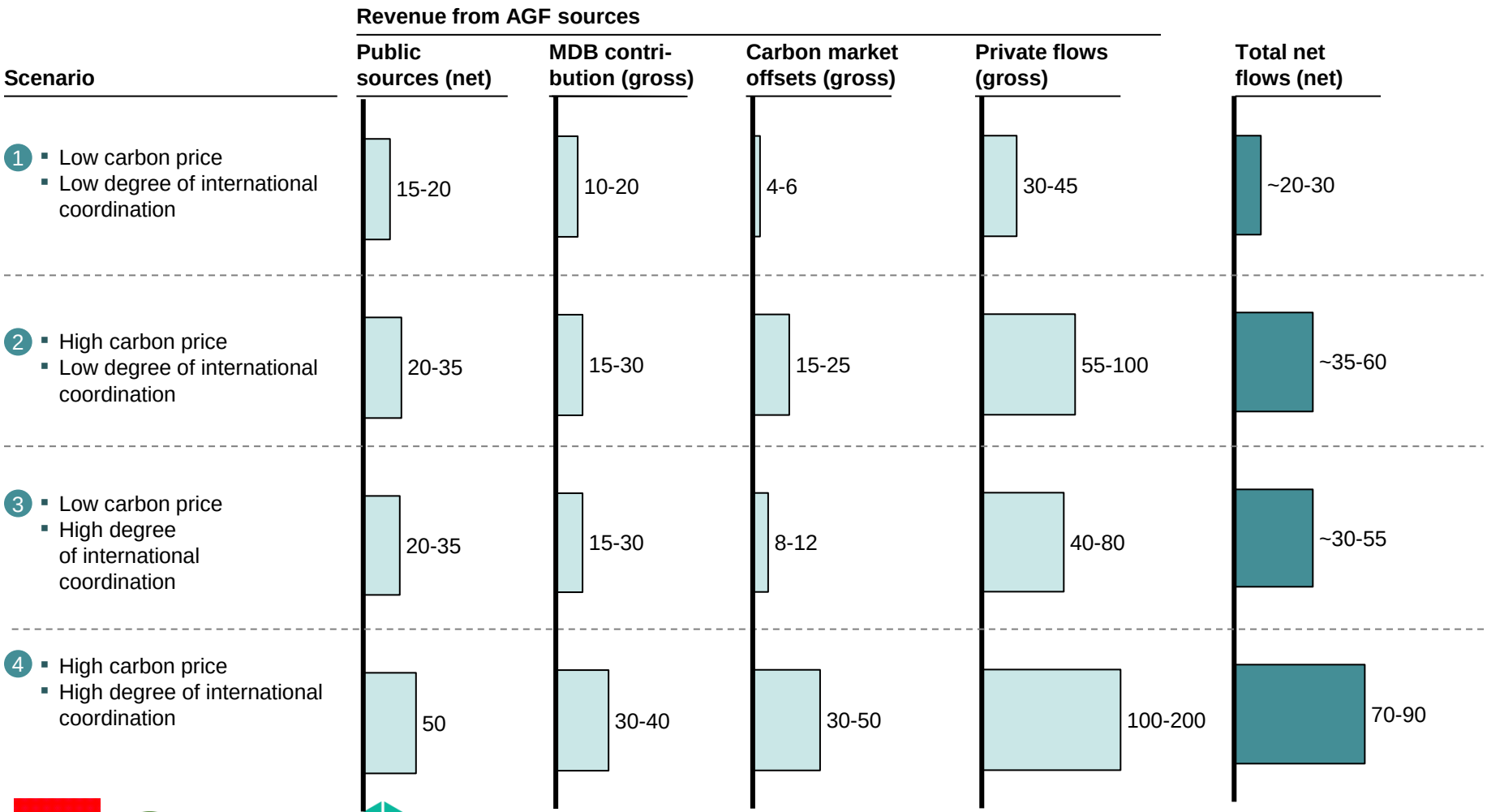


1 Not counted towards financing needs as carbon finance increases needs proportionally
2 International private finance, excludes domestic private finance

SOURCE: AGF report

However, total flows will depend on carbon prices and international coordination

$bn, 2020, per year



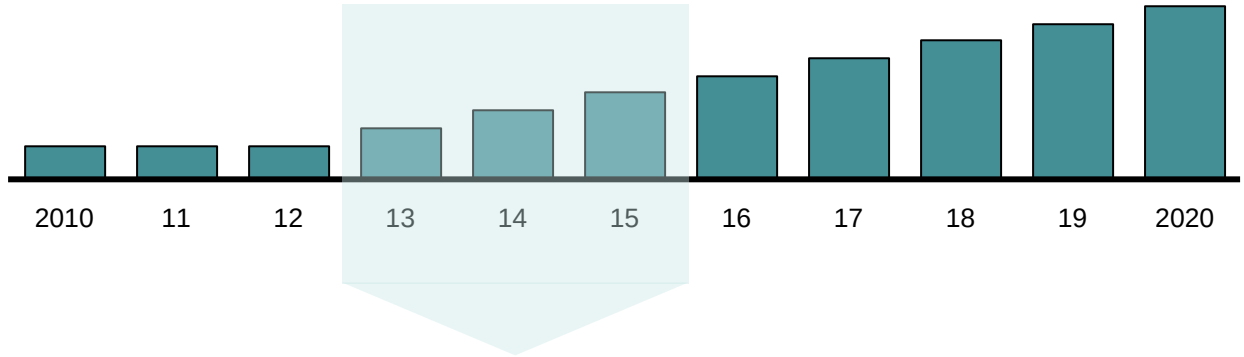
SOURCE: AGF report, Project Catalyst analysis

Defining the interim financing period will be crucial

2013-2015 period overview

Rationale for interim climate finance period

- Goal for policy makers to work towards a more relevant time frame and reach consensus on meaningful, short-term objectives.
- Scale-up financing sources while establishing investment pipeline and delivering concrete mitigation and adaptation measures



Potential sources

- Majority of the AGF sources can be used to meet short-term objectives:
  - Carbon pricing related revenues (ETS auctions, carbon tax)
  - Domestic tax on transport
  - Other public sources e.g., royalties, subsidies

Uses

- Governments will need to establish short term objectives e.g. 50% of avoided deforestation by 2015
- Projects need to be kicked-off to meet these short term targets

Overview on major estimates - ETS for the maritime Sector

Imposing a carbon price on the international maritime sector through a sectoral emission cap

High level description of methodology

- Estimate of total emissions from international maritime transport based on:
  - IMO estimates of CO_2 emissions from *base estimates* (based on the IPCC Special Report on Emission Scenarios , SRES)
- Calculation of revenues by multiplication of estimated emissions under the IMO SRES base case scenarios with carbon prices for three defined scenarios (assumes ETS is linked to global carbon markets and therefore global carbon prices, here approximated by offset prices).

Resulting revenue estimates ($bn)

- Scenario 1: 2.4 – 5.6
- Scenario 2: 4.1 – 9.3
- Scenario 3: 8.1 – 18.5

Tax base assumptions

Driver	Value	Information source
International maritime emission projections	▪ Estimates range from 925 – 1058 Mt CO_2 in 2020	▪ IMO

Caveats:
The maximum potential revenue from the measure ranges from $9.3 - $52.9 bn. These have been discounted by an indicative figure of 30% as compensation for developing countries (assuming that developing countries are compensated based on their share of global imports).

These estimates would an assumption that 25-50% of remaining revenues are made available for climate finance.

Revenue estimates could be further reduced depending if less than 100% of permits are auctioned and if there are strong emission reductions in the sector due to technical and operational measures to reduce sector emissions.

Tax-rate/price assumptions

Driver	Value	Information source
Price for carbon (assumed or equivalent)	▪ Scenario price ($15-50)	▪ AGF scenario paper
Compensation for developing countries	▪ Indicative 30%	▪ Assumption by authors that developing countries are compensated based on their share of global imports
Share of revenues earmarked for climate finance	▪ 25-50%	▪ Assumption by authors

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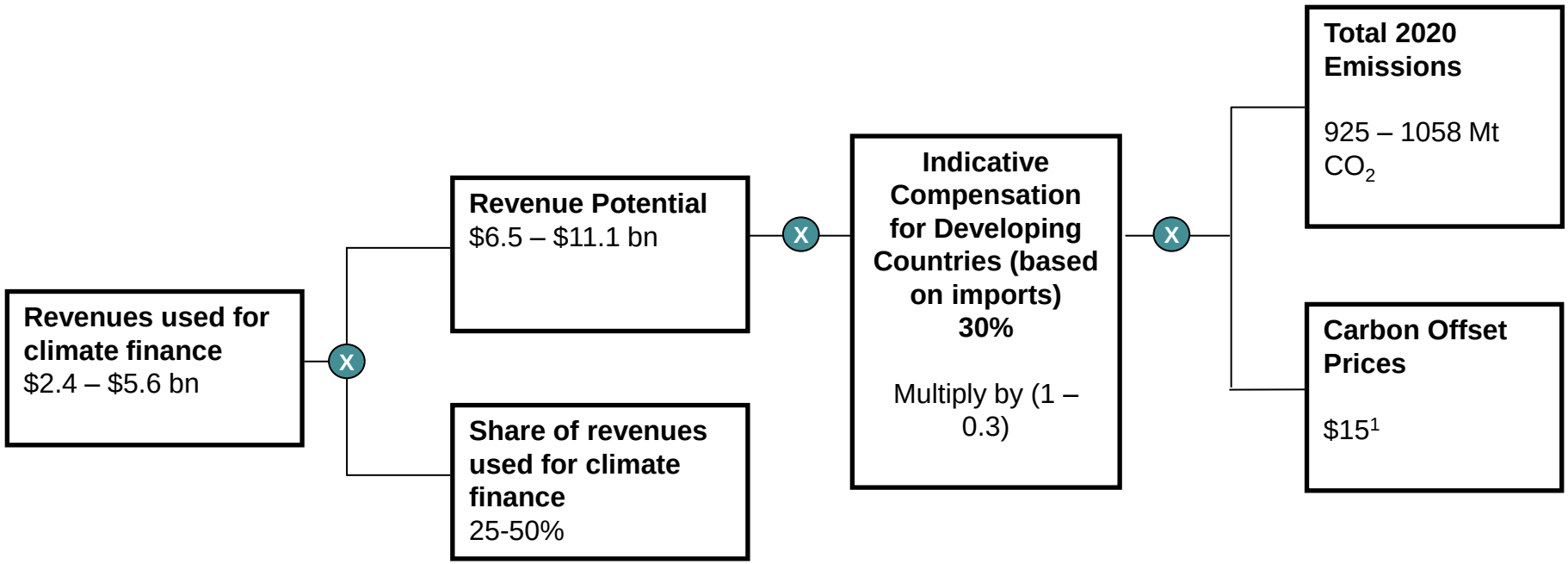
Detailed calculation tree - ETS for maritime, low scenario



[1] Linked to carbon scenario, value shown for low

Overview on major estimates - Carbon levy for maritime

Imposing a carbon price on the international maritime sector through a sectoral carbon levy.

High level description of methodology

- Estimate of total emissions from international maritime transport based on:
  - IMO estimates of CO_2 emissions from *base estimates* (based on the IPCC Special Report on Emission Scenarios , SRES)
- Calculation of revenues by multiplication of estimated emissions under the IMO SRES base case scenarios with carbon prices for three defined scenarios (assumes ETS is linked to global carbon markets and therefore global carbon prices, here approximated by offset prices).

Resulting revenue estimates ($bn)

- Scenario 1: 2.4 – 5.6
- Scenario 2: 4.1 – 9.3
- Scenario 3: 8.1 – 18.5

Tax base assumptions

Driver	Value	Information source
International maritime emission projections	▪ Estimates range from 925 – 1058 Mt CO_2 in 2020	▪ IMO

Caveats:

The maximum potential revenue from the measure ranges from $9.3 - $52.9 bn. These have been discounted by an indicative figure of 30% reflecting the provision of compensation for developing countries (based on the developing countries share of global imports).

These estimates would an assumption that 25-50% of remaining revenues are made available for climate finance.

Revenue estimates could be further reduced if the carbon levy is applied to less than 100% of emissions in the sector and if there are strong emission reductions in the sector due to technical and operational measures to reduce sector emissions.

Tax-rate/price assumptions

Driver	Value	Information source
Price for carbon (assumed or equivalent)	▪ Scenario price ($15-50)	▪ AGF scenario paper
Reimbursement of developing countries	▪ Indicative 30%	▪ Assumption by authors that developing countries are compensated based on their share of global imports
Share of revenues earmarked for climate finance	▪ 25-50%	▪ Assumption by authors

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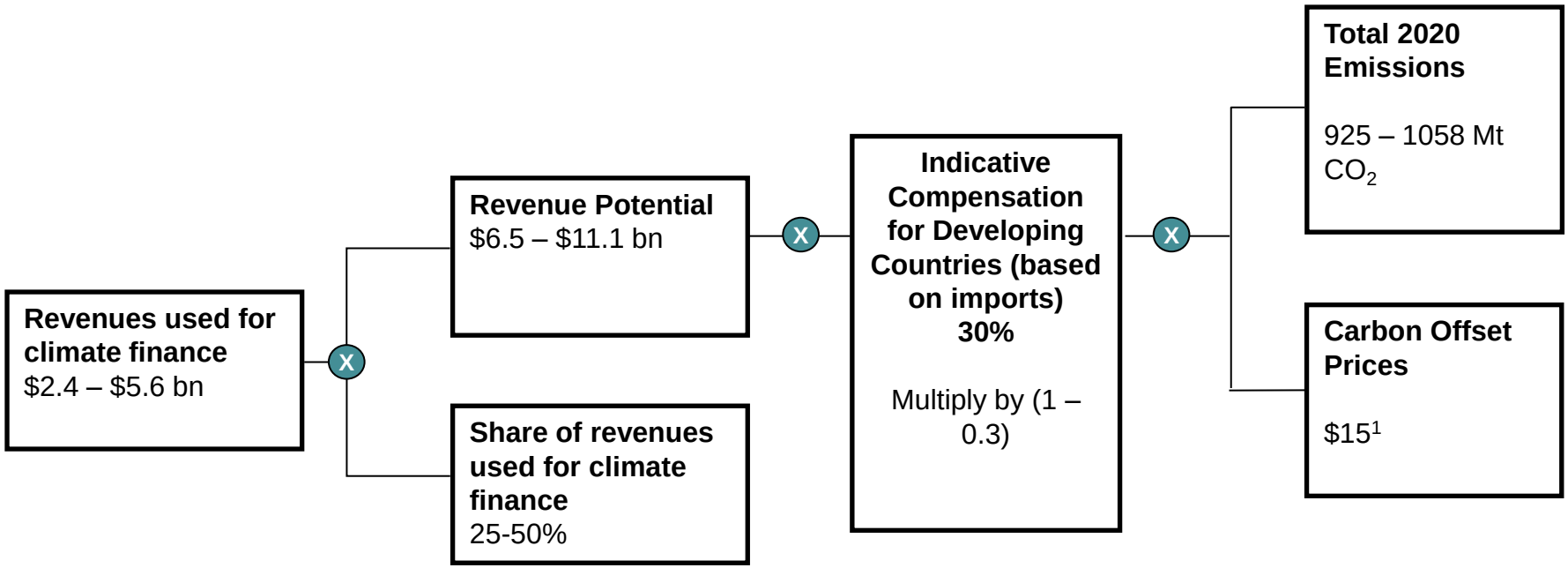
Detailed calculation tree - Carbon Levy for maritime, low scenario



[1] Linked to carbon scenario, value shown for low

Overview on major estimates - ETS for aviation

Creation of a global sectoral cap on emissions for international air travel and auctioning of resulting permits to raise revenue.

High level description of methodology

- Estimate of total emissions from international air travel and air transport based, using
  - Detailed routing information to estimate passenger-kilometers flown and tonne-kilometers transported
  - Assumptions on average fuel emissions by kilometer
- Emissions from domestic flights, flights between developing countries and intra-EU flights excluded (covered by EU ETS)
- Calculation revenues by multiplication of estimated emissions with carbon prices for three defined scenarios (assumes ETS is linked to global carbon markets and therefore global carbon prices, here approximated by offset prices)

Resulting revenue estimates ($bn)

- Scenario 1: 0.9 – 1.9 bn
- Scenario 2: 1.6 – 3.1 bn
- Scenario 3: 3.1 - 6.3 bn

Tax base assumptions

Driver	Value	Information source
Passenger air travel		
Passenger capacity by route 2009[2]	3.3 tr (total)	OAG
Load factor	77%	IATA
Distance by route	Actual route km	OAG
Emissions per passenger-kilometer	0.12-0.15 kg[3]	Defra, EEA, Atmosfair
Annual passenger growth rate	4.1%	ACI, Boeing
Annual efficiency increase	1.7%	GHG emissions outlook
Air freight transport		
Freight volume by route 2013[2]	190 bn TKM (total)	IATA industry forecast
Distance by route	Actual route km	OAG
Emissions per tonne-kilometer	0.6-1.3 kg[3]	Defra
Annual freight growth rate	5.4%	ACI
Annual efficiency increase	1.7%	GHG emissions outlook

Caveats:

Actual revenues would be reduced:

i) Depending on the actual compensation percentage for developing countries
ii) If less than 100% of permits were auctioned,
iii) Depending on the design and the extent of market-based instrument that is applied to aviation emissions
iv) If emissions are reduced in the sector due to technical and operational measures to reach mitigation goals

Tax-rate/price assumptions

Driver	Value	Information source
Price for carbon (assumed or equivalent)	Scenario price ($15-50[1])	AGF scenario paper
Percent of revenues earmarked for climate financing	25-50%	Assumption by authors

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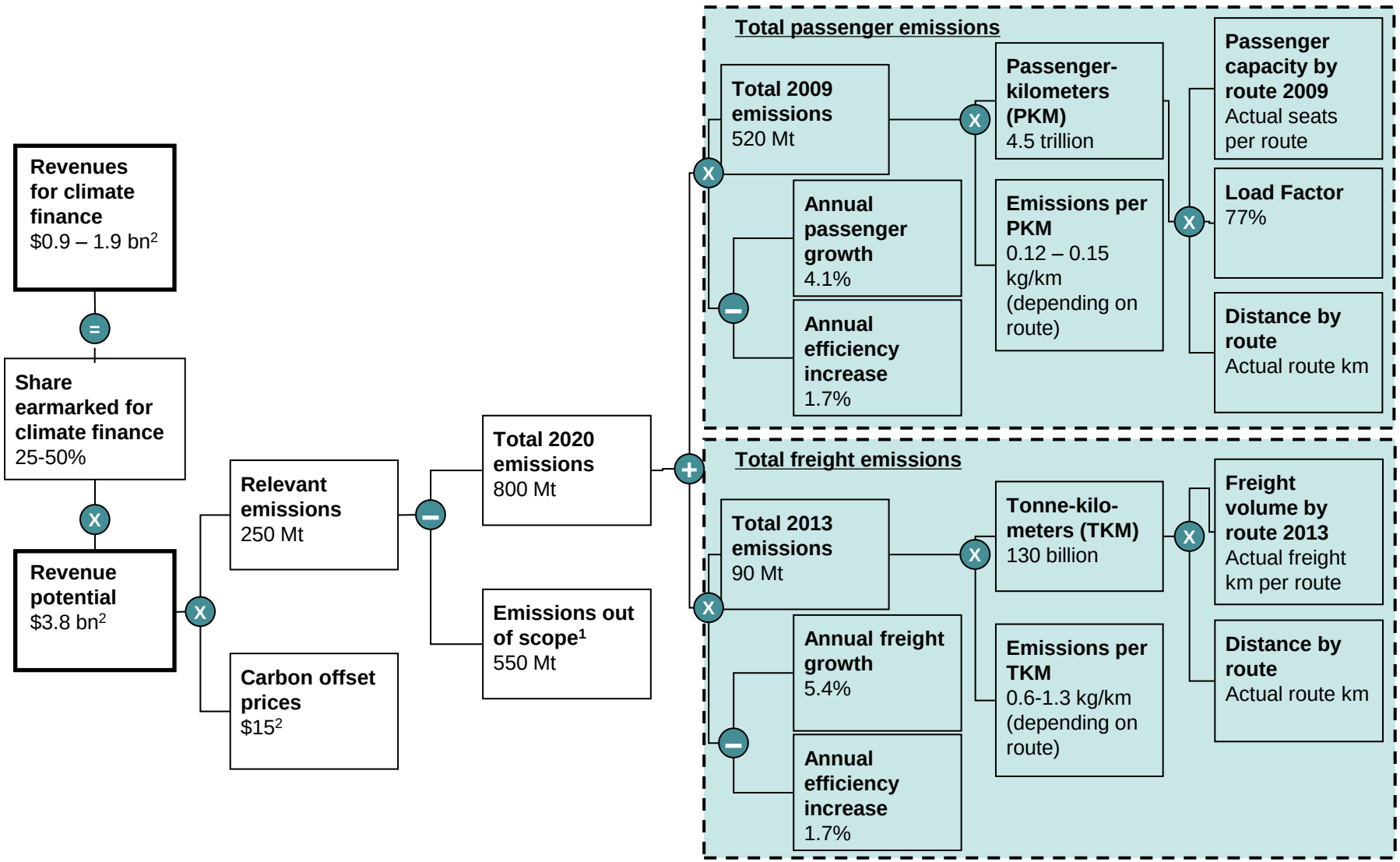
1 Depending on scenario 2 excluding domestic and intra-EU flights 3 depends on flight distance

Detailed calculation tree - ETS for aviation, low scenario



1 Emissions for domestic flights, intra-EU flights, and flights between developing countries

2 Linked to carbon scenario, value shown for low

Overview on major estimates - Fuel Levy on Aviation

Implementation of a global tax on jet fuel.

High level description of methodology

- Estimate of total fuel consumed from international passenger air travel and air freight transport, using
  - Detailed routing information to estimate passenger-kilometers flown and tonne-kilometers transported
  - Assumptions on average fuel consumption by kilometer
- Emissions from domestic flights, flights between developing countries and intra-EU flights excluded (covered by EU ETS)
- Fuel tax per ton of jet fuel estimated to capture the carbon externality and therefore set equal to carbon prices for three defined scenarios
- Calculation of revenues by multiplication of estimated fuel consumption with fuel tax

Resulting revenue estimates ($bn)

- Scenario 1: 0.9 – 1.9 bn
- Scenario 2: 1.6 – 3.1 bn
- Scenario 3: 3.1 - 6.3 bn

Tax base assumptions

Driver	Value	Information source
▪ Passenger air travel		
– Passenger capacity by route 2009[1]	– 3.3 tr (total)	– OAG
– Load factor	– 77%	– IATA
– Distance by route	– Actual route km	– OAG
– Fuel consumption per passenger-kilometer	– 38-48 g[2]	– Defra, EEA, ATAG, Atmosfair
– Annual passenger growth rate	– 4.1%	– ACI, Boeing
– Annual efficiency increase	– 1.7%	– GHG emissions outlook
▪ Air freight transport		
– Freight volume by route 2013[1]	– 190 bn TKM (total)	– IATA industry forecast
– Distance by route	– Actual route km	– OAG
– Fuel consumption per tonne-kilometer	– 0.2-0.4 kg[2]	– Defra, ATAG, EEA
– Annual freight growth rate	– 5.4%	– ACI
– Annual efficiency increase	– 1.7%	– GHG emissions outlook
▪ Carbon content of jet fuel	▪ 3.2 tonnes CO2e/ton	▪ ATAG , EEA

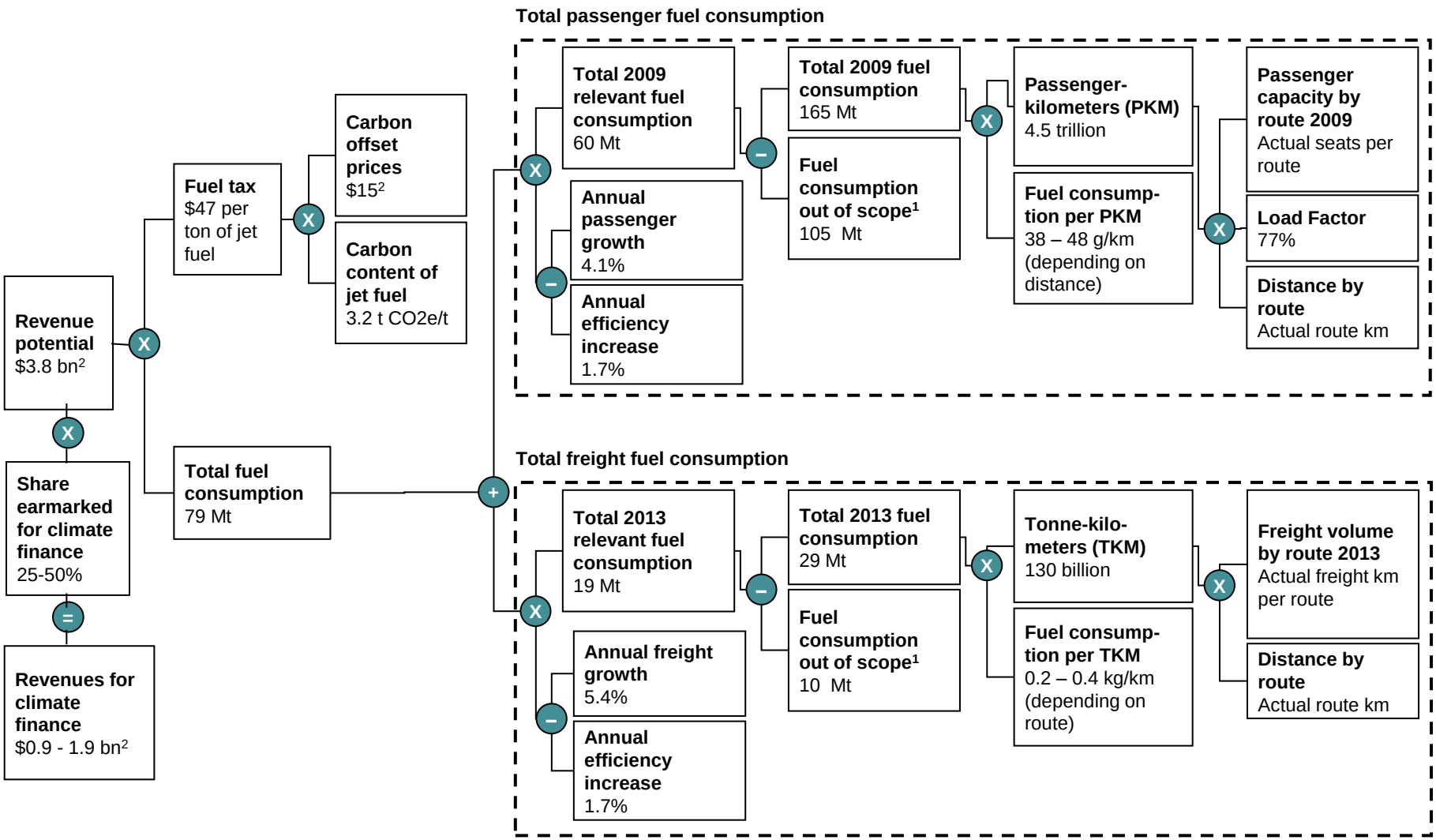
Caveats:
Actual revenues would be reduced:
i)depending on the actual compensation percentage for developing countries
ii) if the levy applied to less than 100% of emissions.
iii)If emissions are reduced in the sector due to technical and operational measures to reach mitigation goals

Tax-rate/price assumptions

Driver	Value	Information source
▪ Price for carbon	▪ Scenario price ($15-50[3])	▪ AGF methodology paper
▪ Percent of revenues earmarked for climate financing	▪ 25-50%	▪ Assumption by authors

1 excluding domestic and intra-EU flights; not including charter flights which account for ~5% of passenger air transport
2 depends on flight distance
3 Depending on scenario

Detailed calculation tree - Fuel Levy for Aviation, low scenario



1 For domestic flights and intra-EU flights
2 Linked to carbon scenario, value shown for low

Overview on major estimates - Ticket Tax

Implementation of a tax on every international airline ticket.

High level description of methodology

- A ticket tax can potentially raise any amount of revenue – only dependant on political will
- Approach taken here: ticket tax should cover carbon externality and is therefore equal to the revenue raised under a sector ETS or fuel levy (passenger travel only)
- The revenue was broken down to measure the results on individual tickets, based on the number of passengers traveled and the average fuel consumption per short, medium and long haul flight

Resulting revenue estimates ($bn)

- Scenario 1: 0.7 – 1.4
- Scenario 2: 1.2 – 2.4
- Scenario 3: 2.4 - 4.7

Resulting ticket surcharges ($)[2]

- Scenario 1: 1 – 7
- Scenario 2: 1 – 12
- Scenario 3: 2 - 24

Tax base assumptions

Driver	Value	Information source
▪ Estimates from WS2 ETS/fuel levy calculations		
– Revenue estimates	– $1.9 bn – $9.5 bn	– WS 2 calculations
– Relevant emissions[1] 2020 (passenger only)	– 189 Mt	– WS 2 calculations
▫ Short haul (<500 km)	▫ 1 Mt	
▫ Medium haul (500 – 1.600 km)	▫ 13 Mt	
▫ Long haul (> 1,600 km)	▫ 175 Mt	
▪ Total number of relevant passengers 2009[1]	▪ 330 m	▪ OAG
– Short haul	– 18 m	
– Medium haul	– 76 m	
– Long haul	– 236 m	
▪ Annual passenger growth rate	▪ 4.1%	▪ ACI, Boeing

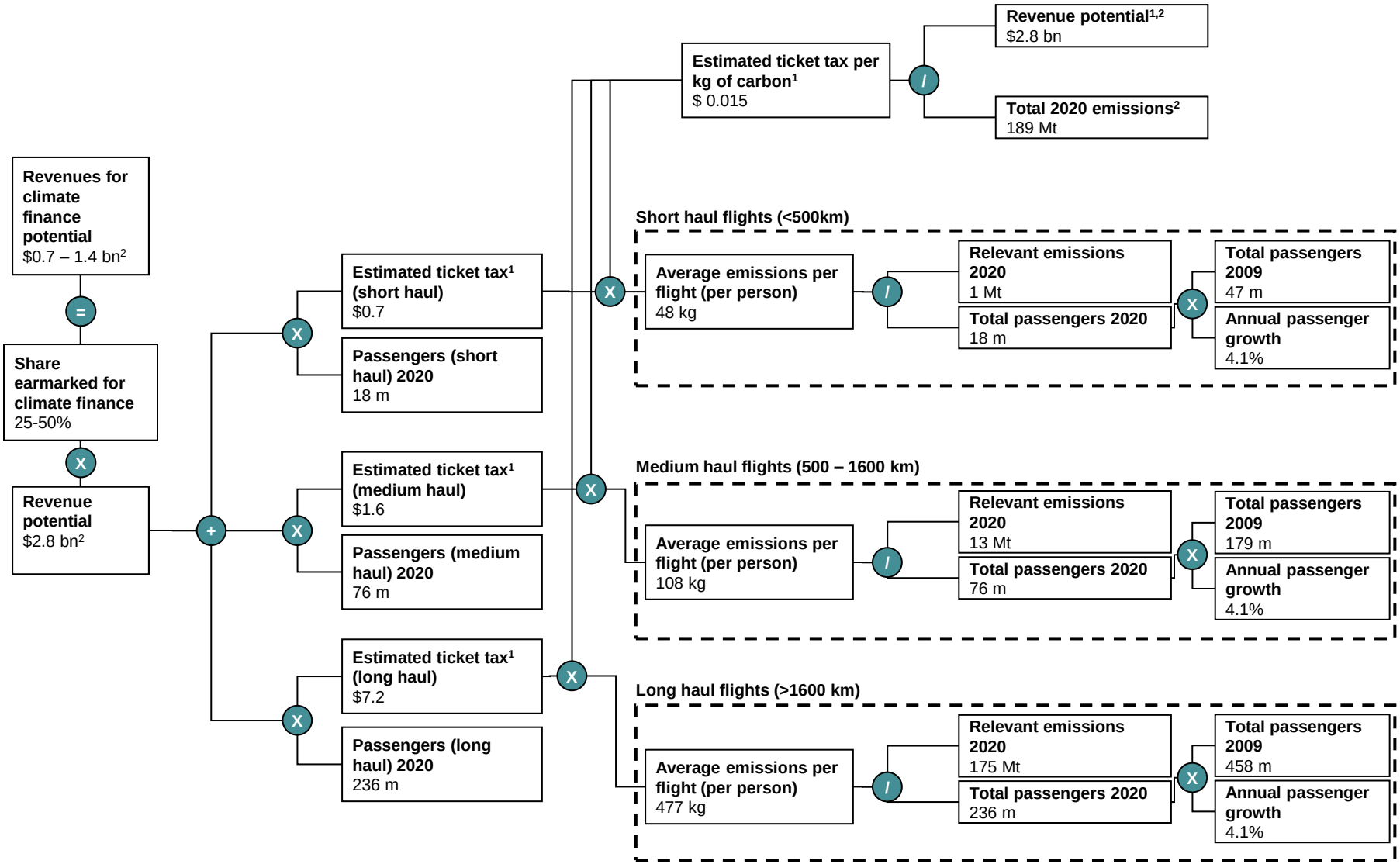
Tax-rate/price assumptions

Driver	Value	Information source
▪ - (see aviation ETS/fuel tax calculations)	▪ -	▪ WS 2 calculations

Caveats:
The calculations represent the maximum potential revenue from a ticket tax. These have NOT been discounted. The revenue estimates will be lower than presented:
i)Depending on the actual compensation percentage for developing countries
ii)If the ticket tax is applied to less than all eligible tickets,

1 Excluding inter-developing country, domestic and intra-EU flights
2 Depends on flight type (short-, medium-, long-haul)

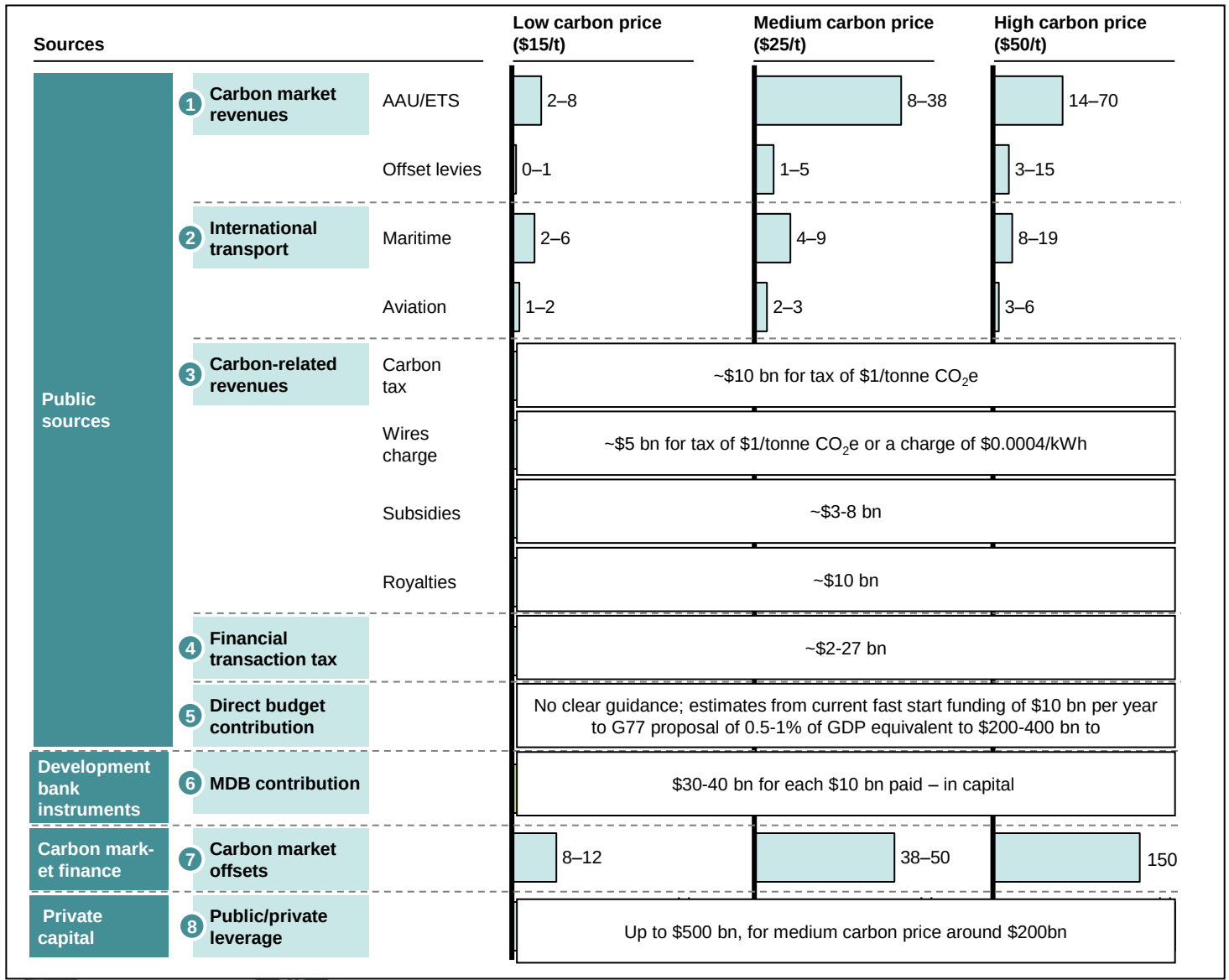
Detailed calculation tree - Ticket Tax, low scenario



1 Linked to carbon scenario, value shown for low
2 Only for passenger air travel between Annex-I countries and 50% of travel between Annex-I countries and other countries

Overview of sources analysed by AGF

$bn, 2020, per year

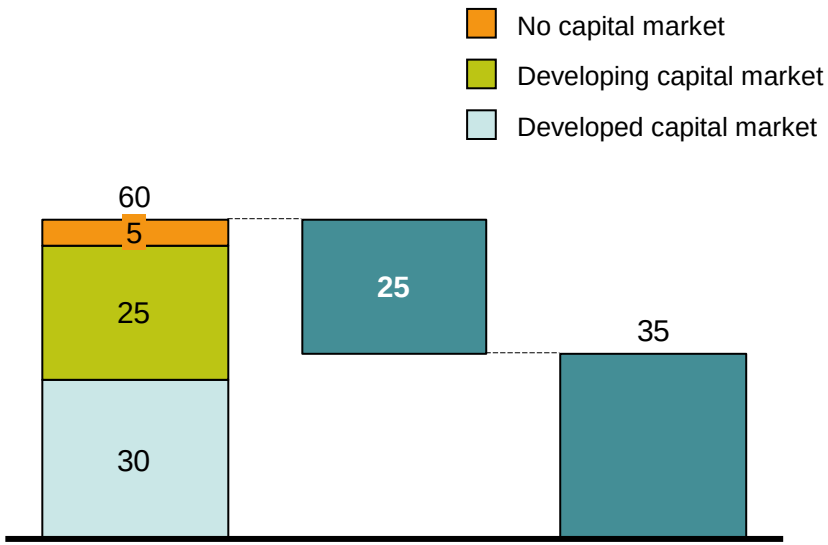


SOURCE: AGF report

The funds raised by the AGF could make a significant contribution towards financing needs

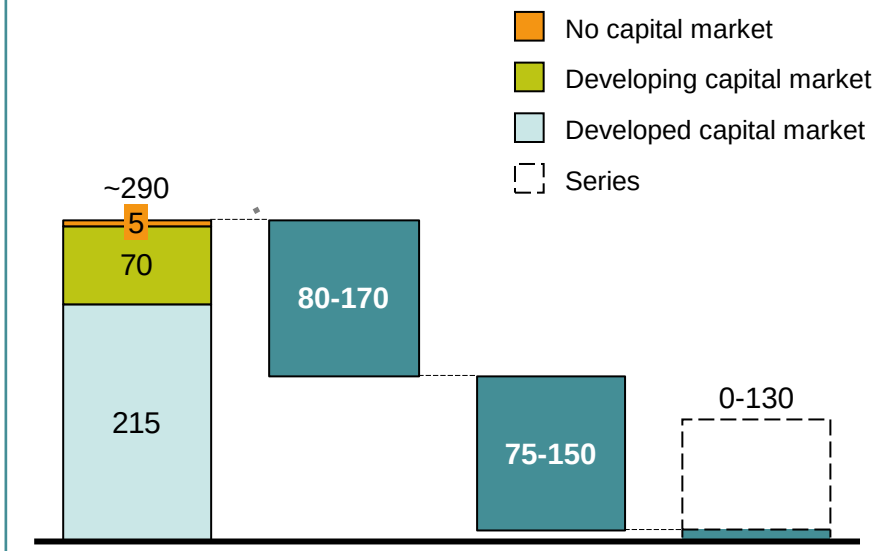
$bn, 2020, per year

AGF sources to fund incremental cost requirements



Likely financial gap of ~$35 bn; carbon market finance not counted as carbon finance increases needs proportionally

AGF sources to fund capital cost requirements



Likely financial gap of investment equivalent to investment required to meet low Copenhagen pledges. This does not include capex savings due to demand reduction

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SOURCE: McKinsey Global GHG Abatement Cost Curve v2.1; Project Catalyst analysis; AGF report