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MODELLING APPROACH AND DATA REQUIREMENTS: CASE OF THE FREIGHT MODEL FOR ARGENTINA

Stakeholder Consultation Workshop

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John P Pritchard, Transport Modeller/Policy Analyst, ITF

On behalf of:

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany

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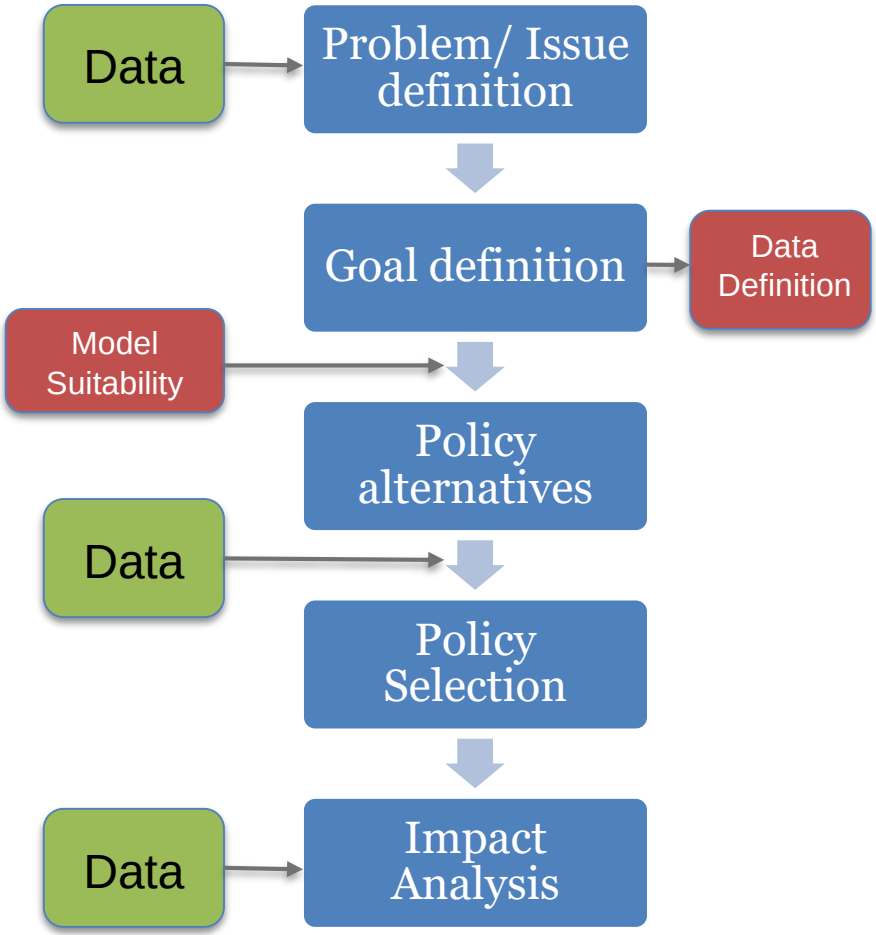
Importance of Data

Importance of data

- Accurate data collection is essential to **maintain integrity** of research and policy analysis
  - Avoid compromising decisions for public policy
- Enables the definition and analysis of **EFFECTIVE policies**
  - **What** is the aim?
  - **How** is success quantified?
  - Did it **achieve** its aim?

Importance of data: Effective Policy

- Data allows us to **understand existing issues**
- When defining policy **aims and goals**, the **data needed** to quantify impact should be defined
- **Suitability of Models** to the context
- **Ex-ante** analysis of alternatives and scenarios
- **Ex-post** analysis of results



Data collection: Things to consider

- **What data is needed?**
  - Necessary to be **strategic** in data collection
    - Data collection can be cost and time consuming
  - Specific models require **specific data**
- **Quality Assurance** and **Validation**
- **Systematized** and **continuous** data collection (**time series**) frameworks are important
- The best time to start is **now!**

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ITF MODELLING FRAMEWORK

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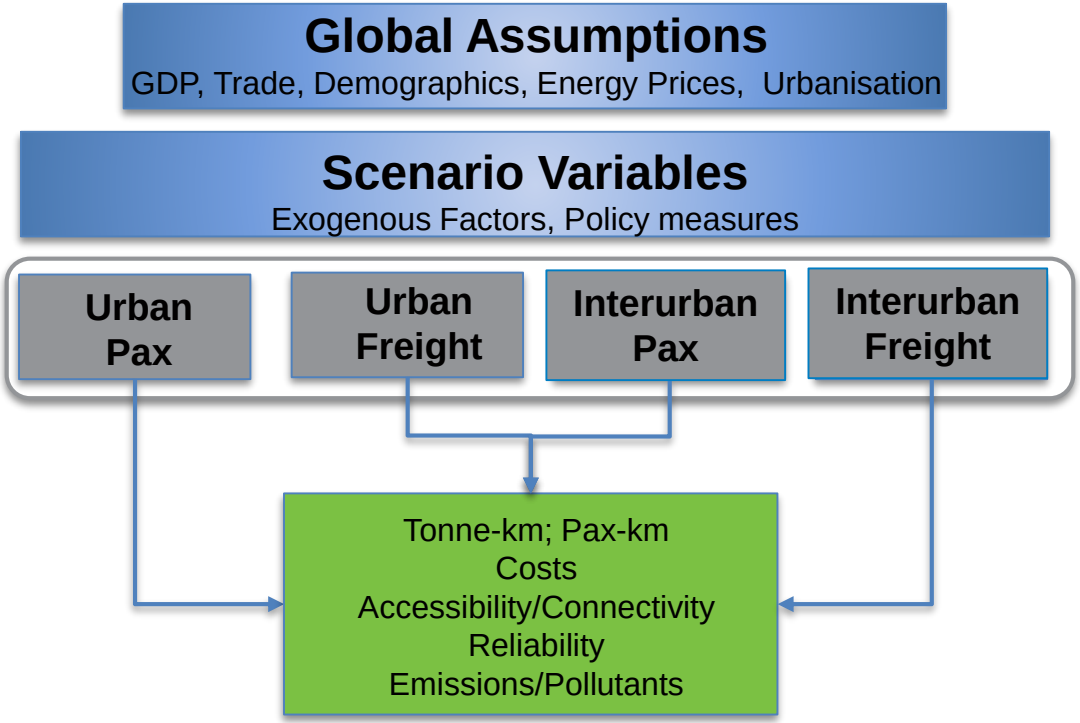
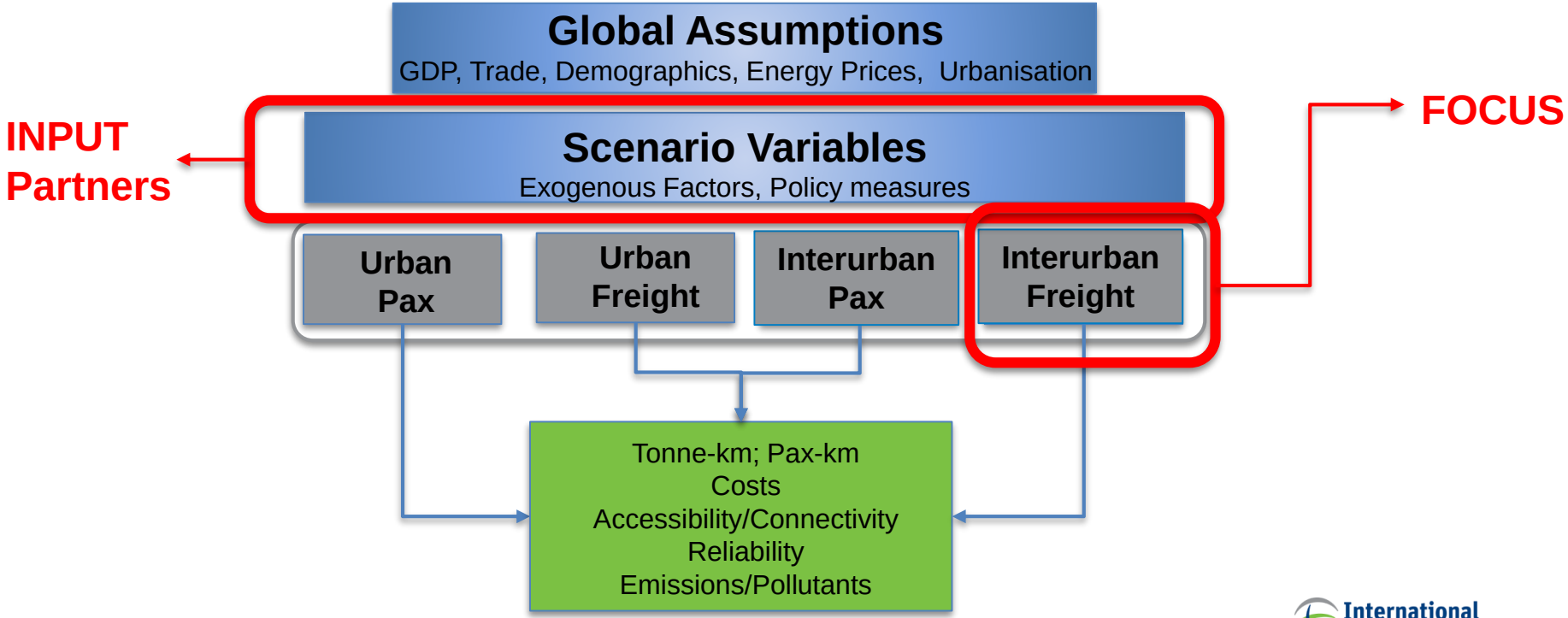
ITF Modelling framework

- Allows testing the impact of various **policies**, **measures**, and **trends** in:
  - **Freight**: Urban, Non-Urban (global)
  - **Passenger**: Urban, Non-Urban (global)
- Scenarios are built into the model with **direct stakeholder engagement** to ensure the inclusion of **relevant** and **interesting policy scenarios**.
- **Simultaneous estimation** in **common network** and zoning system
- Based on traditional **4-step model** approach
- In terms of the technology/and efficiency of vehicles,
  - NEW ITF FLEET MODEL
  - Previously: IEA MoMo model

ITF Modelling framework



ITF Modelling framework



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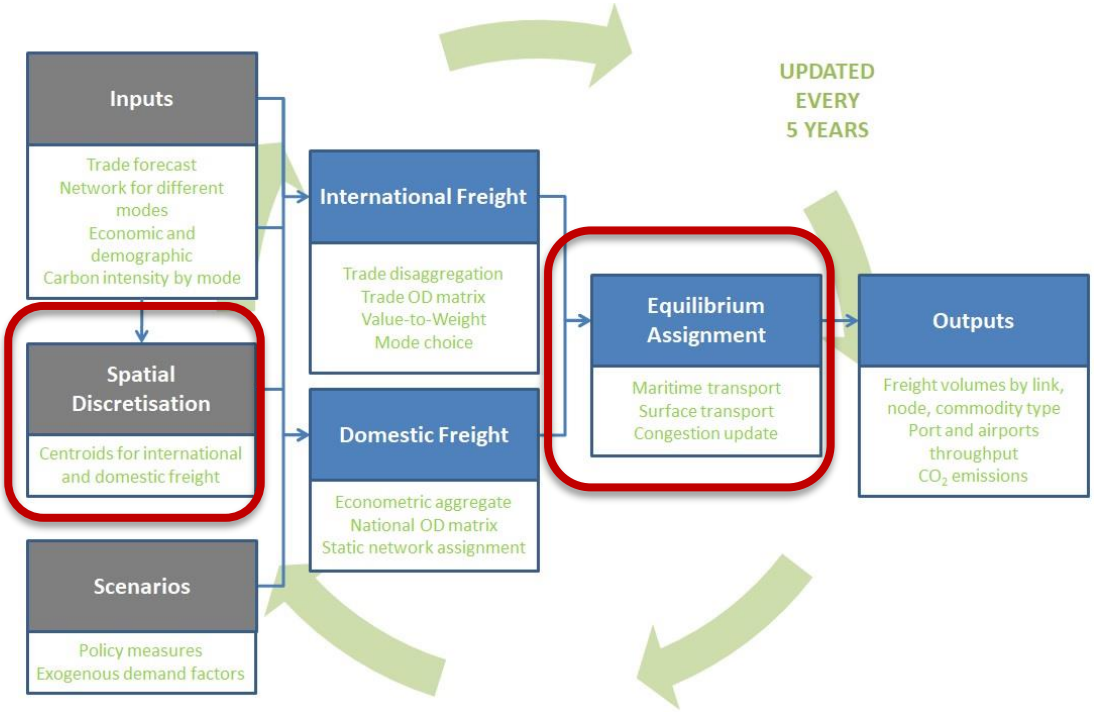
THE ITF NON-URBAN INTERNATIONAL FREIGHT MODEL

ITF Global non-urban freight model



ITF Global non-urban freight model: Components

Spatial discretisation

International

1 164 centroids

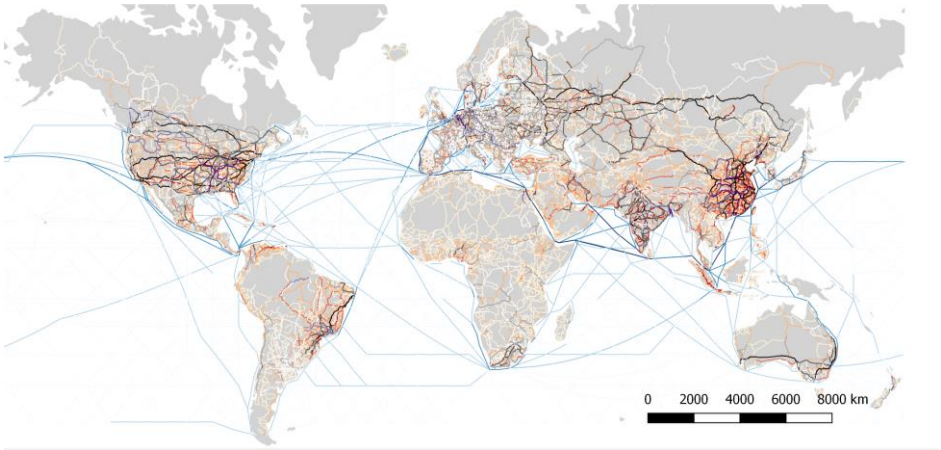
Domestic

7 303 centroids

The **level of detail** between the regions **can vary significantly** as a result of the available data.

ITF Global non-urban freight model: Components

Equilibrium multimodal assignment



- Completely **integrated multimodal** network, that includes:

1. **Maritime**
2. **Roads and Highways**
3. **Inland Waterways**
4. **Railways**

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APPLYING THE MODEL TO ARGENTINA

Overview

- Project relied on the Global Freight Model
- Policy Scenarios designed in direct collaboration with Argentina
  - The ITF does not advocate for particular solutions
  - The inclusion or exclusion of a particular measure does not imply a value judgement
- Output was generated for three different timeframes: 2015, 2030, and 2050
- Required extensive validation of data at the national scale

Policy scenarios

Defined collaboratively:

1. Baseline: reference point
2. Intermodal and infrastructure improvements
3. Fleet renewal with transition to gas
4. Urban freight fleet electrification
5. E-commerce
6. Global trends
7. Combined

DEFINED IN COLLABORATION WITH MINISTRY

INCLUDE REGIONAL AND GLOBAL SCENARIOS

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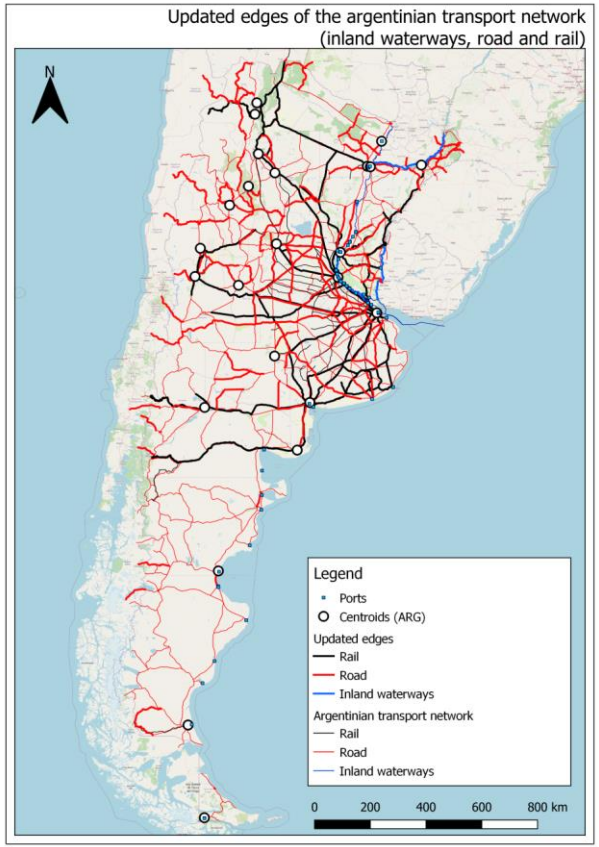
ADAPTING THE MODEL TO A NATIONAL SCALE

Challenges and Opportunities of implementation at national scales

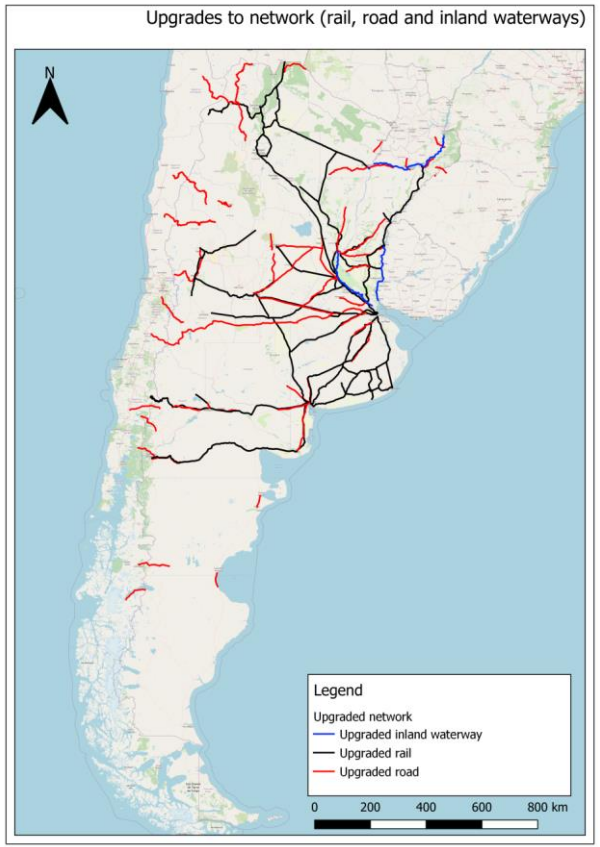
- Implementation at national scales requires effort to **validate** and **recalibrate** the model
- **Quality data is essential**
- **Refining the resolution** allows for more **interesting insights**
- Test **national** and **regional/global** policies and trends simultaneously
  - Regional scenarios have advantages: coherent measures in terms of regionalization and other trends that are not applied only in a country
- **LOCAL EXPERT KNOWLEDGE IS KEY!**

Updates to the network



1. **Centroids** increased
   - 1 international centroid/province **(24 total)**
2. Entire **multimodal Transport network** was defined and validated
   - 58 642 km of roads
   - 23 128 km of rail
   - 2 241 km of inland waterways
3. International **Entry and Exit points** were defined
   - Border Crossings by mode
   - Ports

Proposed upgrades in scenario 2 (Intermodal and infrastructure improvements)



- Extensive inventory of future upgrades to the network based on:
  - Expert consultation
  - Review of **existing plans** and **proposals**

Emission factors updates

- Validated and updated to more accurately reflect the Argentinian reality
- Based on IEA MOMO
  - **Regional values** (e.g. Modes, Vehicle Types, Energy sources)
  - NEW: INTERNAL ITF FLEET MODEL
- To differentiate by country we need to adapt the model
  - Requires **detailed data**:
    - Fleet Composition
    - Carbon Intensity of fleet (by type of **vehicle** and **fuel**)

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RESULTS HIGHLIGHTS

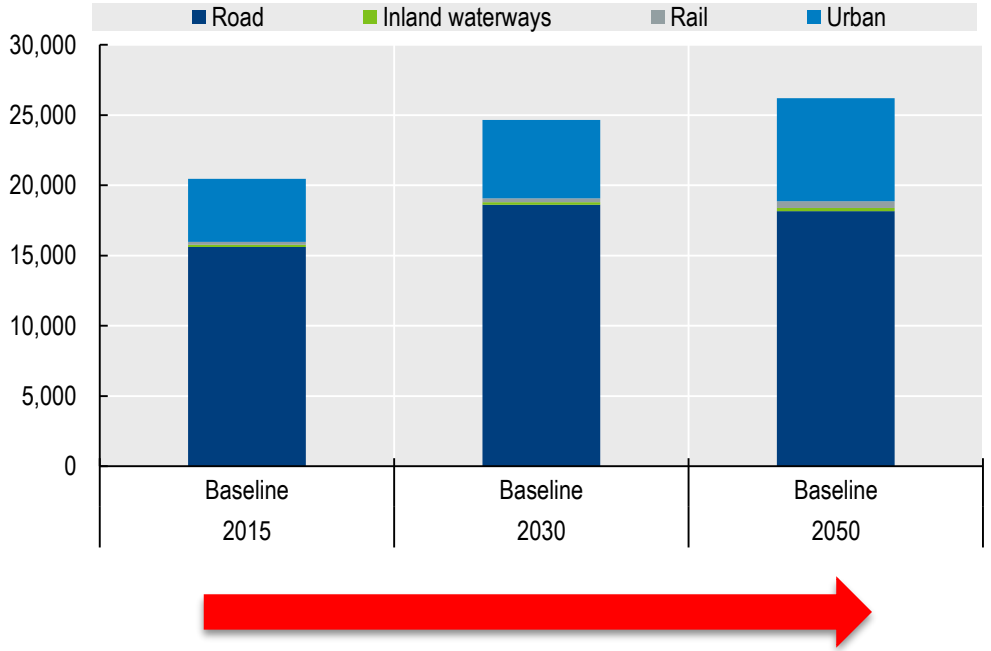
Emissions from surface freight transport

Emissions from surface freight transport increase in the **Baseline**

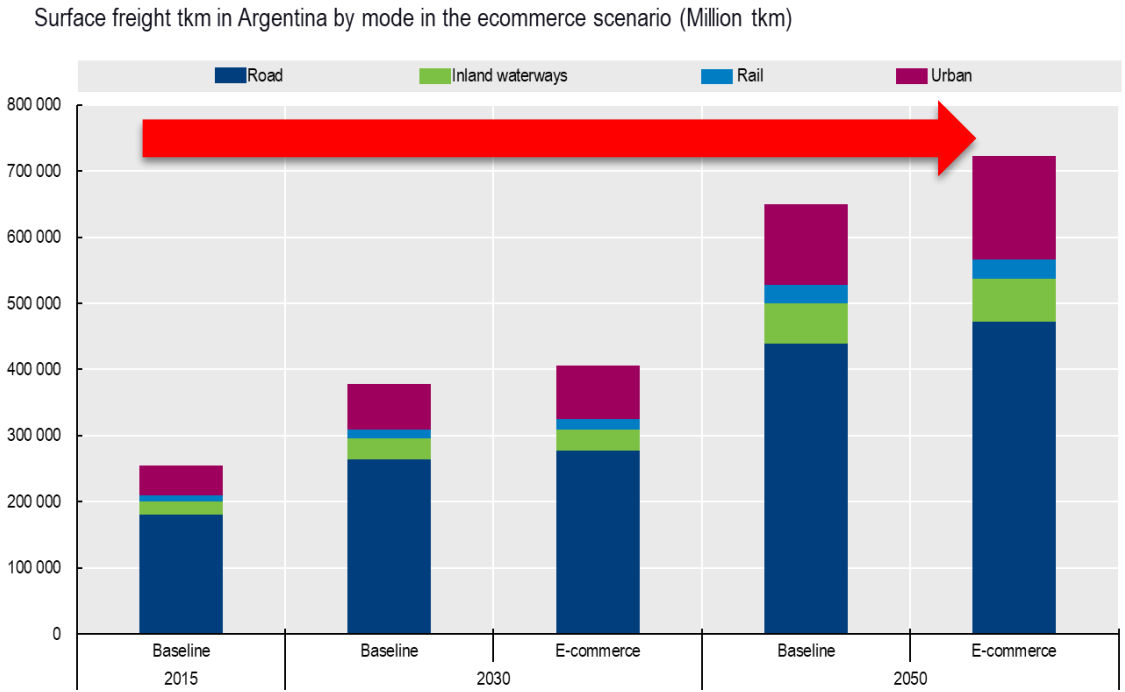
20% in the period from 2015 to 2030

28% in the period to 2050.

Surface freight emissions in Argentina by mode (thousand tonnes of CO_2)



Results: tonne-km



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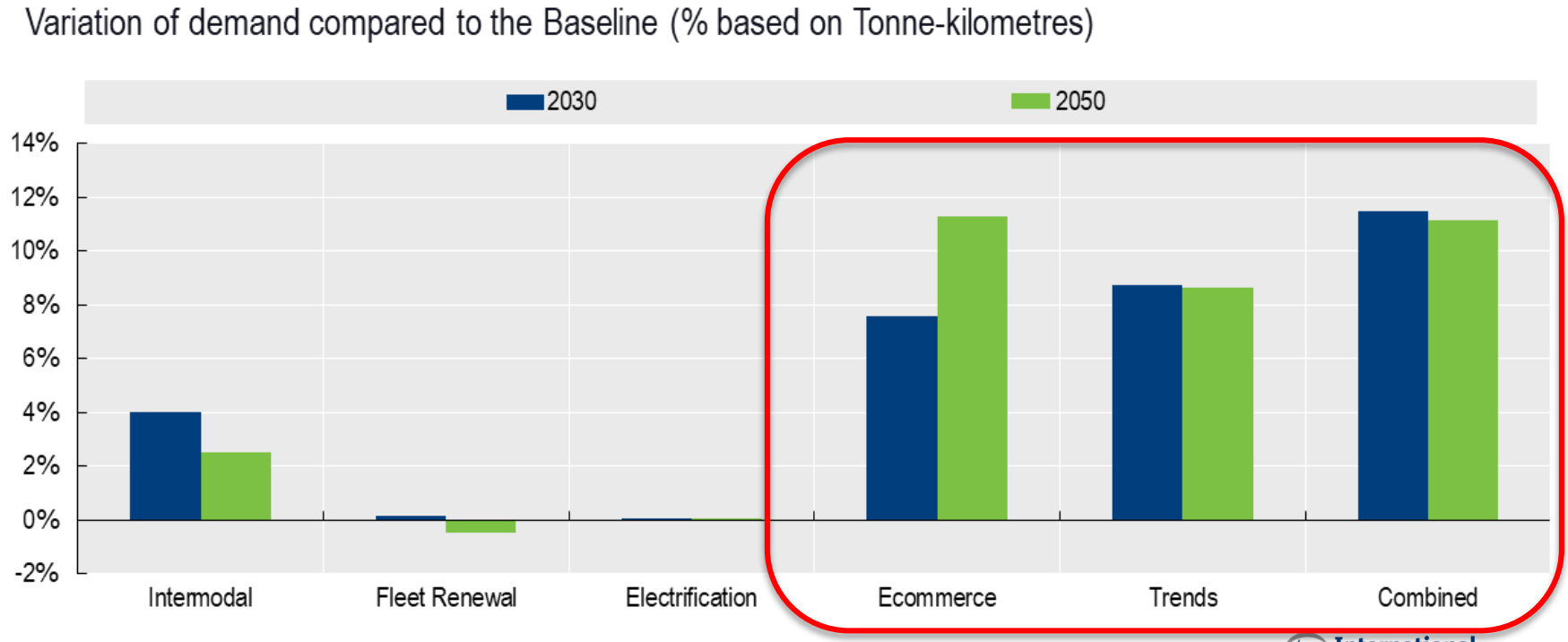
E-commerce

Trends such as e-commerce would **impact the amount of freight** being transported

Results: demand variation



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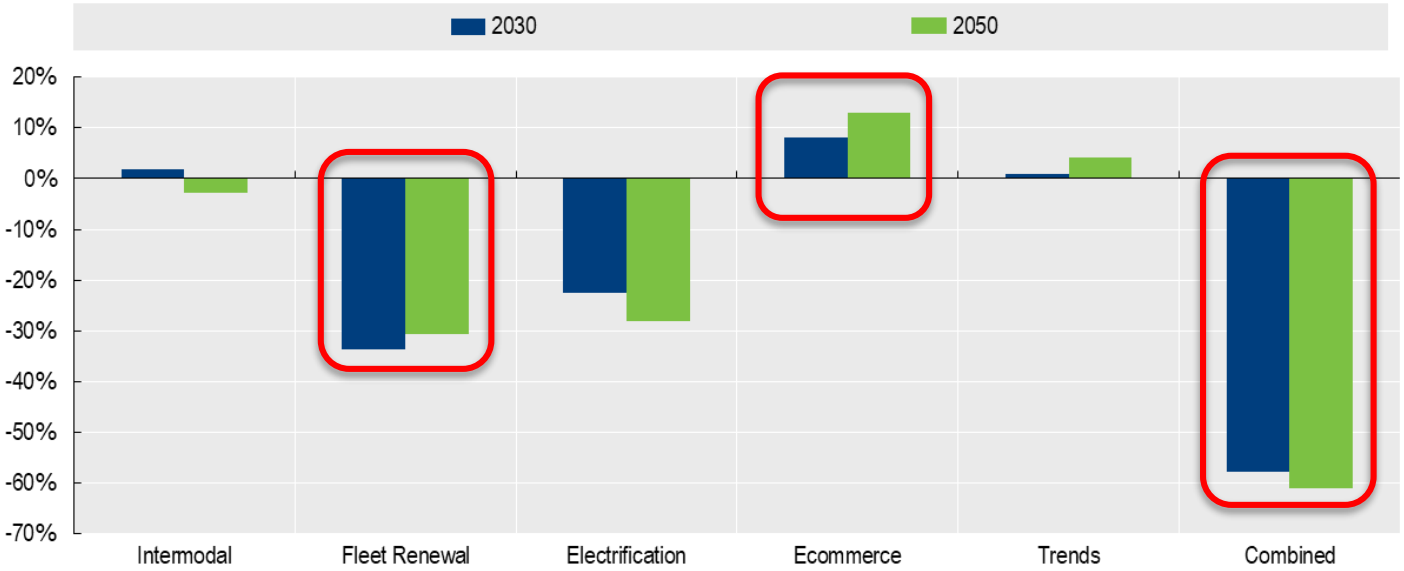
Emissions from surface freight transport

Surface freight emissions in Argentina by mode (thousand tonnes of CO_2)

Variation of emissions compared to the Baseline (%)

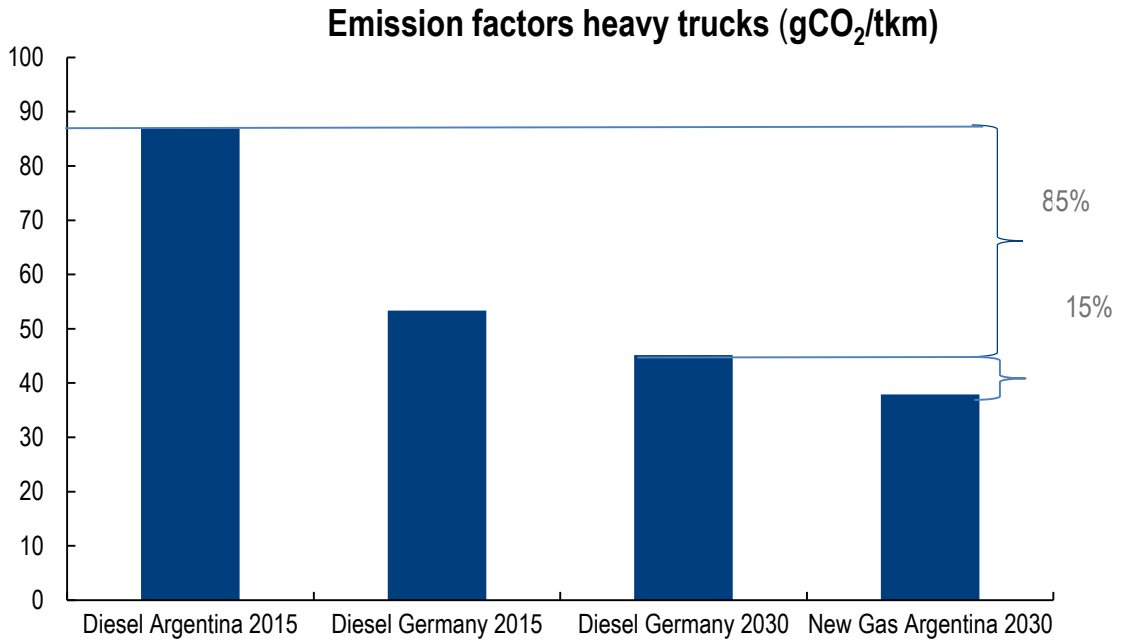


Fleet Renewal Scenario

3 Fleet renewal with transition to gas

The transition to gas *per se* is responsible for **15% of the total reduction of carbon emissions** of heavy long haul trucks by 2030.

Increased **vehicle efficiency** and improvements to **operations** enable the remaining 85%.



Note: All emissions considered in this analysis are tank-to-wheel; upstream methane leaks are not accounted for. The latter can decrease emissions reductions from a transition to gas when accounting for well-to-wheel emissions.

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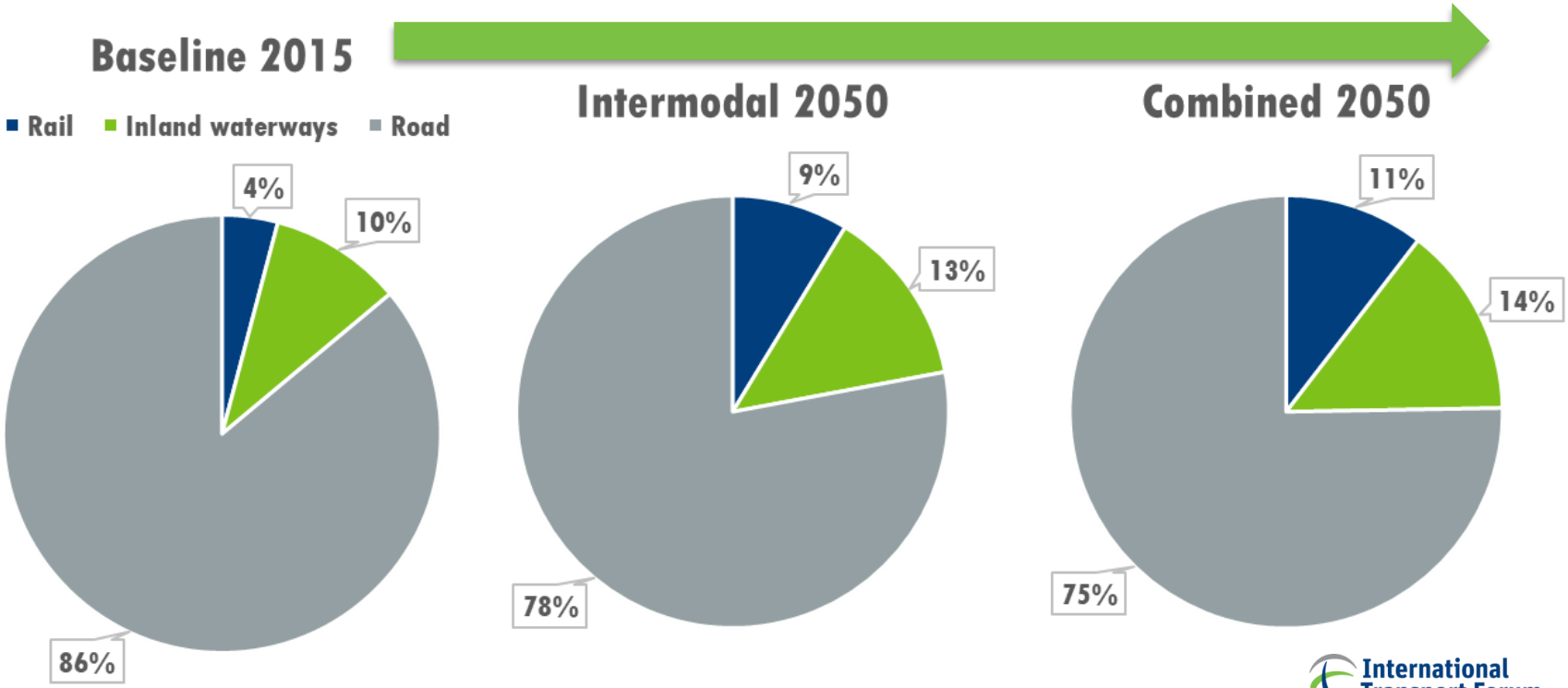
Modal shift

7 Combined

Greener Modes



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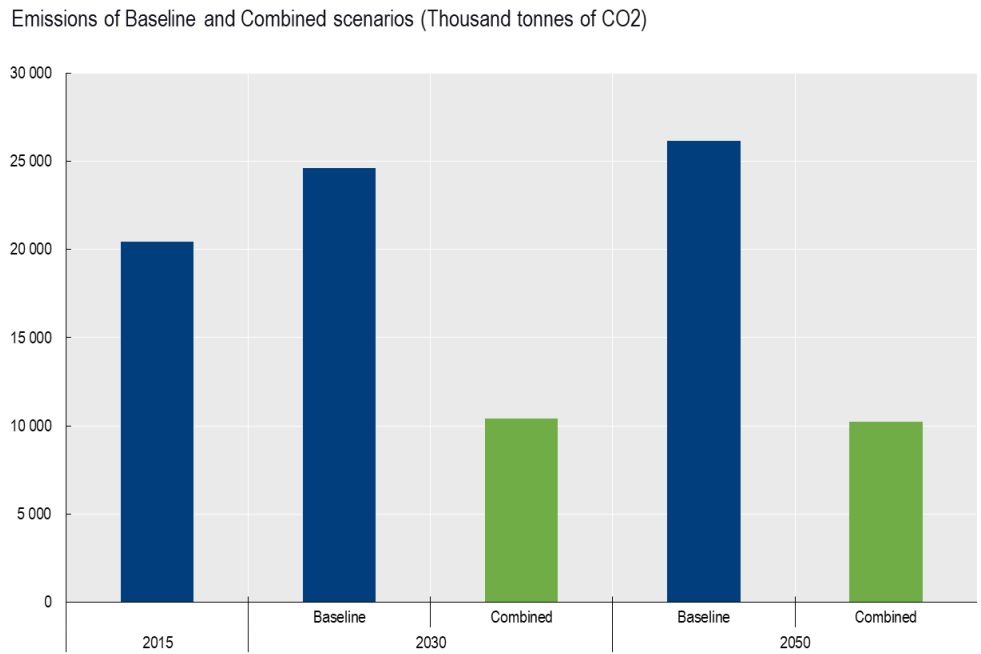
Emissions combined scenario

7 Combined



Emissions could be **cut by half** in 2050 compared to 2015

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KEY TAKEAWAYS AND CALLS TO ACTION

Main steps to decarbonise freight transport in Argentina

1. Renew fleets and improve road freight operations (in urban and non-urban areas)

2. Foster intermodality where modal shifts can be achieved and activity increases can be avoided

3. Combine measures that complement one another (infrastructure, operations, policy and pricing)

Calls to action for policy makers in Argentina

1. Pursue bold actions to decrease emissions from freight transport.

2. Enhance the monitoring and reporting of emissions by transport sub-sector.

3. Install appropriate institutional frameworks that allow to implement pathways to reduce emissions, while promoting transport resilience and efficiency.

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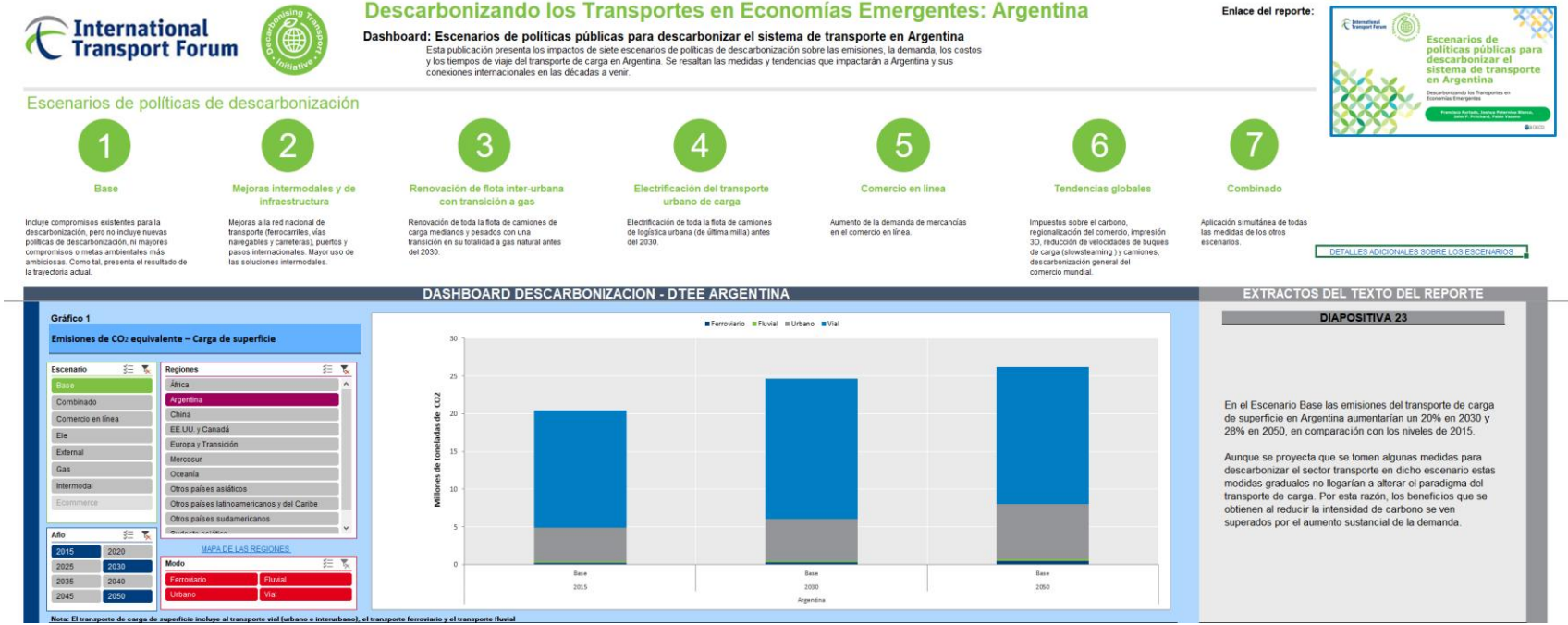
SCENARIO EXPLORATION TOOL

Main sections of the tool

- Emissions
- Foreign trade
- Modal share
- Cost
- Travel time

VISUALIZATION TOOL



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THANK YOU FOR YOUR ATTENTION

JOHN P. PRITCHARD, PH.D.

JOHN.PRITCHARD@ITF-OECD.ORG

2 RUE ANDRÉ PASCAL

F-75775 PARIS CEDEX 16

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