

Ninth Regional EST Forum in Asia

Impacts of Climate Change on Transport & Planning for Climate Adaptive Transport Infrastructure

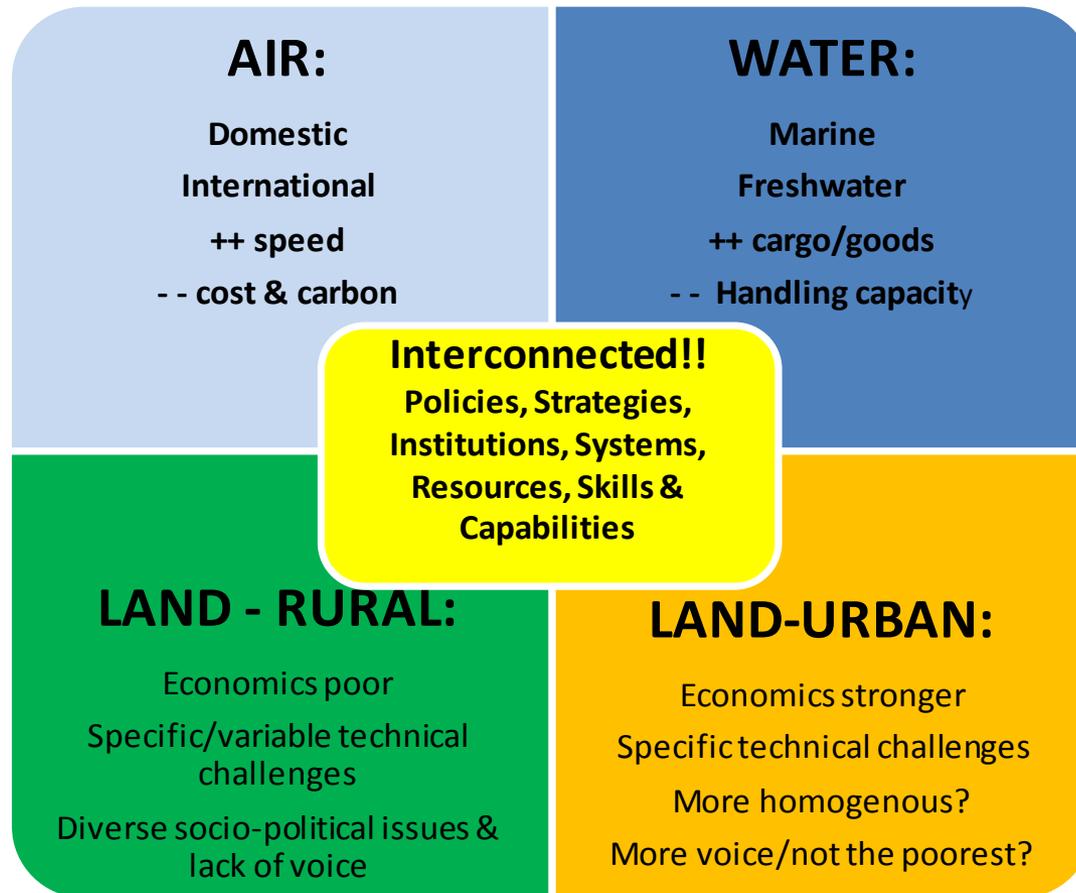
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Transport Infrastructure domains



Waterways – mixed users



Road Bridges – variable users!



Annual capital expenditure on Transport

➤ **US\$1.4 – 2.1 Trillion (\$000,000,000,000)**

- **High Income countries – private (47%)**
- High Income countries – public (29%)
- **Low/Middle Income Countries – private (11%)**
- Low/Middle Income Countries – public (14%)
- *Complex: e.g. India: roads (85% public); ports (20% public)*

(WRI 2014 Lefevre B et al...from WB/IMF/OECD etc)

Transport – vital to economic growth & trade and what else?

- **Asia's population: 3.9 Billion (61% of world population)**
 - **Urban share 1920 (9%)**
 - **Urban share 2005 (48%)**
 - **Urban share 2030 (54%?)**
- **44 million additional urban people/year = 120,000/day**
 - **Urban: 80% of new economic growth**
 - **Urban: 25% of Asia's urban population is poor**
 - **250 million poor people...rising to 300 million by 2030**
- **Adverse health impacts**
- ❖ **Road traffic death & injury**

Climate Risk & Impacts on Transport Infrastructure (1 of 2)

Mode	Climate Hazard	Risks – examples
Rail	Summer Heat	<ul style="list-style-type: none"> • Rail Buckling • Material fatigue • Increased Embankment instability • Equipment overheating • Increased wildfire impacts
	Winter Cold/Ice	<ul style="list-style-type: none"> • Rail & catenary systems stressed
	Extreme Rain	<ul style="list-style-type: none"> • Flood/landslide damage • Scour to structures • Embankment de-stabilisation
	Extreme storms	<ul style="list-style-type: none"> • Signal damage • Power cable damage • Falling trees/line blockage
	In General	<ul style="list-style-type: none"> • Reduced Safety • Increased repair and maintenance cost • Disruption of “just in time” delivery

Climate Risk & Impacts on Transport Infrastructure (2 of 2)

Mode	Climate Hazard	Risks – examples
Road	Summer heat Winter cold/ice Extreme rain Extreme storms	<ul style="list-style-type: none"> • All roads, bridges & tunnels • Coastal roads • Mountain roads • Sewerage systems
Aviation	Similar to above	<ul style="list-style-type: none"> • Airports & runways
Shipping	Similar to above & NB ice/sea-level	<ul style="list-style-type: none"> • Inland shipping • Maritime shipping • Ports
Urban	Similar to above	<ul style="list-style-type: none"> • Heat Island effects • Extreme flash floods • Sea-level rise & storm surge flood
Transmission & Distribution	Similar to above & NB melting permafrost	<ul style="list-style-type: none"> • Electrical networks • Arctic supply fossil fuel pipelines • Gas supply pipelines
Primary Storage & Distribution	Similar to above & NB storms & high tides	<ul style="list-style-type: none"> • Sea-level rise threats to costal storage, refineries & pipelines

A sustainable transport system

➤ *Four Key Attributes*

✓ Accessable

✓ Safe

✓ Environment-friendly

✓ Affordable

➤ **NB: Carbon Pricing – “FASTER Principles”?**

Fairness; policy **A**lignment; **S**tability & predictability;
Transparency; **E**fficiency & cost-effectiveness;
Reliability & environmental effectiveness

Transport Policies & Strategies – Climate Change Mitigation

Diana Kucherbaeva UN ESCAP undertook research & synthesis to support this presentation

➤ Modal Shifts

- Passengers & Freight to Lower-C (private → public)
- Prioritising pedestrians & non-motorised transport

➤ Demand Reduction (mixed zonation, pricing, local supply chains)

➤ Improving Vehicle Efficiency (eng'ing 25% + propulsion 25%-35%)

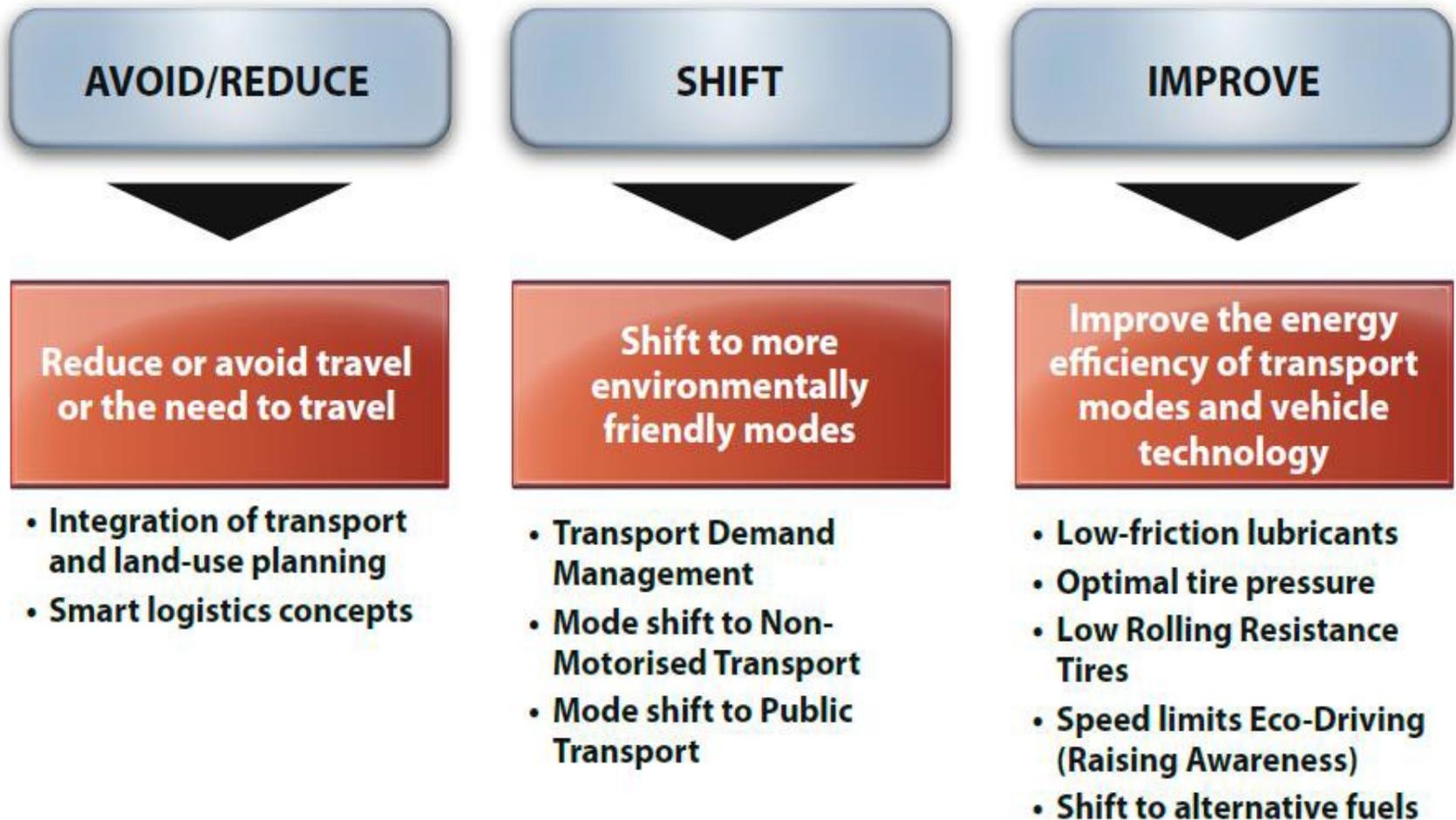
➤ Reducing C-intensity of fuel (CNG & biofuels, BEVs, HFC-PV)

➤ Policy Interventions (pricing, regulation, investment, centralised urban planning)

❖ Lima-Paris Action Agenda – UNFCCC – City-level

Avoid-Shift-Improve

Figure ES-2 (Bongardt, Breithaupt and Creutzig 2011)



Transport Policies & Strategies – Adaptation to Climate Change

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➤ Key Actions:

- Identify critical system components at risk
- Monitor conditions & on-going impacts
- Prepare O&M SoPs to manage & mitigate
- Identify changes required in Design, Processes & Procedures
- Retrofit & relocate vulnerable infrastructure
- **Choose what to de-prioritise !!**

Urban – Bus transport systems retrofitted



Maritime Port – DSM Tz



Previous EST Forum Declarations & Statements

- Kyoto Declaration (2015)
- Colombo Declaration (2014)
- Bali Declaration (2013)
- Bangkok 2020 Declaration (2010)
- Seoul Statement (2009)
- Aichi Statement (2005)
- Manila Statement (2004)

What does it all mean for YOU & me ?

- **9th EST recommends.....**policies, strategies, resource demands & prioritisation advice....
 - **AND...maybe a little more from us?**
- **I WILL....by...20xx? And I am willing to be judged by these x y z (QQT) metrics!!**
 - **Challenge or Opportunity ??**

Thank you - End