

Breakout Question #2:
How do we direct infrastructure investments to have carbon-friendly outcomes?

Strategic level issues (long-term)

Consensus: (What does this group agree on? - up to three items) Please be specific	Needs: (What work needs to be done?) eg research, policy, implementation..	Call for Action: (Who should do what right now? ie the next step)	Message
COMPLEXITY of reorienting and allowing to converge different dimensions of infra (digital, energy, human, finance) - a wicked problem, by now	COHESIVE FRAMEWORK for shift of mindset, goal determinedness, roadmap, public/private engagement for feasible solutions, R&D to tackle complexity, systems thinking	LEADERSHIP kicked-off by government, breaking down complexity from public and private sides, agreeing on need, pushing engagement top-down	There are many trade-offs that need to be understood. Part of the problem is lack of data and lack of models, here more research is needed. Another part of the problem is conflicting agendas and mis-alignment of priorities, leading to sub optimal decisions on the strategic level. These decisions are by definition long-term and will have large consequences. Policy makers need assistance in these decisions, here the research community has a responsibility.
Environment is not a high priority issue in developing countries at present, particularly in infrastructure projects. We need to <u>align env issues with existing priorities</u> such as economic growth, employment etc. There will have to be trade-off choices (maybe going for "second-best" environmental solution).	<ul style="list-style-type: none"> * Countries need national government-driven roadmaps and plans. These need to be meaningful and well-informed. Universities and think tanks must be involved in preparing these. * There must be a high-level system view, total energy approach. 	<ul style="list-style-type: none"> * Cross-cutting engagement of research, policy and private sector communities (+NGOs etc) * Bring together social sciences and hard sciences on these issues at university/thinktank level. * Initial drive from industry 	
There are insufficient <u>metrics, thresholds and boundaries</u> to quantify carbon lifecycle emissions from infrastructure projects in developing countries. Nor enough user-pay opportunities	<ul style="list-style-type: none"> * Baseline studies are needed on infrastructure development in developing countries. * Research to define country-specific metrics, and these must be relevant to the country priorities, regional issues, frequency of use, etc. Different metrics for assessing the feasibility of a project (input metrics) versus during and monitoring the use after construction (output metrics). * This research must be effectively targeted to business and government to ensure the right outcomes. * Incorporate scope 1, 2 and 3 	<ul style="list-style-type: none"> * Research funding * Applications for collaborative funding calls between developing and developed countries (e.g. DfID etc), which is beneficial for long term uptake. 	
Network planning is complex and infrastructure effects difficult to quantify - there are no 'obvious' solutions	Network planning models for completely different environments need to be developed	Cooperation between Europe and the East should accelerate. PoC projects such as distribution around the BR is needed	
Existing technologies have a high investment basis - and linked to existing infrastructure	Get to standardised alternatives soon	Accelerate alternative engineering investigations and involve a much wider group of scientists	
Managing the existing infrastructure	avoid, use, adjust, and invest in new infrastructure with smart infrastructure and warehouses (terminals), and then apply data-based solutions.	Synchronising modes across transport, incorporating traffic space into pricing, new taxing strategies for a low-carbon future	
Revise logistic processes	Vehicles and logistic systems need to be smarter and more interconnected with each other.	Bringing in IT/telecom groups, enforcing/compliance of vehicle limitations to prolong infrastructure	

Tactical level issues (medium-term)

Consensus: (What does this group agree on? - up to three items) Please be specific	Needs: (What work needs to be done?) eg research, policy, implementation..	Call for Action: (Who should do what right now? ie the next step)	Message
Good decision making/planning process	<ul style="list-style-type: none"> * Good quality models to predict emergent behaviour of the system, based on sound data, accounting for all modes. * Objective and unbiased decision criteria, eg based on lifecycle emissions and costs * Engagement of all key stakeholders in a fair consultation process * Base decisions on evidence instead of lobbying and politics! * Local decision makers need to understand how freight and logistics systems operate and its impact on the transport system * Balance the likelihood of things going wrong in the 	<ul style="list-style-type: none"> * Use media to push back on biased decision making * Train high-level government officials about how to set-up good decision-making processes * Get governments to set-up research and think tanks for decision making processes * Logistics training for everyone! * Multi-jurisdiction bodies to make decisions across multiple states 	Once decisions on investments have been made, it is important that the implementation process is guided past various hazards such as corruption, biased decision making, sub-optimisations etc. The research community is needed here, not only to advise decision makers but also to educate as many as possible in the system.
Procurement process	<ul style="list-style-type: none"> * RFQ/RFP/bid selection processes should be transparent, unbiased and well publicised * Anti-corruption/audit processes 	<ul style="list-style-type: none"> * Take politics out of decision making... setup independent processes/ infrastructure board - like the central bank! 	
Cooperation between established operators in the developed world with emerging operators in the developing world	Establish stronger combined operator forum	More presence in current forums	
Project delivery	<ul style="list-style-type: none"> * Regulation, compliance and enforcement * Anti-corruption strategies for project delivery 		
Inventory vs timeliness of delivery	Increase digitalisation and connectivity		

Operational issues

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Production capacity for alternative technologies	Develop inventory of alternative technology production capacity vs obsolescence evaluation	Capacity research	Some actions need to develop as if we're "already there" - i.e. in terms of communication and capacity
Awareness creation programs should accelerate immediately		Behavioural research - what is the psychology of climate change?	
Alignment of research programs to achieve developing country needs			