THE RECOVERY AND RESILIENCE PLAN

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TEDU25: Transforming Tourism and Hospitality through Education

System Dynamics Modelling & Serious Gaming for Sustainable Tourism

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The power of serious gaming

- The tourism-climate system is too complex (too many inputs, too many feedbacks, too many unknowns) to understand by linear reasoning (if A than B).
  - Example of petrol tax
- In the real world, a policy error comes with a high cost
  - In a well-designed serious game, you can reset the system and thus learn by trial and error
- We tested this with a Norwegian tourism and climate serious game[1)]:
  - Three groups of German students: one ‘post-it’ brainstorm, one explanation of the dynamic model and one simply ‘played’ with the model
  - We measured their understanding through a questionnaire pre and post workshop
  - The first two groups scored lower post; only then gamers gained understanding
- Also, Norway serious game substantially changed arguments during conference

[1)] Tiemensma, S. (2011). *Sustainable tourism simulation in Norway* [Master, University of Delft]. Delft.

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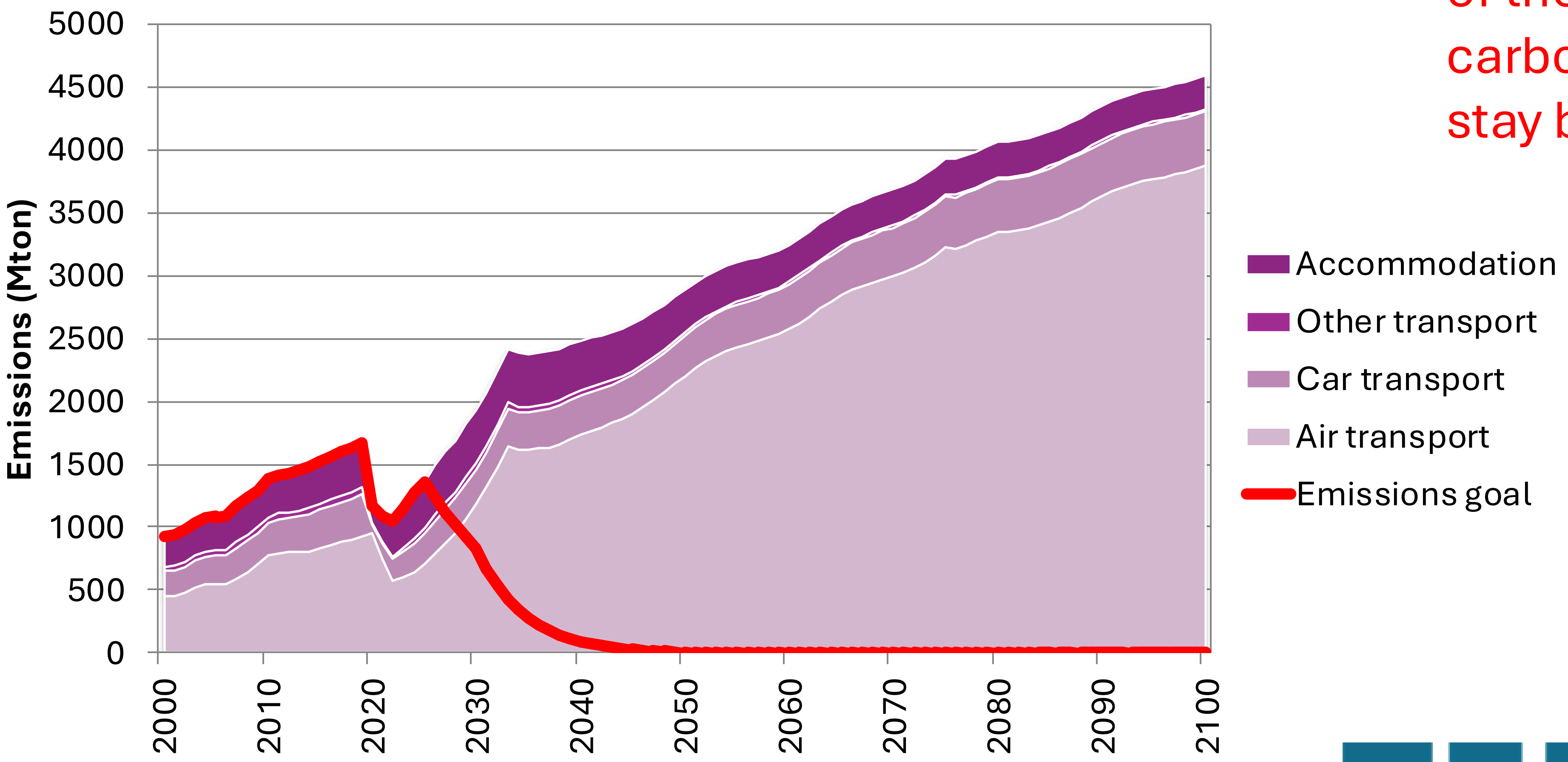
The problem: business as usual

Tourism would consume 25-45% of the remaining carbon budget to stay below 1.5 ° C



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So, let us try a serious game for finding a zero-emissions future for global tourism

- The Global Tourism & Ttansport Model (GTTMdyn) is a system dynamics mode, designed to be used as serious game
- Today we will play this game in a stakeholder context
- Glasgow declaration (2021): half tourism’s emissions by 2030 and achieve zero by 2050, while keeping a thriving tourism&travel sector.

- But what do you need to achieve these goals?

Pre-game most effective measures according to the audience

- Taxes
- Subsidies for clean alternatives
- Communication for behavioural change
- Promotion of domestic
- Rewarding system for ‘good’ behaviour
- Technological solutions
- Zero-emission airplanes
- Include travel time by train as working time.
- Increase LOS

Gaming programme

1. Introduction ecological and political background and target of the role-play
2. Distribution of stakeholder roles among the participants
3. One walk-through with the GTTM^{dyn}.
4. Round 1: Individual stakeholders propose measures fitting their strategy.
5. Round 2: Stakeholders now first negotiate contradicting measures and propose a new set of measures.
6. Round 3: A year and a multitude of weather-related disasters later, stakeholders set priority to emission reduction, away from short-term growth and profits and revise their measures.

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If you fail, many destinations will be destroyed

Floods Eifel, 2021. Source: Roessler, https://www.dw.com/en/germany-greenlights-billions-for-flood-victims/a-59051543

90% of coral reefs will be lost

Coral bleaching Asia: Source: https://www.theluxurysignature.com/2019/03/01/how-climate-change-affecting-tourism-asia-how-we-should-adapt/

Fires will devastate global forests and destinations

The fires near Split, Croatia's second city and a popular tourist destination, have been brought under control. (Photo: AFP/STR) Source: https://vir.com.vn/wildfires-rage-in-europe-from-croatia-to-portugal-50707.html

Winter sports will simply disappear

Is skiing a dying sport in times of climate change? Source: https://www.eurotopics.net/cache/images/5/234105-5x3-topteaser1260x756.jpg?1CEEB

Main description of the situation in the world

It is May 2025, based on the Tourism panel on climate Change[1)], showing tourism is way off a track of decarbonisation, the United Nations have assigned a High-Level Tourism Decarbonization Group (HLTDG). The Commissions consists of seven global stakeholders (‘player groups’). This group must come up with a viable zero-emissions scenario.

[1)]Tourism Panel on Climate Change. (2023). *Tourism and Climate Change Stocktake 2023* (D. Scott, S. Becken, & G. Lipman, Eds.). Tourism Panel on Climate Change,. https://tpcc.info/

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Main scenario goal

- Scenario we want:
  - Achieve 50% CO2 emission reduction by 2030
  - True zero-emissions by 2050
  - Maintain a viable tourism sector fulfilling the general desire to travel
- Tourism comprises:
  - International plus domestic tourism
  - Combined leisure, VFR and business travellers
  - All transport modes

Six stakeholders

- You will be divided in 6 stakeholder groups represented by a certain organisation:
  1. UNWTO (travel agencies, OTA, TO, hotel chains)
  2. IRU (both road-based public transport and private car)
  3. IATA (Airlines)
  4. ICCAIA (Aircraft manufacturers)
  5. UIC (Railways)
  6. ICSA (International environmental NGO)
  7. IH&RA (International Hotel & Restaurant Association)
- You also have a list of all policy measures for suggested policies

Policies overview

- Alternative fuels (Algae, Jatropha, Camelina, Switchgrass and e-fuel)
- Technology (efficiency, electrification, hydrogen)
- Infrastructure (high-speed rail, airports)
- Operations (speed of transport systems)
- Taxes & subsidies (on carbon, tickets, kms)
- Behavioural measures (changing desire to travel, value of distance, length-of-stay)
- Offsets

You receive a table...

Code	Description	Default	Min-max	A1	A2	A3	A4
Policies Sustainable Alternative Fuels (SAF)							
PA01	Land-use capacity	Physical	Sustainable or Physical				
PA02	SAF main policy switch	Subsidy	Subsidy or Mandate				
PA03	Type of SAF	Fossil	4 biofuel, e-fuel				
PA04	Air SAF subsidies time curve	0%	TL 0-90%				
PA05	Biofuel delay time (year)	4	1-7 years				
PA06	Policy Tourism's maximum renewables share (%)	10.0%	1-100%				
PA07	SAF S-curve start year (mandate)	2025	2025-2050				
PA08	SAF S-curve end year (mandate)	2050	2035-2100				
PA07	Policy SAF maximum mandate	0.0%	0-100%				
PA08	Policy PtL energy conversion efficiency	20.0%	TL 0-90%				
Policies Technology							
Code	Description	Default	Min-max	A1	A2	A3	A4
PT01	Car efficiency improvement rate	-0.55%	-3.5%/yr				

Just fill in number:
0 = default
1 = low level
2 = medium level
3 = strongest level

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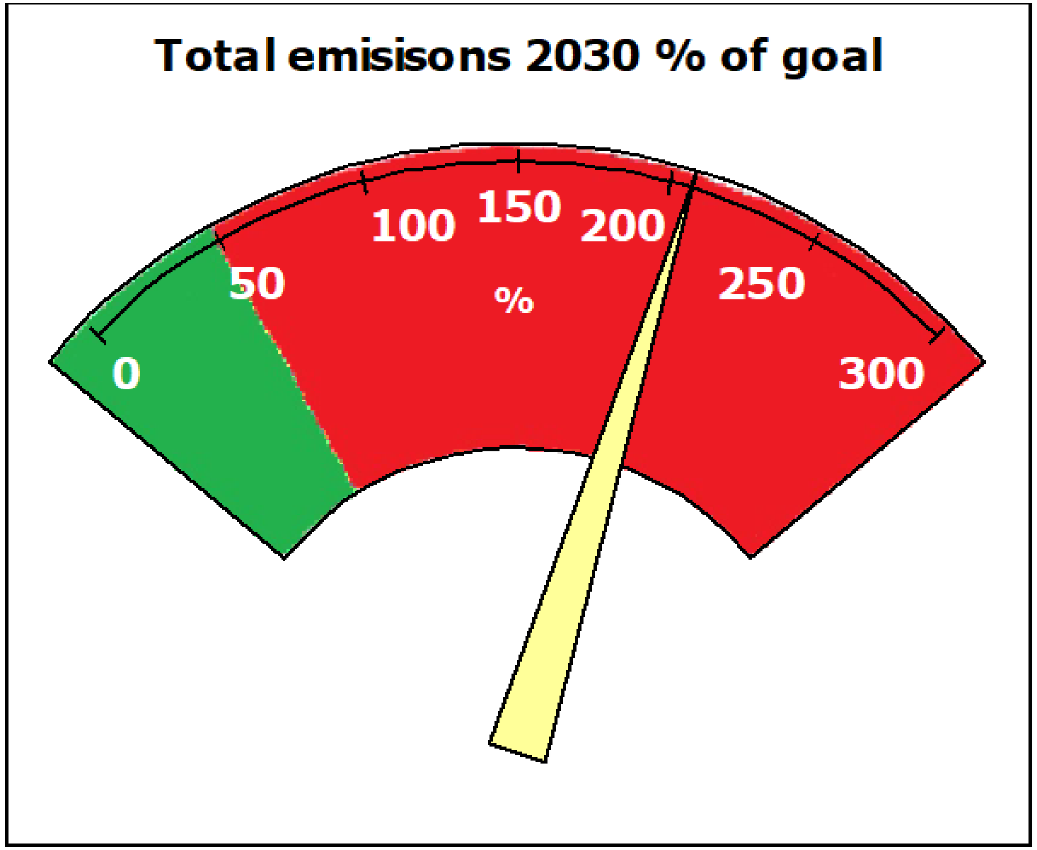
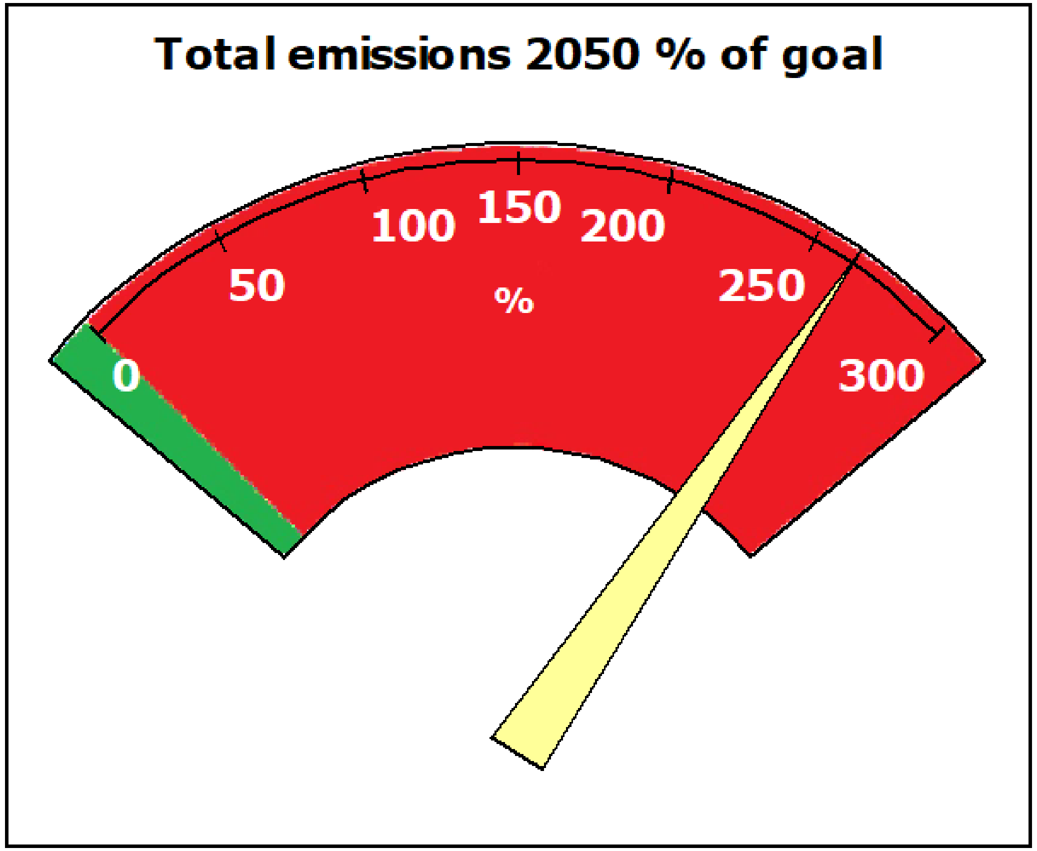
Your main emissions goals

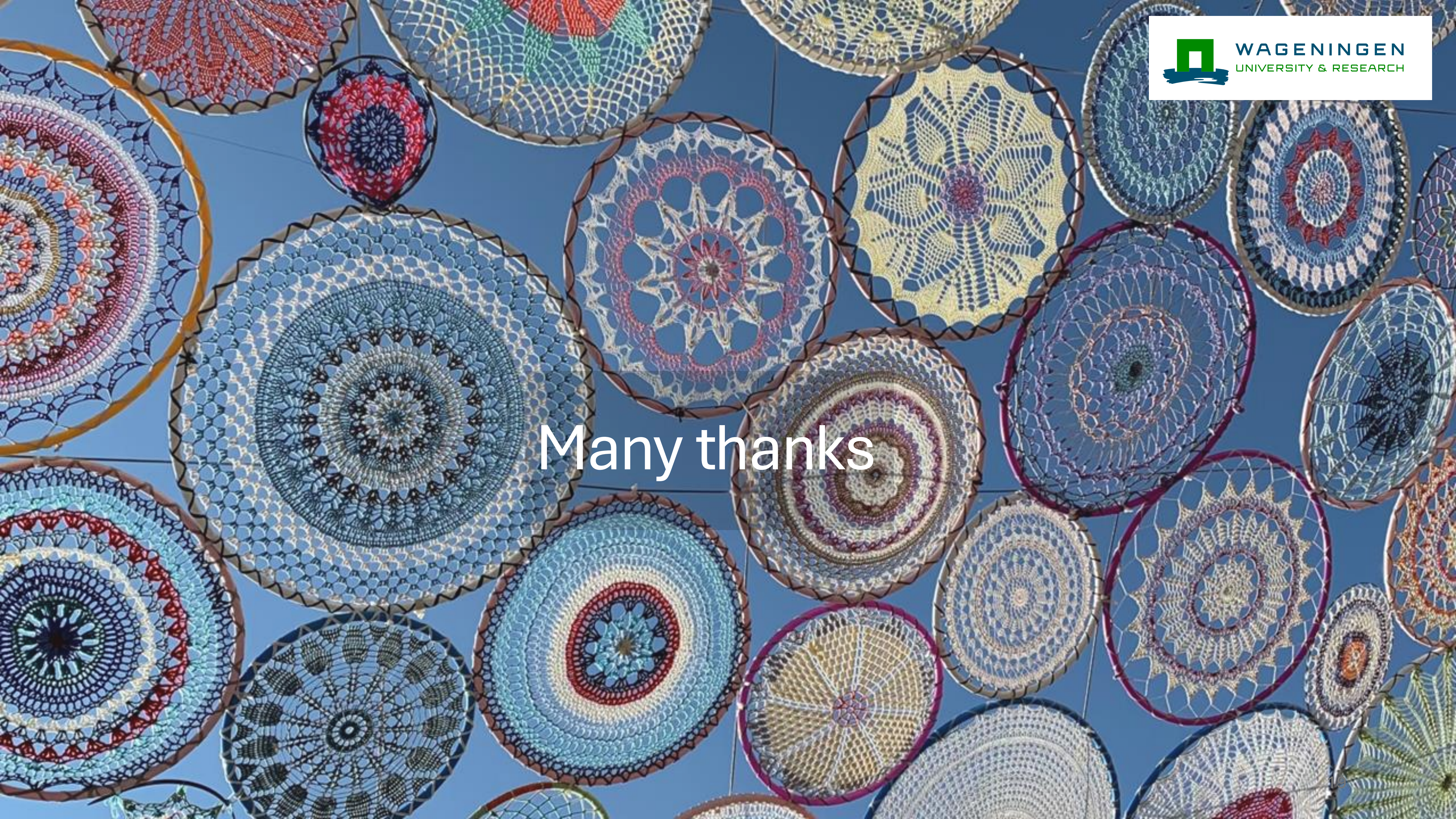




Let us switch to GTTM^{dyn}

Post-game most effective measures

- Stop of growth of distances travelled, particularly long-haul aviation
- E-fuels in aviation
- Electrification of all ground-based transport and accommodation
- 100% renewable energy use
- Investing massively in high-speed rail, particularly to keep revenu growth as in the baseline scenario.



Many thanks