

**39th Conference of
Rectors and Presidents of European Universities of
Technology**

*Universities of Technology addressing the challenges that
planet earth is facing*

September 17th-18th, 2021

**“INDUSTRY’S CONTRIBUTIONS ADDRESSING
THE GLOBAL WARMING CHALLENGE”**

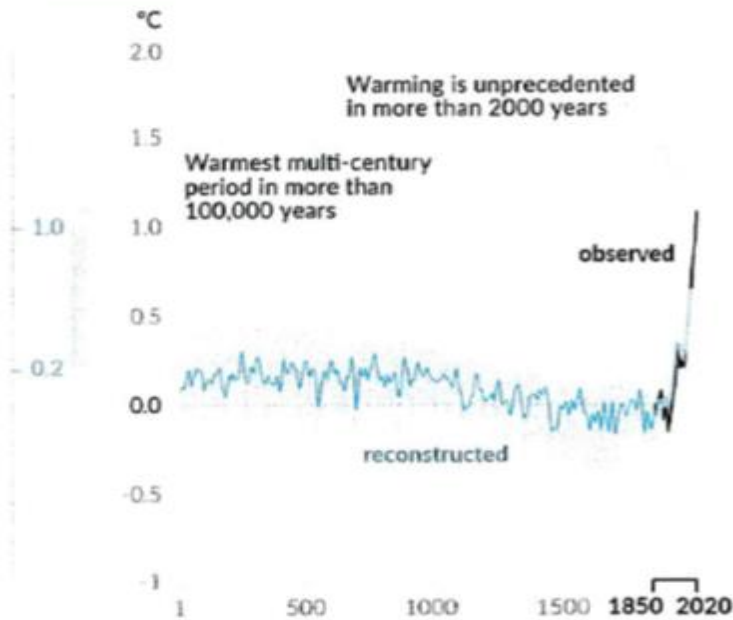
Jean Louis CHAUSSADE

Industrialist, President of the UTC University Board, France

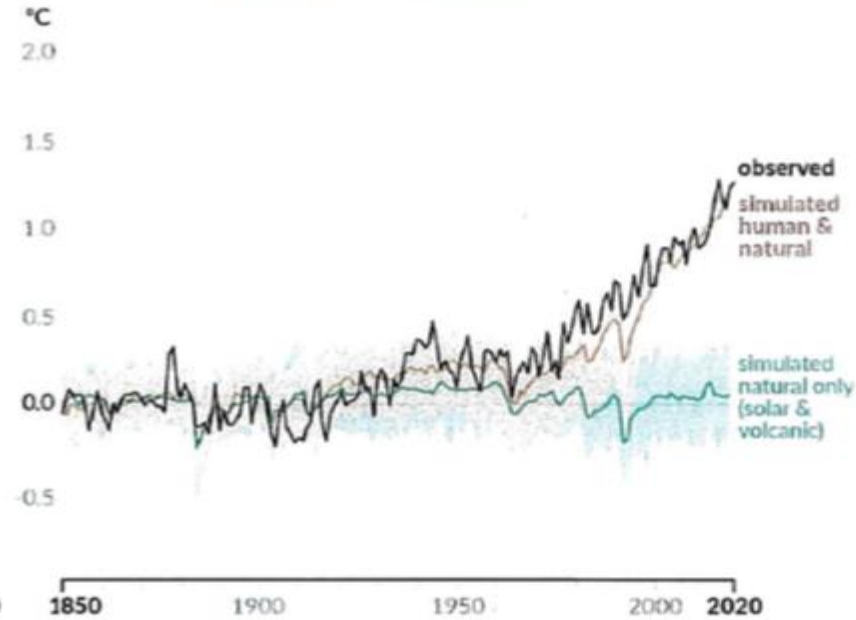
Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years

Changes in global surface temperature relative to 1850-1900

a) Change in global surface temperature (decadal average) as reconstructed (1-2000) and observed (1850-2020)



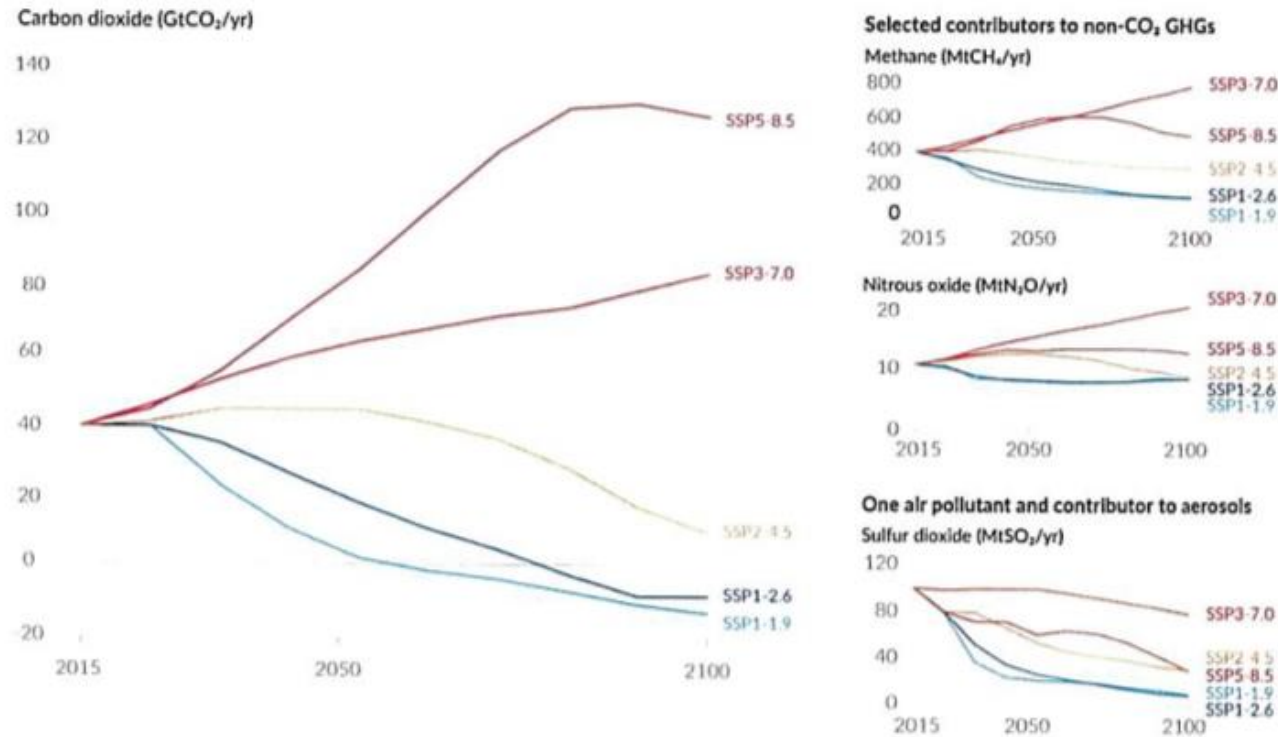
b) Change in global surface temperature (annual average) as observed and simulated using human & natural and only natural factors (both 1850-2020)



geographical patterns of many variables can be identified at a given level of global warming, common to all scenarios considered and independent of timing when the global warming level is reached. {1.6, Box 4.1, 4.3, 4.6, 7.5, 9.2, 9.6, Cross-Chapter Box 11.1, Cross-Section Box TS.1}

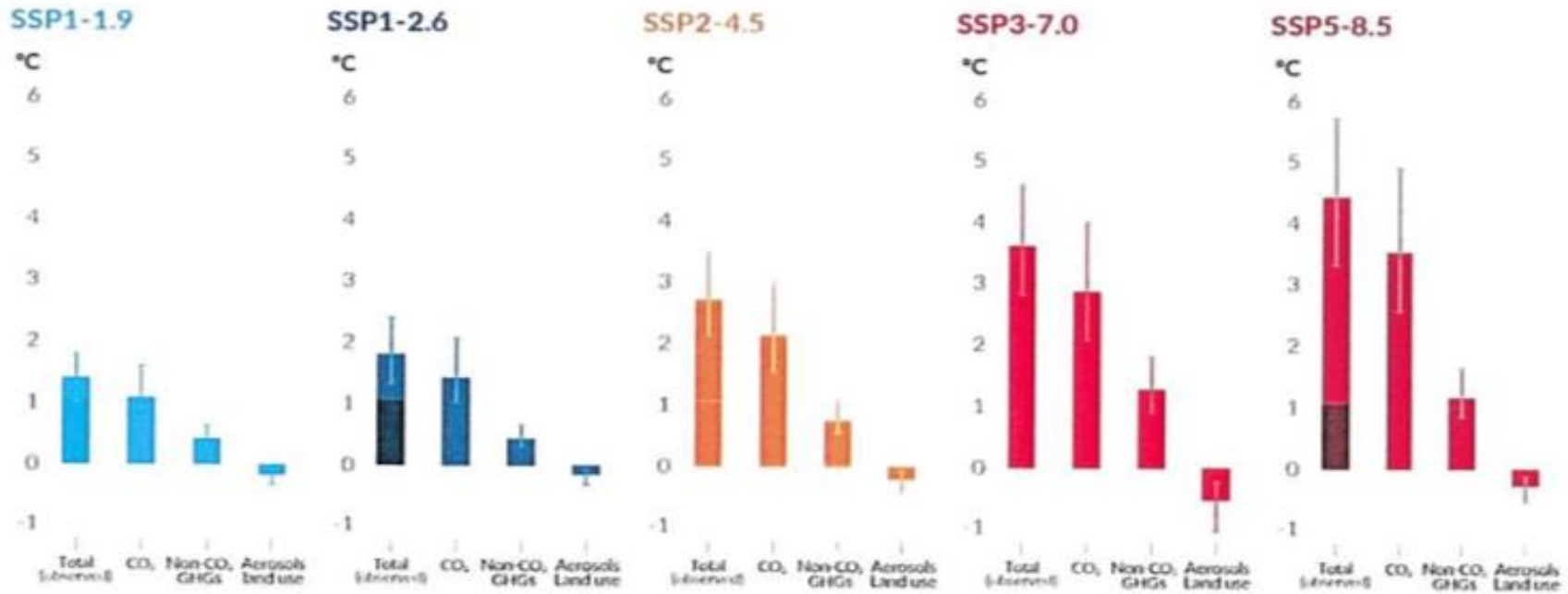
Future emissions cause future additional warming, with total warming dominated by past and future CO₂ emissions

a) Future annual emissions of CO₂ (left) and of a subset of key non-CO₂ drivers (right), across five illustrative scenarios



b) Contribution to global surface temperature increase from different emissions, with a dominant role of CO₂ emissions

Change in global surface temperature in 2081-2100 relative to 1850-1900 (°C)



Total warming (observed warming to date in darker shade), warming from CO₂, warming from non-CO₂ GHGs and cooling from changes in aerosols and land use

Scenario	Near term, 2021–2040		Mid-term, 2041–2060		Long term, 2081–2100	
	Best estimate (°C)	<i>Very likely</i> range (°C)	Best estimate (°C)	<i>Very likely</i> range (°C)	Best estimate (°C)	<i>Very likely</i> range (°C)
SSP1-1.9	1.5	1.2 to 1.7	1.6	1.2 to 2.0	1.4	1.0 to 1.8
SSP1-2.6	1.5	1.2 to 1.8	1.7	1.3 to 2.2	1.8	1.3 to 2.4
SSP2-4.5	1.5	1.2 to 1.8	2.0	1.6 to 2.5	2.7	2.1 to 3.5
SSP3-7.0	1.5	1.2 to 1.8	2.1	1.7 to 2.6	3.6	2.8 to 4.6
SSP5-8.5	1.6	1.3 to 1.9	2.4	1.9 to 3.0	4.4	3.3 to 5.7

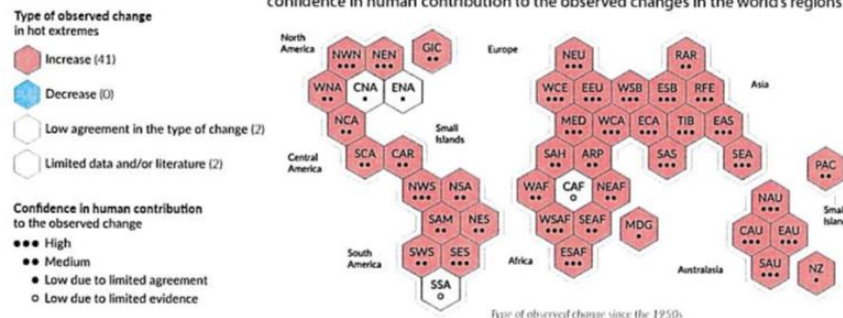
B.1.2 Based on the assessment of multiple lines of evidence, global warming of 2°C, relative to 1850–1900, would be exceeded during the 21st century under the high and very high GHG emissions scenarios considered in this report (SSP3-7.0 and SSP5-8.5, respectively). Global warming of 2°C would *extremely likely* be exceeded in the intermediate scenario (SSP2-4.5). Under the very low and low GHG emissions



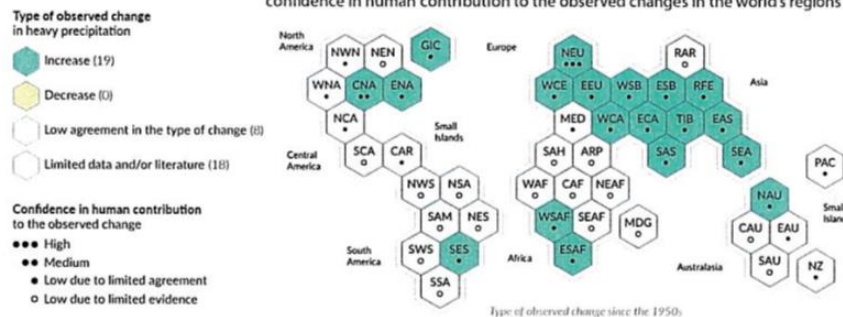
crp

Climate change is already affecting every inhabited region across the globe with human influence contributing to many observed changes in weather and climate extremes

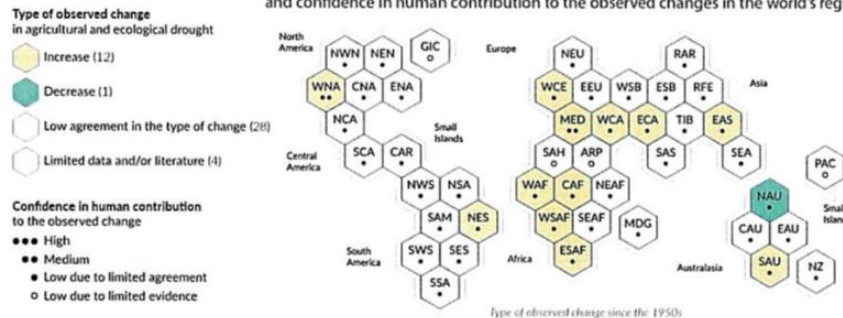
a) Synthesis of assessment of observed change in hot extremes and confidence in human contribution to the observed changes in the world's regions



b) Synthesis of assessment of observed change in heavy precipitation and confidence in human contribution to the observed changes in the world's regions



c) Synthesis of assessment of observed change in agricultural and ecological drought and confidence in human contribution to the observed changes in the world's regions



Each hexagon corresponds to one of the IPCC AR6 WGI reference regions

NWN North-Western North America

IPCC AR6 WGI reference regions: North America: NWN (North-Western North America), NEN (North-Eastern North America), WNA (Western North America), CNA (Central North America), ENA (Eastern North America), Central America: NCA (Northern Central America), SCA (Southern Central America), CAR (Caribbean), South America: NWS (North-Western South America), NSA (Northern South America), NES (North-Eastern South America), SAM (South American Monsoon), SWS (South-Western South America), SES (South-Eastern South America), SSA (Southern South America), Europe: GIC (Greenland/Iceland), NEU (Northern Europe), WCE (Western and Central Europe), EEU (Eastern Europe), MED (Mediterranean), Africa: MED (Mediterranean), SAH (Sahara), WAF (Western Africa), CAF (Central Africa), NEAF (North Eastern Africa), SEAF (South Eastern Africa), WSAF (West Southern Africa), ESAF (East Southern Africa), MDG (Madagascar), Asia: RAR (Russian Arctic), WSB (West Siberia), ESB (East Siberia), RFE (Russian Far East), WCA (West Central Asia), ECA (East Central Asia), TIB (Tibetan Plateau), EAS (East Asia), ARP (Arabian Peninsula), SAS (South Asia), SEA (South East Asia), Australasia: NAU (Northern Australia), CAU (Central Australia), EAU (Eastern Australia), SAU (Southern Australia), NZ (New Zealand), Small Islands: CAR (Caribbean), PAC (Pacific Small Islands)

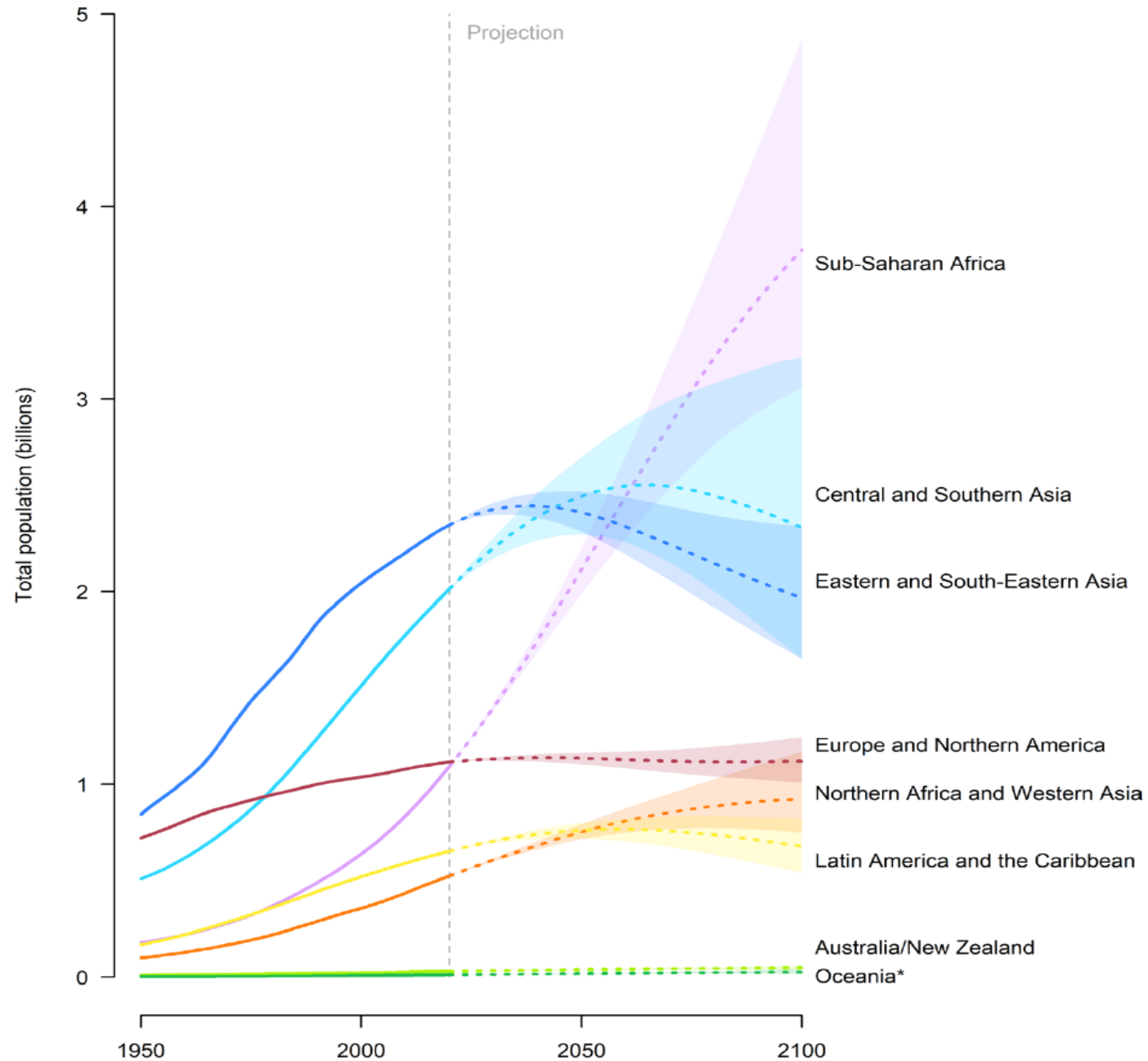


Figure 3 : World population growth forecast

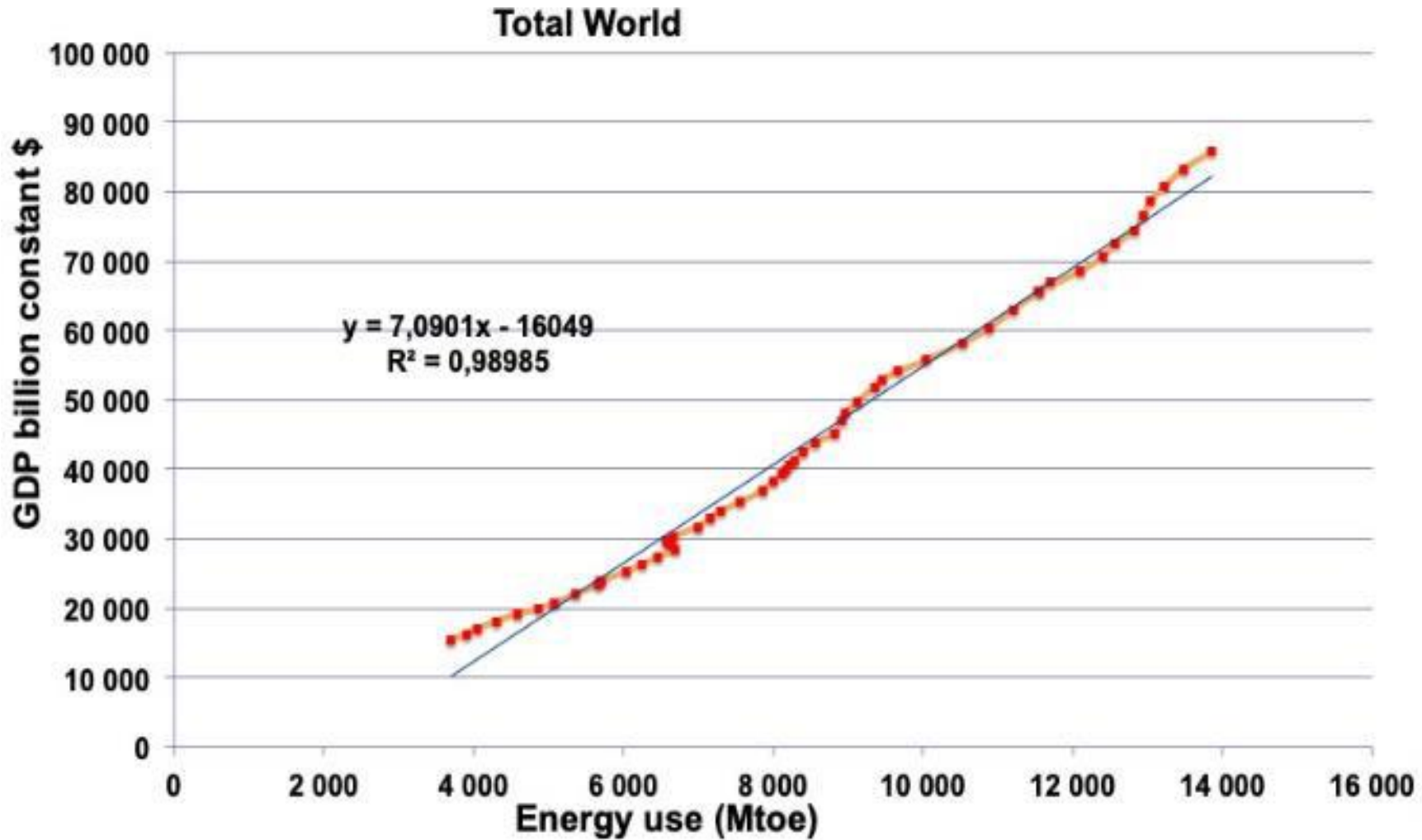


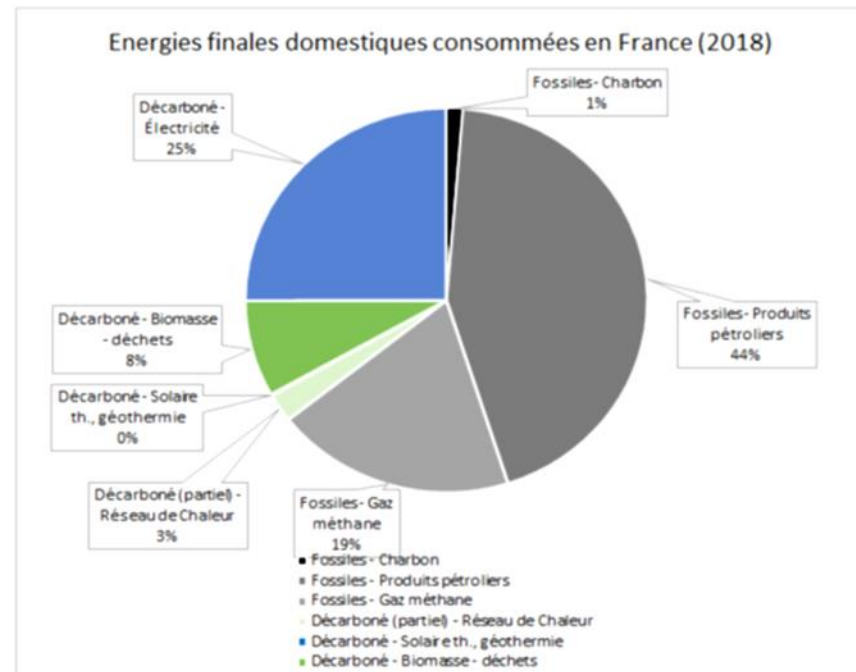
Figure 4 : Global GDP in billions of constant 2018 dollars based on global energy consumption in millions of tonnes of oil equivalent, for the years 1965 to 2018.

Energy mix in 2018 in France

Mix énergétique en 2018 en France

Aujourd'hui

La répartition des énergies finales consommées en France est :



L'électricité représente 25% seulement. Les fossiles plus de 65% !

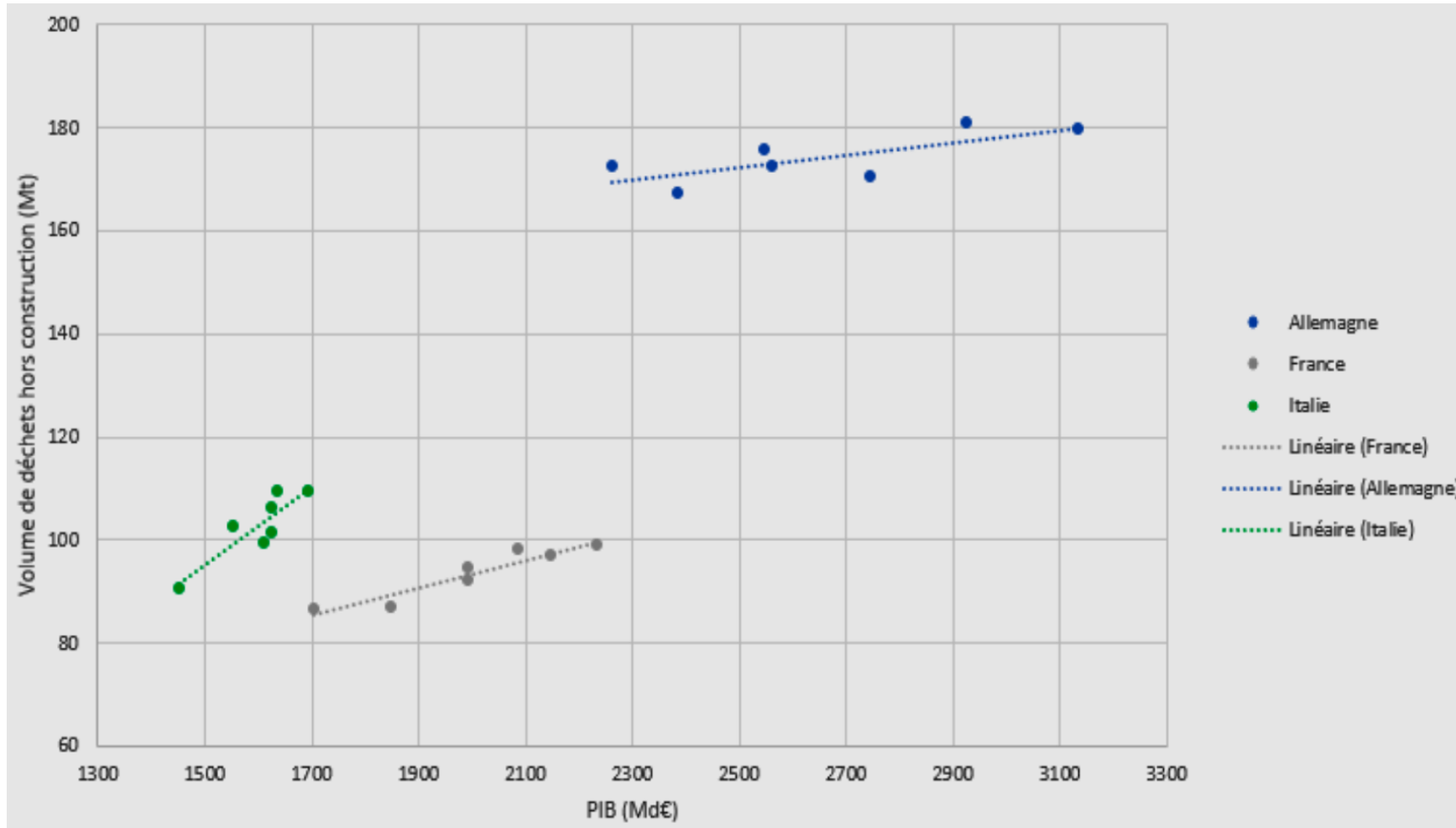


Figure 6 : Waste volume growth versus GDP growth

Figure V-5 : Avoid primary Energy thanks to recycling

Figure V-5 : Consommation d'énergie primaire évitée par le recyclage en 2014

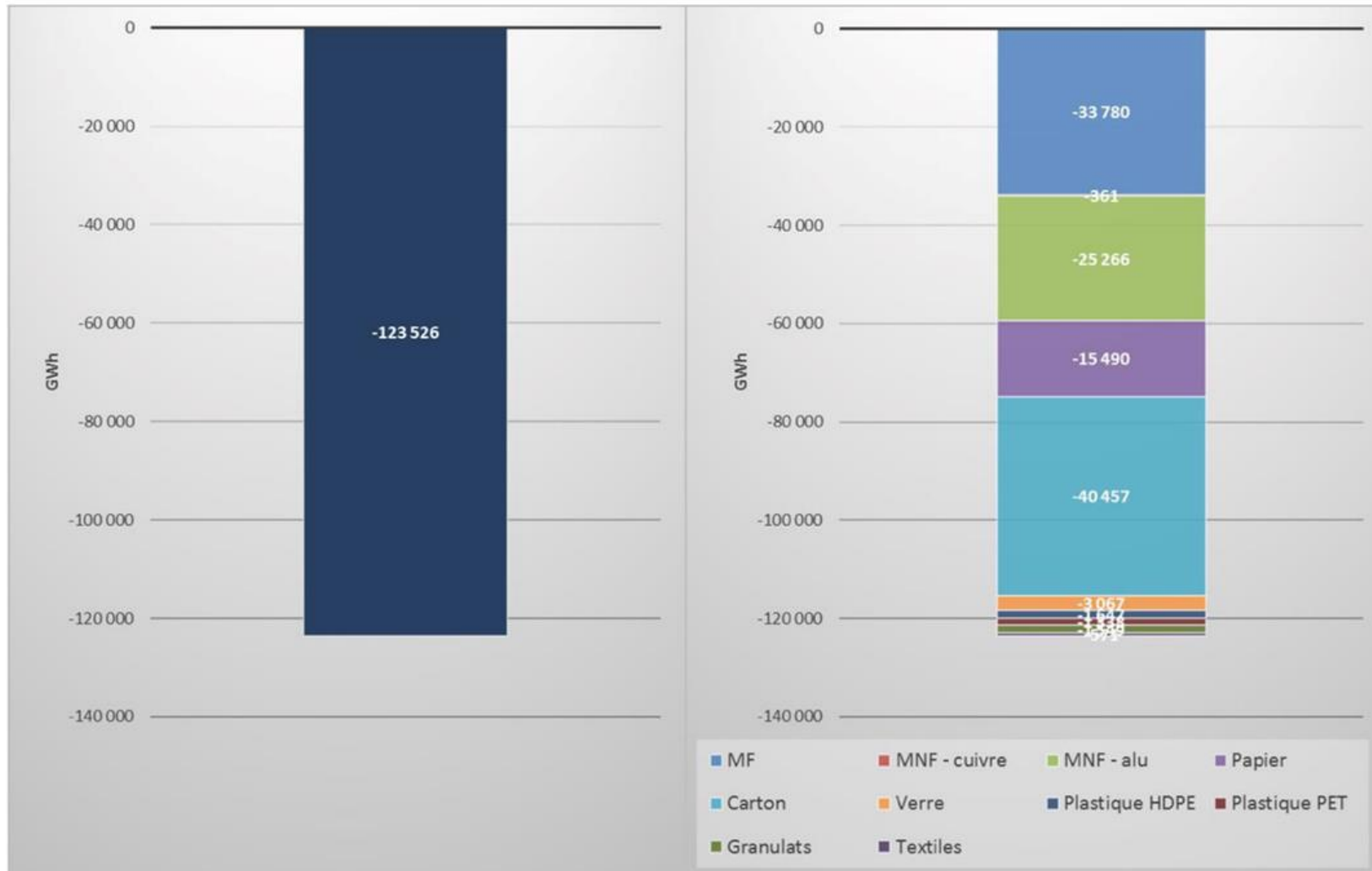
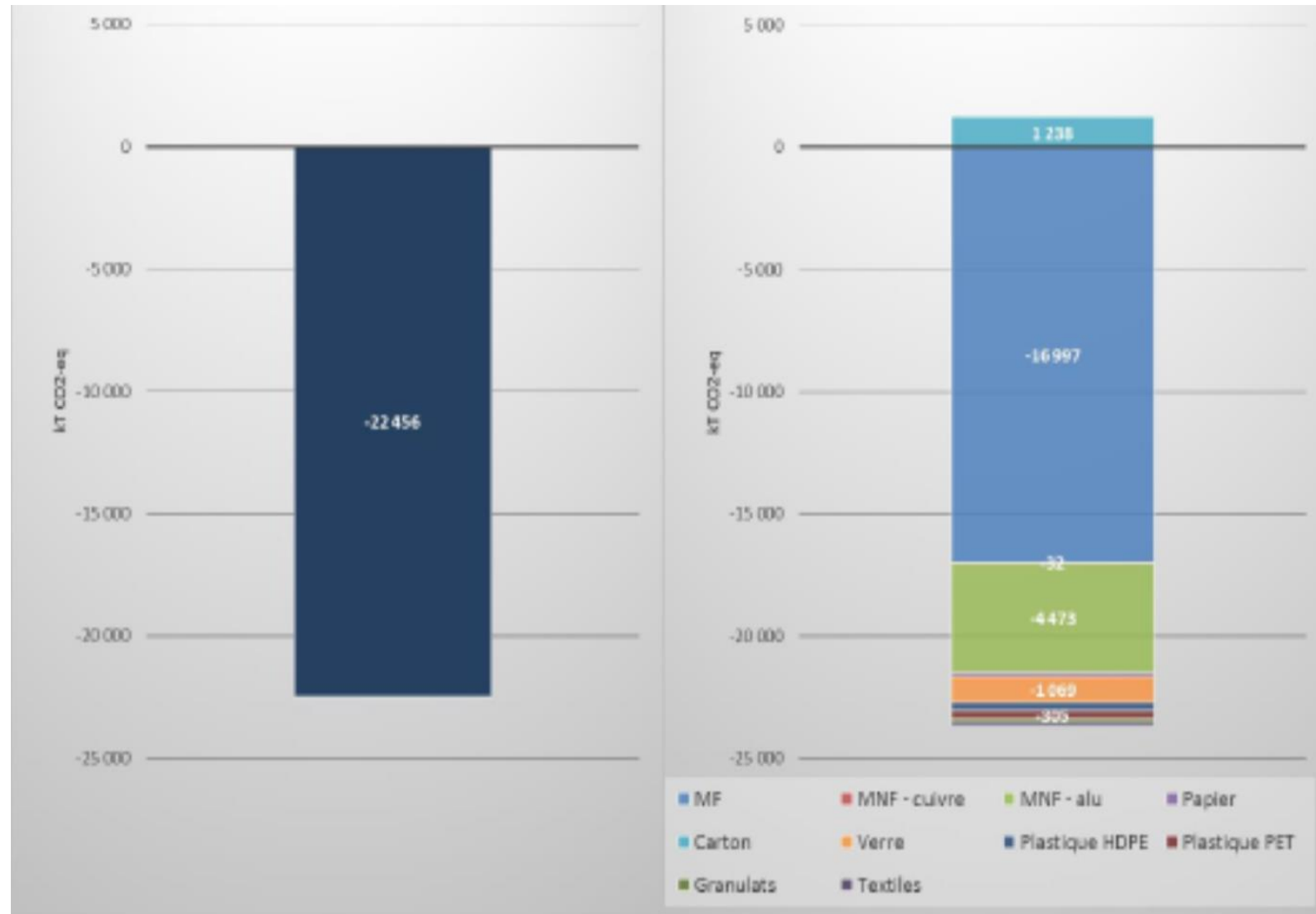


Figure V-1 : Avoid GHG emission thanks to recycling



The directions to be reinforced in the coming years the alumni's education path

- new materials
- new energy equipment
- new mobility devices
- new recycling technologies
- farming processes and crops selection
- data Management and AI development

Thank you