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WORKING GROUP III CONTRIBUTION TO THE IPCC SIXTH ASSESSMENT REPORT (AR6), CLIMATE CHANGE 2022: MITIGATION OF CLIMATE CHANGE

Chapter 17: Supplementary Material - Accelerating the transition in the context of sustainable development - Final Draft Underlying Scientific -Technical Assessment

(Submitted by the Co-Chairs of Working Group III)

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NOTE:
The Final Draft Underlying Scientific-Technical Assessment is submitted to the Fourteenth Session of Working Group III for acceptance. The IPCC at its Fifty-sixth Session (Electronic Session, 21 March – 1 April 2022) will be informed of the actions of the Fourteenth Session of Working Group III in this regard.

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Sector	Sectoral Mitigation Options	Sustainable Development Goals																	Line of sight (section numbers, tables, figures, box)	Remarks (Context Specificity/Scale)
		SDG 1 End poverty	SDG 2 Zero hunger	SDG 3 Good Health and wellbeing	SDG 4 Quality Education	SDG 5 Gender equality	SDG 6 Clean water and sanitation	SDG 7 Affordable and clean energy	SDG 8 Decent work economic growth	SDG 9 Industry innovation and infrastructure	SDG 10 Reduced inequalities	SDG 11 Sustainable cities and communities	SDG 12 Responsible consumption and Production	SDG 13 Climate Action	SDG 14 Life below water	SDG 15 Life on Land	SDG 16 Peace, justice and strong institutions	SDG 17 Partnership		
Energy Systems	Wind energy	+ Wind can provide low-cost electricity to several communities (high confidence)	± Land use for wind energy needs to be coordinated based on local circumstances otherwise can have negative implications on food security (moderate confidence)	+ Minimal air pollution, also integration with health sector frequently discussed (high confidence)			+ Low consumption of water (high confidence)	+ Low-cost and low-carbon electricity in several regions (high confidence)	+ Large job creation per unit investment (moderate confidence)	+ Integration with offshore and other infrastructure (moderate confidence)		+ Could help through net metering (moderate confidence)	- Significant material consumption and disposal needs (high confidence)	+ Low-carbon emissions (high confidence)	± Offshore wind could pose risk to marine life if not appropriately managed (high confidence)	± Land use for wind energy needs to be coordinated otherwise can have negative implications on biodiversity (moderate confidence)			Section 6.4.2.2, Section 6.3.5	Key context would include availability of land that does not compromise biodiversity
	Solar energy	+ Solar PV can provide low-cost electricity to several communities (high confidence)	± Land use for solar energy needs to be coordinated based on local circumstances otherwise can have negative implications on food security (moderate confidence)	+ Minimal air pollution, also integration with health sector frequently discussed (high confidence)			± Low consumption of water for PV but higher for CSP (high confidence)	+ Low-cost and low-carbon electricity in several regions (high confidence)	+ Large job creation per unit investment (moderate confidence)	+ Solar heat may be used in industrial heating		+ Could help through net metering (moderate confidence)	- Significant material consumption and disposal needs (high confidence)	+ Low-carbon emissions (high confidence)		± Land use for solar energy needs to be coordinated otherwise can have negative implications on biodiversity (moderate confidence)			Section 6.4.2.1, Section 6.3.5	Key context would include availability of land that does not compromise biodiversity. Moreover, coordination with materials cycles is needed.
	Hydropower		± Could lead to fisheries damage if not properly managed (moderate confidence)	+ Minimal air pollution (high confidence)			+ Coordination with water infrastructure (moderate confidence)	+ Low-cost and low-carbon electricity in several regions (high confidence)						+ Low-carbon emissions (high confidence)	± Could lead to fisheries damage if not properly managed (moderate confidence)	± Land use needs to be coordinated otherwise can have negative implications on biodiversity (moderate confidence)			Section 6.4.2.3	Key context would include availability of land that does not compromise biodiversity
	Geothermal energy	+ Potential to provide energy in several energy scarce regions (low confidence)		± Low air pollution but some water pollution risks (moderate confidence)			± Water flowback, water pollution and other issues (moderate confidence)	+ Low-cost and low-carbon electricity and heat in several regions (high confidence)		+ Heat may be used in industrial heating		+ Potential for air conditioning and heating (moderate confidence)		+ Low-carbon emissions (high confidence)					Section 6.4.2.8	Would depend on water management infrastructure.
	Nuclear power			+ Reduced air pollution if displacing fossil (high confidence)			- Significant water consumption (high confidence)			+ Could provide low-carbon heat (moderate confidence)			+ Low resource consumption (moderate confidence)	+ Low-carbon emissions (high confidence)					Section 6.4.2.4	Depends on the type of power plants being displaced.
	Bioenergy	± Bioenergy may be useful to provide rural energy, But large-scale bioenergy projects with CCS may be expensive (moderate confidence)	- Bioenergy may compete with food crops (moderate confidence)	± Depending on the scale and infrastructural efficacy, bioenergy may result in good or poor air quality (moderate confidence)			- Some bioenergy feedstocks may cause competition for water (high confidence)	+ Significant potential to deliver low-carbon or carbon-negative energy (high confidence)	+ Potential to provide employment, including to workers who may be transitioning from fossil sectors (high confidence)	+ Considerable opportunities for integration with other industries such as wastewater treatment (high confidence)		+ Could lead to low carbon transport fuels (high confidence)	+ Use of waste biomass could be useful (high confidence)	+ Low-carbon emissions (high confidence)					Section 6.4.2.6	The regional context in terms of the types of biomass/land being utilized is critical.
	Carbon Capture and Storage (CCS)	- Increased cost of electricity, energy or products likely (high confidence)		+ CCS infrastructure generally requires reduction of air pollutants for optimal operation (high confidence)			- Water use generally increases significantly; Significant water treatment needs may also arise for brines (high confidence)		+ Potential to spur technological innovation; also could reduce inequity risks for fossil workers	+ Could help decarbonize some hard-to-decarbonize sectors (high confidence)			± Use of resources and chemicals could increase unless appropriately managed	+ Low-carbon emissions (high confidence)					Section 6.4.2.5	Water use could be managed to remain neutral but could also increase based on how produced waters and cooling water is managed.
	Fossil fuel phaseout	+ Could help reduce environmental degradation in communities (low confidence)		+ Reduction in air pollution, particularly through coal phaseout (high confidence)				± Cost of electricity may reduce but may also increase in some regions/times (moderate confidence)	± Workers may be reemployed in other sectors but risks for regional inequity (high confidence)	+ Could spur innovation in sectors such as electricity storage (high confidence)	+ Could help reroute subsidy funds (low confidence)	+ Could reduce urban air pollution (high confidence)	± Reduced fuel extraction but likely large extraction of other minerals (high confidence)	+ Reduced carbon emissions (high confidence)					Section 6.3.4, Section 6.7.4	Would depend on just transition mechanisms available (especially to workers)

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Sector	Sectoral Mitigation Options	Sustainable Development Goals SDG 1 End poverty	SDG 2 Zero hunger	SDG 3 Good Health and wellbeing	SDG 4 Quality Education	SDG 5 Gender equality	SDG 6 Clean water and sanitation	SDG 7 Affordable and clean energy	SDG 8 Decent work economic growth	SDG 9 Industry innovation and infrastructure	SDG 10 Reduced inequalities	SDG 11 Sustainable cities and communities	SDG 12 Responsible consumption and Production	SDG 13 Climate Action	SDG 14 Life below water	SDG 15 Life on Land	SDG 16 Peace, justice and strong institutions	SDG 17 Partnership	Line of sight (section numbers, tables, figures, box)	Remarks (Context Specificity/Scale)
Agriculture, Forestry and other Land use	Soil carbon management in agriculture	+may lead to narrowing the yield gap, higher and stable profit due to increased productivity and reduced input use with benefit to soil fertility. Water management for reducing drought and adapting to climate change is important issue (high confidence)	+better and sustainable soil management will improve food production and availability as well. Water management for reducing drought and adapting to climate change is important issue (high confidence)	± probably no direct impact (soil-human health nexus thorugh nutritional transfer: may contribute to better nutrient security through quality and nutrient rich products and better living if higher profits and deiversified products) (medium confidence)			+ better landscape water balance by influencing the quality and availability of water supply (high confidence)		+ better soil management can lead to improved productivity and thus economic growth (medium confidence)				+/- low environment footprints, quality and healthy food production and economic and social viability from SLM options (high confidence)	+ clear climate benefit (high confidence)	+ better sponge function to life in water, and less nutrients into the water (medium confidence)	+ proved beneficial for combating soil degradation and improving soil health and beneficial to biodiversity (high confidence)	+ securing local food production and higher and stable profits may reduce migration and prevent conflict and support peace and justice (medium confidence)		Sections 7.3, 7.4 and 7.6	Almost not context or scale dependent. low-cost option, high level of technology readiness. difficulty in monitoring. Trade offs with other uses of the organic matter
	Reduce conversion of natural ecosystems (deforestation, loss and degradation of peatlands and coastal wetlands)	± protecting huge areas may lead to poverty (medium confidence)	- may lead to some competition for land (medium confidence)	+ cleaner air, greener environment generally leads to better health (high confidence)			+ better landscape water balance (high confidence)		± may lead to competition for land and less economic benefits (medium confidence)			± when surrounding cities, it may lead to cooling (high confidence)		+ clear climate benefit (high confidence)	+ better sponge function to life in water, and less nutrients into the water (high confidence)	+ beneficial to biodiversity (high confidence)	- may lead to more competition for resources and thus pressures between actors (low confidence)	'± may lead to joint forces (low confidence)	Section 7.4	Many benefits in terms of climate and biodiversity. It can compete for land and thus with food provision
	Afforestation, reforestation, restoration	+ if it provides income, food and wood products , then neutral to positive (medium confidence)	- may lead to competition for land when done at large scales (medium confidence)	+ cleaner air, greener environment generally leads to better health (medium confidence)			+ better landscape water balance (high confidence)		- may lead to competition for land and less economic benefits (medium confidence)		'± when done with involvement of locals it can reduce inequality (low confidence)	+ when surrounding cities, it may lead to cooling (high confidence)		+ clear climate benefit (high confidence)	+ better sponge function to life in water when done in proper manner (high confidence)	+ beneficial to biodiversity when done in proper manner (medium confidence)			Section 7.4	Very much context dependent and on how measures are carried out. If carried out at massive scale, competition for food will arise, when carried out adapted to local circumstances, and for various needs, the trade offs are small; may have high opportunity costs.
	Forest and fire management	+ if it provides income and wood products, then neutral to positive (high confidence)	± if it provides income and wood products, then neutral to positive (low confidence)	+ cleaner air, greener environment generally leads to better health (low confidence)			+ better landscape water balance (medium confidence)	± can lead to improved wood chain, including bioenergy from residues (high confidence)	+ if it provides income and wood products, then neutral to positive (medium confidence)	+ can lead to improved wood chain, and biobased product innovation (high confidence)	'± when done with involvement of locals it can reduce inequality (low confidence)	± can lead to cooling of cities and building with biobased products (medium confidence)		+ most likely climate benefit (medium confidence)	+ better sponge function to life in water, and less nutrients into the water (medium confidence)	+ beneficial to biodiversity (high confidence)			Section 7.4	This involves small changes in management of existing forests; effects per ha are small. Can be beneficial for biodiversity, provision of wood, etc
	Reduce CH4 and N2O emissions from agriculture		± when part of improved agriculture , it may be reduce hunger (low confidence)	+ cleaner air and soil-plant-herbivore nexus (high confidence)			'± less use of water and less manure into water streams (low confidence)			± requires innovative food production (low confidence)			+ reduction of emissions (medium confidence)	+ clear reduction of emissions (high confidence)	+ less impact on water (high confidence)	+ less impact on land (high confidence)			Section 7.4	Risks include mitigation persistence, ecological impacts associated with improving feed quality and supply, or potential toxicity and animal welfare issues concerning feed additives.
	Shift to sustainable healthy diets	± depends whether the healthier diet is cheaper, often not (medium confidence)	+ balanced food distribution globally may reduce prices for many (low confidence)	+ healthier diets for affluent populations (high confidence)			+ less use of water (high confidence)	+ may lead to less energy use (high confidence)		± more innovative food production (medium confidence)	+ balanced food globally may reduce prices for many (low confidence)	+ balanced food globally may provide more sustainable societies (low confidence)	+ clear reduction of emissions (high confidence)	+ clear reduction of emissions (high confidence)	+ less impact on water (medium confidence)	+ less impact on land (high confidence)			Section 7.4	only for affluent societies; synergies occur because it may lead to freeing up land
	Reduce food loss and food waste	+ reduced food loss will reduce prices, and may lead to less poverty (high confidence)	+ reduced food loss will reduce prices, and may lead to more food available (high confidence)	+ reduced food loss will reduce prices, and may lead to more food available (high confidence)			+ less use of water (high confidence)	+ lead to less energy use (high confidence)			+ balanced food distribution globally may reduce prices for many (low confidence)	+ balanced food distribution globally may provide more sustainable societies (low confidence)	+ balanced food distribution and reduced losses is part of responsible consumption (high confidence)	+ clear reduction of emissions (high confidence)	+ less impact on water (medium confidence)	+ less impact on land (high confidence)	+ leads to less competition for resources and thus less pressures between actors (medium confidence)		Section 7.5	occurs in all societies, there are no trade-offs
	Renewables supply (timber, biomass, agri feedstock)	± can lead to both positive and negative outcomes for livelihoods and food security; if it provides income, food and wood products , then neutral to positive (medium confidence)	± may lead to competition when done at large scale and not taking into account local circumstances or needs (medium confidence)	± can lead to greener landscape, but can also result in large scale undesirable changes (medium confidence)			± can lead to better landscape level water balnce when done in proper manner (medium confidence)	± can lead to better and more stable products and energy provision done properly (medium confidence)	+ if it provides income and wood products, then neutral to positive (medium confidence)	+ can lead to improved wood chain, and biobased product innovation (high confidence)				± clear reduction of emissions up to certain scales and volumes and when negative land use effects are avoided (high confidence)	± depending on type of land use less impact on water (medium confidence)	± depending on type of land use less impact on life on land (medium confidence)			Section 7.6	very much context dependent and dependent on how measures are carried out, leads to enhanced production of renewables needed for substitution of fossil based products. If done at massive scale and not adapted to local circumstances, then there are adverse implications for food security and livelihoods, biodiversity.

Mitigation Options	Sustainable Development Goals					
	SDG 1 End poverty	SDG 2 Zero hunger	SDG 3 Good Health and wellbeing	SDG 4 Quality Education	SDG 5 Gender equality	SDG 6 Clean water and sanitation
Urban land use and spatial planning	(+) Provides employment density and supports productivity (H) (+) Can reduce exposure and vulnerability to climate change given policy integration (H)	(+) Better spatial planning will reduce pressures on land use change, including croplands (H) (-) Growth in urban extent can still reduce cropland if not sufficiently managed (H)	(+) Improves access to health infrastructure; improves air quality when coupled to shifting energy use, improves wellbeing with green and blue infrastructure (H)	(+) Better spatial planning increases educational opportunities (M)	(+) Can increases equal opportunities and effective participation of women, including urban governance (M)	(+) Can improve water quality, water-use efficiency, water harvesting and wastewater treatment; efficient urbanization can also reduce GHG emissions from water infrastructure (H)
Electrification of the urban energy system	(+) Can address energy poverty that is linked to poverty; eradicating poverty is supported by access to modern energy services for all (M)	(+) Electrification can support welfare; electric stoves can support nutritional food intake (M) (-) Can have trade-offs if food systems are coupled with electricity and bioenergy (M)	(+) Improves air quality when coupled to shifting energy use as included in the option; Avoids air pollution from energy and transport infrastructure; Supports energy services for quality health services in hospitals (H)	(+) Electrification and access to electricity supports quality education and educational attainment (H)	(+) Supports equal opportunities, also through electricity for internet access if previously lacking (M)	(+) Renewable energy powered water treatment facilities can support clean water and sanitation (M)
District heating and cooling networks	(+) Can address energy poverty that is linked to poverty; eradicating poverty is supported by access to modern energy services for all (M)	(-) Can have trade-offs if food systems are coupled with bioenergy and heat (M)	(+) Improves air quality when coupled to shifting energy use as included in the option; Supports energy services for quality health services in hospitals (M)			
Urban green and blue infrastructure	(+) Can increase employment and food security, e.g. urban agriculture (H)	(+) Can increase employment and food security, e.g. urban agriculture (M)	(+) Better ecosystem services improves health and wellbeing, can improve air quality (H)	(+) Urban green and blue infrastructure can increase opportunities and sites for environmental education (M)		(+) Also supports water sensitive urban planning and protection of water-related ecosystems (H)
Waste prevention, minimization and management	(+) Can reduce informality in the waste sector and support poverty alleviation (H)	(+) Can support reducing food waste in municipalities and urban centers (M)	(+) Better waste management improves air quality (H) (-) Can depend on air pollution control techniques if waste incineration is involved (M)			(+) Improved water and wastewater infrastructure will reduce water pollution (H)
Integrating sectors, strategies and innovations	(+) Increases employment density, reduces poverty and exposure and vulnerability to climate change (H)	(+) Supports livelihoods, reduces pressures on croplands and consumption related land use impacts (H)	(+) Improves access to health infrastructure; improves air quality when coupled to shifting energy use, improves wellbeing with green and blue infrastructure (H)	(+) Can increase education opportunities, access to electricity and environmental education (H)	(+) Can increases equal opportunities and effective participation of women, including urban governance (M)	(+) Can improve water quality, water-use efficiency, water harvesting and wastewater treatment; efficient urbanization can also reduce GHG emissions from water infrastructure (H)

Mitigation Options	SDG 7 Affordable and clean energy	SDG 8 Decent work economic growth	SDG 9 Industry innovation and infrastructure	SDG 10 Reduced inequalities	SDG 11 Sustainable cities and communities	SDG 12 Responsible consumption and Production
Urban land use and spatial planning	(+) Can reduce energy use and enable access to modern energy infrastructure while urban infrastructure for energy services varies (H)	(+) Provides employment density and supports productivity (H)	(+) Sustainable urbanisation and settlement planning requires development across all infrastructure sectors (H)	(+) Spatial inequalities within cities can be reduced; Urban infrastructure gap between cities can be reduced (H) (-) Unintended gentrification and spatial inequalities are still possible (M)	(+) Supports capacity for participatory, integrated and sustainable human settlement planning (Target 11.3) and protecting the poor and vulnerable (Target 11.5) (H)	(+) Urbanisation with lower material demands will support responsible consumption and production (H) (-) Urban population growth contributes to increased demand for resources with differences in scenarios; increase in urban water demand can increase pressures on water scarcity; over-exploitation of groundwater needs to be avoided (M)
Electrification of the urban energy system	(+) Supports renewable energy, energy efficiency and access to affordable, reliable and modern energy; renewable-energy generation technologies can enhance infrastructure resilience (H)	(+) Supports technological upgrading, innovation and decent job creation (H)	(+) Supports sustainable and resilient infrastructure and can support domestic technology development; renewable-energy generation technologies can enhance infrastructure resilience (H)	(+) Supports equal opportunities, e.g. through internet access if previously lacking (H)	(+) Supports adequate, safe and affordable housing as well as safe, affordable, accessible and sustainable transport (Targets 11.1 and 11.2) (H)	(+) Allows leapfrogging to more resource-efficient urban development (H) (-) Material demands of electrification technologies will increase; policies are important (M)
District heating and cooling networks	(+) Supports renewable energy, energy efficiency and access to affordable, reliable and modern energy (M)	(+) Supports technological upgrading, innovation and decent job creation (M)	(+) Is being used to support sustainable and resilient infrastructure, including adaptation and mitigation (M)		(+) Supports capacity for participatory, integrated and sustainable human settlement planning (Target 11.3) (H)	(+) Allows leapfrogging to more resource-efficient urban development (M)
Urban green and blue infrastructure	(+) Produces a cooling effect, lowering energy use when in relative proximity (M)	(+) Can stimulate new green economies and green jobs (M)	(+) Supports sustainable and resilient infrastructure (H)	(+) Can support equity given policy design (M) (-) Can push out low income residents from main city areas without inclusive policy design (M)	(+) Supports air quality and universal access to safe, inclusive and accessible green and public spaces (Target 11.7) (H)	(+) Supports sustainable development and lifestyles also "in harmony with nature" as emphasized (Target 12.8) (H)
Waste prevention, minimization and management		(+) Can stimulate employment for value added products (M) (-) Transforming informality of waste recycling activities into programs are important (M)	(+) Supports sustainable and resilient infrastructure (H)		(+) Directly related to waste management; supports links between urban, peri-urban and rural areas (Target 11.a) (H)	(+) Reduces waste generation through prevention, reduction, recycling and reuse (Target 12.5) (H) (-) Waste segregation at source and waste processing facilities differs across context (H)
Integrating sectors, strategies and innovations	(+) Supports renewable energy, energy efficiency and access to affordable, reliable and modern energy (H)	(+) Supports technological upgrading, innovation and decent job creation (H)	(+) Supports sustainable and resilient infrastructure (H)	(+) Can reduce the urban infrastructure gap; sustainable urbanization can support reducing inequality within and among cities; Inclusivity of inhabitants in the informal sector is important (H)	(+) Supports integrated policies and plans for inclusion, resource efficiency, mitigation and adaptation (Target 11.b) (H)	(+) Allows leapfrogging to more resource-efficient urban development (H)

Mitigation Options	SDG 13 Climate Action	SDG 14 Life below water	SDG 15 Life on Land	SDG 16 Peace, justice and strong institutions	SDG 17 Partnership	Additional Information: Line of sight (section numbers, tables, figures, box)	Additional Information: Remarks (Context Specificity/Scale)
Urban land use and spatial planning	(+) Contributes to both climate mitigation and adaptation given integration in urban planning (H)	(+) Can reduce growth in urban expansion that can help protect coastal and marine ecosystems (M) (-) Urban development can still impact coastal and marine ecosystems (M)	(+) Can reduce growth in urban expansion that can help protect biodiversity on land and terrestrial and inland freshwaters (H) (-) Urban development can still impact biodiversity (M)	(+) Has synergies with responsive, inclusive and participatory decision-making at all levels and transparent institutions (M)		Section 8.2, 8.4, 8.6	
Electrification of the urban energy system	(+) Energy infrastructure can also strengthen climate resilience and adaptive capacity if addressed together (M)	(+) Energy systems can be designed to minimize impacts on water ecosystems (M)	(+) Clean energy will reduce the impacts of climate change on biodiversity and terrestrial ecosystems (H) (-) Hydropower development and biofuel cultivation may impact ecosystems while there are multiple alternatives, e.g. use of degraded lands for solar energy farms (M)	(+) Improvement in governance through inclusive decision-making improves ability for energy systems to contribute to sustainable development (M)		Section 8.2, 8.4, 8.6	
District heating and cooling networks	(+) Energy infrastructure can also strengthen climate resilience and adaptive capacity if addressed together (M)		(+) Clean energy will reduce the impacts of climate change on biodiversity and terrestrial ecosystems (H)	(+) Improvement in governance through inclusive decision-making improves ability for energy systems to contribute to sustainable development (M)		Section 8.2, 8.4, 8.6	The impacts of the possible synergies and/or trade-offs with the SDGs will change according to the specific urban context. Synergies and/or trade-offs may be more significant in certain contexts than others. Urban mitigation with a view of the SDGs can support shifting pathways of urbanization towards sustainability. The feasibility of urban mitigation options are also malleable and can increase with more enablers. Strengthened institutional capacity that also supports the scale and coordination of the mitigation options can increase these synergies.
Urban green and blue infrastructure	(+) Contributes to both climate mitigation and adaptation given integration in urban planning (H)	(+) Blue infrastructure can contribute to protecting coastal and marine ecosystems (H)	(+) Enhances biodiversity within urban areas and ecosystem services (H)	(+) Has synergies with responsive, inclusive and participatory decision-making at all levels and transparent institutions (M)		Section 8.2, 8.4, 8.6	
Waste prevention, minimization and management	(+) Reduces emissions through better management of urban waste in different contexts and is important for resilience, including coastal areas (M)	(+) Better waste management and wastewater treatment will protect coastal and marine ecosystems, reduce marine debris and nutrient pollution (H)	(+) Better waste management and wastewater treatment will protect terrestrial and inland freshwaters (H)	(+) Has synergies with responsive, inclusive and participatory decision-making at all levels and transparent institutions (M)		Section 8.2, 8.4, 8.6	
Integrating sectors, strategies and innovations	(+) Contributes to both climate mitigation and adaptation given integration in urban planning (H)	(+) Can reduce growth in urban expansion that can help protect coastal and marine ecosystems (M)	(+) Can reduce growth in urban expansion that can help protect biodiversity on land and terrestrial and inland freshwaters (H)	(+) Has synergies with responsive, inclusive and participatory decision-making at all levels and transparent institutions (M)	(+) Partnerships support sustainable infrastructure for urban areas; supports policy coherence for sustainable development (Target 17.14) (H)	Section 8.2, 8.4, 8.6	

Note: A combined evaluation for Level of Confidence (LoC) is given with L=Low, M=Medium, H=High.

Sector	Sectoral Mitigation Options	Sustainable Development Goals						
		SDG 1 End poverty	SDG 2 Zero hunger	SDG 3 Good Health and wellbeing	SDG 4 Quality Education	SDG 5 Gender equality	SDG 6 Clean water and sanitation	SDG 7 Affordable and clean energy
Buildings	Highly energy efficient building envelope	+ Reduce poverty due to less energy expenditures and other financial savings ; - The distributional costs of some mitigation policies supporting energy efficiencymay reduce the disposable income of the poor (medium confidence)	+ Result in avoiding the "heat or eat" dillema (low confidence)	+ Improve health through better indoor air quality, fuel poverty alleviation, better ambient air quality, and reduction of the heat island effect. - inadequate ventilation may lead to the sick building syndrome symptoms (high confidence)	+ Reduce school absenteeism due to better indoor conditions, while fuel poverty alleviation increases the availble space at home for reading (medium confidence)		+ Lower energy demand can lead to reduced water demand for thermal cooling at energy production facilities (medium confidence)	+ Result in fuel poverty alleviation and improving the security of energy supply (high confidence)
	Building design and performance	+ Reduce poverty due to less energy expenditures and other financial savings (medium confidence)	+ Result in avoiding the "heat or eat" dillema. Also, green surfaces and urban farming (vertical, basement or unused buildings) contribute to local and resilient food production (medium confidence)	'+ Improve health through better indoor air quality, fuel poverty alleviation, better ambient air quality, and reduction of the heat island effect (high confidence)			+ Lower energy demand can lead to reduced water demand for thermal cooling at energy production facilities. Also, these measures result in water savings due to improved indoor conditions and lower space of dwellings (medium confidence)	+ Result in fuel poverty alleviation and improving the security of energy supply (high confidence)
	Efficient heating, ventilation and air conditioning (HVAC)	+ Reduce poverty due to less energy expenditures and other financial savings ; - The distributional costs of some mitigation policies supporting energy efficieny may reduce the disposable income of the poor (medium confidence)	+ Result in avoiding the "heat or eat" dillemma (low confidence)	'+ Improve health through better indoor air quality, fuel poverty alleviation, better ambient air quality, and reduction of the heat island effect (high confidence)			+ Lower energy demand can lead to reduced water demand for thermal cooling at energy production facilities (medium confidence)	+ Result in fuel poverty alleviation and improving the security of energy supply (high confidence)
	Efficient Appliances	+ Reduce poverty due to less energy expenditures and other financial savings ; - The distributional costs of some mitigation policies supporting energy efficiency may reduce the disposable income of the poor (medium confidence)	+ Result in avoiding the "heat or eat" dillema. Also, improved cookstoves provide better food security (medium confidence)	'+ Improve health through better indoor air quality, fuel poverty alleviation, better ambient air quality, and reduction of the heat island effect (high confidence)	+ Reduce school absenteeism due to better indoor conditions, while fuel poverty alleviation increases the availble space at home for reading (medium confidence)	+ Efficient cookstoves result in substantial time savings for women, thus increasing the time for rest, communication, education and productive activities (medium confidence)	+ Lower energy demand can lead to reduced water demand for thermal cooling at energy production facilities (medium confidence)	+ Result in energy/fuel poverty alleviation and improving the security of energy supply (high confidence)
	Change in construction methods and circular economy			+ Improve health through better labor conditions (medium confidence)		-	± The change in construction methods and the devlopment of circular business models can lead to reduced or increased water demand, as a trade-off (medium confidence)	+ Result in energy/fuel poverty alleviation and improving the security of energy supply (high confidence)
	Change in construction materials			+ Bio-based and natural materials, e.g. raw earth can improve indoor air quality and brings the concept of biophilia; - Bio-based and natural materials can be more susceptible to the appearance of biological organisms that can cause health problems (medium confidence)		-	± The change in construction materials can lead to reduced or increased water demand, as a trade-off (medium confidence)	+ Result in energy/fuel poverty alleviation and improving the security of energy supply (high confidence)
	Demand-side management	+ Reduce poverty due to less energy expenditures and other financial savings (high confidence)	+ Result in avoiding the "heat or eat" dillemma (low confidence)	'+ Improve health through better indoor air quality, fuel poverty alleviation, better ambient air quality, and reduction of the heat island effect. Furthermore, smart controllers and wireless communications that are used for controlling lighting, windows, HVAC equipment, water heaters, and other building equipment provide many other non-energy benefits such as improved security, access control, fire and other emergency detection and management, and on-time identification of maintenance issues (high confidence)			+ Lower energy demand can lead to reduced water demand for thermal cooling at energy production facilities (medium confidence)	+ Result in fuel poverty alleviation and improving the security of energy supply (high confidence)
	On-site and nearby production and use of renewables	+ Increase the productive time of women and children; - The distributional costs of some mitigation policies supporting RES may reduce the disposable income of the poor (medium confidence)	+ Improving energy access enhances agricultural productivity and improves food security . - increased bioenergy production may restrict the available land for food production (medium confidence)	'+ Improve health through better indoor air quality, energy/fuel poverty alleviation, better ambient air quality, and reduction of the heat island effect (high confidence)	+ Reduce school absenteeism due to better indoor conditions and enable people living in poor developing countries to read (medium confidence)	+ Improved access to electricity and clean fuels in developing countries will result in substantial time savings for women , thus increasing the time for rest, communication, education and productive activities (medium confidence)	+ Substituting fossil-fueled electricity can lead to reduced water demand for thermal cooling at energy production facilities. Also, improved access to electricity is necessary to treat water at homes . - Switch to bioenergy may increase wter use compared to existing conditions. (medium confidence)	+ Result in energy poverty alleviation and improving the security of energy supply. - Risks of reduced energy access, in cases where the distributional costs of mitigation increase the energy costs (medium confidence)

Sector	Sectoral Mitigation Options	SDG 8 Decent work economic growth	SDG 9 Industry innovation and infrastructure	SDG 10 Reduced inequalities	SDG 11 Sustainable cities and communities	SDG 12 Responsible consumption and Production	SDG 13 Climate Action	SDG 14 Life below water
Buildings	Highly energy efficient building envelope	± Result in direct and indirect macroeconomic effects (GDP, employment, public budgets) associated with lower energy prices due to the reduced energy demand, energy efficiency investments, and fostering innovation. + Also result in improving labour productivity . (high confidence)	+ The development of 'green buildings' can foster innovation; - Reduced energy demand can lead to early retirement of fossil energy infrastructure. (medium confidence)	'± Can reduce or increase income inequalities (medium confidence)	+ Eliminate major sources (both direct and indirect) of poor air quality (indoor and outdoor). Also, buildings with high energy efficiency and/or green features are sold/rented at higher prices than conventional, low energy efficient houses. (high confidence)	+ Result in reduced consumption of natural resources (medium confidence)	+ Reduce emissions and increase resilience (high confidence)	
	Building design and performance	± Result in direct and indirect macroeconomic effects (GDP, employment, public budgets) associated with lower energy prices due to the reduced energy demand . (high confidence)	- Reduced energy demand can lead to early retirement of fossil energy infrastructure. (medium confidence)	+ Reduce income inequalities (low confidence)	+ Eliminate major sources (both direct and indirect) of poor air quality (indoor and outdoor). (high confidence)	+ Result in reduced consumption of natural resources (medium confidence)	+ Reduce emissions and increase resilience (high confidence)	
	Efficient heating, ventilation and air conditioning (HVAC)	± Result in direct and indirect macroeconomic effects (GDP, employment, public budgets) associated with lower energy prices due to the reduced energy demand, energy efficiency investments, and fostering innovation. + Also result in improving labour productivity . (high confidence)	+ The development of 'green buildings' can foster innovation; - Reduced energy demand can lead to early retirement of fossil energy infrastructure. (medium confidence)	'± Can reduce or increase income inequalities (medium confidence)	+ Eliminate major sources (both direct and indirect) of poor air quality (indoor and outdoor). (high confidence)	+ Result in reduced consumption of natural resources (medium confidence)	+ Reduce emissions and increase resilience (high confidence)	
	Efficient Appliances	± Result in direct and indirect macroeconomic effects (GDP, employment, public budgets) associated with lower energy prices due to the reduced energy demand, energy efficiency investments, and fostering innovation. + Also result in improving labour productivity . (high confidence)	- Reduced energy demand can lead to early retirement of fossil energy infrastructure. (medium confidence)	'± Can reduce or increase income inequalities ; + Efficient cookstoves result in substantial time savings for women and children, thus enhancing education and the development of productive activities (medium confidence)	+ Eliminate major sources (both direct and indirect) of poor air quality (indoor and outdoor). (high confidence)	+ Result in reduced consumption of natural resources; - Possible risks due to the penetration of new efficient appliances and early retirement of existing equipment. (medium confidence)	+ Reduce emissions and increase resilience (high confidence)	
	Change in construction methods and circular economy	± Result in direct and indirect macroeconomic effects (GDP, employment, public budgets) associated with development of smarter construction methods and circular business models . + Also result in improving labour productivity . (high confidence)	+ The development of smarter construction methods and circular business models can foster innovation. (high confidence)		+ Result in reduced consumption of natural and scarce resources, waste generation and enviromental impacts ; (high confidence)	+ Result in reduced consumption of natural and scarce resources; (high confidence)	+ Reduce emissions and increase resilience (high confidence)	
	Change in construction materials	± Result in direct and indirect macroeconomic effects (GDP, employment, public budgets) associated with the use and development of green construction materials . (medium confidence)	+ The use and development of green construction materials can foster innovation. (high confidence)		+ Result in reduced consumption of natural and scarce resources, waste generation and enviromental impacts; (high confidence)	+ Result in reduced consumption of natural and scarce resources; (high confidence)	+ Reduce emissions, removal and storage of CO2 (bio-based materials) and increase resilience (high confidence)	
	Demand-side management	± Result in direct and indirect macroeconomic effects (GDP, employment, public budgets) associated with lower energy prices due to the reduced energy demand, energy efficiency investments, and fostering innovation. + Also result in improving labour productivity . (high confidence)	+ Adoption of digitilization, smart meters, etc., help in infrastructure improvement and expansion; - Reduced energy demand can lead to early retirement of fossil energy infrastructure. (high confidence)	+ Reduce income inequalities (low confidence)	+ Eliminate major sources (both direct and indirect) of poor air quality (indoor and outdoor). (high confidence)	+ Result in reduced consumption of natural resources (medium confidence)	+ Reduce emissions and increase resilience (high confidence)	
	On-site and nearby production and use of renewables	± Result in diirect and indirect macroeconomic effects (GDP, employment, public budgets) associated with lower energy prices due to the reduced energy demand, RES investments, improved energy access and fostering innovation. (high confidence)	+ Adoption of RES and smart grids helps in infrastructure improvement and expansion ; - Increased RES penetration can lead to early retirement of fossil energy infrastructure (high confidence)	'± Can reduce or increase income inequalities ; + Improved access to electricity and clean fuels in developing countries will result in substantial time savings for women and children, enhancing education and the development of productive activities (medium confidence)	+ Eliminate major sources (both direct and indirect) of poor air quality (indoor and outdoor). (high confidence)	+ Result in reduced consumption of natural resources (medium confidence)	+ Reduce emissions and increase resilience (high confidence)	

Sector	Sectoral Mitigation Options	SDG 15 Life on Land	SDG 16 Peace, justice and strong institutions	SDG 17 Partnership	Line of sight (section numbers, tables, figures, box)	Remarks (Context Specificity/Scale)
Buildings	Highly energy efficient building envelope		+ Building retrofits are associated with lower crime ; Institutions that are effective, accountable and transparent are needed at all levels of government for boosting zero energy buildings . (medium confidence)	+ The development of zero energy buildings requires among others capacity building, citizen participation as well as monitoring of the achievements (medium confidence)	Section 9.8 and Table 9.5	Trade-offs related to public health may be minimized with adequate ventilation. Economic impacts (synergies and trade-offs) are associated with reduced energy demand, resulting lower energy prices, energy efficiency investments, fostering innovation, and improvements in labour productivity.
	Building design and performance	+ Green roofs and walls strengthen urban biodiversity (medium confidence)	+ Institutions that are effective, accountable and transparent are needed at all levels of government for boosting sufficiency measures . (medium confidence)		Section 9.8 and Table 9.5	Economic impacts (synergies and trade-offs) are mainly associated with reduced energy demand and the resulting lower energy prices.
	Efficient heating, ventilation and air conditioning (HVAC)				Section 9.8 and Table 9.5	The distributional costs of some mitigation policies may hinder the implementation of these measures. In this case, appropriate access policies should be designed to efficiently shield poor households from the burden of carbon taxation. Economic impacts (synergies and trade-offs) are associated with reduced energy demand, resulting lower energy prices, energy efficiency investments, fostering innovation, and improvements in labour productivity.
	Efficient Appliances	+ Result in halting deforestation through efficient cookstoves (medium confidence)			Section 9.8 and Table 9.5	Under real-world conditions improved cookstoves have shown smaller, and in many cases limited, long-run health and environmental impacts than expected, as the households use these stoves irregularly and inappropriately, fail to maintain them, and their usage decline over time. It is of paramount importance the various cookstove programs to consider the mid- and long-term needs of maintenance, repair, or replacement to support their sustained use. In addition, the distributional costs of some mitigation policies may hinder the implementation of these measures. In this case, appropriate access policies should be designed to efficiently shield poor households from the burden of carbon taxation. Economic impacts (synergies
	Change in construction methods and circular economy			+ The change in construction methods and the devlopment of circular business models requires a better integration and partnership between stakeholders (high confidence)	Section 9.4 and 9.5	Economic impacts (synergies and trade-offs) are associated with development of smarter construction methods, circular business models, and improvements in labour productivity.
	Change in construction materials	- Bio-based materials can increase the pressure and competition for land use (medium confidence)		+ The change in construction materials requires a better integration and partnership between stakeholders (high confidence)	Section 9.4	Economic impacts (synergies and trade-offs) are associated with the use and development of green construction materials.
	Demand-side management				Section 9.8 and Table 9.5	Economic impacts (synergies and trade-offs) are associated with reduced energy demand, resulting lower energy prices, energy efficiency investments, fostering innovation, and improvements in labour productivity.
	On-site and nearby production and use of renewables	+ Result in halting deforestation through improved access to electricity and clean fuels (medium confidence)	+ Improved access to electric lighting can improve safety (particularly for women and children); + Institutions that are effective, accountable and transparent are needed at all levels of government for providing energy access and promoting modern renewables. (medium confidence)	+ The development of zero energy buildings requires among others capacity building, citizen participation as well as monitoring of the achievements (medium confidence)	Section 9.8 and Table 9.5	The distributional costs of some mitigation policies supporting RES may reduce the disposable income of the poor and hinder their utilization. In this case, appropriate access policies should be designed to efficiently shield poor households from the burden of carbon taxation. Some of the trade-offs are mainly related to switch to bioenergy, which may restrict the available land for food production and increase water consumption. Economic impacts (synergies and trade-offs) are associated with reduced demand for fossil fuels, resulting lower energy prices, RES investments, fostering innovation, and improvements in energy access.

Sector	Sectoral Mitigation Options	Sustainable Development Goals																	Line of sight (section numbers, tables, figures, box)	Remarks (Context Specificity/Scale)
		SDG 1 End poverty	SDG 2 Zero hunger	SDG 3 Good Health and wellbeing	SDG 4 Quality Education	SDG 5 Gender equality	SDG 6 Clean water and sanitation	SDG 7 Affordable and clean energy	SDG 8 Decent work economic growth	SDG 9 Industry innovation and infrastructure	SDG 10 Reduced inequalities	SDG 11 Sustainable cities and communities	SDG 12 Responsible consumption and Production	SDG 13 Climate Action	SDG 14 Life below water	SDG 15 Life on Land	SDG 16 Peace, justice and strong institutions	SDG 17 Partnership		
	Fuel efficiency-light duty vehicle	+Improved efficiency reduces costs and makes transport more affordable (high confidence)		+ Reduce air pollution/ improve air quality (high confidence)				+Can support the global rate of improvement in overall energy efficiency (high confidence)	+creation of new jobs due to new investment in fuel efficiency (medium confidence)			+Can reduce air pollution in cities (high confidence)		+ Reduction of GHG emissions (high confidence)		+ reduce demand for land needed to produce transportation fuels (medium confidence)			Sections 10.3, 10.4, 10.8	
	Electric light duty vehicles			+ Reduce air pollution (high confidence)				+ EVs consume a considerable less energy than conventional fuels, which increases affordability (high confidence); ± EVs can positively or negatively impact electric grid functioning depending on charging behaviour and grid integration strategy (high confidence)	+ could create jobs associated with the EV supply chain; + could create jobs to build and operate the associated infrastructure (low confidence)	+ Larger penetration of electric vehicles requires innovative business models;n Digitalization and Automatic Vehicle will help on the socio-economic structures that impede adoption of EV's and the urban structures that enable reduced car dependence; There is a need for investments in the infrastructure that can support alternative fuels for LDVs. Large-scale electrification of LDVs requires expansion of low-carbon power systems, while charging or battery swapping infrastructure is [illegible]	±Significant equity issues with EV's in the transition period can be overcome with programs, for example, by expanding public charging infrastructure (medium confidence)	+Can reduce air and noise pollution in cities (high confidence)	'± could increase demand for critical mineral but increased recycling can mitigate this risk (medium confidence)	+ Reduction of GHG emissions (high confidence)					Sections 10.3, 10.4, 10.8	
	Fuel efficiency- heavy duty vehicle	+Improved efficiency reduces costs and makes transport more affordable (high confidence)		+ Reduce air pollution/ improve air quality (high confidence)				+Can support the global rate of improvement in overall energy efficiency (high confidence)	+creation of new jobs due to new investment in fuel efficiency (medium confidence)					+ Reduction of GHG emissions (high confidence)		+ reduce demand for land needed to produce transportation fuels (medium confidence)			Sections 10.3, 10.4, 10.8	
	Fuel shift (including electricity)- heavy duty vehicle			+ Reduce air pollution/ improve air quality (medium confidence)				+Some alternative fuels can help increase the share of renewable energy in the global energy mix (medium confidence).	+ could create jobs associated with thesupply chain of new fuels; + could create jobs to build and operate the associated infrastructure (low confidence)	+R&D is critical for new fuels and to test the full life cycle costs of various heavy vehicle options; need to invest in supporting infrastructure (high confidence)			'± Electric vehicles-EV and Fuel Cel Vehicle-FCVs for HDVs could increase demand for critical mineral but increased recyling can mitigate this risk (medium confidence)	+ Reduction of GHG emissions (high confidence)					Sections 10.3, 10.4, 10.8	
Transport	Shift to public transport	+ Affordable transport access for all ; + Improve access to health, education, and other social services lowering the cost of services needed by the low-income/ poor. (high confidence)		+ Access to healthcare; reduce air pollution/inrease air quality (high confidence)	+ Affordable public transport can increase accesible to educational resources (high confidence)	+ Affordable transport access for all (high confidence)		+ Improves energy efficiency of transport and makes it more affordable (high confidence)	+ Role of transport for economic and human development (high confidence)	±needs adequate infrastructure; In developing countries weather conditions and unreliable connectivity affect the lack of incentives to improve existent public transportation (high confidence)	+ improved investments in public transit increases equity in transport access (high confidence)	+ Sustainable transport systems for cities; facilitates universal access to public transport (high confidence);+ Could support positive economic links between urban and peri-urban areas (high confidence). + can reduce air pollution in cities (high confidence)	+ reduced material consumption during production of vehicles and their operations (high confidence)	+ Reduction of GHG emissions (high confidence)			+Governance and institutional capacity can now provide international exchanges and education programs based on successful cities and nations enabling vehicle decarbonisation to create more efficient and effective policy mechanisms towards self-sustaining markets (medium confidence) '±Global governance issues are also need to be reviewed in order to progress faster; Governance and institutional capacity can help make significant progress if targets are set and if not reached then levies or carbon taxes follow. (medium confidence)	+ Scaling up requires the development and strengthening of partnerships for planning and infrastructure (high confidence)	Section 10.2, 10.8 and Table 10.3	Increased demand for electricity for EVs and production of hydrogen and derivatives requires careful integration with the power sector. For example, increased demand for renewable electricity could pose additional land use constraints. Simultaneoulsy, smart charging of EVs can support the grid integration of renewables. Similarly, hydrogen production could be scheduled to manage the variability of wind and solar. Competition for hydrogen with other sectors should also be considered. Synergies and/or trade-offs may be more significant in certain contexts than others. Strengthened institutional capacity that also supports the scale and coordination of the mitigation options can increase these synergies.
	Shift to bikes, ebikes and non motorized transport	+ Affordable transport access for all ; + Improve access to health, education, and other social services lowering the cost of services needed by the low-income/ poor. (high confidence)		± Reduce air pollution; increases physical activity leading to reduced health mortality. - Traffic crashes discourage the use of bikes ; '+ Scaling up active modes (through careful local urban design and transport planning) can reduce gender inequities in access to basic services, healthcare and education. (medium [illegible]	+ Scaling up active modes (through careful local urban design and transport planning) can reduce gender inequities in access to basic services, healthcare and education (medium confidence)	+ Scaling up active modes (through careful local urban design and transport planning) can reduce gender inequities in access to basic services (medium confidence)		+saves energy (high confidence)	+ increases employment opportunities-demand for bike repair shops, bike parking (medium confidence)	+needs adequate infrastructure; + Opportunities including digitalization, the Internet of Things and also big data' (high confidence)	+ Access to bicycle lanes or cycle tracks increase the odds of female commuters using bicycles (medium confidence)	+ Compact, polycentric cities where active transport is most viable can enhance inclusive and sustainable urbanization (high confidence); + can reduce air pollution in cities (high confidence)	+ reduced material consumption during production of vehicles and their operations (high confidence)	+ Reduction of GHG emissions (high confidence)		+ preserve land that would have been otherwise used to construct and maintain parking garages and surface parking lots (medium confidence)			Section 10.2, 10.8 and Table 10.3	
	Shipping efficiency, logistics optimization, new fuels							+Some alternative fuels can help increase the share of renewable energy in the global energy mix (medium confidence). +Can support the global rate of improvement in overall energy efficiency (medium confidence)	+ could create jobs associated with thesupply chain of new fuels; + could create jobs to build and operate the associated infrastructure (low confidence)	+R&D is critical for new fuels and to test the full life cycle costs of various heavy vehicle options; need to invest in supporting infrastructure (high confidence)				+ Reduction of GHG emissions (high confidence)					Section 10.6, 10.8	
	Aviation-Energy Efficiency, new fuels							+Some alternative fuels can help increase the share of renewable energy in the global energy mix (medium confidence). +Can support the global rate of improvement in overall energy efficiency (medium confidence)	+ could create jobs associated with the supply chain of new fuels; + could create jobs to build and operate the associated infrastructure (low confidence)	+R&D is critical for new fuels and to test the full life cycle costs of various heavy vehicle options; need to invest in supporting infrastructure (high confidence)				+ Reduction of GHG emissions (high confidence)					Section 10.5, 10.8	
	Biofuels		- Using land to produce biofules could put stress on global food systems (medium confidence) +Could increase incomes for farmers and support investments in rural infrastructure (low confidence)	± Biofuels may improve air quality due to reducitons in tailpipe emission of some pollutants. The biofuels supply chain may negatively impact air quality (e.g., due to increased fertilizer use) (medium confidence)				+Can help increase the share of renewable energy in the global energy mix (high confidence)	+ could create jobs associated with the supply chain of biofuels; + could create jobs to build and operate the associated infrastructure (low confidence)	+R&D is critical for new fuels and to test the full life cycle costs of various heavy vehicle options; need to invest in supporting infrastructure (high confidence)		+ could reduce air pollution in cities (medium confidence)		+ Reduction of GHG emissions (high confidence)	- could increase eutrophication in water bodies (high confidence)	- Additional land use for biofuels may increase pressue on biodiversity (medium confidence)			Sections 10.3, 10.4, 10.5, 10.6, 10.8	

Sector	Sectoral Mitigation Options	Sustainable Development Goals																Line of sight (section numbers, tables, figures, box)	Remarks (Context Specificity/Scale)
		SDG 1 End poverty	SDG 2 Zero hunger	SDG 3 Good Health and wellbeing	SDG 4 Quality Education	SDG 5 Gender equality	SDG 6 Clean water and sanitation	SDG 7 Affordable and clean energy	SDG 8 Decent work economic growth	SDG 9 Industry innovation and infrastructure	SDG 10 Reduced inequalities	SDG 11 Sustainable cities and communities	SDG 12 Responsible consumption and Production	SDG 13 Climate Action	SDG 14 Life below water	SDG 15 Life on Land	SDG 16 Peace, justice and strong institutions	SDG 17 Partnership	
Industry	Energy efficiency							+ Enhances security in Clean Energy (High confidence)	+ Employment opportunities in a green economy (High confidence)	+ industrial innovation through new technologies (High confidence)				+ Contributes to climate action through efficient use of energy (High confidence)					Section 11.5.3	Heavily dependent on technology and so the scale of the continuous co-benefits across regions would depend on the extend and ease of technological transfer.
	Material efficiency and demand reduction						+ reduce the pressures on water bodies (Low confidence)		+ New Business Models generates emploment opportunities (Medium confidence); - Reduction in national sales	+ Infrastructural development to support mitigation option (Medium confidence)			+ Environmental stewardship (Medium confidence)	+ Contributes to climate action through reduced consumption (High confidence)					Section 11.5.3	The scale of the co-benefits achieved through material efficiency would depend on the extent to which the transition from traditional to requisit new business models can be achieved.
	Circular economy						+ Increase use of waste as resource (High confidence)	+ Improved energy efficiency as key CE practice (Medium confidence)	+ Job opportunities through new business models (Medium confidence)			+ public environmental awareness (Medium confidence)	+Enhances environmental benefits; + Increase use of waste as resource(High confidence)			+ Enhances biodiversity protection on land (Low confidence)		+ improved social relations between industrial sectors and local societies (Medium confidence)	Section 11.5.3	Successful implementation of transformational new business models are required to scale up and derive extended co-benefits through the CE strategy.
	Electrification	+ Supports poverty alleviation strategies (High confidence)	+ Improved food security (Medium confidence)	+ Supports delivery of health services; + improves indoor air quality compared to biomas use (High confidence)		+ reduces energy-related hurdles domestically affecting women (High confidence)		+ Decarbonization of grid when fuel is switched to cleaner sources (High confidence)						+ Contributes to climate action through switching to renewables (High confidence)					Section 11.5.3	The extent of the co-benefits experience on social system would be relative as it would be dependent on their current access to energy.
	CCS			+ control of non-CO2 pollutants (such as Sulphur dioxide); - increase of non-CO2 pollutants (such as Particulate matter, Nitrogen oxide and Ammonia); (High confidence)				+ Decarbonization of energy production through utilization of CO2 (High confidence)	+diversified employment prospects (Low confidence)	+ direct foreign investment and know-how (Medium confidence)				+ Contributes to climate action through carbon capture (High confidence)					Section 11.5.3	15-25% additional energy is required by CCS technologies compared with conventional plants. As such, this has potential implications for air pollutants. If no additional measures to reduce emissions are installed, Particulate matter, Nitrogen oxide and Ammonia would increase accordingly.