

Chapter 5 – Table 5.3

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Transport	Behavioural response	Equal right to economic resources access basic services (1.1.1.4.1.a, 1.b)	Ensure Access to Safe Nutritious Food (2.1; 2.2)	Road Traffic Accidents (3.4/3.6)	Equal Safe Access to Educational Institutions (4.1/4.2/4.3/4.5)
		<p>↑/↓ [+2,-1] [] [] ★★★</p> <p>The costs of daily mobility can have important economic stress impacts not only impacting carless family with low-mobility, but in countries with high levels of car dependence, the costs of motoring can be burdensome, raising questions of affordability for households with limited economic resources. During economic crisis public transport authorities may react by reducing levels of service and increasing fares, likely exacerbating the situation for low-income households.</p> <p>Dodson et al. (2004); Cascajo et al. (2017)</p>	<p>↑ [+2] [] [] ★★★</p> <p>Low-income community residents (non-white) who lack local access to affordable, quality sources of nutrition have to travel outside their immediate neighborhood to find better sources of food to feed themselves and their families. Lack of locally available healthy food often exacerbates the rates of obesity in many of these communities since it is often difficult or expensive to travel long distances on a regular basis to shop for food.</p> <p>Lowery et al. (2016); Hillier et al. (2011); Krukowski et al. (2013); LeDoux and Vojnovic (2013); Zenk et al. (2014); Ghosh-Dastidar et al. (2014); Clifton (2004)</p>	<p>↑/↓ [+2,-1] [] [] ★★</p> <p>Active travel modes' (such as walking and cycling) represent strategies not only for boosting energy efficiency but also, potentially, for improving health and well-being (e.g., lowering rates of diabetes, obesity, heart disease, dementia, and some cancers). However, a risk associated with these measures is that they could increase rates of road traffic accidents, if the provided infrastructure is unsatisfactory. Overall health effects will depend on the severity of the injuries sustained from these potential accidents relative to the health benefits accruing from increased exercise (McCollum et al., 2018).</p> <p>McCollum et al. (2018); Creutzig et al. (2012); Haines and Dora (2012); Saunders et al. (2013); Shaw et al. (2014); Woodcock et al. (2009); Shaw et al (2017); Chakrabarti and Shin (2017); Hunag et al. (2017)</p>	<p>↑ [+1] [] [] ★★</p> <p>Differences in road ways affects school travel safety, collaborative efforts need to address safety issues from a dual perspective, first by working to change the existing infrastructure and use of roads to better address the traffic problems that children currently face walking to school, and then to better site schools and better control the roadways and land uses around them in the future</p> <p>Chia-Yuan Yu (2015)</p>
	Accelerating energy efficiency improvement	<p>↑/↓ [+2,-1] [] [] ★★★</p> <p>Decarbonisation of public bus in Sweden is receiving attention more than efficiency improvement. With more electrification electricity price goes up and affordability can worsen for poor unless redistributive policies are in place.</p> <p>Xylia et al (2017)</p>	[0]	<p>Reduce illnesses from hazardous air, water and soil pollution (3.9)</p> <p>↑ [+2] [] [] ★★★</p> <p>Locally relevant policies targeting traffic reductions and ambitious diffusion of electric vehicles results in measured changes in non-climatic population exposure included ambient air pollution, physical activity, and noise. The transition to low-carbon equitable and sustainable transport can be fostered by numerous short- and medium-term strategies that would benefit energy security, health, productivity, and sustainability. Evidence-based approach that takes into account greenhouse gas emissions, ambient air pollutants, economic factors (affordability, cost optimisation), social factors (poverty alleviations, public health benefits), and political acceptability is needed tackle these challenges.</p> <p>Schucht et al. (2015); Figueroa et al. (2014); Peng et al. (2017); Klausbruckner et al. (2016)</p>	[0]
	Improved access & fuel switch to modern low-carbon energy	<p>↑/↓ [+2,-1] [] [] ★★★</p> <p>Increasingly volatile global oil prices have raised concerns for the vulnerability of households to fuel price increases. Pricing measures as a key component of sustainable transport policy need to consider equity. Pro-poor mitigation policies are needed to reduce climate impact reduce threat; for example investing more and better in infrastructure by leveraging private resources and using designs that account for future climate change and the related uncertainty. Communities in poor areas cope with and adapt to multiple-stressors including climate change. Coping strategies provide short-term relief but in the long-term may negatively affect development goals. And responses generate a trade-off between adaptation, mitigation and development. African cities with slums and due to high commuting costs many walk to work places which limit access. In Latin America triple informality leading to low productivity and living standards.</p> <p>Dodson and Sipe (2007); Hallegate et al. (2015); Suckall, Tompkins, and Stringer (2014); Lall, Henderson, and Venables (2017); Corporacion Andina de Fomento (2017); Klausbruckner et al. (2016)</p>	<p>Ensure Access to Food Security (2.1, 2.3, 2.a, 2.b,2.c)</p> <p>~ [0] [] [] ★</p> <p>21 projects aiming at resilient transport infrastructure development to improve access (e.g. C40 Cities Clean Bus Declaration, UITP Declaration on Climate Leadership, Cycling Delivers on the Global Goals, Global Sidewalk Challenge) do not substantially contribute to realizing the (indirect) transport targets with mostly a rural focus: Agricultural Productivity (SDG 2) and Access to Safe Drinking Water (SDG 6)</p> <p>Partnership on Sustainable Low Carbon Transport (2017)</p>	<p>Reduce illnesses from hazardous air pollution (3.9)</p> <p>↑ [+2] [] [] ★</p> <p>Projects aiming at resilient transport infrastructure development (e.g. C40 Cities Clean Bus Declaration, UITP Declaration on Climate Leadership, Cycling Delivers on the Global Goals, Global Sidewalk Challenge) are targeting at reducing air pollution, Electric vehicles using electricity from renewables or low carbon sources combined with e-mobility options such as trolleybuses, metros, trams and electro buses, as well as promote walking and biking, especially for short distances need consideration</p> <p>Partnership on Sustainable Low Carbon Transport (2017); Ajanovic (2015)</p>	[0]

		INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	
Replacing coal	Non-biomass renewables											Air Pollution (3.9)										
	solar, wind, hydro	↑	[+2]	■■■■	⊕⊕⊕	★★★	[0]					↑	[+2]	■■■■	⊕⊕⊕	★★★★	↑	[+1]	■■	⊕	★	
		Deployment of renewable energy and improvements in energy efficiency globally will aid climate change mitigation efforts, and this, in turn, can help to reduce the exposure of the world's poor to climate-related extreme events, negative health impacts, and other environmental shocks (McCollum et al., 2018).					No direct interaction					Promoting most types of renewables and boosting efficiency greatly aid the achievement of targets to reduce local air pollution and improve air quality; however, the order of magnitude of the effects, both in terms of avoided emissions and monetary valuation, varies significantly between different parts of the world. Benefits would especially accrue to those living in the dense urban centers of rapidly developing countries. Utilization of biomass and biofuels might not lead to any air pollution benefits, however, depending on the control measures applied. In addition, household air quality can be significantly improved through lowered particulate emissions from access to modern energy services (McCollum et al., 2018).					Decentralized renewable energy systems (e.g., home- or village-scale solar power) can support education and vocational training.					
		McCollum et al. (2018); Hallegatte et al. (2016); IPCC (2014); Riahi et al. (2012)										McCollum et al. (2018); Anenberg et al. (2013); Chaturvedi and Shukla (2014); Haines et al. (2007); IEA (2016); Kaygusuz (2011); Nemet et al. (2010); Rafaj et al. (2013); Rao et al. (2013); Rao et al. (2016); Riahi et al. (2012); Rose et al. (2014); Smith and Sagar (2014); van Vliet et al. (2012); West et al. (2013)					Anderson A., Loomba P., Orajaka I., Numfor J., Saha S., Janko S., Johnson N., Podmore R., Larsen R. (2017)					
Increased use of biomass							Farm Employment and Incomes (2.3)				Disease and Mortality (3.1/3.2/3.3/3.4), Air Pollution (3.9)											
		↑ / ↓	[+2,-2]	■■■	⊕⊕	★	↑ / ↓	[+2,-2]	■■■■	⊕⊕⊕	★★★★	↑	[+2]	■■■■	⊕⊕⊕	★★★	[0]					
		Large-scale bioenergy production could lead to the creation of agricultural jobs, as well higher farm wages and more diversified income streams for farmers. Modern energy access can make marginal lands more cultivable, thus potentially generating on-farm jobs and incomes; on the other hand, greater farm mechanization can also displace labor. On the other hand, large-scale bioenergy production could alter the structure of global agricultural markets in a way that is, potentially, unfavorable to small-scale food producers. see SDG2 (McCollum et al., 2018).					Large-scale bioenergy production could lead to the creation of agricultural jobs, as well higher farm wages and more diversified income streams for farmers. Modern energy access can make marginal lands more cultivable, thus potentially generating on-farm jobs and incomes; on the other hand, greater farm mechanization can also displace labor. On the other hand, large-scale bioenergy production could alter the structure of global agricultural markets in a way that is, potentially, unfavorable to small-scale food producers. The distributional effects of bioenergy production are underexplored in the literature (McCollum et al., 2018).					Replacing coal by biomass can reduce adverse impacts of upstream supply-chain activities, in particular local air and water pollution, and prevent coal mining accidents. Improvements to local air pollution in power generation compared to coal-fired power plants depend on the technology and fuel of biomass powerplants, but could be significant when switching from outdated coal combustion technologies to state-of-the-art biogas power generation.					No direct interaction					
		McCollum et al. (2018); Balishter et al. (1991); Creutzig et al. (2013); de Moraes et al. (2010); Gohin (2008); Rud (2012); Satolo and Bacchi (2013); van der Horst and Vermeylen (2011); Corbera and Pascual (2012); Creutzig et al. (2013); Davis et al. (2013); van der Horst and Vermeylen (2011); Muys et al. (2014); Ertem, Kappler, and Neubauer (2017)					McCollum et al. (2018); Balishter et al. (1991); Creutzig et al. (2013); de Moraes et al. (2010); Gohin (2008); Rud (2012); Satolo and Bacchi (2013); van der Horst and Vermeylen (2011); Corbera and Pascual (2012); Creutzig et al. (2013); Davis et al. (2013); van der Horst and Vermeylen (2011); Muys et al. (2014); Ertem, Kappler, and Neubauer (2017)					IPCC AR5 WG3 (2014); Koormeef et al. (2011); Singh et al. (2011); Hertwich et al. (2008); Veltman et al. (2010); Corsten et al. (2013); Ashworth et al. (2012); Einsiedel et al. (2013); IPCC (2005); Miller et al. (2007); de Best-Waldhober et al. (2009); Shackley et al. (2009); Wong-Parodi and Ray (2009); Waabøquist et al. (2009, 2010); Reiner and Nuttall (2011); Epstein et al. (2010); Burgherr et al. (2012); Chen et al. (2012); Chan and Griffiths (2010); Asfaw et al. (2013)										
Nuclear/Advanced Nuclear												Disease and Mortality (3.1/3.2/3.3/3.4)										
		[0]					[0]					↓	[-1]	■■■■	⊕⊕⊕	★★★	[0]					
		No direct interaction					No direct interaction					In spite of the industry's overall safety track record, a non-negligible risk for accidents in nuclear power plants and waste treatment facilities remains. The long-term storage of nuclear waste is a politically fraught subject, with no large-scale long-term storage operational worldwide. Negative impacts from upstream uranium mining and milling are comparable to those of coal, hence replacing fossil fuel combustion by nuclear power would be neutral in that aspect. Increased occurrence of childhood leukaemia in populations living within 5 km of nuclear power plants was identified by some studies, even though a direct causal relation to ionizing radiation could not be established and other studies could not confirm any correlation (low evidence/agreement in this issue).					No direct interaction					
												IPCC AR5 WG3 (2014); Cardis et al. (2006); Balonov et al. (2011); Moomaw et al. (2011a); WHO (2013); Abdelouas (2006); Al-Zoughool and Kewski (2009) cited in Sathaye et al. (2011a); Smith et al. (2013); Schnelzer et al. (2010); Tirmarche (2012); Brugge and Buchner (2011); Møller et al. (2012); Hiyama et al. (2013); Mousseau and Møller (2013); Møller and Mousseau (2011); Møller et al. (2011); von Stechow et al. (2016); Heinävaara et al. (2010); Kaatsch et al. (2008); Sermage-Faure et al. (2012); Hoeve and Jacobson (2012)										
CCS: Bio energy							Farm Employment and Incomes (2.3)				Disease and Mortality (3.1/3.2/3.3/3.4)											
		↑ / ↓	[+2,-2]	■■■	⊕⊕	★	↑ / ↓	[+1,-2]	■■■■	⊕⊕⊕	★★★★	↑ / ↓	[+2,-1]	■■■	⊕⊕⊕	★★★	[0]					
		See effects of increased bioenergy use.					See increased use of biomass effects. In addition, the concern that more bioenergy (for BECCS) necessarily leads to unacceptably high food prices is not founded on large agreement in the literature. AR5, for example, finds a significantly lower effect of large-scale bioenergy deployment on food prices by mid-century than the effect of climate change on crop yields. Also, Muratori et al. (2016) show that BECCS reduces the upward pressure on food crop prices by lowering carbon prices and lowering the total biomass demand in climate change mitigation scenarios. Competition for land-use. Use of agricultural residue for bioenergy can reduce soil carbon thereby threatening agricultural productivity.					See positive impacts of increased biomass use. On the other hand, there is a non-negligible risk of CO2 leakage both from geological formations as well as from the transportation infrastructure from source to sequestration locations.					No direct interaction					
							See literature on increased biomass use and Muratori et al. (2016), IPCC AR5 (2014), Dooley,K. & Kartha,S. (2018)					IPCC AR5 WG3 (2014); Atchley et al. (2013); Apps et al. (2010); Siirila et al. (2012); Wang and Jaffe (2004); Koormeef et al. (2011); Singh et al. (2011); Hertwich et al. (2008); Veltman et al. (2010); Corsten et al. (2013)										
Advanced coal	CCS: Fossil											Disease and Mortality (3.1/3.2/3.3/3.4)										
		[0]					[0]					↓	[-1]	■■■	⊕⊕⊕	★★★	[0]					
		No direct interaction					No direct interaction					The use of fossil CCS imply continued adverse impacts of upstream supply-chain activities in the coal sector, and because of lower efficiency of CCS coal power plants, upstream impacts and local air pollution are likely to be exacerbated. Furthermore, there is a non-IPCC AR5 WG3 (2014); Atchley et al. (2013); Apps et al. (2010); Siirila et al. (2012); Wang and Jaffe (2004); Koormeef et al. (2011); Singh et al. (2011); Hertwich et al. (2008); Veltman et al. (2010); Corsten et al. (2013)					No direct interaction					



	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE			
Agriculture & Livestock																							
Behavioural response: Sustainable healthy diets and reduced food waste	↓	[0,-1]	■■■■	⊕⊕⊕⊕	★★	↑	[+2]	■■■■■	⊕⊕⊕⊕⊕	★★★★★	↑	[+1]	■■	⊕	★		[0]						
Cutting livestock consumption can increase food security for some if land grows food not feed, but can also undermine livelihoods and culture where livestock has long been the best use of land such as in parts of SSA.						Curbing consumer waste of major food crops (i.e., wheat, rice, and vegetables) and meats (i.e., beef, pork, and poultry) in China, USA and India alone could feed ~413 million people per year (West et al., 2014). One billion extra people could be fed if food crop losses could be halved (Kummu et al., 2012). Reducing waste, especially from meat and dairy could play a role in delivering food security and reduce the need for sustainable intensification (Smith, 2013). Dietary change toward global healthy diets could improve nutritional health, food security and reduce emissions.						Consume fewer foods with low nutritional value e.g. alcohol, (Garnett, 2011). Demand-side measures aimed at reducing the proportion of livestock products in human diets, where the consumption of animal products is higher than recommended, are associated with multiple health benefits, especially in industrialized countries (Bustamante et al., 2014).										No direct interaction	
IPCC WGIII, 2014						West et al.(2014), Kummu et al.(2012), Smith, P. (2013), Beddington et al. (2012), Lamb et al. (2016), Garnett, T., 2011; Bajželj et al., 2014; Tilman & Clark, 2014)						Garnett, T. (2011), Bustamante, M., et al. (2014)											
Land based greenhouse gas reduction and soil carbon sequestration	↑	[+2]	■■■■■	⊕⊕⊕⊕	★★★★★	↑	[+2]	■■■■■	⊕⊕⊕⊕⊕	★★★★★	↑/↓	[+2,-2]	■■■	⊕⊕	★★	↑/↓	[+2,-2]	■■■	⊕	★			
Many climate smart agriculture interventions aim to improve rural livelihoods, thereby contributing to poverty alleviation. Agroforestry or integrated crop–livestock–biogas systems can substitute costly, external inputs, saving on household expenditures – or even lead to the selling of some of the products, providing the farmer with extra income, leading to increased adaptive capacity (Bogdanski, 2012).						Safe application of biotechnology, both conventional and modern methods can help to improve agricultural productivity,improving crops adaptability thereby catering to food security. Reducing tillage,eliminating fallow and keeping the soil covered with residue, cover crops or perennial vegetation help prevent soil erosion and has the potential to increase Soil Organic Matter (SOC). Efficient land management techniques can help in increasing crop yield and hence food security issues can be addressed. Yield projections are actually higher for developing countries than for developed countries, reflecting the fact that they have more “catch-up” potential (Evenson, 1999). Action is needed throughout the food system, on moderating demand, reducing waste, improving governance and producing more food. (Godfray & Garnett, 2014). Improving cropland management is the key to increase crop productivity without further degrading soil and water resources (Branca et al., 2011). Climatee Smart Agriculture practices increases productivity and prioritizes food security.						Growing crops such as cassava, sorghums and millets even in harsh conditions are important to the diets of very poor people. The policy scenarios show that reduced research support, delayed industrialization, delayed biotechnology, and climate change will delay progress in reducing malnutrition of children. The “global” effects are small, but local effects for some countries, e.g., Bangladesh and Nigeria, are significant (Evenson, 1999).					Science-based actions within CSA is required to integrate data sets and sound metrics for testing hypotheses about feedback regarding climate, weather data products and agricultural productivity, such as the nonlinearity of temperature effects on crop yield and the assessment of trade-offs and synergies that arise from different agricultural intensification strategies (Steenwerth, 2014). Low commodity prices have led to declining investment in research and development, farmer education, etc. (Lamb et al., 2016).						
Lipper et al. (2014), Bogdanski (2012), Branca et al. (2011), Campbell et al. (2014), Hammond et al. (2016), Mbow et al. (2013), Scherr et al. (2012), Steenwerth et al. (2014), Vermeulen et al. (2012)						Mtui (2011); Harvey et al. (2014); Campbell et al. (2014); West and Post (2002); Johnson et al. (2007); Harvey et al. (2014); Evenson (1999); Godfray and Garnett (2014); Branca et al. (2011); McCarthy, Lipper, and Branca (2011); Behnassi, Boussaid, and Gopichandran (2014); Lipper et al. (2014); Steenwerth (2014)						Godfray & Garnett (2014); Evenson (1999)					Steenwerth, K. L., (2014); Lamb, A., et al. (2016)						
Greenhouse gas reduction from improved livestock production and manure management systems	↑	[+2]	■■	⊕	★	↑	[+2]	■■■■■	⊕⊕⊕⊕	★★★★★	↑/↓	[+2,-2]	■■■	⊕⊕	★★		[0]						
Mixed-farming systems, can not only farmers mitigate risks by producing a multitude of commodities, but they can also increase the productivity of both crops and animals in a more profitable and sustainable way, (Quoted from Sansoucy, R. (1995))						Fostering transitions toward more productive livestock production systems targeting land-use change appears to be the most efficient lever to deliver food availability outcomes. (Quoted from Havlik, P., et al. (2014)) Genomic selection should be able to at least double the rate of genetic gain in the dairy industry. Given the prevalence of mixed crop–livestock systems in many parts of the world, closer integration of crops and livestock in such systems can give rise to increased productivity and increased soil fertility (Thornton, 2010). Managing the indirect effects of livestock systems intensification is critical for the sustainability of the global food system: like improving productivity and their close link to land sparing (Herrero and Thornton, 2013). In East Africa pastoralists have shifted from cows to camels, which are better-adapted to survive periods of water scarcity and able to consistently provide more milk (Steenwerth et al., 2014). Scenarios where zero human-edible concentrate feed is use for livestock soil erosion potential reduces by 12%.						Bio-digestion which has positive public-health aspects, particularly where toilets are coupled with the bio-digester, and the anaerobic conditions kill pathogenic organisms as well as digest toxins. Separation processes can improve or worsen health risks related to food crops or to livestock.										No direct interaction	
Sansoucy (1995)						Havlik et al. (2014); Steenwerth (2014), Thornton (2010); Herrero and Thornton (2013); Steenwerth et al. (2014); Schader et al. (2015)						Sansoucy (1995); Burton (2007)											

Forest	Reduced deforestation, REDD+ [+2] Poverty reduction (1.5) Partnerships between local forest managers, community enterprises and private sector companies can support local economies and livelihoods, and boost regional and national economic growth. Katila et al. (2017)	[+1, -2] Food Security and promotion of Sustainable Agriculture(2.1/2.4/2a) Food security, may lead to the conversion of productive land under forest, including community forests, into agricultural production. In a similar fashion, the production of biomass for energy purposes(SDG 7) may reduce land available for food production and/or for community forest activities Katila et al., 2017). Efforts by the Government of Zambia to reduce emissions by REDD+ have contributed erosion control, ecotourism and pollination valued at 2.5% of the country's GDP. Katila et al. (2017); Turpie, Warr, & Ingram (2015); Epstein and Theuer (2017); Dooley and Kartha (2018)	[0] No direct interaction	[+1] Ensure inclusive and quality education(4.4/4.7) Local forest users learn to understand laws, regulations and policies which facilitate their participation in the society. Education and capacity building provide technical skill and knowledge (Katila et al., 2017). Katila et al. (2017)
	Afforestation and reforestation [+2, -2] Poverty and Development (1.1/1.2/1.3/1.4) CDM-AR can have different implications on local community livelihoods. Willingness to adopt afforestation is influenced in particular by Australian landholder's perceptions of its potential to provide a diversified income stream, and its impacts on flexibility of land management (Schirmer and Bull, 2014). Land sparing would have far reaching implications for the UK countryside and would affect landowners, rural communities (Lamb et al., 2016). Livelihoods threatened if subsistence agriculture targeted (Dooley and Kartha, 2018). Zomer et al. (2008); Schirmer and Bull (2014); Lamb et al. (2016); Dooley and Kartha (2018)	[+1, -1] Food Security (2.1) CDM-AR can have different implications on local to regional food security and local community livelihoods. Zomer et al. (2008); Dooley and Kartha (2018)	[+1] Ensure healthy lives (3.c) Urban trees are increasingly seen as a way to reduce harmful air pollutants and hence improve cardio-respiratory health. Jones et al. (2018)	[-1] Promote knowledge and skill to promote SD (4.7) Most landholders reported having low levels of knowledge about tree planting for carbon sequestration—particularly available programmes, prices and markets, and government rules and regulations Schirmer and Bull, 2014). Schirmer and Bull (2014)
	Behavioural response (responsible sourcing) [0] No direct interaction	[0] No direct interaction	[0] No direct interaction	[0] No direct interaction
Oceans	Ocean iron fertilization [0] No direct interaction	[+1, -1] Food Security (2.2/2.3) OIF can have different implications on fish stocks and aquaculture, it might actually increase food availability for fish stocks (increasing yields) but potentially at the cost of reducing the yields of fisheries outside the enhancement region by depleting other nutrients. Smetacek and Naqvi (2008); Lampitt et al. (2008); Williamson et al. (2012)	[0] No direct interaction	[0] No direct interaction
	Blue carbon [+3] Poverty and Development (1.1/1.2/1.5) Avoiding loss of mangroves and maintaining the 2000 stock could save a value of ecosystem services from mangroves in Southeast Asia of approximately US\$2.16 billion until 2050 (2007prices), with a 95% prediction interval of US\$1.58–2.76 billion (case study area South East Asia); Seaweed aquaculture will enhance carbon uptake and provide employment; traditional management systems provide benefits for blue carbon and support livelihoods for local communities; Greening of aquaculture can significantly enhance carbon storage; PES schemes could help capture the benefits derived from multiple ecosystem services beyond carbon sequestration. Zomer et al. (2008); Schirmer and Bull (2014); Lamb et al. (2016)	[+3] Food Production (2.3/2.4) avoiding loss of mangroves and maintaining the 2000 stock could save a value of ecosystem services from mangroves in Southeast Asia including fisheries; Seaweed aquaculture will provide employment; traditional management systems provide livelihoods for local communities; Greening of aquaculture can increase income and well-being; Mariculture is a promising approach for China. Brander et al. (2012); Sondak et al. (2017); Vierros (2017); Ahmed et al. (2017a); Ahmed	[0] No direct interaction	[0] No direct interaction
	Enhanced Weathering [0] No direct interaction	[0] No direct interaction	[0] No direct interaction	[0] No direct interaction



		INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	
Replacing coal	Non-biomass renewables solar, wind, hydro	↑	[+1]	📄	👤	★	↑	[+1]	📄📄	👤👤	★★	↑	[+2]	📄	👤	★	↑ / ~	[+2,0]	📄📄	👤👤	★★	
		Decentralized renewable energy systems (e.g., home- or village-scale solar power) can reduce the burden on girls and women of procuring traditional biomass.					Decentralized renewable energy systems (e.g., home- or village-scale solar power) can enable a more participatory, democratic process for managing energy-related decisions within communities. (Quote from McCollum et al., 2018)					The energy justice framework serves as an important decision-making tool in order to understand how different principles of justice can inform energy systems and policies. Islar et al. (2017) states that off-grid and micro-scale energy development offers an alternative path to fossil-fuel use and top-down resource management as they democratize the grid and increase marginalized communities' access to renewable energy, education and health care.					International cooperation (in policy) and collaboration (in science) is required for the protection of shared resources. Fragmented approaches have been shown to be more costly. Specific to SDG7, to achieve the targets for energy access, renewables, and efficiency, it will be critical that all countries: (i) are able to mobilize the necessary financial resources (e.g., via taxes on fossil energy, sustainable financing, foreign direct investment, financial transfers from industrialized to developing countries); (ii) are willing to disseminate knowledge and share innovative technologies between each other; (iii) follow recognized international trade rules while at the same time ensuring that the least developed countries are able to take part in that trade; (iv) respect each other's policy space and decisions; (v) forge new partnerships between their public and private entities and within civil society; and (vi) support the collection of high-quality, timely, and reliable data relevant to the furthering their missions. There is some disagreement in the literature on the effect of some of the above strategies, such as free trade. Regarding international agreements, "no-regrets options", where all sides gain through cooperation, are seen as particularly beneficial (e.g., nuclear test ban treaties) (McCollum et al., 2018).					
		Schwerhoff G., Sy M. (2017)					McCollum et al. (2018); Cass et al. (2010); Cumbers (2012); Kunze and Becker (2015); Walker and Devine-Wright (2008)					Islar et al. (2017)					McCollum et al. (2018); Clarke et al. (2009); Eis et al. (2016); Montreal Protocol (1989); New Climate Economy (2015); O'Neill et al. (2017); Ramaker et al. (2003); Riahi et al. (2015); Riahi et al. (2017)					
	Increased use of biomass		[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction			
	Nuclear/Advanced Nuclear		[0]	No direct interaction				[0]	No direct interaction				↓	[-1]	📄📄	👤👤	★★		[0]	No direct interaction		
												Reduce illicit arms trade (16.4) Continued use of nuclear power poses a constant risk of proliferation. IPCC AR5 WG3 (2014); von Hippel et al. (2011, 2012); Sagan (2011); Yim and Li (2013); Adamantiades and Kessides (2009); Rogner (2010).										
	CCS: Bio energy		[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction			
	Advanced coal		[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction			
	CCS: Fossil		[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction				[0]	No direct interaction			

Forest	Reduced deforestation, REDD+	<p>Opportunities for Women (5.1/5.5)</p> <p>↑ / ↓ [+1, -1] 🏠 🌐 ★</p> <p>Women have been less involved in REDD+ initiative (pilot project) design decisions and processes than men. Girls and women have an important role in forestry activities, related to fuel-wood, forest-food and medicine. Their empowerment contributes to sustainable forestry as well as reducing inequality (Katila et al., 2017).</p> <p>Brown (2011); Larson et al. (2015); Katila et al. (2017)</p>	<p>Reduced inequality, empowerment and inclusion (10.1/10.2/10.3/10.4)</p> <p>↑ [+2] 🏠 🌐 ★</p> <p>Urges developed country to support, through multilateral and bilateral channels, the development of REDD+ national strategies or action plans and implementation (Lima et al., 2017). Girls and women have an important role in forestry activities, related to fuel-wood, forest-food and medicine. Their empowerment contributes to sustainable forestry as well as reducing inequality (Katila et al., 2017).</p> <p>Lima et al. (2017); Katila et al. (2017)</p>	<p>Build effective, accountable and inclusive institutions, Responsible decision making (16.6/ 16.7/16.8)</p> <p>↑ [+2] 🏠 🌐 🌐 🌐 ★★</p> <p>Institutional building (National Forest Monitoring Systems, Safeguard Information Systems, etc.), with full and effective participation of all relevant countries (Lima et al., 2017). REDD+ actions also deliver non-carbon benefits (e.g. local socioeconomic benefits, governance improvements, Lima et al., 2015). Forest governance is another central aspect in recent studies, including debate on decentralization of forest management, logging concessions in public owned commercially valuable forests, and timber certification, primarily in temperate forests (Bustamante et al., 2014).</p> <p>Lima et al. (2017); Lima et al. (2015); Bustamante et al. (2014)</p>	<p>Resource mobilization and Strengthen multi-stakeholder Partnership (17.1/ 17.3/17.5/17.17)</p> <p>↑ / ↓ [+1, -1] 🏠 🌐 ★</p> <p>To provide finance and technology to developing countries to support emissions reductions. Be supported by adequate and predictable financial and technology support, including support for capacity-building (Lima et al., 2017). Partnerships in the form of significant aid money from, e.g., Norway, other bilateral donors, and the World Bank's Forest Carbon Partnership Facility (FCPF) are forthcoming (Andrew, 2017). Estimates of opportunity cost for REDD are very low. Lower costs and/or higher carbon prices could combine to protect more forests, including those with lower carbon content. Conversely, where the cost of action is high, a large amount of additional funding would be required for the forest to be protected (Miles and Kapos, 2008). Forest governance is another central aspect in recent studies, including debate on decentralization of forest management, logging concessions in public owned commercially valuable forests, and timber certification, primarily in temperate forests (Bustamante et al., 2014). Partnerships between local forest managers, community enterprises and private sector companies can support local economies and livelihoods, and boost regional and national economic growth (Katila et al., 2017).</p> <p>Lima et al. (2017); Andrew (2017); Miles and Kapos (2008); Bustamante et al. (2014); Katila et al. (2017)</p>
	Afforestation and reforestation	<p>Opportunities for Women (5.1/5.5)</p> <p>↑ [+1] 🏠 🌐 ★</p> <p>Many women in developing countries are already prominently engaged in economic sectors related to climate adaptation and mitigation efforts such as agriculture, renewable energy, forest management and are important drivers and leaders in climate responses that are innovative and effective, benefitting not only their families but their larger communities as well. Women's participation in the decision-making process of forest management, for example, has been shown to increase rates of reforestation while decreasing the illegal extraction of forest products</p> <p>UNDESA, 2016</p>	<p>Empower economic and political inclusion of all, irrespective of sex (10.2)</p> <p>↑ [+1] 🏠 🌐 ★</p> <p>Women's participation in the decision-making process of forest management, for example, has been shown to increase rates of reforestation while decreasing the illegal extraction of forest products.</p> <p>UNDESA, 2016</p>	<p>Responsible decision making (16.7)</p> <p>↑ [+1] 🏠 🌐 ★</p> <p>Land-related mitigation, such as biofuel production, as well as conservation and reforestation action can increase competition for land and natural resources so these measures should be accompanied by complementary policies. (Quoted from Epstein, A. H., & Theuer, S. L. H. (2017))</p> <p>Epstein and Theuer (2017)</p>	<p>Resource mobilization and Strengthen Partnership (17.1/17.14)</p> <p>↑ [+2] 🏠 🌐 🌐 🌐 ★★</p> <p>Financing at the national and international level is required to grow more seedlings/sapling, restore land, create awareness education factsheets, providing training of local communities regarding the benefits of afforestation and reforestation. Article 12 of the Kyoto Protocol further sets a Clean Development Mechanism through which countries in Annex I earn 'certified emissions reductions' through projects implemented in developing countries (Montanarella and Alva, 2015). Afforestation and reforestation in India are being carried out under various programmes, namely social forestry initiated in the early 1980s, Joint Forest Management Programme initiated in 1990, afforestation under National Afforestation and Eco-development Board (NAEB) programmes since 1992, and private farmer and industry initiated plantation forestry. If the current rate of afforestation and reforestation is assumed to continue, the carbon stock could increase of 11% by 2030 (Ravindranath, Chaturvedi, and Murthy, 2008).</p> <p>Kibria, G. (2015); Montanarella and Alva (2015); Ravindranath, Chaturvedi, and Murthy (2008)</p>
Behavioural response (responsible sourcing)	<p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	<p>Responsible decision making (16.7)</p> <p>↑ [+1] 🏠 🌐 ★★</p> <p>Indonesian factories may seek advantages through non-price competition—perhaps by highlighting decent working conditions or the existence of a union—or to see trade associations or government agencies promoting the country as a responsible sourcing location (Bartley, 2010). In the absence of domestic legal instruments providing incentives to improve sustainability of sourcing, it appears that initiatives to engage the major importing enterprises in developing responsible sourcing practices and policies is a practical approach. Unless initiatives involve all the major importers, they are unlikely to be successful since the high costs associated with accreditation would increase production costs for these firms relative to their competitors (Huang, Wilkes, Sun and Terheggen, 2013).</p> <p>Bartley (2010); Huang, Wilkes, Sun and Terheggen (2013)</p>	<p>Finance and trade (17.1/17.10)</p> <p>↑ [+1] 🏠 🌐 🌐 ★★</p> <p>Private certification initiatives for wood product and biomass sourcing may extend their schemes with criteria for "leakage" (external GHG effects). Also Recycling of waste wood in pellets is not yet practiced, due to unclear rules in the EU Waste Directive about overseas shipping (Sikkema et al., 2014). Engagement of Chinese government and private sector stakeholders in supply country sustainability initiatives may be the best way to support this gradual process of improvement. Although carrying out due diligence in timber sourcing can require considerable internal resources, it may be substantially less of a financial burden than the potential fines and reputational damage resulting from sourcing unknown or controversial timber (Huang, Wilkes, Sun and Terheggen, 2013).</p> <p>Sikkema et al. (2014); Huang, Wilkes, Sun, and Terheggen (2013)</p>	
Oceans	<p>Ocean iron fertilization</p> <p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	
	<p>Blue carbon</p> <p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	
	<p>Enhanced Weathering</p> <p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	<p>[0]</p> <p>No direct interaction</p>	



Industry	SDG 6: Clean Water and Sanitation				SDG 12: Responsible Consumption and Production				SDG 14: Life Below Water				SDG 15: Life on Land															
	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE													
Industry	Accelerating energy efficiency improvement	↑/↓	[+2,-1]	■■■■	●●●	★★★	Water efficiency and pollution prevention (6.3/6.4/6.6)	Efficiency and behavioural changes in the industrial sector that lead to reduced energy demand can lead to reduced requirements on energy supply. As water is used to convert energy into useful forms, the reduction in industrial demand is anticipated to reduce water consumption and wastewater, resulting in more clean water for other sectors and the environment. Likewise, reducing material inputs for industrial processes through efficiency and behavioural changes will reduce water inputs in the material supply chains. In extractive industries there can be a trade off with production unless strategically managed, and wastewater, resulting in more clean water for other sectors and the environment. Behavioral changes in the industrial sector that lead to reduced energy demand can lead to reduced requirements on energy supply. As water is used to convert energy into useful forms, the reduction in industrial demand is anticipated to reduce water consumption and wastewater, resulting in more clean water for other sectors and the environment.	Vassolo and Doell (2005); Fricko et al. (2016); Holland et al. (2016); Nguyen et al. (2014)	Sustainable and Efficient resource (12.2,12.5, 12.6, 12.7, 12.a)	↑	[+1]	■■■■	●●●	★★★	Once started leads to chain of actions within the sector and policy space to sustain the effort. Help in expansion of sustainable industrial production (Ghana)	Apeaning and Thollandar (2013); Fernando et al. (2017)	[0]	No direct interaction	[0]	No direct interaction							
	Low-carbon fuel switch	↑/↓	[+2,-2]	■■■■	●●●	★★★★	Water efficiency and pollution prevention (6.3/6.4/6.6)	A switch to low-carbon fuels can lead to a reduction in water demand and wastewater if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low-carbon fuel such as e.g., biofuel could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock.	Hejazi et al. (2015); Song et al. (2016); Fricko et al. (2016)	Sustainable production (12.2,12.3, 12.a)	↑	[+2]	■■■■	●●●	★★★★	Circular economy instead of liner global economy can achieve climate goal and can help in economic growth through industrialisation which saves on resources, environment and supports small, edium and even large industries, can lead to employment generation. so new regulations, incentives, tax regime can help in achieving the goal especially in newly emerging developing cpuntries although applicable for large industrialised countries also.	Supino et al. (2015); Fan et al. (2017); Leider et al. (2015); Zheng et al. (2016); Shi et al.	[0]	No direct interaction	↑	[+1,-1]	■■■■	●	★	Sustainable production (15.1,15.5,15.9,15.10)	Circular economy instead of linear global economy can achieve climate goal and can help in economic growth through industrialisation which saves on resources, environment and supports small, medium and even large industries, can lead to employment generation. so new regulations, incentives, tax regime can help in achieving the goal especially in newly emerging developing countries although applicable for large industrialised countries also.	Shi et al. (2017)	
	Decarbonisation/ CCS/CCU	↑/↓	[+1,-1]	■■■■	●	★★	Water efficiency and pollution prevention (6.3/6.4/6.6)	CCU/S requires access to water for cooling and processing which could contribute to localized water stress. CCS/U process can potentially be configured for increased water efficiency compared to a system without carbon capture via process integration.	Meldrum et al. (2013); Fricko et al. (2016); Byers et al. (2016); Brandl et al. (2017)	Sustainable production and consumption (12.1,12.6 12.a)	↑	[+2]	■■	●●●●	★★★★	EPI plants are capital intensive and are mostly operated by multinational with long investment cycles. In developed countries new investments are happening in brown fields , while in developing countries these are in green fields. Collaboration among partners and user demand change, policy change are essential for encouraging these large risky investments.	Wessling et al. (2017)	Conserve and Sustainably use ocean (14.1, 14.5)	↓	[-1]	■■	●	★	CCU/S in chemical industry faces challenge for transport cost and storage. In UK cluster region have been identified fro storage under sea.	Griffin et al. (2017)	[0]	No direct interaction	[0]
Buildings	Behavioral response	↑	[+2]	■■■■	●●●	★★★★	Water efficiency and pollution prevention (6.3/6.4/6.6)	Behavioral changes in the residential sector that lead to reduced energy demand can lead to reduced requirements on energy supply. As water is used to convert energy into useful forms, the reduction in residential demand is anticipated to reduce water consumption and wastewater, resulting in more clean water for other sectors and the environment.	Bartos and Chester (2014); Fricko et al. (2016) Holland et al. (2016)	Responsible and sustainable consumption (12.6/12.7/12.8)	↑	[+2]	■■■■	●●●	★★★★	Technological improvements alone are not sufficient to increase energy savings. Zhao et al. (2017) findings indicate that building technology and occupant behaviors interact with each other and finally affect energy consumption from home. They found that occupant habits could not take advantage of more than 50 percent of energy efficiency potential allowed by an efficient building. In the electronic segment product obsolescence represents a key challenge for sustainability. Echegaray (2015) discusses the dissonance between consumers' product durability experience, orientations to replace devices before terminal technical failure, and perceptions of industry responsibility and performance. The results from their urban sample survey indicate that technical failure is far surpassed by subjective obsolescence as a cause for fast product replacement. At the same time Liu, Oosterveer, and Spaargaren (2017) suggest that we need to go beyond individualist and structuralist perspectives to analyse sustainable consumption (i.e. combines both human agency paradigm and social structural perspective).	Zhao et al. (2017); Somerfeld, Buys, and Vine (2017); Isehour and Feng (2016); He, Xiong, Wessling et al. (2017)	[0]	No direct interaction	[0]	No direct interaction							
	Accelerating energy efficiency improvement	↑	[+2]	■■■■	●●●	★★★★	Water efficiency and pollution prevention (6.3/6.4/6.6)	Efficiency changes in the residential sector that lead to reduced energy demand can lead to reduced requirements on energy supply. As water is used to convert energy into useful forms, the reduction in residential demand is anticipated to reduce water consumption and wastewater, resulting in more clean water for other sectors and the environment. A switch to low-carbon fuels in the residential sector can lead to a reduction in water demand and wastewater if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low-carbon fuel such as e.g., biofuel could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock. As water is used to convert energy into useful forms, energy efficiency is anticipated to reduce water consumption and wastewater, resulting in more clean water for other sectors and the environment. Subsidies for renewables are anticipated to lead to the benefits and tradeoffs outlined when deploying renewables. Subsidies for renewables could lead to improved water access and treatment if subsidies support projects that provide both water and energy services (e.g., solar desalination).	Hendrickson et al. (2014); Bartos and Chester (2014); Fricko et al. (2016); Holland et al. (2016); Bartos and Chester (2014); Bilton et al. (2011); Scott et al. (2011); Kumar et al. (2012); Kern et al. (2014); Meldrum et al. (2014); Kim et al (2017)	Sustainable Practices and Lifestyles (12.6/12.7/12.8)	↑	[+1]	■■■■	●●●	★★★★	Sustainable practices adopted by public and private bodies in their operations (e.g., for goods procurement, supply chain management, and accounting) create an enabling environment in which renewable energy and energy efficiency measures may gain greater traction (McCollum et al., 2018).	McCollum et al. (2018); CDP (2015); European Climate Foundation (2014); Khan et al. (2015); New Climate Economy (2015); Stefan and Paul (2008)	[0]	No direct interaction	↑	[+2]	■■■■	●●●	★★★★	Reduced deforestation (15.2)	Improved cook stove help halting deforestation in rural India	Bhojvaid Vasundhara et al. (2014)	
Buildings	Improved access & fuel switch to modern low-carbon energy	↑/↓	[+2,-1]	■■■■	●●	★★★★	Access to improved water and sanitation (6.1/6.2), Water efficiency and pollution prevention (6.3/6.4/6.6)	A switch to low-carbon fuels in the residential sector can lead to a reduction in water demand and wastewater if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low-carbon fuel such as e.g., biofuel could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock. Improved access to energy can support clean water and sanitation technologies. If energy access is supported with water-intensive energy sources, there could be tradeoffs with water efficiency targets.	Hejazi et al. (2015); Song et al. (2016); Fricko et al. (2016); Rao and Pachauri (2017); Cihin et al. (2016)	Sustainable use and management of natural resource (12.2)	↑/↓	[+2,-1]	■■■■	●●	★★★★	A switch to low-carbon fuels in the residential sector can lead to a reduction in water demand and wastewater if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low-carbon fuel such as e.g., biofuel could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock. Improved access to energy can support clean water and sanitation technologies. If energy access is supported with water-intensive energy sources, there could be tradeoffs with water efficiency targets.	Hejazi et al. (2015); Song et al. (2016); Fricko et al. (2016); Rao and Pachauri (2017); Cihin et al. (2016)	[0]	No direct interaction	↑	[+2]	■■■■	●●●	★★★★	Healthy Terrestrial Ecosystems (15.1/15.2/15.4/15.5/15.8)	Ensuring that the world's poor have access to modern energy services would reinforce the objective of halting deforestation, since firewood taken from forests is a commonly used energy resource among the poor (McCollum et al., 2018).	McCollum et al. (2018); Ballis et al. (2015); Bazilian et al (2011); Karekezi et al. (2012); Winter et al. (2015)	

Transport	Behavioural response	<p>Water efficiency and pollution prevention (6.3/6.4/6.6) [↑2] [] [] [] [] ★★★</p> <p>Behavioral changes in the transport sector that lead to reduced transport demand can lead to reduced transport energy supply. As water is used to produce a number of important transport fuels, the reduction in transport demand is anticipated to reduce water consumption and wastewater, resulting in more clean water for other sectors and the environment.</p> <p>Vidic et al. (2013); Tiedemann et al. (2016); Fricko et al. (2016); Holland et al. (2016)</p>	<p>Ensure Sustainable Consumption & Production patterns (12.3) [↑2] [] [] [] [] ★★★</p> <p>Urban carbon mitigation must consider the supply chain management of imported goods, the production efficiency within the city, the consumption patterns of urban consumers, and the responsibility of the ultimate consumers outside the city. Important for climate policy of monitoring the CO2 clusters that dominate CO2 emissions in global supply chains because they offer insights on where climate policy can be effectively directed.</p> <p>Lin et al. (2015); Kagawa et al. (2015); Felix et al (2016)</p>	[0]	No direct interaction	[0]	No direct interaction
	Accelerating energy efficiency improvement	<p>Water efficiency and pollution prevention (6.3/6.4/6.6) [↑2] [] [] [] [] ★★★</p> <p>Similar to behavioral changes, efficiency measures in the transport sector that lead to reduced transport demand can lead to reduced transport energy supply. As water is used to produce a number of important transport fuels, the reduction in transport demand is anticipated to reduce water consumption and wastewater, resulting in more clean water for other sectors and the environment.</p> <p>Vidic et al. (2013); Tiedemann et al. (2016); Fricko et al. (2016); Holland et al. (2016)</p>	<p>Sustainable Consumption (12.2/12.8) [↑2] [] [] [] [] ★★★</p> <p>Relational complex transport behavior resulting in significant growth in energy-inefficient car choices, as well as differences in mobility patterns (distances driven, driving styles) and actual fuel consumption between different car segments all affect the non-progress on transport decarbonisation. Consumption choices, and individual lifestyles are situated tied to the form of the surrounding urbanization. Major behavioral changes and emissions reductions requires understanding of this relational complexity, consideration of potential interactions with other policies and the local context and implementation of both command-and-control as well as market-based measures.</p> <p>Stanley, Hensher and Loader (2011); Heinenon et al. (2013); Gallego, Montero and Salas (2013); Aamaas and Peters (2017); Gössling and Metzler (2017); Azevedo and Leal (2017)</p>	[0]	No direct interaction	[0]	No direct interaction
	Improved access & fuel switch to modern low-carbon energy	<p>Water efficiency and pollution prevention (6.3/6.4/6.6) [↑/↓] [↑2, -1] [] [] [] [] ★★★</p> <p>A switch to low-carbon fuels in the transport sector can lead to a reduction in water demand and wastewater if the existing higher-carbon fuel is associated with a higher water intensity than the lower-carbon fuel. However, in some situations the switch to a low-carbon fuel such as e.g., biofuel could increase water use compared to existing conditions if the biofuel comes from a water-intensive feedstock. Transport electrification could lead to tradeoffs with water use if the electricity is provided with water intensive power generation.</p> <p>Hejazi et al. (2015); Song et al. (2016); Fricko et al. (2016)</p>	<p>Ensure Sustainable Consumption & Production patterns (12.3) [↑2] [] [] [] [] ★★★</p> <p>Due to persistent reliance on fossil fuels, it is posited that transport is more difficult to decarbonize than other sectors. This study partially confirms that transport is less reactive to a given carbon tax than the non-transport sectors: in the first half of the century, transport mitigation is delayed by 10–30 years compared to non-transport mitigation. The extent to which earlier mitigation is possible strongly depends on implemented technologies and model structure.</p> <p>Pietzcker et al. (2013); Figueroa et al. (2014); IPCC AR5 WG3 (2014); Creutzig et al., (2015)</p>	[0]	No direct interaction	[0]	No direct interaction



	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE
Agriculture & Livestock	Behavioural response: Sustainable healthy diets and reduced food waste	Water efficiency and pollution prevention (6.3/6.4/6.6)	[+2,-1]	[]	[]	[]	[+2]	[]	[]	[]	[0]	[+1]	[]	[]	[]
Land based greenhouse gas reduction and soil carbon sequestration	Water efficiency and pollution prevention (6.3/6.4/6.6)	[+1,-1]	[]	[]	[]	[+1]	[]	[]	[]	[0]	[+1,-1]	[]	[]	[]	[]
Greenhouse gas reduction from improved livestock production and manure management systems	Water use efficiency and pollution prevention (6.3/6.4/6.6)	[+2,-1]	[]	[]	[]	[+1]	[]	[]	[]	[0]	[+1]	[]	[]	[]	[]

Industry	Energy savings (7.1, 7.3, 7a, 7b)				Reduces Unemployment (8.2,8.3,8.4,8.5, 8.6)				Infrastructure renewal (9.1/9.3/9.5,9a)				Sustainable cities (15.6,15.8,15.9)							
	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE
Accelerating energy efficiency improvement	↑	[+2]		⊕⊕⊕	★★★★	↑	[+1]		⊕⊕⊕	★★★	↑	[+1]		⊕⊕	★★	↑	[+2]		⊕	★
Energy efficiency lead to reduced relatively less energy demand and hence energy supply and energy security, reduces import. Positive rebound effect can raise demand but to a very less extent due to low rebound effect in industry sector in many countries and by appropriate mix of industries (china) can maintain energy savings gain. supplying surplus energy to cities is also happening.proving mtence culture, Switching off idle equipment help saving energy (e.g Ghana)	Unemployment rate reduction from 25% to 12% in south africa. Enhances firm productivity and technical and managerial capacity of the employees. New jobs for manginenergy efficiency opens up opportunities in energy service delivery sector.				Transitioning to a more renewably-based energy system that is highly energy efficient is well aligned with the goal of upgrading energy infrastructure and making the energy industry more sustainable. In the reverse direction, infrastructure upgrades in other parts of the economy, such as modernized telecommunication networks, can create the conditions for a successful expansion of renewable energy and energy efficiency measures (e.g., smart-metering and demand-side management, McCollum et al., 2018).				Industries are becoming supplier of energy, waste heat , water, roof tops for solar energy settlements and hence reduced primary energy demand also and make towns and cities grow sustainably											
Apeaning and Thollandar (2013); Zhang et al. (2015); IPCC WGIII (2014); Chakravarty et al. (2013); Karner et al. (2015); Fernando et al. (2017); Li et al. (2016); Wesseling et al. (2017)	Altieri et al (2016); Fernando et al. (2017); Johansson and Thollandar (2018)				Apeaning and Thollandar (2013); McCollum et al. (2018); Bhattacharyya et al. (2016); Goldthau (2014); Meltzer (2016); Riahi et al. (2012)				Karner et al (2015)											
Low-carbon fuel switch	↑	[+2]		⊕⊕⊕	★★★★	↑	[+2]		⊕⊕⊕⊕	★★★★	↑	[+2]		⊕⊕⊕⊕	★★★★	↑	[+2]		⊕	★
Industries are becoming supplier of energy, waste heat , water, roof tops for solar energy generation and hence reduced primary energy demand. CHP in chemical industries can help providing surplus power in the grid.	Circular economy instead of liner global economy can achieve climate goal and can help in economic growth through industrialisation which saves on resources, environment and supports small, edium and even large industries, can lead to employment generation. so new regulations, incentives, tax regime can help in achieving the goal.				Circular economy instead of liner global economy is helping new innovation and infrastructure can achieve climate goal and can help in economic growth through industrialisation which saves on resources, environment and supports small, edium and even large industries, can lead to employment generation. so new regulations, incentives, tax regime can help in achieving the goal.				Industries are becoming supplier of energy, waste heat , water, roof tops for solar energy generation and supply to neighbouroural human settlements and hence reduced primary energy demand also and make towns and cities grow sustainably											
Karner et al (2015); Griffin et al (2017)	Supino et al (2015); Fan et al (2017); Leider et al (2015); Zheng et al (2016); Shi et al (2017); Liu et al (2014); Stahel (2017)				Supino et al (2015); Fan et al (2017); Leider et al (2015); Zeng et al (2016); Shi et al (2017); Liu et al (2014); Stahel (2017)				Karner et al (2015)											
Decarbonisation/ CCS/CCU	↑ / ↓	[+2,-2]		⊕⊕	★★	↑	[+2]		⊕⊕⊕	★★★	↑	[+2]		⊕⊕⊕⊕	★★★★	[0]	No direct interaction			
CCS for EPs can be incremental but needs additional space and can need additional energy sometimes compensating for higher efficiency otherwise, Recirculating Blast R Furnace & CCS for iron steel means high energy demand, electric melting in glass can mean higher electricity prices, in paper industry new separation and drying technologies are key to reduce the energy intensity, allowing for carbon neutral operation in the future, bio refineries can reduce petrorefineries, DRI in iron and steel with H2 encourages innovation in hydrogen infrastructure, in chemicals industry also encourage renewable electricity and hydrogen, biobased polymers can increase biomass price.	EPI are important players for economic growth. Deep decarbonisation of EPI through radical innovation is consistent with well below 2C scenario				Deep decarbonisation through radical technological change in EPI will lead to radical innovations e.g.in completely changing industries' innovation strategy, plant and equipment ,skill, production technique, design and so on. Radical CCS will need new infrastructure to transport CO2.															
Wesseling et al. (2017); Griffin et al. (2017)	Wesseling et al. (2017); Åhman et al. (2016); Denis-Ryan et al. (2016)				Wesseling et al. (2017); Åhman et al. (2016); Denis-Ryan et al. (2016); Griffin et al. (2017)															
Buildings	↑	[+2]		⊕⊕⊕⊕	★★★★	↑	[+2]		⊕⊕⊕	★★★	↑	[+2]		⊕⊕	★★	↑	[+2]		⊕⊕	★★
Saving energy, Improvement in Energy efficiency (7.3, 7a, 7b)	Progressively improve resource efficiency (8.4), Employment oportunities				Innovation and new infrastructure (9.2,9.4,9.5)				Sustainable cities (15.6,15.8,15.9)											
Lifestyle change measures and adoption behavior affect residential energy use and implementation of efficient technologies as residential HVAC systems. Also social influence can drive energy savings in users exposed to energy consumption feedback. Effect of autonomous motivation on energy savings behaviour is greater than that of other more established predictors such as intentions, subjective norms, perceived behavioural control and past behaviour. Use of a hybrid engineering approach using social psychology and economic behaviour models are suggested for Residential peak electricity demand response. However, some take back in energy savings can happen due to rebound effect unless managed appropriately or accounted for welfare improvement. Adjusting Thermostat helps in saving energy . Uptake of energy efficient appliance by households with introduction of appliance standard, training, promotional material dissemination, desire to save energy bill are helping to change acquisition behaviour.	Behavioural change programmes help in sustaining energy savings through new infrastrucuter development				Adoption of smart meter and smart grid following community based social marketing help in infrastructure expansion. People are adopting solar rooftops, white roof/vertical garden/green roofs at much faster rate due to new innovation, regulations.				Behavioural change programmes help in making cities more sustainable.											
Yue, Yang, and Chen (2013); Somerfeld, Buys, and Vine (2017); Zhao et al. (2017); de Koning et al. (2016); Isehour and Feng (2016); Sluisveld et al. (2016); Noonan et al. (2015); Allen et al. (2015); Jain et al. (2013a); Hori et al. (2013); Sweeney et al. (2013); Webb et al., (2013); Huebner et al. (2013); Gyamfi, Krumdieck, and Urmee (2013); Chakravarty et al. (2013); Santarius (2016); Song et al. (2016); Anda et al. (2014); Roy et al (2018)	Anda et al. (2014)				Anda et al. (2014); Roy et al. (2018)				Anda et al. (2014); Roy et al. (2018)											
Accelerating energy efficiency improvement	↑	[+2]		⊕⊕⊕	★★★★	↑ / ↓	[+2,-1]		⊕	★★	↑	[+2]		⊕⊕	★★	↑	[+2]		⊕⊕⊕	★★★★
Increase in energy savings (7.3)	Employment Opportunities (8.2/8.3/8.5/8.6) / Strong Financial Institutions (8.10)				Innovation and new infrastructure (9.2,9.4,9.5)				Urban Environmental Sustainability (11.3/11.6, 11.b,11.c)											
There is high agreement among researchers based on large number of evidence across various countries that energy efficiency improvement reduce energy consumption and hence lead to energy savings. Efficient cookstove saves bioenergy. Efficient cookstove saves bioenergy.Countries with higher hours of use due to higher ambient temperature or a more carbon intensive electricity grid benefit more from available improvements in energy efficiency and use of refrigerant transition .	Deploying renewables and energy-efficient technologies, when combined with other targeted monetary and fiscal policies, can help spur innovation and reinforce local, regional, and national industrial and employment objectives. Gross employment effects seem likely to be positive; however, uncertainty remains regarding the net employment effects due to several uncertainties surrounding macro-economic feedback loops playing out at the global level. Moreover, the distributional effects experienced by individual actors may vary significantly. Strategic measures may need to be taken to ensure that a large-scale switch to renewable energy minimizes any negative impacts on those currently engaged in the business of fossil fuels (e.g., government support could help businesses re-tool and workers re-train). To support clean energy and energy efficiency efforts, strengthened financial institutions in developing country communities are necessary for providing capital, credit, and insurance to local entrepreneurs attempting to enact change. (McCollum et al., 2018).				Adoption of smart meter and smart grid following community based social marketing help in infrastructure expansion, statutory norms to enhance energy and resource efficiency in building is encouraging green building projects .				Renewable energy technologies and energy-efficient urban infrastructure solutions (e.g., public transit) can also promote urban environmental sustainability by improving air quality and reducing noise. Efficient transportation technologies powered by renewably-based energy carriers will be a key building block of any sustainable transport system (McCollum et al., 2018). Green buildings help in sustainable construction.											
Berrueta et al. (2017); Cameron, Taylor, and Emmett (2015); Liddell and Guiney (2015); McLeod, Hopfe, and Kwan (2013); Noris et al. (2013); Salvalai et al. (2017); Yang, Yan, and Lam (2014); Kwong, Adam, and Sahari (2014); Holopainen et al. (2014); Bhojvaid Vasundhara et al. (2014); Kim et al. (2017); Shah (2015)	Berrueta et al. (2017); McCollum et al. (2018); Aether (2016); Babiker and Eckaus (2007); Bertram et al. (2015); Blyth et al. (2014); Borenstein (2012); Creutzig et al. (2013); Clarke et al. (2014); Dechezleprêtre and Sato (2014); Dinkelmann (2011); Fankhauser et al. (2008); Ferroukhi et al. (2016); Frondel et al. (2010); Gohin (2008); Guivarch et al. (2011); Jackson and Senker (2011); Johnson et al. (2015)				Anda et al. (2014); Roy et al. (2018)				McCollum et al. (2018); Bongardt et al. (2013); Creutzig et al. (2012); Grubler and Fisk (2012); Kahn Ribeiro et al. (2012); Raji et al. (2015); Riahi et al. (2012); Kim et al (2017)											
Improved access & fuel switch to modern low-carbon energy	↑	[+2]		⊕⊕⊕	★★★	↑	[+2]		⊕⊕⊕	★★★	↑	[+2]		⊕⊕	★★	↑	[+3]		⊕⊕⊕	★★★★
Meeting energy demand	Sustainable economic growth and employment				Innovation and new infrastructure (9.2,9.4,9.5)				Housing (11.1)											
Renewable energies could potentially serve as the main source of meeting energy demand in the rapidly growing developing country cities. Ali et al. (2015) estimated the potential of solar, wind and biomass renewable energy options to meet part of the electrical demand in Karachi, Pakistan.	Creutzig et al. 2014 assessed the potential for renewable energies in the European region. They found that a European energy transition with a high-level of renewable energy installations in the periphery could act as an economic stimulus, decrease trade deficits, and possibly have positive employment effects. Provision of energy access can play a critical enabling role for new productive activities, livelihoods and employment. Reliable access to modern energy services can have an important influence on productivity and earnings. (McCollum et al., 2018)				Adoption of smart meter and smart grid following community based social marketing help in infrastructure expansion, statutory norms to enhance energy and resource efficiency in building is encouraging green building projects . Introduction of incentives and norms for solar rooftops/white/green roofs in cities are helping to accelerate the expansion of the innovation and infrastructure.				Ensuring access to basic housing services implies that households have access to modern energy forms. (Quote from McCollum et al., 2018), roof top solar in Macau make cities sustainable . Introduction of incentives and norms for solar/white/green rooftops in cities are helping to accelerate the expansion of the infrastructure.											
Creutzig et al. (2014); Connolly et al. (2014); Islar et al. (2017); Mittlefehldt (2016); Blighly et al. (2017); Ozturk et al. (2017); Mahony and Dufour (2015); Byravan et al. (2017); Abanda et al. (2016); Peng and Lu (2015); Pietzcker (2013); Ali et al. (2015); Li, Yang, and Richardson (2013); Zulu and Richardson (2013)	Creutzig et al. (2014); Byravan et al. (2017); Ali et al. (2015); McCollum et al. (2018); Bernard and Torero (2015); Chakravorty et al. (2014); Grogan and Sadanand (2013); Pueyo et al. (2013); Rao (2013)				Anda et al. (2014); Roy et al. (2018)				McCollum et al. (2018); Bhattacharya et al. (2016); UN (2016); Song et al (2016); Roy et al. (2018)											

Transport	Behavioural response	Promote Sustained, inclusive economic growth (8.3)	Build Resilient Infrastructure (9.1)	Make cities & Human settlements inclusive, safe, resilient (11.2)
	<p>Energy savings (7.3, 7a, 7b)</p> <p>↑ [+2]</p> <p>Behavioural response will reduce the volume of transport needs and, by extension, energy demand.</p> <p>Ahmad S., Puppim de Oliveira J.A., 2016; Figueroa M.J., Ribeiro S.K., 2013</p>	<p>Promote Sustained, inclusive economic growth (8.3)</p> <p>↓ [-2]</p> <p>Policy contradictions (e.g. standards, efficient technologies leading to increased electricity prices leading the poor to switch away from clean(er) fuels); unintended outcomes (e.g. redistribution of income generated by carbon taxes) results in contradiction to the primary aims of (productive) job creation and poverty alleviation, and in trade-offs between mitigation adaptation and development policies. Detailed assessment of consequences of mitigation policies requires developing methods and reliable evidence to enable policymakers to more systematically identify how different social groups may be affected by the different available policy options.</p> <p>(Klausbrückner, Annegarn, Henneman, & Rafaj, 2016); (Lucas & Pangbourne, 2014); (Suckall, Tompkins, & Stringer, 2014)</p>	<p>Build Resilient Infrastructure (9.1)</p> <p>↑ / ↓ [+2, -2]</p> <p>As people prefer more mass transportation, integrating train lines, a tram line, BRTs, gondola lift systems, a bicycle-sharing systems and hybrid buses and telecommuting need for new infrastructure increases</p> <p>Dulac (2013); Aamaas and Peters (2017); Martínez-Jaramillo et al. (2017); Xylia et al. (2017)</p>	<p>Make cities & Human settlements inclusive, safe, resilient (11.2)</p> <p>↑ [+2]</p> <p>Climate change threatens to worsen poverty, therefore pro-poor mitigation policies are needed to reduce this threat, for example investing more and better in infrastructure by leveraging private resources and using designs that account for future climate change and the related uncertainty</p> <p>Hallegatte et al. (2015); Ahmad and Puppim de Oliveira (2016)</p>
	<p>Accelerating energy efficiency improvement</p> <p>Energy savings (7.3, 7a, 7b)</p> <p>↑ [+2]</p> <p>Accelerating efficiency in tourism transport reduces energy demand (china)</p> <p>Shukhin et al (2016)</p>	<p>Promote Sustained, inclusive economic growth (8.3)</p> <p>↑ / ↓ [+2, -2]</p> <p>Significant opportunities to slow travel growth and improve efficiency exist and, similarly, alternatives to petroleum exist but have different characteristics in terms of availability, cost, distribution, infrastructure, storage, and public acceptability. Production of new technologies, fuels and infrastructure can favour economic growth, however, efficient financing of increased capital spending and infrastructure is critical.</p> <p>Gouldson et al. (2015); Karkatsouliset al. (2016)</p>	<p>Build Resilient Infrastructure (9.1)</p> <p>↑ / ↓ [+2, -2]</p> <p>Combining promotion of mass transportation, integrating train lines, a tram line, BRTs, gondola lift systems, a bicycle-sharing systems and hybrid buses and telecommuting, reduce traffic and significantly contribute to meet climate targets a comprehensive package of complementary mitigation options is necessary for deep and sustained emission reductions. In Sweden public bus fleet is aiming more towards decarbonisation compared to efficiency</p> <p>Dulac (2013); Aamaas and Peters (2017); Martínez-Jaramillo et al. (2017); Xylia et al. (2017)</p>	<p>Make cities sustainable (11.2, 11.3)</p> <p>↑ [+2]</p> <p>Two most important elements of making cities sustainable are efficient building and transport (case of Macau).</p> <p>Song et al. (2016)</p>
	<p>Improved access & fuel switch to modern low-carbon energy</p> <p>Increase share of renewable (7.2)</p> <p>↑ [+2]</p> <p>Biofuel increase share of renewables but can perform poorly if too many countries increase their use of biofuel, whereas electrification performs best when many other countries implement this technology. The strategies are not mutually exclusive and simultaneous implementation of some provides synergies for national energy security. Therefore, important to consider result of material and contextual factors that co-evolve. Electric vehicles using electricity from renewables or low carbon sources combined with e-mobility options such as trolleybuses, metros, trams and electro buses, as well as promote walking and biking, especially for short distances need consideration</p> <p>Månsson (2016); Ajanovic (2015); Wolfram et al. (2017); Alahakoon (2017)</p>	<p>Promote Sustained, inclusive economic growth (8.3)</p> <p>↑ / ↓ [+2, -2]</p> <p>the decarbonisation of the freight sector tends to occur in the second part of the century and that the sector decarbonises by a lower extent than the rest of the economy. Decarbonising road freight on a global scale remains a challenge even when notable progress in biofuels and electric vehicles has been accounted for.</p> <p>Carrara and Longden (2016); Creutzig et al. (2015); IPCC AR5 WG3 (2014)</p>	<p>Help building inclusive infrastructure (9.1, 9.a)</p> <p>↑ [+2]</p> <p>Lack of appropriate infrastructure lead to limited access to job for urban poor (africa, Latin America, India)</p> <p>Gouldson et al. (2015); Figueroa, Fulton and Tiwari (2013); Vasconcellos and Mendonça (2016); Lal et al. (2017)</p>	<p>Make cities & Human settlements inclusive, safe, resilient (11.2)</p> <p>↑ [+2]</p> <p>in rapidly growing cities, the carbon savings from investments at scale, in cost-effective low-carbon measures could be quickly overwhelmed – in as little as 7 years – by the impacts of sustained population and economic growth, highlighting the need to build capacities that enable the exploitation not only of the economically attractive options in the short term but also of those deeper and more structural changes that are likely to be needed in the longer term. With hybrid electric vehicles, plug-in electric vehicles there is emerging new concepts in transportation such as electric highways</p> <p>Gouldson et al. (2015); Figueroa, Fulton and Tiwari (2013); Vasconcellos and Mendonça (2016); Alahakoon (2017)</p>



		INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE
Replacing coal	Non-biomass renewables solar, wind, hydro	↑	[+3]		⊕⊕⊕	★★★★	~	[0]		⊕⊕	★★	~ / ↓	[0, -1]		⊕⊕⊕	★★	↑	[+2]		⊕⊕	★★★
		Decarbonization of the energy system through an up-scaling of renewables will greatly facilitate access to clean, affordable and reliable energy. Hydropower plays an increasingly important role for the global electricity supply. This mitigation option is in line with the targets of SDG7 under the caveat of a transition to modern biomass.					Decarbonization of the energy system through an up-scaling of renewables and energy efficiency is consistent with sustained economic growth and resource decoupling. Long-term scenarios point towards slight consumption losses caused by a rapid and pervasive expansion of such energy solutions. Whether sustainable growth, as an overarching concept, is attainable or not is more disputed in the literature. Existing literature is also undecided as to whether or not access to modern energy services causes economic growth (McCollum et al., 2018).					A rapid up-scaling of renewable energies could necessitate the early retirement of fossil energy infrastructure (e.g., power plants, refineries, pipelines) on a large-scale. The implications of this could in some cases be negative, unless targeted policies can help alleviate the burden on industry (McCollum et al., 2018).					Deployment of renewable energy and improvements in energy efficiency globally will aid climate change mitigation efforts, and this, in turn, can help to reduce the exposure of people to certain types of disasters and extreme events (McCollum et al., 2018).				
		Cherian (2015); Rogelj (2013); Cherian (2015); Jingura and Kamusoko (2016)					McCollum et al. (2018); Bonan et al. (2014); Clarke et al. (2014); Jackson and Senker (2011); New Climate Economy (2014); OECD (2017); York and McGee (2017)					McCollum et al. (2018); Bertram et al. (2015); Fankhauser et al. (2008); Guivarch et al. (2011); Johnson et al. (2015)					McCollum et al. (2018); Daut et al. (2013); Hallegatte et al. (2016); IPCC (2014); Riahi et al. (2012); Tully (2006)				
	Increased use of biomass	↑	[+3]		⊕⊕⊕	★★★★	↑	[+1]		⊕	★	↑	[+1]		⊕⊕⊕	★★		[0]			
		Increased use of modern biomass will facilitate access to clean, affordable and reliable energy. This mitigation option is in line with the targets of SDG7.					Decarbonization of the energy system through an up-scaling of renewables will greatly facilitate access to clean, affordable and reliable energy.					Access to modern and sustainable energy will be critical to sustain economic growth.					No direct interaction				
		Cherian A. (2015); Jingura R.M., Kamusoko R.(2016), Rogelj (2013)					Jingura R.M., Kamusoko R. (2016)					Jingura and Kamusoko (2016); Shahbazet al. (2016)									
	Nuclear/Advanced Nuclear	↑	[1]		⊕	★★	↑	[1]		⊕	★★	↓	[-1]		⊕⊕⊕	★★★★		[0]			
		Increased use of nuclear power can provide stable baseload power supply and reduce price volatility.					Local employment impact and reduced price volatility					Legacy cost of waste and abandoned reactors					No direct interaction				
		IPCC AR5 WG3 (2014)					IPCC AR5 WG3 (2014)					IPCC AR5 WG3 (2014); Marra and Palmer (2011); Greenberg, (2013a); Schwenk-Ferrero (2013a); Skipperud et al. (2013); Tyler et al. (2013a)									
	CCS: Bio energy	↑	[+2]		⊕⊕⊕	★★★★	↑	[+1]		⊕	★	↑	[+1]		⊕	★		[0]			
		Increased use of modern biomass will facilitate access to clean, affordable and reliable energy.					See positive impacts of bio-energy use.					See positive impacts of bio-energy use and CCS/CCU in industrial demand.					No direct interaction				
		IPCC AR5 WG3 (2014)																			
Advanced coal	CCS: Fossil	↑	[+2]		⊕⊕⊕	★★★★	↓	[-1]		⊕⊕⊕	★★★★	↑	[+1]		⊕	★		[0]			
		Advanced and cleaner fossil-fuel technology is in line with the targets of SDG7.					Lock-in of human and physical capital in the fossil-resources industry					See positive impacts of CCS/CCU in industrial demand.					No direct interaction				
		IPCC AR5 WG3 (2014)					IPCC AR5 WG3 (2014); Vergragt et al. (2011); Markusson et al. (2012); IPCC (2005); Benson et al. (2005); Fankhauser et al. (2008); Shackley and Thompson (2012); Johnson et al. (2015); Bertram et al. (2015)														



	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	SCORE	EVIDENCE	AGREEMENT	CONFIDENCE
Agriculture & Livestock Behavioural response: Sustainable healthy diets and reduced food waste	↑	[+1]	Energy Efficiency, universal access (7.1,7.3)	Ⓜ	Ⓢ	↑	[+1]	Sustained and inclusive economic growth (8.2)	Ⓜ	Ⓢ	↑	[+1]	Infrastructure building and promotion of inclusive industrialization (9.1/ 9.2)	Ⓜ	Ⓢ	[0]	[0]	No interaction		
	Reducing global food supply chain losses have several important secondary benefits like conserving energy.					23–24% of total cropland and fertilisers are used to produce losses. So reduction in food losses will help to diversify these valuable resources into other productive activities.					By targeting infrastructure, processing and distribution losses wastage in food systems can be minimized. 23–24% of total cropland and fertilisers are used to produce losses. So reduction in food losses will help to diversify these valuable resources into other productive activities.									
	Kummu et al. (2012)					Kummu et al. (2012); Hiç et al. (2016)					Beddington et al. (2012); Ingram (2011); Lamb et al. (2016); Kummu et al. (2012); Hiç et al. (2016)									
Land based greenhouse gas reduction and soil carbon sequestration	↑	[+1]	Sustainable and modern energy (7.b)	Ⓜ	Ⓢ	↑ / ↓	[+2, -1]	Sustainable Growth (8.2)	Ⓜ	Ⓢ	↑ / ↓	[+2, -2]	Infrastructure building, promotion of inclusive industrialization and innovation (9.1/ 9.2)	Ⓜ	Ⓢ	[0]	[0]	no direct interaction		
	Conventional agricultural biotechnology methods such as energy-efficient farming can help in sequestration of soil carbon. Modern biotechnologies like green-energy, N-efficient GM crops can also help in C-sequestration. Biotech crops allow farmers to use less and environmental friendly energy and practice soil carbon sequestration. Biofuels, both from traditional and GMO crops such as sugarcane, oilseed, rapeseed, and Jatropha can be produced. Green energy programs through plantations of perennial non edible oil-seed producing plants and production of biodiesel for direct use in the energy sector, or blending biofuels with fossil fuels in certain proportions thereby minimizing use of fossil fuels (Quoted from Lakshmi et. al (2015)). Genetically modified crops reduces demand fossil fuel-based inputs.					Many developing countries including Gulf States will benefit from CSA given the central role of agriculture in their economic and social development (Quoted from Behnassi, M., Boussaid, M., & Gopichandran, R. (2014)). Low commodity prices have reduced the incentive to invest in yield growth and have led to declining farm labour and farm capital investment. (Quoted from Lamb, A., et al. (2016))					Reduced research support and delayed industrialization will have an adverse effect on food security and nourishment of children. Organic farming technologies utilizing bio-based fertilizers (composted humus and animal manure) are some of the conventional biotechnological options for reducing artificial fertilizer use (Lakshmi et al., 2015). CSA requires huge financial investment and institutional innovation. CSA is committed to new ways of engaging in participatory research and partnerships with producers (Steenwerth, 2014). Technologies used on-farm and during food processing to increase productivity which also helps in adaptation and/or mitigation are new, so convincing potential customers are difficult. Also Low awareness of CSA and inaccessible language, high costs, lack of verified impact of technologies, hard to reach and train farmers, low consumer demand, unequal distribution of costs/benefits across supply chains are barriers of CSA technology adoption (Long, Blok, and Coninx (2016). Low commodity prices have reduced the incentive to invest in yield growth and have led to declining investment in research and development (Lamb et al., 2016).									
	Mtui (2011); Johnson et al. (2007); Lakshmi et. al (2015); Sarin et al. (2007); Treasury (2009); Lua et al. (2009); Jain and Sharma (2010); Lybbert and Sumner (2010)					Behnassi, Boussaid and Gopichandran (2014); Lamb, et al. (2016)					Evenson (1999); Lakshmi et al (2015); Behnassi, Boussaid and Gopichandran (2014); Steenwerth et al. (2014); Long, Blok and Coninx (2016); Lamb et al. (2016)									
Greenhouse gas reduction from improved livestock production and manure management systems	↑	[+1]	Energy Efficiency (7.3)	Ⓜ	Ⓢ	↑	[+1]	Sustainable Economic Growth (8.4)	Ⓜ	Ⓢ	↑	[+2]	Technological upgradation and Innovation (9.2)	Ⓜ	Ⓢ	[0]	[0]	No direct interaction		
	Scenarios where zero human-edible concentrate feed is use for livestock non-renewable energy use reduces by 36%					Exploiting the increasingly decoupled interactions between crops and livestock could be beneficial for promoting structural changes in the livestock sector and is a prerequisite for the sustainable growth of the sector. (Quoted from Herrero, M., & Thornton, P. K. (2013)					Complete genome maps for poultry and cattle now exist, and these open up the way to possible advances in evolutionary biology, animal breeding and animal models for human diseases. Genomic selection should be able to at least double the rate of genetic gain in the dairy industry. (Quoted from Thornton, P. K. (2010)) Nanotechnology, biogas technology, separation technologies are a disruptive technology that enhance biogas production from anaerobic digesters or to reduce odours.									
	Schader et al. (2015)					Herrero and Thornton (2013)					Thornton (2010); Sansoucy (1995); Burton (2007)									
Forest Reduced deforestation, REDD+	↑ / ↓	[+1, -1]	Energy Efficiency (7.3)	Ⓜ	Ⓢ	↑	[+1]	Sustainable Economic Growth (8.4)	Ⓜ	Ⓢ	↑ / ↓	[+1, -1]	Infrastructure building ,promotion of inclusive industrialization (9.1/ 9.2/9.5)	Ⓜ	Ⓢ	[0]	[0]	No direct interaction		
	Consider the entire sinks and reservoirs of greenhouse gas while developing the nationally appropriate mitigations actions. For countries with a significant contribution of forest degradation (and GHG emissions) from wood fuels, this should be considered (Quoted from Lima, M. G. B., Kissinger, G., Visseren-Hamakers, I. J., Braña-Varela, J., & Gupta, A. (2017)). Biomass for energy is recognized as often being inefficient, and is often harvested in an unsustainable manner, but is a renewable energy source					Efforts by the Government of Zambia to reduce emissions byREDD+, have contributed erosion control, ecotourism and pollination valued at 2.5% of the country's GDP. Partnerships between local forest managers, community enterprises and private sector companies can support local economies and livelihoods, and boost regional and national economic growth.					Expanding road net works are recognized as one of the main drivers of deforesting and forest degradation, diminishing forest benefits to communities. On the other hand, roads can enhance market access, thereby boosting local benefits (SDG 1) from the commercialization of forest products.(Quoted from Katila, P., et al. (2017)). Efforts by the Government of Zambia to reduce emissions byREDD+, have contributed erosion control, ecotourism and pollination valued at 2.5% of the country's GDP.									
	Lima et al. (2017); Katila et al. (2017)					Turpie, Warr and Ingram (2015); Epstein and Theuer (2017); Katila et al. (2017)					Katila et al. (2017); Turpie, Warr and Ingram (2015); Epstein and Theuer (2017)									
Afforestation and reforestation	↑	[+1]	Energy Conservation (7.3/7.b)	Ⓜ	Ⓢ	↑	[+2]	Decent job creation and Sustainable economic growth (8.3/8.4)	Ⓜ	Ⓢ	[0]	[0]	Improving air quality, green and public spaces (11.6,11.7, 11a, 11b)	Ⓜ	Ⓢ	[0]	[0]	No direct interaction		
	The US Forest Service estimates that an average NYC street tree (urban afforestation) produces \$209 in annual benefits, which is primarily driven by aesthetic (\$90 per tree) and energy savings (from shade) benefits (\$47.63 per tree)					Many tree plantations worldwide have higher growth rates which can provide higher rates of returns for investors. Agroforestry initiatives that offer significant opportunities for projects to provide benefits to smallerholder farmers can also help address land degradation through community based efforts in more marginal areas. Mangroves reduce impacts of disasters (cyclones/storms/floods) enhance water quality, fisheries, tourism business, and livelihoods.										Many urban tree plantations world wide are done with focus on multiple benefits like air quality improvement, cultural preference for green nature, healthy community interaction besides temperature control and biodiversity enhancement goals.				
	Jones et al. (2018)					Zomer et al. (2008); Kibria (2015)										Pei et al (2018); McKinney (2018); Kowarik (2018); Wei (2018); Chen et al (2018); McPherson et al (2018)				
Behavioural response (responsible sourcing)	↑	[+1]	Universal access (7.3)	Ⓜ	Ⓢ	↑	[+2]	Decent job creation and Sustainable economic growth (8.3/8.4)	Ⓜ	Ⓢ	↑	[+2]	Technological upgradation and Innovation,promotion of inclusive industrialization (9.1/ 9.2)	Ⓜ	Ⓢ	[0]	[0]	No direct interaction		
	The trade of wood pellets from clean wood waste should be facilitated with less administrative barriers for the import by the EU, in order to have this new option seriously accounted for as a future resource for energy. (Quoted from Sikkema, R., et al. (2014)). Recommends further harmonization of legal harvesting, sustainable sourcing and cascaded use requirements for woody biomass for energy with the current requirements of voluntary SFM certification schemes.					Some standards seek primarily to coordinate global trade, many purport to promote ecological sustainability and social justice or to institutionalize "corporate social responsibility" (CSR) e.g. labour standards developed in the wake of sweatshop and child labour scandals. Environmental standards for pollution control etc. Indonesian factories may seek advantages through non-price competition—perhaps by highlighting decent working conditions or the existence of a union—or to see trade associations or government promoting the country as a responsible sourcing location.					Capacity for processing certified timber is often underutilized, due the limited supply available. As a result, manufacturing firms that are seeking to tap into green markets often turn to other sources of timber.(Quoted from Bartley, T. (2010)). Responsible sourcing, when integrated into business practices, can enable retailers to better manage brand value and reputation by avoiding negative public relations, as well as maintaining and enhancing brand integrity (Huang et al., 2013).					Many urban tree plantations world wide are done with focus on multiple benefits like air quality improvement, cultural preference for green nature, healthy community interaction besides temperature control and biodiversity enhancement goals. People's preference for urban forest gardens are encouraging new urban green spaces, tree selection helps in building resilience to disaster.				
	Sikkema et al. (2014)					Bartley, T. (2010)					Bartley, T. (2010); Huang, W., Wilkes, A., Sun, X., & Terheggen, A. (2013)					Pei et al (2018); McKinney (2018); Kowarik (2018); Wei (2018); Chen et al (2018); McPherson et al (2018)				
Oceans Ocean iron fertilization	[0]	[0]	No direct interaction			[0]	[0]	No direct interaction			[0]	[0]	No direct interaction			[0]	[0]	No direct interaction		
Blue carbon	[0]	[0]	No direct interaction			[0]	[0]	No direct interaction			[0]	[0]	No direct interaction			[0]	[0]	No direct interaction		
Enhanced Weathering	[0]	[0]	No direct interaction			[0]	[0]	No direct interaction			[0]	[0]	No direct interaction			[0]	[0]	No direct interaction		