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Panel A Part 1

		1 NO POVERTY				2 ZERO HUNGER				3 GOOD HEALTH AND WELL-BEING				4 QUALITY EDUCATION										
Industry	Accelerating energy efficiency improvement	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE			
		Reduces poverty				air pollution reduction and better health (3.9)				Technical education, vocational training (4.3, 4.4, 4.5)														
	↑ [+2]	↑ [+2]	★★	⊕	★	[0]	[0]	↑ [+2]	★★	⊕	★★	↑ [+1]	★★	⊕	★★		↑ [+1]	★★	⊕	★★				
	% of people living below poverty line declines from 49% to 18% in south african context					No direct interaction, No literature						People living in the deprived communities feel positive and predict considerable financial savings. Efficiency 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. In extractive industries there is trade off unless strategically managed. 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.					Awareness, knowledge and technical and managerial capability are closely linked, energy audit, information for trade unions							
	Altieri et al (2016)											Xi et al (2013), Zhang et al (2015), Vassolo and Doell (2005); Fricko et al. (2016); Holland et al. (2016); Nguyen et al (2014)					Fernando et al (2016), Apeaning and Thollandar (2013)							
	Low-carbon fuel switch	[0]				[0]		↑ [+2]	★★	⊕	★★	↑ [+1]	★★	⊕	★★		↑ [+1]	★★	⊕	★★				
	No direct interaction, No literature					No direct interaction, No literature						Industries are becoming supplier of energy, waste heat, water, roof tops for solar energy generation and hence helping in improving air and water quality.					New technplogy deployment creates demand for awareness, knowledge with technical and managerial capability otherwise acts as barrier for rapid expansion.							
												Vassolo and Doell (2005); Fricko et al. (2016); Holland et al. (2016); Nguyen et al (2014), Karner et al (2015)					Fernando et al (2016), Apeaning and Thollandar (2013)							
	Decarbonisation/CCS/CCU	[0]				[0]		↓ [-1]	★★★	⊕	★★★													
	No direct interaction, No literature					No direct interaction, No literature						Disease and Mortality (3.1/3.2/3.3/3.4)												
												There is a risk of CO2 leakage both from geological formations as well as from the transportation infrastructure from source to sequestration locations.												
												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).												
Residential	Behavioral response	↑ [+2]	★★	⊕	★	[0]		↑ [+2]	★★★	⊕	★★★													
	Poverty reduction via financial savings (1.1)					No direct interaction, No literature						Improved warmth and comforts												
	People living in the deprived communities feel positive and predict considerable financial savings.											Home occupants reported warmth as the most important aspect of comfort which were largely temperature-related and low in energy costs. Residents living in the deprived areas expect improved warmth in their properties after energy efficiency measures are employed.												
	Scott, Jones, and Webb (2014)											Scott, Jones, and Webb (2014); Huebner, Cooper, and Jones (2013); Yue, Long, and Chen (2013); Zhao et al. 2017												
	Accelerating energy efficiency improvement	↑ [+2]	★★★	⊕	★★★	↑ [+2]	★★	↑ [+2]	★★★	⊕	★★★	↑ [+2]	★★	⊕	★★		↑ [+2]	★★	⊕	★★				
	Poverty and Development (1.1/1.2/1.3/1.4)					Food Security						Healthy lives and well-being for all at all ages(3.2, 3.9)					Reducing school absences							
	Energy efficiency interventions lead to cost savings which are realized due to reduced energy bills that further lead to poverty reduction. Participants with low incomes experience greater benefits. Energy efficiency and biomass strategies benefited poor more than wind and solar whose benefits are captured by industry. carbon mitigation can increase or decrease inequalities. The distributional costs of new energy policies (e.g., supporting renewables and energy efficiency) are dependent on instrument design. If costs fall disproportionately on the poor, then this could impair progress toward universal energy access and, by extension, counteract the fight to eliminate poverty. (Quote from McCollum et al., in review)					Using the improved stoves supports local food security and has significantly impacted on food security. By making fuel lasting longer, the improved stoves also help improve food security and provide a better buffer against fuel shortages induced by climate change-related events such as droughts, floods or hurricanes (Berrueta et al. 2017).						Efficient cookstove improves health especially for indigenous and poor rural communities. Household energy efficiency has positive health impacts on children's respiratory health, weight, and susceptibility to illness, and the mental health of adults. Household energy efficiency improves winter warmth, lowers relative humidity with benefits for cardiovascular and respiratory health. Further improved Indoor Air Quality by thermal regulation and occupant comfort are realised. However in one instance negative health impacts (asthma) of increased household energy efficiency were also noted when housing upgrades take place without changes in occupant behaviours. Home occupants reported warmth as the most important aspect of comfort which were largely temperature-related and low in energy costs. Residents living in the deprived areas expect improved warmth in their properties after energy efficiency measures are employed.					Household energy efficiency measures reduce school absences for children with asthma.							
	Maidment et al. (2014); Scott, Jones, and Webb (2014); Berrueta et al. (2017); McCollum et al. (in review); Cameron et al. (2016); Casillas and Kammen (2012); Fay et al. (2015); Hallegate et al. (2016); Hirth and Ueckerdt (2013); Jakob and Steckel (2014); Casillas et al (2012)					Berrueta et al. (2017)						Berrueta et al., 2017; Maidment et al., 2014; Willand, Ridley, and Maller, 2015; Wells et al., 2015; Cameron, Taylor, and Emmett, 2015; Liddell and Guiney, 2015; Sharpe et al., 2015; Derbez, 2014; Djamilia, Chu, Kumaresan, 2013, Scott, Jones, and Webb (2014); Huebner, Cooper, and Jones (2013); Yue, Long, and Chen (2013); Zhao et al. 2017, Bhojvaid Vasundhara et al (2014)					Maidment et al. (2014)							
	Improved access & fuel switch to modern low-carbon energy	↑ [+2]	★★★	⊕	★★★	↑ [+2]	★★	↑ [+2]	★★★	⊕	★★★	↑ [+2]	★★	⊕	★★		↑ [+1]	★★	⊕	★★				
	Poverty and Development (1.1/1.2/1.3/1.4)					Food Security and Agricultural Productivity (2.1/2.4)						Disease and Mortality (3.1/3.2/3.3/3.4)					Equal Access to Educational Institutions (4.1/4.2/4.3/4.5)							
	Access to modern energy forms (electricity, clean cook-stoves, high-quality lighting) is fundamental to human development since the energy services made possible by them help alleviate chronic and persistent poverty. Strength of the impact varies in the literature. (Quote from McCollum et al., in review)					Modern energy access is critical to enhance agricultural yields/productivity, decrease post-harvest losses, and mechanize agri-processing - all of which can aid food security. However, large-scale bioenergy and food production may compete for scarce land and other inputs (e.g., water, fertilizers), depending on how and where biomass supplies are grown and the indirect land use change impacts that result. If not implemented thoughtfully, this could lead to higher food prices glo (Quote from McCollum et al., in review)ally, and thus reduced access to affordable food for the poor. Enhanced agricultural productivities can ameliorate the situation by allowing as much bioenergy to be produced on as little land as possible.						Access to modern energy services can contribute to fewer injuries and diseases related to traditional solid fuel collection and burning, as well as utilization of kerosene lanterns. Access to modern energy services can facilitate improved health care provision, medicine and vaccine storage, utilization of powered medical equipment, and dissemination of health-related information and education. Such services can also enable thermal comfort in homes and contribute to food preservation and safety. (Quote from McCollum et al., in review)					Access to modern energy is necessary for schools to have quality lighting and thermal comfort, as well as modern information and communication technologies. Access to modern lighting and energy allows for studying after sundown and frees constraints on time management that allow for higher school enrollment rates and better literacy outcomes. (Quote from McCollum et al., in review)							
	McCollum et al. (in review); Bonan et al. (2014); Burlig and Preonas (2016); Casillas and Kammen (2010); Cook (2011); Kirubi et al. (2009); Pachauri et al. (2012); Pueyo et al. (2013); Rao et al. (2014); Zulu and Richardson, 2013; Pade, 2013					McCollum et al. (in review); Asaduzzaman et al. (2010); Cabraal et al. (2005); Finco and Doppler (2010); Hasegawa et al. (2015); Lotze-Campen et al. (2014); Msangi et al. (2010); Smith et al. (2013); Smith, P. et al. (2014); Sola et al. (2016); Tilman et al. (2009); van Vuuren et al. (2009)						McCollum et al. (in review); Aranda et al. (2014); Lam et al. (2012); Lim et al. (2012); Smith et al (2013)					McCollum et al. (in review); Lipscomb et al. (2013); van de Walle et al. (2013)							

Panel A Part 1

<p>Transport</p> <p>Behavioural response</p>			<p>Road Traffic Accidents (3.4/3.6)</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. (Quote from McCollum et al., in review)</p> <p><i>McCollum et al. (in review); 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)</i></p>	
<p>Accelerating energy efficiency improvement</p>			<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, Lah, Fulton, McKinnon, & Tiwari, 2014);(Peng, Yang, Wagner, & Mauzerall, 2017); (Klausbruckner et al., 2016)</p>	
<p>Improved access & fuel switch to modern low-carbon energy</p>	<p>End Poverty in all its forms everywhere (1.1,1.4,1.a, 1.b)</p> <p>↑/↓ [+2,-1] [] [⊕⊕] ★★★</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. 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 tripple informality leading to low productivity and living standards. In Sweden decarbonisation of public bus 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><i>(Hallegate et al, 2015); (Suckall, Tampkins, & Stringer, 2014), Lal, Henderson, & Venables, 2017, (Corporacion Andina de Fomento, 2017), Xylia et al (2017), Klausbruckner, Annegarn, Henneman, & Rafaj, 2016</i></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><i>Partnership on Sustainable Low Carbon Transport, 2017</i></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 targetting at reducing airpollution, 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 consieration</p> <p><i>Partnership on Sustainable Low Carbon Transport, 2017, Ajanovic (2015)</i></p>	

Panel A Part 2



		INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	
Replacing coal	Non-biomass renewables solar, wind, hydro	↑	[+2]	■■■■	⊕⊕	★★★						↑	[+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. (Quote from McCollum et al., in review)											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. (Quote from McCollum et al., in review)						Decentralized renewable energy systems (e.g., home- or village-scale solar power) can support education and vocational training.				
	McCollum et al. (in review); Hallegatte et al. (2016); IPCC (2014); Riahi et al. (2012)											McCollum et al. (in review); 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		↑/↓	[+2,-2]	■■■	⊕⊕	★★★	↑/↓	[+2,-2]	■■■■	⊕⊕	★★★	↑	[+2]	■■■■	⊕⊕	★★★						
	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 (Quote from McCollum et al., in review)						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. (Quote from McCollum et al., in review)						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.									
	McCollum et al. (in review); 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 F.C., Kappler B., Neubauer P. (2017)						McCollum et al. (in review); 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 F.C., Kappler B., Neubauer P. (2017)					IPCC AR5 WG3 (2014); Koorneef 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); Waöquist 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												↓	[-1]	■■■	⊕⊕	★★★						
												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). 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); Tirmarache (2012); Brugge and Buchner (2011); Möller et al. (2012); Hiyama et al. (2013); Mousseau and Möller (2013); Möller and Mousseau (2011); Möller 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		↑/↓	[+2,-2]	■■■	⊕⊕	★★★	↑/↓	[+1,-2]	■■■■	⊕⊕	★★★	↑/↓	[+2,-1]	■■■	⊕⊕	★★★						
	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.						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.									
							See literature on increased biomass use + Muratori et al. (2016), IPCC AR5 (2014)					IPCC AR5 WG3 (2014); Atchley et al. (2013); Apps et al. (2010); Siirila et al. (2012); Wang and Jaffe (2004); Koorneef et al. (2011); Singh et al. (2011); Hertwich et al. (2008); Veltman et al. (2010); Corsten et al. (2013).										
Advanced coal	CCS: Fossil											↓	[-1]	■■■	⊕⊕	★★★						
	No literature						No literature					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-negligible risk of CO2 leakage from geological storage the CO2 transport infrastructure from source to sequestration location.					No literature					
												IPCC AR5 WG3 (2014); Atchley et al. (2013); Apps et al. (2010); Siirila et al. (2012); Wang and Jaffe (2004); Koorneef et al. (2011); Singh et al. (2011); Hertwich et al. (2008); Veltman et al. (2010); Corsten et al. (2013).										

Panel A Part 3



		INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE		
Agriculture & Livestock	Behavioural response: Sustainable healthy diets and reduced food waste		[0,-1]			★★		[+2]			★★★★★		[+1]			★							
	Land based greenhouse gas reduction and soil carbon sequestration							[+2]			★★★★★		[+2,-2]			★★		[+2,-2]			★		
Greenhouse gas reduction from improved livestock production and manure management systems			[+2]			★		[+2]			★★★★★		[+2,-2]			★★							
								[+2]			★★★★★		[+2,-2]			★★							

Panel B Part 1



		INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	
Industry	Accelerating energy efficiency improvement			No literature					No literature					No literature								
	Low-carbon fuel switch			No literature					No literature					No literature								
	Decarbonisation/CCS/CCU																					<p>Environmental justice (17.6, 17.7)</p> <p>↑ [+2] 🏠 🌐 ⚙️ ★★★</p> <p>EPI plants are capital intensive and are mostly operated by multinational with long investment cycles. In developed countries new innovation investments are happening in brown fields. Such large innovation investments need strong collaboration among partners/competitors which can be facilitated by public fund, They happen at national, supra national scale, across sectors, needs fresh revisit at IPR issues.</p> <p>Wesseling, J.H., S. Lechtenböhmer, M. Ahman, L.J. Nilsson, E. Worrell, L. Coenen (2017)</p>
Residential	Behavioral response																					<p>Environmental justice</p> <p>↑ [+2] 🏠 🌐 ⚙️ ★</p> <p>Hult et al. found that consumption perspective strengthens the environmental justice discourse (as it claims to be a more just way of calculating global and local environmental effects) while possibly also increasing the environmental discourse.</p> <p>Hult and Larsson (2016)</p>
	Accelerating energy efficiency improvement			<p>Gender equality and Women empowerment (5.1, 5.4)</p> <p>↑ [+2] 🏠 🌐 ⚙️ ★★</p> <p>Efficient cookstoves lead to empowerment of rural and indigenous women.</p> <p>Berrueta et al. (2017), Bhojvaid Vasundhara et al (2014)</p>					<p>Empowerment and Inclusion (10.1/10.2/10.3/10.4)</p> <p>↑/↓ [1,-1] 🏠 🏠 🏠 🌐 ⚙️ ★★★</p> <p>Energy efficiency measures and the provision of energy access can free up resources that can then be put towards other productive uses (e.g., educational and employment opportunities), especially for women and children in poor, rural areas. The distributional costs of new energy policies are dependent on instrument design. If costs fall disproportionately on the poor, then this could work against the promotion of social, economic and political equality for all. The impacts of energy efficiency measures and policies on inequality can be both positive (if they reduce energy costs) or negative (if mandatory standards increase the need for purchasing more expensive equipment and appliances). (Quote from McCollum et al., in review)</p> <p>McCollum et al. (in review); Cameron et al. (2016); Casillas and Kammen (2012); Fay et al. (2015); Hallegatte et al. (2016); Hirth and Ueckerdt (2013); Jakob and Steckel (2014); Cayla and Osso (2013); Dinkelman (2011); Pachauri et al. (2012); Pueyo et al. (2013)</p>													
	Improved access & fuel switch to modern low-carbon energy			<p>Women's Safety & Worth (5.1/5.2/5.4) / Opportunities for Women (5.1/5.5)</p> <p>↑ [+1] 🏠 🌐 ⚙️ ★★</p> <p>Improved access to electric lighting can improve women's safety and girls' school enrollment. Cleaner cooking fuel and lighting access can reduce health risks and drudgery, which are disproportionately faced by women. Access to modern energy services has the potential to empower women by improving their income-earning and entrepreneurial opportunities and reducing drudgery. Participating in energy supply chains can increase women's opportunities and agency and improve business outcomes. (Quote from McCollum et al., in review)</p> <p>McCollum et al. (in review); Anenberg et al. (2013); Chowdhury (2010); Haves (2012); Matinga (2012); Pachauri and Rao (2013); Chowdhury (2010); Clancy et al (2011); Dinkelman (2011); Haves (2012); Kaygusuz (2011); Kohlin et al. (2011); Pachauri and Rao (2013); Burney J., Alaofe H., Naylor R., Taren D. (2017)</p>					<p>Institutional Capacity and Accountability (16.1/16.3/16.5/16.6/16.7/16.8)</p> <p>↑ [+2] 🏠 🏠 🏠 🌐 ⚙️ ★★★★★</p> <p>Institutions that are effective, accountable, and transparent are needed at all levels of government (local to national to international) for providing energy access, promoting modern renewables, and boosting efficiency. Strengthening the participation of developing countries in international institutions (e.g., international energy agencies, United Nations organizations, World Trade Organization, regional development banks and beyond) will be important for issues related to energy trade, foreign direct investment, labor migration, and knowledge and technology transfer. Reducing corruption, where it exists, will help these bodies and related domestic institutions maximize their societal impacts. (Quote from McCollum et al., in review) Limiting armed conflict and violence will aid most efforts related to sustainable development, including progress in the energy dimension.</p> <p>McCollum et al. (in review); Acemoglu (2009); Acemoglu et al. (2014); ICSU, ISSC (2015); Tabellini (2010)</p>												<p>Promote transfer and diffusion of technology (17.6,17.7)</p> <p>↑ [+2] 🏠 🌐 ⚙️ ★</p> <p>Green building technology in Kazakhstan was based on transfer of knowledge among various parties</p> <p>Kim et al (2017)</p>	
Transport	Behavioural response								<p>Reduce Inequality (10.2)</p> <p>↑ [+2] 🏠 🌐 ⚙️ ★★</p> <p>The equity impacts of climate change mitigation measures for transport, and indeed of transport policy intervention overall, are poorly understood by policymakers. This is in large part because standard assessment of these impacts is not a statutory requirement of current policy making. Managing transport energy demand growth will have to be advanced alongside efforts in passenger travel toward reducing the deep inequalities in access to transport services that currently affect the poor worldwide.</p> <p>Lucas & Pangbourne, 2014, Figueroa, Lah, Fulton, McKinnon, & Tiwari, 2014</p>						<p>Ensure safety on road (16.1)</p> <p>↑/↓ [+1, -1] 🏠 🌐 ⚙️ ★</p> <p>With behavioural change towards walking for short distance pedestrian safety on the road might reduce unless public policy is appropriately formulated</p> <p>Partnership on Sustainable Low Carbon Transport, 2017</p>						<p>Help promote global partnership(17.1, 17.3,17.5,17.6,17.7)</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 happening through multistakeholder coalition</p> <p>Partnership on Sustainable Low Carbon Transport, 2017</p>	
	Accelerating energy efficiency improvement								<p>Ensure responsive, inclusive, participatory decision making (16.7)</p> <p>↑ [+2] 🏠 🌐 ⚙️ ★★</p> <p>In transport mitigation is necessary to conduct need assessment and stakeholder consultation to determine plausible challenges, prior to introducing a desired planning reforms. Further, the involved personnel should actively engage transport-based stakeholders during policy identification and its effective implementation to achieve desired results. User behaviour and stakeholder integration is key for successful transport policy implementation</p> <p>Aggarwal, 2017, AlSabbagh, Siu, Guehneemann, & Barrett, 2017</p>											<p>Help promote global partnership(17.1, 17.3,17.5,17.6,17.7)</p> <p>↑ [+2] 🏠 🌐 ⚙️ ★</p> <p>Projects aiming at resilient transport infrastructure development and technology adoption (e.g. C40 Cities Clean Bus Declaration, UITP Declaration on Climate Leadership, Cycling Delivers on the Global Goals, Global Sidewalk Challenge) are happening through multistakeholder coalition</p> <p>Partnership on Sustainable Low Carbon Transport, 2017</p>		
	Improved access & fuel switch to modern low-carbon energy				<p>Reduce Inequality (10.2)</p> <p>↑ [+2] 🏠 🌐 ⚙️ ★★</p> <p>The equity impacts of climate change mitigation measures for transport, and indeed of transport policy intervention overall, are poorly understood by policymakers. This is in large part because standard assessment of these impacts is not a statutory requirement of current policy making. Managing transport energy demand growth will have to be advanced alongside efforts in passenger travel toward reducing the deep inequalities in access to transport services that currently affect the poor worldwide.</p> <p>Lucas & Pangbourne, 2014, Figueroa, Lah, Fulton, McKinnon, & Tiwari, 2014</p>					<p>Ensure responsive, inclusive, participatory decision making (16.7)</p> <p>↑ [+1, -1] 🏠 🌐 ⚙️ ★</p> <p>Formal transport infrastructure improvement in many cities in developing countries lead to eviction from informal settlements which need appropriate redistributive policies and cooperation and partnership with all.</p> <p>Colenrander et al 2017</p>										<p>Help promote global partnership(17.1, 17.3,17.5,17.6,17.7)</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 happening through multistakeholder coalition</p> <p>Partnership on Sustainable Low Carbon Transport, 2017</p>		

Panel B Part 3



		INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE
Agriculture & Livestock	Behaviourial response: Sustainable healthy diets and reduced food waste			No literature					No literature			<p>Strong and effective institutions and responsive decision making (16.6/ 16.7 / 16.a)</p> <p>↑ / ↓ [+1,-1] [1][1][1] [2][2] ★★</p> <p>Appropriate incentives to reduce food waste may require some policy innovation and experimentation, but a strong commitment for devising and monitoring them seems essential. (Quoted from Bajželj et al.(2014))</p> <p>A financial incentive to minimise waste could be created through effective taxation (e.g. by taxing foods with the highest wastage rates, or by increasing taxes on waste disposal)</p> <p>Decision makers should try to integrate agricultural,environmental and nutritional objectives through appropriate policy measures to achieve sustainable healthy diets coupled with reduction in food waste.</p> <p>It is surprising that politicians and policy makers demonstrate little regarding the need of having strategies to reduce meat consumption and to encourage more sustainable eating practices in Netherlands.</p> <p>Bajželj et al.(2014), Lamb et al. (2016), Garnett, T. (2011), Dagevos, H., & Voordouw, J. (2013).</p>	<p>Resource mobilization and Strenghten Partnership (17.1/17.14)</p> <p>↑ / ↓ [+1,-1] [1] [2] ★</p> <p>Decision makers should try to integrate agricultural,environmental and nutritional objectives through appropriate policy measures to achieve sustainable healthy diets coupled with reduction in food waste.</p> <p>It is surprising that politicians and policy makers demonstrate little regarding the need of having strategies to reduce meat consumption and to encourage more sustainable eating practices in Netherlands.</p> <p>Garnett, T. (2011), Dagevos, H., & Voordouw, J. (2013).</p>			
	Land based greenhouse gas reduction and soil carbon sequestration			No literature					No literature			<p>Build effective, accountable and inclusive institutions (16.6/ 16.7/16.8)</p> <p>~ / ↓ [0,-1] [1][1][1] [2][2] ★★</p> <p>Action is needed throughout the food system for improving governance and producing more food. (Quoted from Godfray, H. C. J., & Garnett, T. (2014)).</p> <p>CSA requires policy intervention for careful adjustment of agricultural practices to natural conditions, a knowledge-intensive approach, huge financial investment etc, so having strong institutional framework is very important.</p> <p>The main source of climate finance for CSA in developing countries is the public sector. Lack of institutional capacity (as a means for securing creation of equal institutions amongsocial groups and individuals) can reduce feasibility of AFOLU mitigation measures in the near future, especially in areas where small-scale farmers or forest users are the mainstakeholders (Quoted from Bustamante, M., (2014))</p> <p>Godfray, H. C. J., & Garnett, T. (2014),Behnassi, M., Boussaid, M., &Gopichandran, R. (2014),Steenwerth, K. L., (2014), Lipper, L., et al. (2014), Bustamante, M., (2014)</p>	<p>Resource mobilization and Strenghten multi-stakeholder Partnership</p> <p>↑ [+2] [1][1][1] [2][2] ★★</p> <p>Climate Smart Agriculture requires more careful adjustment of agricultural practices to natural conditions, a knowledge-intensive approach, huge financial investment, and policy and institutional innovation, etc. Besides private investment quality of public investment is also important. (Quoted from Behnassi, M., Boussaid, M., &Gopichandran, R. (2014)).</p> <p>Sources of climate finance for CSA in developing countries, including bilateral donors, multilateral financial institutions besides public sector finance.</p> <p>CSA is committed to new ways of engaging in participatory research and partnerships with producers (Quoted from Steenwerth, K. L., (2014))</p> <p>Behnassi, M., Boussaid, M., &Gopichandran, R. (2014), Lipper, L., et al. (2014), Steenwerth, K. L., (2014)</p>			
	Greenhouse gas reduction from improved livestock production and manure management systems			No literature					No literature			<p>Responsible decision making (16.7)</p> <p>↑ [+1] [1] [2] ★</p> <p>To minimize the economic and social cost, policies should target emissions at their source—on the supply side—rather than on the demand side as supply-side policies have lower calorie cost than demand-side policies.The role of livestock system transitions in emission reductions depends on the level of the carbon price and which emissions sector is targeted by the policies (Quoted from Havlik, P., et al. (2014))</p> <p>Havlik, P., et al. (2014)</p>	<p>Improve domestic capacity for tax collection (17.1)</p> <p>↑ [+2] [1][1] [2][2] ★★</p> <p>The role of livestock system transitions in emission reductions depends on the level of the carbon price and which emissions sector is targeted by the policies (Quoted from Havlik, P., et al. (2014))</p> <p>Mechanisms for effecting behavioral change in livestock systems need to be better understood by implementing combinations of incentives and taxes simultaneously in different parts of the world (Quoted from Herrero, M., & Thornton, P. K. (2013))</p> <p>Havlik, P., et al. (2014), Herrero, M., & Thornton, P. K. (2013).</p>			

Forest	Reduced deforestation, REDD+	Opportunities for Women (5.1/5.5)	Reduced inequality, empowerment and inclusion (10.1/10.2/10.3/10.4)	Build effective, accountable and inclusive institutions, Responsible decision making (16.6/ 16.7/16.8)	Resource mobilization and Strengthen multi-stakeholder Partnership (17.1/ 17.3/17.5/17.17)
		<p>↑/↓ [+1,-1] 🏠 🌐 ★</p> <p>Women have been less involved in REDD+ initiative (pilot project) design decisions and processes than men.</p> <p>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 (Quoted from Katila, P., et al. (2017))</p> <p>Brown 2011, Larson et al. 2015, (Quoted from Katila, P., et al. (2017))</p>	<p>↑ [+2] 🏠 🌐 ★</p> <p>Urges development country to support, through multilateral and bilateral channels, the development of REDD+ national strategies or action plans and implementation (Quoted from Lima, M. G. B., Kissinger, G., Visseren-Hamakers, I. J., Braña-Varela, J., & Gupta, A. (2017)).</p> <p>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 (Quoted from Katila, P., et al. (2017))</p> <p>(Quoted from Lima, M. G. B., Kissinger, G., Visseren-Hamakers, I. J., Braña-Varela, J., & Gupta, A. (2017)), (Quoted from Katila, P., et al. (2017))</p>	<p>↑ [+2] 🏠🏠 🌐🌐🌐 ★★★</p> <p>Institutional building (National Forest Monitoring Systems, Safeguard Information Systems, etc.), with full and effective participation of all relevant countries (Quoted from Lima, M. G. B., Kissinger, G., Visseren-Hamakers, I. J., Braña-Varela, J., & Gupta, A. (2017)).</p> <p>REDD+ actions also deliver non-carbon benefits (e.g. local socioeconomic benefits, governance improvements) (Quoted from Lima, M. B., et al. (2015))</p> <p>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. (Quoted from Bustamante, M et al. (2014))</p> <p>(Quoted from Lima, M. G. B., Kissinger, G., Visseren-Hamakers, I. J., Braña-Varela, J., & Gupta, A. (2017)), Lima, M. B., et al. (2015) , Bustamante, M et al. (2014)</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. (Quoted from Lima, M. G. B., Kissinger, G., Visseren-Hamakers, I. J., Braña-Varela, J., & Gupta, A. (2017)) .</p> <p>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. (quoted from Andrew, D. (2017)).</p> <p>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.(Quoted from Miles, L., & Kapos, V. (2008)).</p> <p>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. (Quoted from Bustamante, M et al. (2014))</p> <p>(Quoted from Lima, M. G. B., Kissinger, G., Visseren-Hamakers, I. J., Braña-Varela, J., & Gupta, A. (2017)), Andrew, D. (2017), Miles, L., & Kapos, V. (2008), Bustamante, M et al. (2014)</p>
	Afforestation and reforestation			<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, A. H., & Theuer, S. L. H. (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 af-forestation and reforestation.</p> <p>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.(Quoted from Montanarella, L., & Alva, I. L. (2015)).</p> <p>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 allowed to continue, the carbon stock could increase of 11% by 2030 (Quoted from Ravindranath, N. H., Chaturvedi, R. K., & Murthy, I. K. (2008))</p> <p>Kibria, G. (2015), Montanarella, L., & Alva, I. L. (2015), Ravindranath, N. H., Chaturvedi, R. K., & Murthy, I. K. (2008)</p>
	Behaviourial response (responsible sourcing)			<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.(Quoted from Bartley, T. (2010))</p> <p>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.(quoted fromHuang, W., Wilkes, A., Sun, X., & Terheggen, A. (2013)).</p> <p>Bartley, T. (2010), Huang, W., Wilkes, A., Sun, X., & Terheggen, A. (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.(Quoted from Sikkema, R., et al. (2014))</p> <p>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. (quoted fromHuang, W., Wilkes, A., Sun, X., & Terheggen, A. (2013)).</p> <p>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. (quoted fromHuang, W., Wilkes, A., Sun, X., & Terheggen, A. (2013))</p> <p>Sikkema, R., et al. (2014), Huang, W., Wilkes, A., Sun, X., & Terheggen, A. (2013).</p>
Oceans	Ocean iron fertilization				
	Blue carbon				
	Enhanced Weathering				

Panel B Part 3

Panel C Part 1



		INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	
Industry	Accelerating energy efficiency improvement	Water efficiency and pollution prevention (6.3/6.4/6.6)	[+2,-1]	■■■	⊕⊕	★★	Sustainable and Efficient resource (12.2,12.5, 12.6, 12.7, 12 a)	[+1]	■■■■■	⊕⊕⊕	★★★	No literature	No literature				
	Low-carbon fuel switch	Water efficiency and pollution prevention (6.3/6.4/6.6)	[+2,-2]	■■■	⊕⊕	★★★	Sustainable production (12.2.,12.3, 12.a)	[+2]	■■■■■	⊕⊕⊕⊕	★★★★	No literature	Sustainable production (15.1,15.5,15.9,15.10)	[+1,-1]	■	⊕	★
	Decarbonisation/CCS/CCU	Water efficiency and pollution prevention (6.3/6.4/6.6)	[+1,-1]	■■■■	⊕	★★	Sustainable production and consumption (12.1,12.6 12.a)	[+2]	■	⊕⊕⊕⊕	★★★★	No literature	No literature				
Residential	Behavioral response	Water efficiency and pollution prevention (6.3/6.4/6.6)	[+2]	■■■	⊕⊕⊕	★★★	Responsible and sustainable consumption	[+2]	■■■■■	⊕⊕⊕	★★★	No literature	No literature				
	Accelerating energy efficiency improvement	Water efficiency and pollution prevention (6.3/6.4/6.6)	[+2]	■■■■	⊕⊕⊕	★★★	Sustainable Practices and Lifestyles (12.6/12.7/12.8)	[+1]	■■■■■	⊕⊕⊕	★★★	No literature	Reduced deforestation (15.2)	[+2]	■■■	⊕⊕⊕	★★★
	Improved access & fuel switch to modern low-carbon energy	Access to improved water and sanitation (6.1/6.2), Water efficiency and pollution prevention	[+2,-1]	■■■	⊕⊕	★★★	No literature	No literature				No literature	Healthy Terrestrial Ecosystems (15.1/15.2/15.4/15.5/15.8)	[+2]	■■■	⊕⊕⊕	★★★



		INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON 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]	★★★★	★★★★	★★★★	Ensure Sustainable Consumption & Production patterns, Sustainable	[+2]	★★★★	★★★★	★★★★	Conservation of Biodiversity and restoration of land (15.1/ 15.5/15.9)	[+1]	★★★★	★★★★	★★★★	
		Reduced food waste avoids direct water demand and wastewater for crops and food processing, and avoids water used for energy supply by reducing agricultural, food processing and waste management energy inputs. Healthy diets will support water efficiency targets if the shift towards healthy foods results in food supply chains that are less water intensive than the supply chains supporting the historical dietary pattern.					Reduce loss and waste in food systems, processing, distribution and by changing household habits. To reduce environmental impact of livestock both production and consumption trends of this sector should be traced. Livestock production needs to be intensified in a responsible way (i.e., be made more efficient in the way that it uses natural resources) Wasted food represents a waste of all the emissions generated during the course of producing and distributing that food. Mitigation measures include: Eat no more than needed to maintain a healthy body weight, Eat seasonal, robust, field grown vegetables rather than protected, fragile foods prone to spoilage and requiring heating and lighting in their cultivation, refrigeration stage, Consume fewer foods with low nutritional value e.g. Alcohol, tea, coffee, chocolate, bottled water (These foods are not needed in our diet and need not be produced), Shop on foot or over the internet (Reduced energy use), Reduction in food waste will not only pave the path for sustainable production but will also help in achieving sustainable consumption (Quoted from Garnett, T. (2011)) Reduce meat consumption to encourage more sustainable eating practices.						Reducing food waste has secondary benefits like protecting soil from degradation, and decreasing pressure for land conversion into agriculture and thereby protecting biodiversity. The agricultural area that becomes redundant through the dietary transitions can be used for other agricultural purposes such as energy crop production, or will revert to natural vegetation. A global food transition to less meat, or even a complete switch to plant-based protein food has a dramatic effect on land use. Up to 2,700 Mha of pasture and 100 Mha of cropland could be abandoned (Quoted from Stehfest et al. (2009))				
		Khan et al. (2009); Bajzelj et al. (2014); Ran et al. (2016); Villarreal Walker et al. (2014); Mekonnen et al. (2013); Bajzelj et al. (2014); Ingram, J. (2011); Kummu et al. (2012); Tilman, D. & Clark, M. (2014)					Beddington et al. (2012), Steinfeld, H., & Gerber, P. (2010), Bajzelj et al. (2014), Ingram, J. (2011), Garnett, T. (2011), West et al. (2014), Kummu et al. (2012), Hedenus, F. (2014), Stehfest, E. (2009), Dagevos, H., & Voordouw, J. (2013), Bellarby et al. (2013), Tilman, D. & Clark, M. (2014), Smith, P. (2013), Lamb et al. (2016), Hij et al. (2016)						Kummu et al. (2012), Stehfest et al. (2009)				
Land based greenhouse gas reduction and soil carbon sequestration	Water efficiency and pollution prevention (6.3/6.4/6.6)	[+1,-1]	★★★★	★★★★	★★★★	Ensure Sustainable Production patterns(12.3)	[+1]	★★★★	★★★★	★★★★	★★★★	Conservation of Biodiversity and restoration of land (15.1/ 15.5/15.9)	[+1,-1]	★★★★	★★★★	★★★★	
	Soil carbon sequestration can alter the capacity of soils to store water, which impacts the hydrological cycle and could be positive or negative from a water perspective, dependent on existing conditions. Climate Smart Agriculture enrich linkages across sectors including management water resources. Minimum tillage systems have been reported to reduce water erosion and thus sedimentation of water courses. (Quoted from Bustamante, M., (2014))						Yield of millet or sorghum can double as compared with unimproved land more than 1 tonne per hectare due to sustainable intensification. An integrated approach to safe applications of both conventional and modern agricultural biotechnologies will contribute to increased yield.(Quoted from Lakshmi et al (2015))						Agricultural intensification can promote conservation of biological diversity by reducing deforestation, and by rehabilitation and restoration of biodiverse communities on previously developed farm or pasture land. However, planting monocultures on biodiversity hot spots can have adverse side-effects, reducing biodiversity. Genetically modified crops reduces demand for cultivated land. Adoption of integrated landscape approaches can provide various ecosystem services, CSA enrich linkages across sectors including management of land and bio-resources. Land sparing has the potential to be beneficial for biodiversity, including for many species of conservation concern, but benefits will depend strongly on the use of spared land. In addition, high yield farming involves trade-offs and is likely to be detrimental for wild species associated with farmland.(Quoted from Lamb, A., et al. (2016)) IPCC WGIII, 2014, Lamb, A., et al. (2016), Lybbert T, Sumner D (2010), Harvey, C. A., et al. (2014), Behnassi, M., Boussaid, M., & Gopichandran, R. (2014), Lamb, A., et al. (2016)				
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]	★★★★	★★★★	★★★★	Ensure Sustainable Production patterns and restructuring taxation(12.3/12c)	[+1]	★★★★	★★★★	★★★★	★★★★	Restoration of land (15.1)	[+1]	★★★★	★★★★	★★★★	
	Livestock efficiency measures are expected to reduce water required for livestock systems as well as associated livestock wastewater flows. However, efficiency measures that include agricultural intensification could increase water demands locally, leading to increased water stress if the intensification is mismanaged. Scenarios where zero human-edible concentrate feed is use for livestock fresh water use reduces by 21%.						In the future, many developed countries will see a continuing trend in which livestock breeding focuses on other attributes in addition to production and productivity, such as product quality, increasing animal welfare, disease resistance (Quoted from Thornton, P. K. (2010)). Diet composition and quality are key determinants of the productivity and feed-use efficiency of farm animals (Quoted from Herrero, M., et al. (2013)). Mechanisms for effecting behavioral change in livestock systems need to be better understood by implementing combinations of incentives and taxes simultaneously in different parts of the world (Quoted from Herrero, M., & Thornton, P. K. (2013)). Reducing the amount of human-edible crops that are fed to livestock represents a reversal of the current trend of steep increases in livestock production, and especially of monogastrics, so would require drastic changes in production and consumption (Quoted from Schader, C., et al. (2015))							Grasslands Are Precious, but improved management is required as grass accounts for close to 50% of feed use in livestock systems (Quoted from Herrero, M., et al. (2013)). The scenario with 100% reduction of Food-Competing-Feedstuffs resulted in a 335 Mha decrease in arable land area, which corresponds to a decrease of 22% in arable and 7% in the total agricultural area. (Quoted from Schader, C., et al. (2015))			
	Mekonnen et al. (2013); Kong et al. (2016); Ran et al. (2016), Schader, C., et al. (2015)					Thornton, P. K. (2010), Herrero, M., et al. (2013), Herrero, M., & Thornton, P. K. (2013), Schader, C., et al. (2015)						Herrero, M., et al. (2013), Schader, C., et al. (2015)					

Panel D Part 1



		INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	
Industry	Accelerating energy efficiency improvement	↑	[+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 mtenance culture, Switching off idle equipment help saving energy (e.g Ghana)	★★★★	★★★★	↑	[-1]	Reduces Unemployment (8.2,8.3,8.4,8.5, 8,6)	★★★★	★★★★	↑	[+1]	Infrastructure renewal (9.1,9.3/9.5,9a)	★★	★★	↑	[+2]	Sustainable cities (15.6,15.8,15.9)	★	★	★
	Low-carbon fuel switch	↑	[+2]	Sustainable and modern (7.2, 7.a)	★★★★	★★★★	↑	[+2]	Economic growth with decent employment (8.1,8.2,8.3,8.4)	★★★★	★★★★	↑	[+2]	Innovation and new infrastructure (9.2,9.3,9.4,9.5,9.a)	★★★★	★★★★	↑	[+2]	Sustainable cities (15.6,15.8,15.9)	★	★	★
	Decarbonisation/CCS/CCU	↑/↓	[-2,-2]	Affordable and sustainable energy sources	★★	★★	↑	[+2]	Progressively decouple growth from env degradation (8.1, 8.2, 8.4)	★★★★	★★★★	↑	[+2]	Innovation and new infrastructure (9.2,9.4,9.5)	★★★★	★★★★	↑	[+2]	Sustainable cities (15.6,15.8,15.9)	★	★	★
Residential	Behavioral response	↑	[+2]	Saving Energy, Improvement in Energy efficiency (7.3, 7a, 7b)	★★★★	★★★★	↑	[+2]	Progressively improve resource efficiency (8.4)	★★	★★	↑	[+2]	Innovation and new infrastructure (9.2,9.4,9.5)	★	★	↑	[+2]	Urban Environmental Sustainability (11.3/11.6, 11.b,11.c)	★★★★	★★★★	★★★★
	Accelerating energy efficiency improvement	↑	[+2]	Increase in energy savings (7.3)	★★★★	★★★★	↑/↓	[-2,-1]	Employment Opportunities (8.2/8.3/8.5/8.6) / Strong Financial Institutions (8.10)	★★	★★	↑	[+2]	Housing and Transport (11.1/11.2)	★★★★	★★★★	↑	[+3]	Housing and Transport (11.1/11.2)	★★★★	★★★★	★★★★
	Improved access & fuel switch to modern low-carbon energy	↑	[+2]	Meeting energy demand	★★★★	★★★★	↑	[+2]	Sustainable economic growth and employment	★★	★★	↑	[+3]	Housing and Transport (11.1/11.2)	★★★★	★★★★	↑	[+3]	Housing and Transport (11.1/11.2)	★★★★	★★★★	★★★★

Panel D Part 2

		7 AFFORDABLE AND CLEAN ENERGY				8 DECENT WORK AND ECONOMIC GROWTH				9 INDUSTRY, INNOVATION AND INFRASTRUCTURE				11 SUSTAINABLE CITIES AND COMMUNITIES							
		INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON SCORE	EVIDENCE	AGREEMENT	CONFIDENCE	INTERACTION	NILSSON 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. (Quote from McCollum et al., in review)		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. (Quote from McCollum et al., in review)		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. (Quote from McCollum et al., in review)														
	Cherian A. (2015), Rogelj (2013); Cherian A. (2015); Jingura R.M., Kamasoko R.(2016)		McCollum et al. (in review); 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. (in review); Bertram et al. (2015); Fankhauser et al. (2008); Guivarch et al. (2011); Johnson et al. (2015)		McCollum et al. (in review); Daut et al. (2013); Hallegatte et al. (2016); IPCC (2014); Riahi et al. (2012); Tully (2006)														
	Increased use of biomass		↑	[+3]	■■■■	⊕⊕⊕	★★★★	↑	[+1]	■	⊕	★	↑	[+1]	■■■	⊕⊕⊕	★★				
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.																	
Cherian A. (2015); Jingura R.M., Kamasoko R.(2016), Rogelj (2013)		Jingura R.M., Kamasoko R. (2016)		Jingura R.M., Kamasoko R. (2016), Shahbaz M., Rasool G., Ahmed K., Mahalik M.K. (2016)																	
Nuclear/Advanced Nuclear		↑	[1]	■■■	⊕	★★	↑	[1]	■■■	⊕	★★	↓	[-1]	■■■	⊕⊕⊕	★★★★					
	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																	
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]	■	⊕	★					
	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.																	
IPCC AR5 WG3 (2014)																					
Advanced coal	CCS: Fossil	↑	[+2]	■■■■	⊕⊕⊕	★★★★	↓	[-1]	■■■■	⊕⊕⊕	★★★★	↑	[+1]	■	⊕	★					
	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.																	
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).																			

Panel D Part 2

