

Appendix A: Examples of indicators for process and outcome characteristics

This appendix provides examples of indicators for various process and outcome characteristics.

It mainly addresses the energy sector, but also includes some examples for other sectors.

TABLE A.1

Examples of outcome indicators

Category	Characteristics	Indicators
Scale of outcome – GHGs and sustainable development	Macro level	<ul style="list-style-type: none"> • Share of total GHG emissions reductions or removals globally, regionally, by sector or by subsector • Share of a global or national sustainable development goal, measured by an indicator • Share of zero-carbon emissions in electricity generation compared with global best practices • Average total emissions per kWh • Change in RE use (e.g. solar, wind) compared with the starting situation • Phase-out of coal – number (and level) of new investments in coal plants • Phase-out of other fossil fuels – number (and level) of new investments in fossil fuel plants, and in fossil fuel exploration and extraction • Share of RE (e.g. solar, wind) in generation mix • New investments in RE by technology • RE installed capacity (MW) and associated costs (\$/MW installed) • RE net generation (kWh) • Emissions abated in the energy sector (tCO₂e) compared with business as usual • Emissions intensity in the energy sector (gCO₂e/kWh) • Energy intensity of the economy (kJ/GDP) • Emissions intensity of the economy (tCO₂e/GDP) • Cost of electricity from RE sources by technology (\$/kWh) • Energy access (number of households or people with access to electricity or improved access) • Avoided energy demand megawatt (MW) • CO₂e emissions from nitric acid plants • Number of plants equipped with N₂O abatement technology

TABLE A.1, continued

Examples of outcome indicators

Category	Characteristics	Indicators
Scale of outcome – GHGs and sustainable development, continued	Medium level	<ul style="list-style-type: none"> • Share of a national sustainable development goal, measured by an indicator • Limiting of growth of final energy use in the sector or subsector targeted to X%, compared with the starting situation • Capacity share of zero-carbon emissions • Subsector energy intensity • Final energy fuel share by sector or subsector • Phase-out of coal – number (and level) of investments in new coal plants • Phase-out of other fossil fuels – number (and level) of new investments in fossil fuel plants, and in fossil fuel exploration and extraction • Share of RE (e.g. solar, wind) in national generation mix • New investments in RE by technology (country or state) • RE installed capacity (MW) and associated costs (\$/MW installed) • RE net generation (kWh) • Emissions abated in the energy sector (tCO₂e) compared with business as usual • Emissions intensity in the energy sector (gCO₂e/kWh) • Energy intensity of the economy (kJ/GDP) • Emissions intensity of the economy (tCO₂e/GDP) • Cost of electricity from RE sources by technology (\$/kWh) • Energy access (number of households or people with access to electricity or improved access) • Avoided energy demand megawatt (MW) • GHG impacts (tCO₂e) of NAMA by sector • GHG impacts as percentages of NDC sectoral goals • Value of economic and environmental returns by sector • CO₂e emissions from nitric acid plants • Number of plants equipped with N₂O abatement technology nationally
	Micro level	<ul style="list-style-type: none"> • Achievement of subnational or local sustainable development targets • New-build emissions intensity • Equipment energy performance • Per capita energy use and emissions intensity • Passenger energy use and emissions intensity • Phase-out of coal – number of investments in new coal plants • Phase-out of other fossil fuels – number (and level) of new investments in fossil fuel plants, and in fossil fuel exploration and extraction • Number of households with solar home systems • New investments in RE by technology • Energy access (number of households or people with access to electricity or improved access) • GHG impacts (tCO₂e) of NAMA, average per state • Value of economic and environmental returns, average by state • CO₂e emissions from nitric acid plants • Number of plants equipped with N₂O abatement technology (taking into account plant capacity and abatement efficiency of the chosen catalyst)

TABLE A.1, continued

Examples of outcome indicators

Category	Characteristics	Indicators
Time frame over which outcome is sustained – GHG and sustainable development	Long term	<ul style="list-style-type: none"> • By 2100, phase-out of all fossil fuels • By 2050, phase-out of coal plants • Long-term RE goals • Sustainable development benefits by 2050 (disaggregated by sustainable development impacts) • GHG impacts (tCO₂e) over the long term (e.g. 2029–2040) • Value of economic and environmental returns over the long term (e.g. 2029–2040) • CO₂e emissions from nitric acid plants
	Medium term	<ul style="list-style-type: none"> • By 2030, achievement of global and national sustainable development goals • By 2030, phase-out of X% of coal plants • Limiting of growth of final energy use in the sector or subsector targeted to X% by 2030, compared with the starting situation • GHG impacts (tCO₂e) over the medium term (e.g. 2019–2028) • Value of economic and environmental returns over the medium term (e.g. 2019–2028) • Number of plants equipped with N₂O abatement technology
	Short term	<ul style="list-style-type: none"> • By 2020 achieve X% of the Sustainable Development Goals • By 2020 phase out of X% of coal plants • Limiting of growth of final energy use in the sector or subsector targeted to X% by 2020, compared with the starting situation • GHG impacts (tCO₂e) in the short term (e.g. 2015–2018) • Value of economic and environmental returns in the short term (e.g. 2015–2018)

Sources: Vieweg and Noble (2013); UN (2016); Westphal and Thwaites (2016); IEA(2017)

TABLE A.2

Examples of process indicators

Category	Characteristics	Indicators	References
Technology	Research and development (R&D)	<ul style="list-style-type: none"> • R&D investments/funding • Patents registered (applied for) • Number of centres, think tanks or institutes of learning • Number of trainings and rate of participation • Number of new testing/laboratory facilities • Number of new business models with an element of innovation • Number of states that integrate the technological package in subnational actions 	<ul style="list-style-type: none"> • Bergek et al. (2008) • Laursen and Salter (2004)

TABLE A.2, continued

Examples of process indicators

Category	Characteristics	Indicators	References
Technology, continued	Adoption	<ul style="list-style-type: none"> • Number of new businesses/start-ups • Number of new business models • Number of product or process innovations • Documented examples of incremental and radical innovations • Number of awards for innovation development • Number of subnational actions for forest regeneration • Number of subnational actions for implementation of planned grazing 	<ul style="list-style-type: none"> • OECD (2005) • Fageberg (2005)
	Scale-up	<ul style="list-style-type: none"> • Number of workshops, platforms for knowledge sharing among industry associations, etc. • Number of new demonstration projects initiated • Number of projects replicating state-of-the-art technology (ongoing) • Number of projects implemented (with economies of scale) • Number of government services to support adoption of new technologies • Number of forest properties that implement regenerative actions as part of subnational actions • Number of ranches that implement planned grazing as part of subnational actions • Ratio of plants with abatement technology and monitoring equipment to the total number of plants (including those without such equipment) within a country 	<ul style="list-style-type: none"> • Nygaard and Hansen (2015) • Nemet (2009) • Peters et al. (2012)
Agents of change	Entrepreneurs	<ul style="list-style-type: none"> • Number of new entrepreneurs and new entrants in low-carbon sectors • Provision of training in entrepreneurship • Incentives provided for new entrepreneurs (e.g. subsidies, seed funding for small and medium-sized enterprises, research support) • Number of public-private partnership projects • Volume of venture capital investments • Share of private funding and public funding • MOUs signed, projects in pipeline • New models of partnerships formed with government/firms and donors • Entrepreneurs trained for regenerative management 	<ul style="list-style-type: none"> • Langevang, Namatovu and Dawa (2012) • Kemp, Schot and Hoogma (1998)

TABLE A.2, continued

Examples of process indicators

Category	Characteristics	Indicators	References
Agents of change, continued	Coalitions of advocates	<ul style="list-style-type: none"> • Trade expos, business shows, workshops, conferences, seminars • University–industry collaboration • Number of linkages across research institutions • Research grants and research projects • Consultancy projects • Industry associations created to enhance firm cooperation • Number of lobby groups (organizations or committees committed to low-carbon development that have been established or significantly strengthened, and actively lobby for changes) • Number of advocacy programmes, campaigns and initiatives • Civil society organizations denouncing unsustainable, high-carbon practices and behaviour • Community surveys/preferences denouncing the outreach of unsustainable practices • Number of leaders and authorities bringing up, promoting or demonstrating zero-carbon development practices and changed behaviour • Number of civil society organizations that collaborate with subnational actions of a NAMA • Number of exchanges or meetings between an initiative's members (e.g. Nitric Acid Climate Action Group members – governmental level or plant operators) and key actors not directly involved in the initiative, such as the World Bank carbon market programme and labelling initiatives, who could influence all developing country players to take action 	<ul style="list-style-type: none"> • Lundvall (1992) • Hekkert et al. (2011) • Kebede, Mitsufuji and Choi (2014) • Ockwell and Byrne (2015) • Hellsmark and Jacobsson (2009) • NAMA Facility (2015)
	Beneficiaries	<ul style="list-style-type: none"> • Number of grassroots campaigns in favour of low-carbon practices • Number of owners and holders of forest lands and grazing lands that implement regenerative practices • Number of governments that become involved with an initiative and support its vision (e.g. signatories of a joint declaration of support) • Number of plants that become involved with an initiative and support its vision 	

TABLE A.2, continued

Examples of process indicators

Category	Characteristics	Indicators	References
Incentives	Economic and non-economic	<ul style="list-style-type: none"> • New subsidies and tariff structures, such as renewable energy obligations, feed-in tariffs, renewable energy auctions and value-added tax (VAT) exemption • New MOUs signed • New projects in pipeline • New models of partnerships formed with government/firms and donors (i.e. models that create access to resources and services, thus incentivizing conscious behaviour towards resource use) • Number of financing mechanisms that encourage the regenerative actions of a landscape regeneration NAMA • Number of economic and non-economic incentives in place at the national level (e.g. moratorium on deforestation, ban on coal power plants) 	<ul style="list-style-type: none"> • Johnstone, Haščič and Popp (2010) • Butler and Neuhoff (2008) • Norberg-Bohm (2000) • Westley et al. (2011) • Painuly (2001) • Gallastegui (2002) • Kiss, Manchón and Neij (2013)
	Disincentives	<ul style="list-style-type: none"> • Disincentives provided via carbon pricing/tax, increase in petrol/diesel prices, car registration tax etc. • Number of counterproductive subsidies eliminated • Number of national policies that create a disincentive for unabated N₂O emissions 	<ul style="list-style-type: none"> • Wesselink et al. (2013) • Hansen and Coenen (2016)
	Institutional and regulatory	<ul style="list-style-type: none"> • Number of new regulations and institutions to promote low-carbon practices • Number of subnational actions for forest regeneration • Number of subnational actions for implementation of planned grazing • Number of regulations or policies in place at the national level 	
Norms	Awareness	<ul style="list-style-type: none"> • Number of open debates, statements or publications highlighting the insufficiency of current practices • Number of leaders and organizations pushing/heading debates questioning current practices and pathways, and lobbying for behavioural change • Number of information workshops and similar platforms • Number of awareness generation programmes through private sector or business associations, etc. • Number of initiatives targeting public opinion on ethical and moral issues (e.g. agenda setting) • Number of awareness campaigns • Number of governments that understand the potential of the nitric acid sector for climate protection measured through, for example, awareness-raising activities such as communication materials or events held • Actions undertaken as a result of enhanced awareness among government officials 	<ul style="list-style-type: none"> • Nygaard and Hansen (2015) • Wüstenhagen, Wolsink and Bürer (2007)

TABLE A.2, continued

Examples of process indicators

Category	Characteristics	Indicators	References
Norms, continued	Behaviour	<ul style="list-style-type: none"> • New government persuasion programmes, appealing to the collective conscious through the medium of advertising • New government enforcement programmes and initiatives compelling behavior change • Policies targeting change in norms and rules (e.g. dynamic pricing regulation) • Number of young leaders trained (future generation to keep momentum and sustain change) • Number of leadership awards announced for public demonstration of changed behaviour • Number of governmental agents/services supporting the adoption of new technologies and changed behaviour • Number of owners and trained owners 	<ul style="list-style-type: none"> • McAdams (1997) • Shove (2003) • Lapinski and Rimal (2005) • Kinzig et al. (2013)
	Social norms	<ul style="list-style-type: none"> • New regulatory standards (e.g. mandatory emission levels) • New laws making previous behaviour illegal • Number of users affected • Checks and balances introduced to prevent fallbacks to previous practices and behaviour • Number of awareness campaigns 	<ul style="list-style-type: none"> • EEA (2013) • Ambec et al. (2013) • David and Sinclair-Desgagné (2005)