

Appendix C: Key Data Sources Used to Develop Non-Country-Reported Emission Estimates

Emissions Source	Data Type	Data Source
Energy		
Natural Gas and Oil Systems	Historical production and consumption	EIA's International Energy Statistics (2018)
	Projected production and consumption	EIA's International Energy Outlook (2017)
	Refinery throughput	BP Statistical Review of World Energy (2017)
Coal Mining Activities	Historical production	EIA's International Energy Statistics (2018)
	Projected consumption	EIA's International Energy Outlook (2017)
	China-specific emissions	China Coal Research Institute (2016)
Stationary and Mobile Combustion	Historical consumption	EIA's International Energy Statistics (2018)
	Projected consumption	EIA's International

		Energy Outlook (2017)
Biomass Combustion	Historical biofuel consumption	EIA's International Energy Statistics (2018)
	Historical charcoal and wood fuel consumption	FAO's FAOSTAT Database (2016)
	Projected biofuel consumption	EIA's International Energy Outlook (2017)
	Projected wood fuel consumption	FAO's <i>Future Trends in Energy, Climate and Woodfuel Use</i> (2010)
Other Energy Sources	None	Country-reported data only
Industrial Processes		
Nitric and Adipic Acid Production	Adipic acid plant production capacity	SRI Consulting, World Petrochemical Report: Adipic Acid (2010) Chemical Week, Product Focus: Adipic Acid (2007)
	Adipic acid production data	ICIS Europe, Asia Chemical Profile: Adipic Acid (2013)

		ICIS Europe, European chemical profile: Adipic acid (2011) Chemical Week, Product Focus: Adipic Acid (2007)
	Bio-based adipic acid production	Shen et al. (2009)
	fertilizer production data	International Fertilizer Industry Association, IFADATA Statistical Database (2016)
	Projected adipic acid consumption	SRI Consulting, World Petrochemical Report: Adipic Acid (2010)
	N fertilizer consumption projections	Tenkorang & Lowenberg- DeBoer et al., <i>Forecasting Long-term Global Fertilizer Demand</i> (2008)
	Projected regional growth rates for fertilizer use	FAO World Agriculture Report (2012)

Uses of Substitutes for Ozone-Depleting Substances	ODS consumption	The United Nations Environment Programme (UNEP) (2018) U.S EPA Vintaging Model
	End-use distributions of ODS	U.S. EPA Vintaging Model UNEP Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol (2017)
	ODS phase-out timing and types of alternatives employed	UNEP Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol (2017)
	GDP growth factors	USDA International Macroeconomic Data Set. UNEP Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol (2017)
	HFC consumption	UNEP Executive Committee of

		the Multilateral Fund for the Implementation of the Montreal Protocol (2017)
	Foam market information	Ashford (2004)
HCFC-22 Production	HCFC-22production	<p>UNEP Data Access Centre. HCFC Production (2017)</p> <p>UNEP Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol (2017)</p> <p>Chemical and Economics Handbook, CEH Marketing Research Report: Fluorocarbons (2014)</p> <p>Chemical and Economics Handbook, CEH Marketing Research Report: Fluorocarbons (2008)</p> <p>Chemical and Economics Handbook, CEH</p>

		Marketing Research Report: Fluorocarbons (2001) Montzka, et al. (2010)
Electric Power Systems	SF6 sales to utilities and manufacturers emission rate	RAND survey (2007)
	Electrical equipment lifetime	Ecofys (2018)
	Net electricity consumption	EIA's International Energy Outlook (2017)
	Japanese emissions and projections	Yokota (2006)
	US emissions and projections	U.S. EPA Greenhouse Gas Inventory (2017)
Primary Aluminum Production	Primary aluminum production	USGS Minerals Yearbook – Aluminum (2016) USGS Mineral Commodity Survey (2015)
	Global production percentages by cell-type	International Aluminum Institute, Anode Effects Survey: Report on the

		Aluminium Industry's Global Perfluorocarbon Gases Emissions Reduction Programme (2016)
	Global aluminum production growth rate	USGS Minerals Yearbook – Aluminum (2016) USGS Mineral Commodity Survey (2015)
	Emission factors by cell-type	International Aluminum Institute, Anode Effects Survey: Report on the Aluminium Industry's Global Perfluorocarbon Gases Emissions Reduction Programme (2016) Marks and Nunez (2018)
Magnesium Production	Primary magnesium production	USGS Minerals Yearbook – Magnesium (2017)
	EU historical emissions	Harnisch and Schwarz (2003) Edgar (2004)

	Automobile production	Ward's Motor Vehicle Data (2001) International Organization of Motor Vehicle Manufacturers (2017)
	Chinese casting volume	Edgar (2004)
	Recycling-based production	Edgar (2006) International Magnesium Association Conference, Magnesium Supply and Demand (2005)
	CDM projects	United Nations Framework Convention on Climate Change, Clean Development Mechanism (CDM) Projects
Semiconductor Manufacturing	Semiconductor manufacturing capacity	SEMI World Fab Forecast (2016) SEMI World Fab Watch (2007)
	F-GHG emission factors	U.S. EPA Greenhouse Gas Reporting Program (GHGRP) Envirofacts. Subpart I:

		Electronics Manufacture (2017)
Flat Panel Display Manufacturing	Maximum design capacities	DisplaySearch (2016)
	Country capacity shares	DisplaySearch (2016)
Photovoltaic Manufacturing	Maximum design capacities	DisplaySearch (2016)
	Country capacity shares PV technology shares	EIA's International Energy Outlook (2017)
Other Industrial Processes Sources	None	Country-reported data only
Agriculture		
Agricultural Soils	Commercial Synthetic Fertilizer	IFADATA Statistical Database (2016) FAOSTAT Statistical Database (2016)
	Regional N fertilizer consumption	Tenkorang & Lowenberg-DeBoer et al., <i>Forecasting Long-term Global Fertilizer Demand</i> (2008)

	Average annual percentage change in fertilizer use by region	FAO World Agriculture Report (2012)
	Historical crop production and area	FAOSTAT Statistical Database (2016)
	Crop production and area projections	IFPRI - IMPACT Model Growth Rate Spreadsheet for Crop Area and Yield (2017)
	Animal population	FAOSTAT Statistical Database (2016)
	Livestock product growth rates	IFPRI - IMPACT Model Growth Rate Spreadsheet for Livestock Populations (2016)
Livestock Management	Animal population data	FAOSTAT Statistical Database (2016)
	Livestock product growth rates	IFPRI - IMPACT Model Growth Rate Spreadsheet for Livestock Populations (2016)

Rice Cultivation	Area harvested for rice cultivation	FAOSTAT Statistical Database (2016)
	Water management regime type	Global Rice Science Partnership (GRiSP) Rice Almanac (2013) IRRI World Rice Statistics (2009)
	Length of rice-growing season	Global Rice Science Partnership (GRiSP) Rice Almanac (2013) IRRI World Rice Statistics (2009)
	Projected rice area harvested	IFPRI - IMPACT Model Growth Rate Spreadsheet for Crop Area and Yield (2017)
Other Agricultural Sources	None	Country-reported data only
Waste		
Landfills	Historical and projected population	UN Department of Economic and Social Affairs, Population Division, World Population Prospects (2015)

	Historical GDP	USDA Real GDP Projections (2016) World Bank GDP (2017)
	Projected GDP	OECD Long-term baseline projections (2014)
	MSW generation per capita	OECD.stat Questionnaire on the state of the environment: municipal waste generation and treatment (2016) UNSD Environmental statistics database (2016)
	MSW landfill rate	OECD.stat Questionnaire on the state of the environment: municipal waste generation and treatment (2016) Eurostat "Municipal waste generation and treatment" (2016)

	Industrial waste generation	OECD Environment Statistics Database, Waste generation by sector (2011) National Bureau of Statistics of China, China Statistical Yearbook (2015)
Wastewater	Historical and projected population	UN Department of Economic and Social Affairs, Population Division, World Population Prospects (2015)
	Annual percentage of urban population	UN Department of Economic and Social Affairs, Population Division, World Population Prospects (2014)
	Percentage of the population with wastewater collection and treatment	UNSD Environmental statistics database (2016)

	Per capita protein generation	FAO Statistical Yearbook (2016)
Other Waste Sources	None	Country-reported data only