GREENHOUSE GAS EMISSIONS

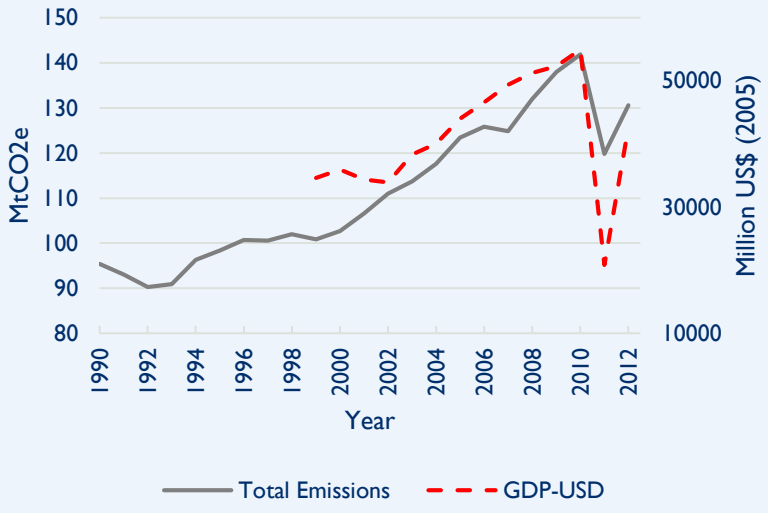
LIBYA

GHG EMISSIONS, OIL PRODUCTION, AND GDP

Libya's economy and GHG emissions are heavily influenced by oil production. With 48 billion barrels of oil, Libya has the world's 9th largest proven oil reserves, and the largest proven reserves in Africa. The economy is poorly diversified and is heavily dependent on the petroleum sector; prior to the civil war, hydrocarbons were the driver of 70% of national GDP and more than 95% of all exports. Libya's GHG emissions are tightly tied to GDP, which, given the oil-dominated economy, serves as a proxy for production. (1, 2)

Prior to the civil war in 2011, Libya's GHG emissions grew at an average of 2.4% per year over a 20-year period (1990-2010). Libya's annual average GDP growth was 2.1% over the same period. The outbreak of civil war in 2011 resulted in a dramatic decline in GDP and emissions. Although Libya is still in a period of uncertainty, data from 2013 (the most recent year for which reliable statistics are available) indicate that GHG emissions have begun to increase as oil production has resumed. Emissions levels in 2013 were 139% of 1990 levels (133 $MtCO_2e$), though this still represents a decline from Libya's emissions peak of 142 $MtCO_2e$ in 2010, (149% of 1990 levels). (1)

GDP & GHG Emissions in Libya (1990-2012)



LIBYA'S NUMBERS AT A GLANCE

133.01 $MtCO_2e$ *
Total GHG emissions (2013)
(0.28% of world total)
World: 48,257.30 $MtCO_2e$

6,265,987
Population (2013) (0.09% of world total)
World: 7,136,796,000

8.79
tCO_2e per capita (2013) (184% of world total)
World: 4.79 tCO_2e

$4,509
GDP per capita (2011)** (47% of world average)
World: $9,659

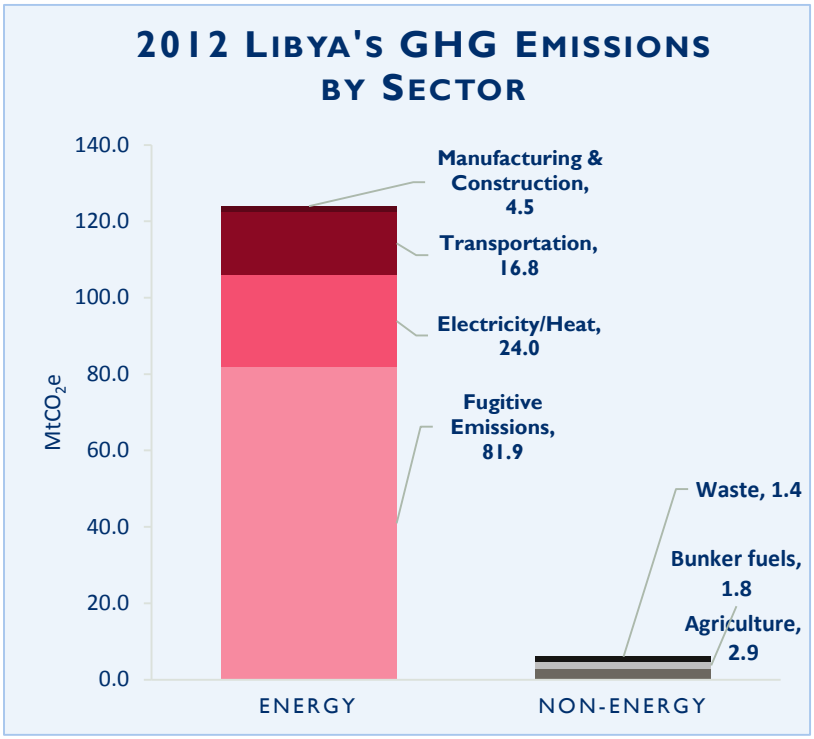
3,064
tCO_2e/million US$ GDP (2011)
(275% of world average)
World: 849
Libya GDP: $28,357 million
World GDP: $67,713,961 million

+39.1 $MtCO_2e$ (+41%)
Change in annual GHG emissions (1990-2013)
World: +13,635.1 (+42%)

Source: WRI CAIT 2.0, 2017
*Million metric tons of carbon dioxide equivalent
** Constant 2010 US$

GHG EMISSIONS AND GDP

Libya's total GHG emissions in 2012 were 130.60 $MtCO_2e$, totaling 0.28% of global GHG emissions. A sector breakdown of GHG emissions in Libya indicates that production and exports drive GHG emissions rather than domestic demand. The energy sector contributes the vast majority of GHG emissions in Libya. In both 1990 and 2012, it contributed ~95% of total emissions. The bulk of these emissions are fugitive emissions from crude oil and natural gas production (64% in 2012). Manufacturing, transportation, and electricity generation combine to contribute 34% of GHG emissions. Non-energy sectors emit a comparatively negligible 6.1 $MtCO_2e$, or 5%, of Libya's total emissions, of which agriculture contributes 48%.



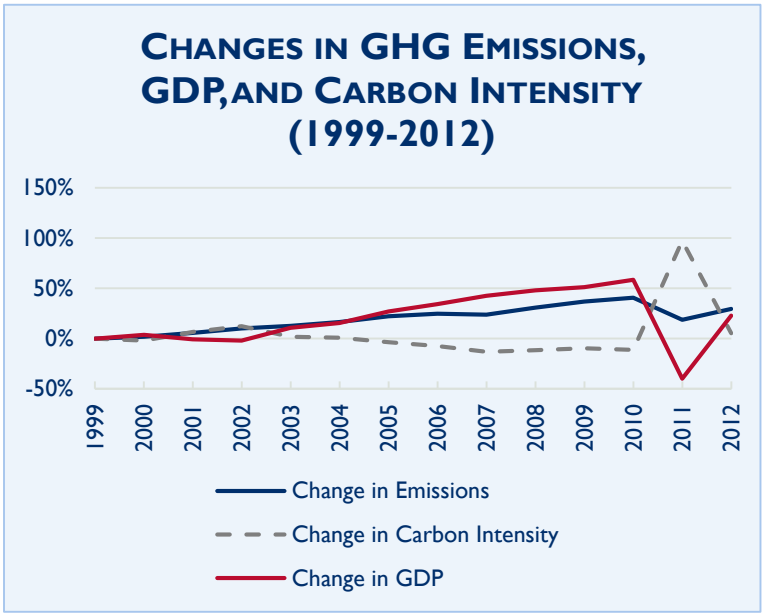
Between 1990 and 2012, fugitive emissions and emissions from transportation increased most drastically within the energy sector. Fugitive emissions rose from 63.73 $MtCO_2e$ in 1990 to 81.67 $MtCO_2e$ in 2012, and transportation emissions rose from 6.12 $MtCO_2e$ in 1990 to 16.59 $MtCO_2e$ in 2012. (1)

CARBON INTENSITY: REDUCTION AND INCREASE

Between 1999 and 2010, the carbon intensity of the Libyan economy declined by 11.3%. In 2011, the civil war led to a much more significant decline of GDP than of emissions, causing carbon intensity to skyrocket to two times 1999 levels. In 2012, carbon intensity declined to near pre-civil war levels; it remains unclear at present whether the pre-war trend will resume.

CLIMATE CHANGE MITIGATION TARGETS AND PLANS

Libya signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1999, but it has not submitted a national communication to assess climate change vulnerability and propose a policy framework to address vulnerabilities. Libya is one of a handful of countries, including Syria and Western Sahara, that have not submitted an Intended Nationally Determined Contribution in connection with the UNFCCC COP21. Libya received funding from the Global Environment Facility (GEF) in 2002 to support the development of a national communication to the UNFCCC, but the



project ended in 2005 without measurable results. GEF reports that an additional $4.5 million was provided to Libya for projects related to biodiversity, climate change, and land degradation, but all of the funds were directed to land degradation projects only.

Despite these shortfalls, Libya has the potential to reduce emissions in the energy sector. Libya's Renewable Energy Authority (REAOL) estimates that Libya has one of the highest solar radiation potentials in the world and ranks 5th among Middle East North Africa countries in wind power potential. REAOL developed short- and long-term plans for achieving 10% renewable energy supply (compared to 1% in 2010), which would be equal to 2,650 MW installed capacity, by 2025 (see table below). There are a number of barriers to achieving this goal, including ongoing political instability, a lack of legislation governing the renewable energy sector (including the lack of an energy regulatory agency), the need for increased capacity building, and the lack of a stable financing mechanism. (3,4)

PROPOSED NATIONAL STRATEGY FOR THE DEVELOPMENT OF RENEWABLE ENERGY IN LIBYA (2015-2025)

	2015	2020	2025
RENEWABLE CONTRIBUTION TO NATIONAL ENERGY MIX (GOAL)	3%	7%	10%
PROPOSED RESOURCES AND CAPACITIES	• 260 MW Wind • 25 MW CSP* • 85 MW PV** • 60 MW SWH***	• 600 MW Wind • 150 MW CSP • 300 MW PV • 250 MW SWH	• 1000 MW Wind • 400 MW CSP • 800 MW PV • 450 MW SWH

*Concentrated Solar Power (CSP)

**Photovoltaic (PV)

***Solar Water Heating (SWH)

KEY RESOURCES

1. WRI, CAIT 2. 2017. Climate Analysis Indicators Tool: WRI's Climate Data Explorer. Washington, DC: World Resources Institute.

2. U.S. Energy Information Administration, Libya. 2017

3. IMF. Libya Beyond the Revolution: Challenges and Opportunities.

4. Approach to Climate Change, Libya. London School of Economics and Political Science— Grantham Research Institute on Climate Change and the Environment. 2015.

5. National Plan for Developing the Renewable Energy in Libya. Libyan Transitional Government, Renewable Energy Authority of Libya (REAOL). 2012.