

From NACE to NAICS to Accounts: New Insights from a U.S. Pilot Account of the Environmental Goods and Services Sector

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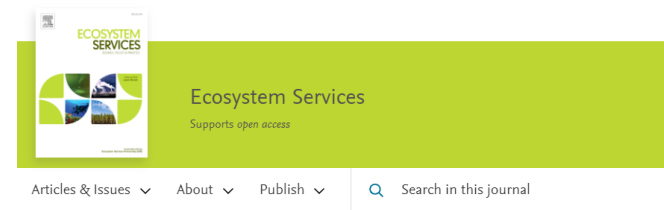
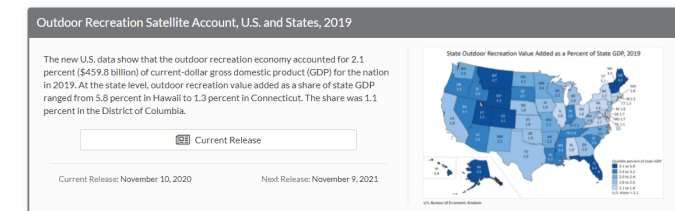
***Disclaimer:** The opinions are those of the authors and do not necessarily reflect the official position of the Bureau of Economic Analysis, Department of Commerce, or United States Government.*

- Brief background/updates on where the U.S. stands on environmental economic accounts work
- Pilot estimates of U.S. environmental goods & services sector (EGSS)
 - Methodology overview
 - Results
- Lessons/challenges relevant for London Group participants
- Discussion of issues related to recent developments in classification

What does the U.S. do currently?

- The U.S. does not currently produce formal environmental-economic accounts, but...
 - **Related satellite accounts** produced by BEA
 - Outdoor Recreation Satellite Account
 - Marine Economy Satellite Account
 - **Interagency research** producing pilot accounts as proof-of-concept work:
 - Land (Wentland et al 2020)
 - Water (Bagstad et al 2020)
 - Ecosystem services (Warnell et al 2020)
 - Urban ecosystems (Heris et al 2021)
 - **Environmental activity accounts**
 - Environmental goods & services sector (this paper)
 - Public sector environmental and resource management expenditures (IMF paper)
 - NBER-CRIW chapter will merge the two papers above

Outdoor Recreation



Accounting for Natural Capital: lessons learned from applications in Europe and the United States

Edited by Carl Shapiro, Alessandra La Notte, Ken Bagstad, Pierre Glynn, Jane Ingram, Joachim Maes, Sara Vallecillo
Last update 10 September 2021

Policy Working Group for Natural Capital Accounting and Environmental-Economic Statistics

- Earth Day 2022 announcement:

“...We have the data and expertise needed to produce these accounts scattered across Federal agencies. Some, like DOC are already moving in this direction. Over the next nine months, an **interagency group will harmonize those efforts and plan a strategy** for regularly producing natural capital accounts, with the first regularly-produced pilot accounts planned for release in 2023.”



Yesterday, I joined @WHOSTP and @OMBPress to announce the initiation of the first U.S. national system of natural capital accounts and standardized environmental-economic statistics.

@CommerceGov is taking meaningful steps to combat climate change and nature loss. #EarthDay



12:19 PM · Apr 22, 2022 · Twitter Media Studio



BRIEFING ROOM

Accounting for Nature on Earth Day 2022

APRIL 24, 2022 • OSTP BLOG



OFFICE OF SCIENCE AND TECHNOLOGY POLICY

The mission of OSTP is to maximize the benefits of science and technology to advance health, prosperity, security, environmental quality, and justice for all Americans.

<https://www.whitehouse.gov/ostp/news-updates/2022/04/24/accounting-for-nature-on-earth-day-2022/>

Strategy Now Available for Public Comment



PUBLIC COMMENT DRAFT – [Federal Register](#) Document ID 2022-17993
[Regulations.gov](#) Docket Number OMB-2022-0009

NATIONAL STRATEGY TO DEVELOP STATISTICS FOR ENVIRONMENTAL- ECONOMIC DECISIONS

*A U.S. System of Natural Capital Accounting and
Associated Environmental-Economic Statistics*

Office of Science and Technology Policy
Office of Management and Budget
Department of Commerce

AUGUST 18th, 2022



<https://www.whitehouse.gov/wp-content/uploads/2022/08/Natural-Capital-Accounting-Strategy.pdf>

Prior work in the U.S. on environmental activities

- Predecessors in the US
 - Bureau of Labor Statistics (2010-11)
 - Measuring Green Jobs Initiative
 - Green Goods and Services (GGS)
 - Green Goods and Services occupation survey (GGS-OCC)
 - Green Technologies and Practices (GTP) survey
 - 2010 Economics and Statistics Administration (ESA) and the U.S. Department of Commerce issued a report: *Measuring the Green Economy*
 - 1998 Survey of Environmental Products and Services (SEPS)
 - Census Bureau / EPA / ITA
- All of the above: definitions not SEEA-based
 - e.g., public transportation-related expenditures



Survey of Environmental
Products and Services

- BEA's satellite account approach
 - Primary data source: U.S. supply-use table (SUT) data
 - Drawn chiefly from the Economic Census
 - Very detailed product-level categories (5,300+ product categories)
 - Supplementary data sources to fill in gaps
- Determine relevant categories based on SEEA Ch. 4 definitions
 - Start with European Statistical System categories
 - Converting CPA/NACE to NAPCS/NAICS → mapping is imperfect
 - Use U.S. sources and prior work for clarifications on NAPCS/NAICS definition, including DOC/ESA's "Measuring the Green Economy" appendix

- Coding environmental activity
 - Imperfect alignment of product/industry classifications to SEEA definition of “environmental activity”
 1. Fully aligned category
 2. Partially relevant
 - e.g., organic agricultural products not split out
 - » Data from USDA on proportion of organic output used to supplement this data
 3. Out of boundary/scope
 - 1 & 2 were then sorted into CEPA and CReMA classifications

- How relevant are partial categories?
 - **Scenario 1**: exclude them entirely
 - Conservative estimate of the EGSS
 - **Scenario 2**: assign a small percentage of the partial category (10%) where supplemental data is currently insufficient
 - Slightly less conservative, but still fairly conservative overall
 - If the gap between these two estimates is large, it would be evidence that partial categories are overwhelmingly important
 - A large gap would indicate that Scenario 1 is not really in the ballpark

Results

Table 1a. Estimates of gross output for environmental goods and services (millions)

		2015		2019	
CEPA	CEPA category	Producer Value	Purchaser Value	Producer Value	Purchaser Value
10	Protection of ambient air and climate	\$1,882	\$4,568	\$1,864	\$6,393
100	Management of water	\$99,249	\$101,051	\$114,754	\$116,432
110	Management of forest resources	Unavailable	Unavailable	Unavailable	Unavailable
112	Minimisation of the intake of forest resources	Unavailable	Unavailable	Unavailable	Unavailable
120	Management of wild flora and fauna	\$1,059	\$1,059	\$205	\$205
131	Production of energy from renewable sources	\$53,108	\$55,431	\$57,720	\$61,294
132	Heat/Energy saving and management	\$27,077	\$68,955	\$27,198	\$67,278
20	Wastewater management	\$80,916	\$82,286	\$89,811	\$91,335
30	Waste management	\$122,012	\$149,309	\$148,009	\$181,420
40	Protection and remediation of soil, groundwater and surface water	\$5,975	\$9,601	\$10,027	\$17,721
60	Protection of biodiversity and landscapes	\$74,756	\$74,756	\$86,728	\$86,728
70	Protection against radiation	\$1,731	\$2,216	\$2,879	\$3,643
90	Other environmental protection	\$4,926	\$4,926	\$5,978	\$5,978
Mixed	Mixed	\$28,278	\$28,987	\$33,387	\$34,125
Unclassified	Unclassified	\$4,641	\$5,540	\$3,879	\$4,589
		\$505,608	\$588,682	\$582,440	\$677,141

Note: Scenario 1 - Excluding EGS where we do not have source data to estimate the “environmental” portion of the commodity.

Results

Table 1b. Estimates of gross output for environmental goods and services (millions) (10% environmental portion)

		2015		2019	
CEPA	CEPA category	Producer Value	Purchaser Value	Producer Value	Purchaser Value
10	Protection of ambient air and climate	\$1,882	\$4,568	\$1,864	\$6,393
100	Management of water	\$99,249	\$101,051	\$114,754	\$116,432
110	Management of forest resources	\$2,688	\$3,523	\$2,570	\$3,510
112	Minimisation of the intake of forest resources	\$227	\$282	\$256	\$329
120	Management of wild flora and fauna	\$1,409	\$1,418	\$704	\$715
131	Production of energy from renewable sources	\$55,594	\$58,165	\$60,250	\$64,005
132	Heat/Energy saving and management	\$27,208	\$69,123	\$27,328	\$67,449
20	Wastewater management	\$80,916	\$82,286	\$89,811	\$91,335
30	Waste management	\$122,302	\$149,692	\$148,318	\$181,840
40	Protection and remediation of soil, groundwater and surface water	\$8,164	\$11,790	\$12,244	\$19,938
60	Protection of biodiversity and landscapes	\$74,756	\$74,756	\$86,728	\$86,728
70	Protection against radiation	\$1,731	\$2,216	\$2,879	\$3,643
90	Other environmental protection	\$4,926	\$4,926	\$5,978	\$5,978
Mixed	Mixed	\$31,587	\$32,664	\$37,125	\$38,233
Unclassified	Unclassified	\$5,275	\$6,235	\$4,196	\$4,966
		\$517,913	\$602,692	\$595,005	\$691,494

Note: Scenario 2 - For EGS where we do not have source data to estimate the “environmental” portion of the commodity, we use a placeholder of 10%.

- EGSS gross output was **\$677.1 billion in 2019**
 - About 1.8% of the total gross output of the US economy
 - \$691 billion when a portion of the partial categories are included
 - Not a particularly large gap between scenarios
- What's quantitatively most important in the U.S.?
 - Waste management, wastewater management, water management

- Imperfect mapping of NAPCS/NAICS to “environmental” definition in SEEA
 - Revision cycle to NAPCS/NAICS could incorporate better alignment with SEEA environmental product/industry categories
- Imperfect alignment with NAICS and NACE
 - Greater harmony across classification systems would improve measurement and comparability of environmental activity accounts
 - Or, at a minimum, more detailed definitions of the underlying activity to allow for clean coding of the activity
- Better data & methods required for estimating proportion of partial categories considered to be “environmental”

- Partial categories – what to do?
 - NAPCS/NAICS revisions?
 - Economic Census revisions?
 - Supplemental surveys?
 - US EPA and Census used to survey firms
 - Survey of Environmental Products and Services
 - “Big Data” and non-traditional data?
 - Firm-level ESG disclosures, annual reports
 - e.g., environmental R&D (source: Refinitiv)
 - KPMG: 96 (80) percent of the largest (large and mid-cap) firms around the world already publicly report on sustainability (KPMG, December 2020)

REFINITIV 

ESG reports and related sustainability/climate disclosures



Examples of Environmental R&D and environmental investment disclosures

Exceeded 2020 reduction goals; progressing further greenhouse gas reductions

By the end of 2020, ExxonMobil delivered on its goal to significantly reduce methane emissions and flaring versus 2016 levels. The Company's goals included a 15 percent reduction in methane and a 25 percent reduction in flaring. Both goals were achieved through targeted improvements at facilities in the United States, Equatorial Guinea, Angola and Nigeria, eliminating approximately 6 million tonnes of CO₂ equivalent emissions (CO₂e).

Since 2000, ExxonMobil has invested over \$10 billion in projects to research, develop and deploy lower-emission energy solutions. ExxonMobil also continues to expand collaborative efforts with other companies and academic institutions. See pages 22 to 29 for more information on these collaborations.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

ENVIRONMENTAL MATTERS

Environmental Expenditures

	2020	2019
	(millions of dollars)	
Capital expenditures	1,087	1,276
Other expenditures	3,389	3,969
Total	4,476	5,245

Throughout ExxonMobil's businesses, new and ongoing measures are taken to prevent and minimize the impact of our operations on air, water and ground. These include a significant investment in refining infrastructure and technology to manufacture clean fuels, as well as projects to monitor and reduce nitrogen oxide, sulfur oxide and greenhouse gas emissions, and expenditures for asset retirement obligations. Using definitions and guidelines established by the American Petroleum Institute, ExxonMobil's 2020 worldwide environmental expenditures for all such preventative and remediation steps, including ExxonMobil's share of equity company expenditures, were \$4.5 billion, of which \$3.4 billion were included in expenses with the remainder in capital expenditures. The total cost for such activities is expected to increase to approximately \$4.9 billion in 2021 and 2022. Capital expenditures are expected to account for approximately 25 percent of the total.

Environmental Liabilities

lower-carbon capital allocation

\$2B

by 2028 in carbon-reduction projects

page 41

\$750M

by 2028 in investments in renewables and offsets

pages 44-46

\$300M

committed to the Future Energy Fund II

page 47

carbon footprinting

page 42

drilling & completions

production

pipeline

liquefaction/refining

shipping

use

Standardized reporting enabling buyer choice

Reliable, verifiable information driving returns

Life-cycle carbon-footprinted products mobilizing action

policy

page 49

innovation support

carbon pricing

targeted policies

metrics

page 52

upstream production net greenhouse gas emissions intensity reduction metrics for 2028:		
24 kg CO ₂ e/boe for oil (global industry averages 46)		40% reduction from 2016
24 kg CO ₂ e/boe for gas (global industry averages 71)		26% reduction from 2016
2 kg CO ₂ e/boe for methane and a global methane detection campaign		53% reduction from 2016
0 routine flaring by 2030 and 3 kg CO ₂ e/boe for overall flaring		66% reduction from 2016



- Classification of Environmental Activities (CEA)
 - Should more emphasis be placed on **water, wastewater, and waste treatment**?
 - Given their quantitative importance, at least in the U.S. and many other countries, small adjustments to product classifications that would better align with SEEA in these categories would potentially make a large impact for enhancing the precision of measuring the EGSS and comparability across countries using similar classification systems
 - Should revisions to CEA (CEPA-ReMA) be **more global** in focus?
 - New proposal diverges from the SEEA-CF official CEA by excluding categories of resource management related to mineral resources, timber, aquatic, and other biological resources. For countries outside of Europe, their economies may be more oriented toward these resources, potentially presenting a problem of comparability.

- What are the **conceptual definitions** for the next CEA?
 - Are the SEEA-CF definitions of RM and EP still relevant? Or, are new definitions assumed in this proposed classification? How are the EP and RM definitions used to help distinguish the different categories?
- Should there be a **more unified approach to water**?
 - What is the definition of ‘natural water’ and is that the boundary that should be used for water as it becomes scarcer and more critical?
 - Should expenditures related to water supply – including drinking water – be included in the Resource Management for water?
 - Is it practically possible to exclude drinking water when identifying expenditures for water management?

- How should countries include the **categories not covered** by the Eurostat classification?
- How should we think of classifications related to **Climate Change** expenditures and **Disaster Risk** expenditures?

Thank You!



Additional questions/comments?

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