



SEEA MINERAL AND ENERGY ASSET ACCOUNTS

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Peter van de Ven
Head of National Accounts
Statistics and Data Directorate, OECD



Introduction

Measuring and monitoring mineral and energy assets:

- **International standards** for environmental-economic accounting (SEEA)
- Development of **global databases** with internationally comparable data
- Mapping international **classifications**
- **Availability of data**, including OECD dissemination platform
- Main conclusions



International Standards

- **SEEA Central Framework** was adopted as an international statistical standard by the UN Statistical Commission in 2012
- **SEEA Experimental Ecosystem Accounting** complements the Central Framework and represents international efforts toward coherent ecosystem accounting
- **SEEA Energy** is fully consistent with SEEA Central Framework and provides further details on the energy accounts



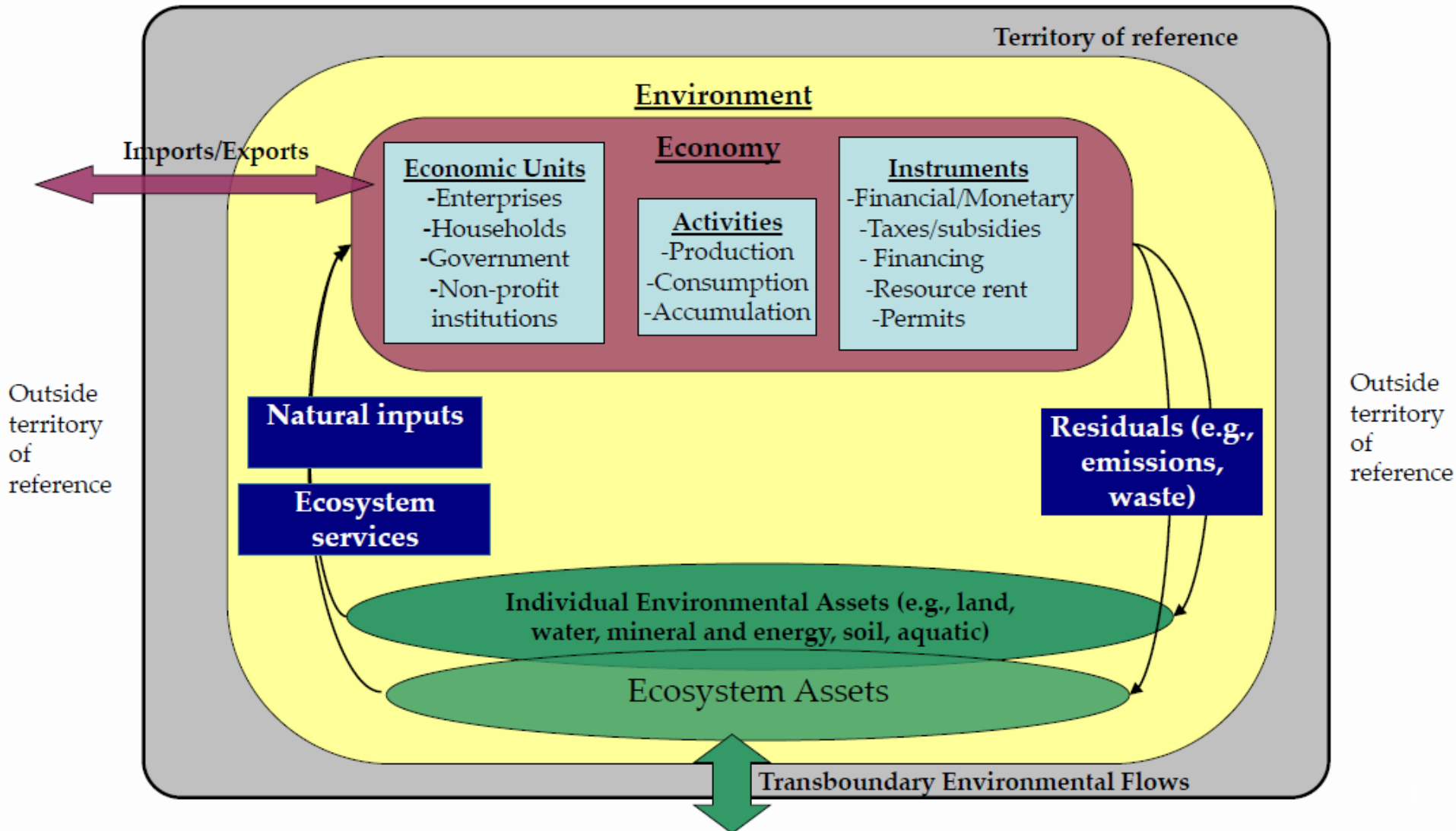


What guidance does SEEA provide?

- Full accounting for **relationship between economy and environment**, including monitoring of individual environmental assets (Central Framework) and ecosystem assets (Experimental Ecosystem Accounting)
- Integrated with the **System of National Accounts**
- Both stocks and related flows
- Coherent and internally consistent
- Comprehensive
- Time series measuring same concept over time
- Applies to both physical and monetary based data



SEEA Conceptual Framework





What is an asset?

- Definition of asset: a **store of value representing a benefit or series of benefits accruing to the economic owner by holding or using the entity over a period of time** (same definition as in the SNA)
- In **SEEA**, asset accounts in physical terms may have a **broader scope as there is no requirement that an asset must deliver economic benefits**



UNCEEA Area Group on Developing Global Databases

- Objective: to provide users with **SEEA compliant data sets** for integrated policy development and analysis, including the SDGs
- Goal: to provide **direct access to SEEA databases**, developed from national data, with global coverage (as much as feasible) and via a single-entry portal on the SEEA website (seea.un.org).
- OECD has been taking a lead role for air emissions and **natural resources asset accounting**



Accounts for mineral and energy resource assets

- Mineral and energy resources: **known deposits** of oil resources, natural gas resources, coal and peat resources, non-metallic minerals and metallic minerals
- For reporting purposes, the SEEA 2012 proposes to aggregate known stocks of mineral and energy resources into **three classes**, called SEEA-2012 classes A, B and C
- SEEA-2012 classes are defined using the **UNFC-2009 classification**
- **Main advantages** of the UNFC-2009 classification for SEEA users:
 - **Internationally agreed** classification
 - It applies to **both mineral and energy resources**
 - It can be **mapped with other classifications** used by countries (e.g. with CRIRSCO template for minerals, with SPE-PRMS for oil and gas, and soon with Russian classifications)



International classifications systems for natural resources and reserves

Abbreviation	Full Name	Subject Resource	Latest edition (first edition)
SPE-PRMS ¹	Society of Petroleum Engineers – Petroleum Resources Management System	Fossil Energy (crude oil and natural gas)	2007
CRIRSCO ²	Committee For Mineral Reserves International Reporting Standards	Minerals	2013 (2006)
UNFC-2009 ³	United Nations Framework Classification for Fossil Energy and Mineral Resources	Minerals and Fossil Energy	2009 (1997)
SEEA-2012 ⁴	System of Environmental-Economic Accounting – Central Framework	Renewable and non-renewable natural resources and land	2012 (2003)

¹ SPE-PRMS (2007)

http://www.spe.org/industry/docs/Petroleum_Resources_Management_System_2007.pdf#search=%27Petroleum_Resources_Management_System_2007.pdf

² CRIRSCO (2013) http://www.crirSCO.com/templates/crirSCO_international_reporting_template_2013.pdf

³ UNECE (2009) <http://www.unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/EnergySeriesNo33.pdf>

⁴ SEEA (2012) http://unstats.un.org/unsd/envaccounting/seeaRev/SEEA_CF_Final_en.pdf

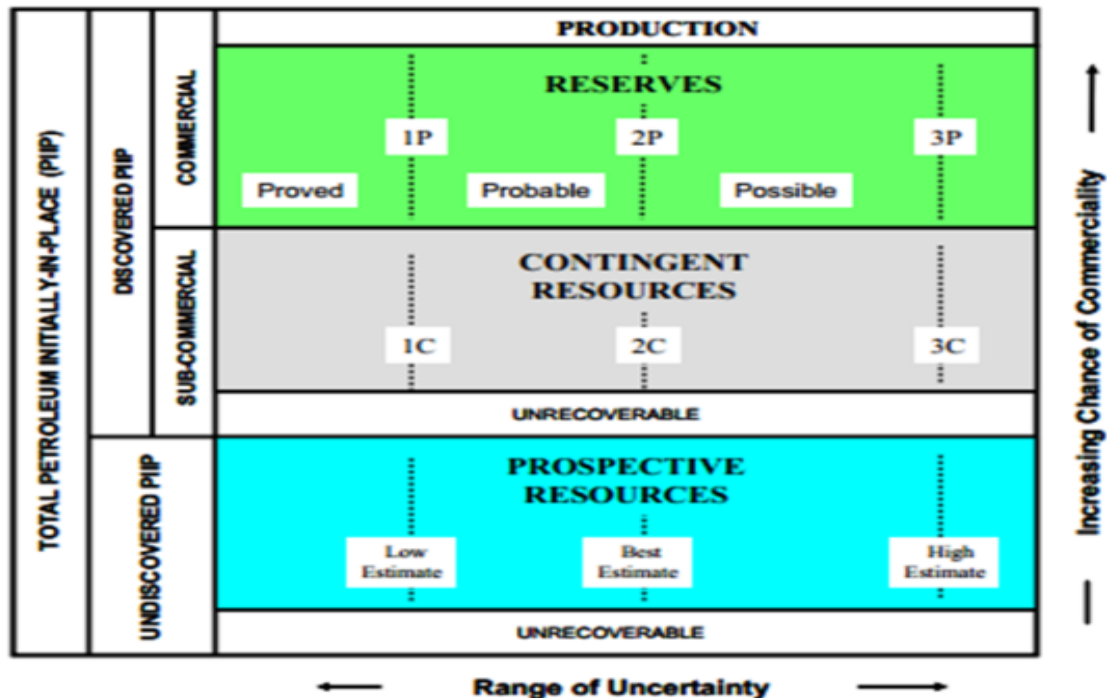


SPE-PRMS classification

SPE-PRMS (fossil energy) is a two dimensional system, based on:

- Vertical axis: Degree of commerciality of the resource
- Horizontal axis: Range of geological uncertainty
- Source:

http://www.spe.org/industry/docs/Petroleum_Resources_Management_System_2007.pdf#search=%27Petroleum_Resources_Management_System_2007.pdf

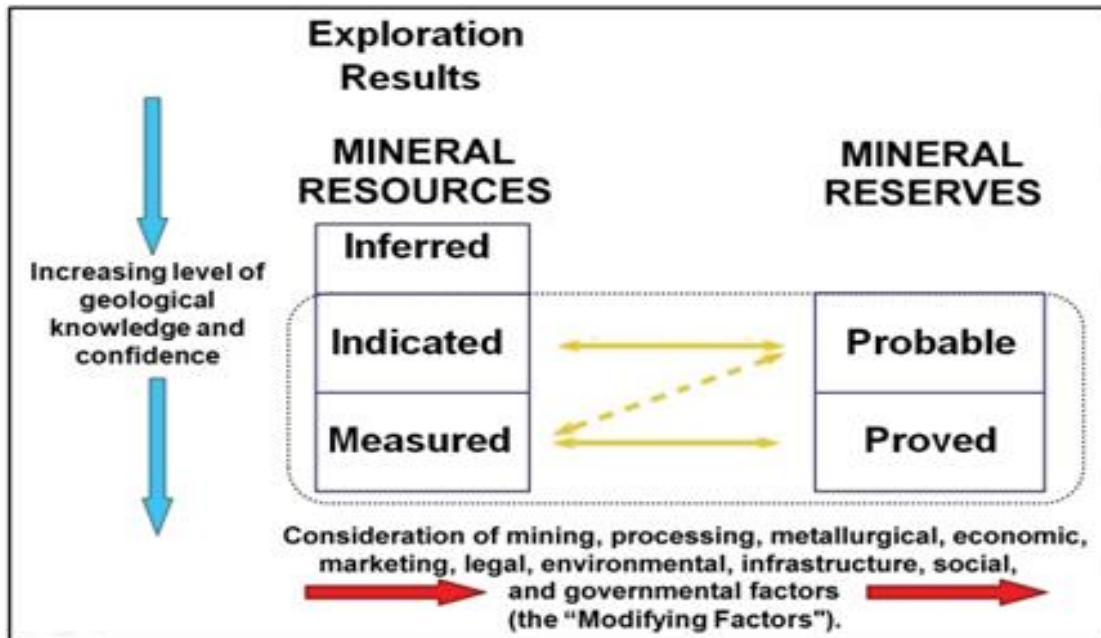




CRIRSCO classifications

CRIRSCO (minerals) is a two dimensional system, based on;

- Vertical axis: **Geological confidence**
- Horizontal axis: **Modifying factors** (e.g. socio-economic factors such as resource prices or legal constraints)
- Source:
http://www.criresco.com/templates/crisco_international_reporting_template_2013.pdf

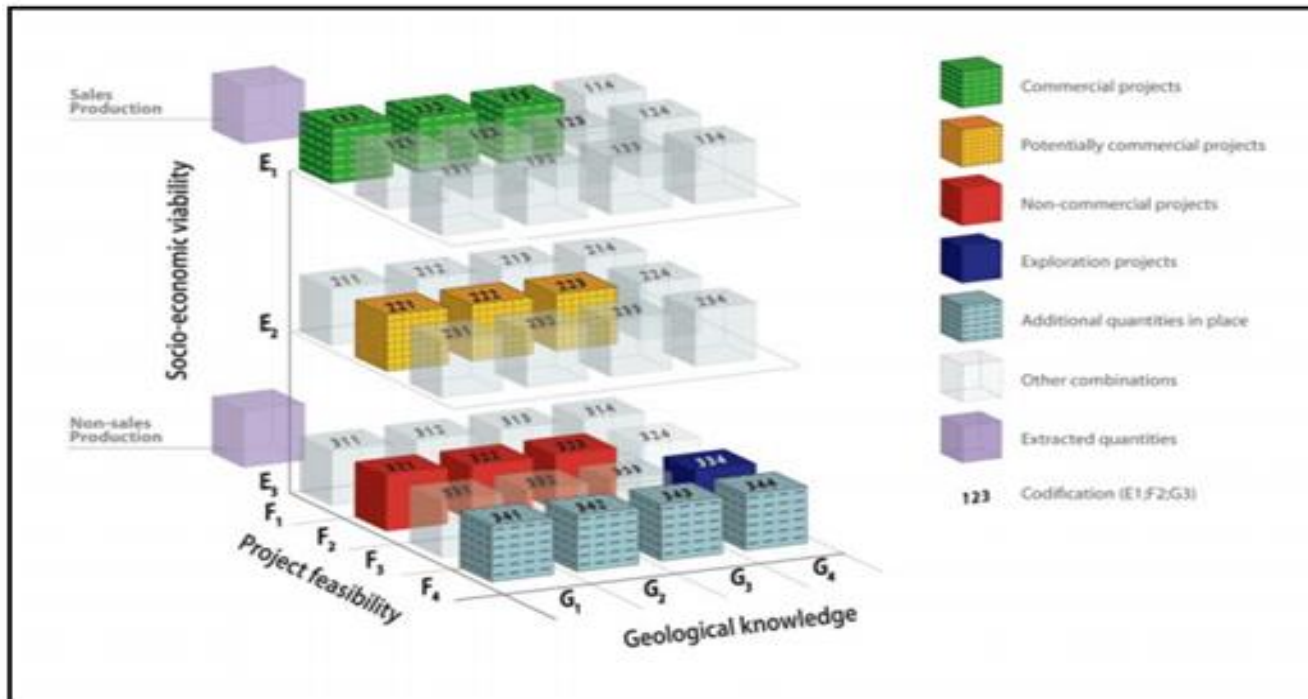




UNFC-2009 classification

UNFC 2009 (fossil energy and minerals) is a three dimensional system, based on:

- E axis: **Economic and social viability** of the project
- F axis: **Field project status and its feasibility**
- G axis: **Geological knowledge** about the available quantities
- Source: <http://www.unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/EnergySeriesNo33.pdf>





SEEA-2012 classification

SEEA-2012 classification on natural resources distinguishes **three classes for reporting known deposits**, based on UNFC 2009

Class A: Commercially recoverable resources

This class includes deposits for projects that fall in categories E1 and F1 and where the level of confidence in the geologic knowledge is high (G1), moderate (G2) or low (G3);

Class B: Potentially commercially recoverable resources

This class includes deposits for those projects that fall in the category E2 (or eventually E1) and at the same time in F2.1 or F2.2 and where the level of confidence in the geologic knowledge is high (G1), moderate (G2) or low (G3);

Class C: Non-commercial and other known deposits

These are resources for those projects that fall into category E3 and for which the feasibility is categorized as F2.2, F2.3 or F4 and where the level of confidence in the geologic knowledge is high (G1), moderate (G2) or low (G3)



Correspondence table (oil and gas)

Correspondence between SPE-PRMS, UNFC-2009 and SEEA-2012 classifications

Fundamental Characterization	PRMS Classes	PRMS Sub-Class	UNFC E axis	UNFC F axis	UNFC G axis			
					1P/1C Low Estimate	2P/2C Best Estimate	3P/3C High Estimate	
Discovered and Commercially Recoverable	Reserves	On Production	1.1 or 1.2	1.1	1	1+2	1+2+3	SEEA-2012 Class A
		Approved for Development	1.1 or 1.2	1.2	1	1+2	1+2+3	
		Justified for Development	1.1 or 1.2	1.3	1	1+2	1+2+3	
Discovered and Not Commercially Recoverable	Contingent Resources	Development Pending	1	2.1	1	1+2	1+2+3	SEEA-2012 Class B
			2.1	2.1	1	1+2	1+2+3	
		Development Unclassified or on Hold	2.1	2.2	1	1+2	1+2+3	
			3.2	2.2	1	1+2	1+2+3	
	Development not Viable	2.2	2.3	1	1+2	1+2+3	SEEA-2012 Class C	
Unrecoverable		3.3	4.1	1	1+2	1+2+3		
Undiscovered	Prospective Resources	Prospect	3.2	3.1	4.1	4.1+4.2	4.1+4.2+4.3	
		Lead	3.2	3.2	4.1	4.1+4.2	4.1+4.2+4.3	
		Play	3.2	3.3	4.1	4.1+4.2	4.1+4.2+4.3	
	Unrecoverable		3.3	4.2	4.1	4.1+4.2	4.1+4.2+4.3	

Rows correspond to items of the SPE-PRMS classification and columns to items of the UNFC-2009 classification. SEEA-2012 natural resource classes are indicated with colours. Source: UNECE (2009) <http://www.unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/EnergySeriesNo33.pdf>



Correspondence table (minerals)

Correspondence between CRIRSCO, UNFC-2009 and SEEA-2012 classifications

Fundamental Characterization	Solid Mineral Classes	Mineral Project Development Stage	UNFC E axis	UNFC F axis	UNFC G axis			
					Proved Measured	Probable Indicated	----- Inferred	
Discovered and Commercially Recoverable	Mineral Reserves	On Production	1	1.1	1	2		SEEA-2012 Class A
		Project Implementation	1	1.2	1	2		
		Feasibility Study	1	1.3	1	2		
Discovered and Not Commercially Recoverable	Mineral Resources	Pre-Feasibility Study	1	2.1	1	2	3	SEEA-2012 Class B
			2.1	2.1	1	2	3	
		Order of Magnitude Studies	2.1	2.2	1	2	3	
	3.2		2.2	1	2	3		
	Discovered Not Economic		2.2	2.3	1	2	3	SEEA-2012 Class C
	Unrecoverable		3.3	4.1	1	2	3	
Undiscovered	Exploration Results	Conceptual Studies	3.2	3.3	4			
	Unrecoverable		3.3	4.2	4			

Rows correspond to items of the SPE-PRMS classification and columns to items of the UNFC-2009 classification. SEEA-2012 natural resource classes are indicated with colours. Source: UNECE (2009) <http://www.unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/EnergySeriesNo33.pdf>



National and international datasets

National Data *

- Australia (ABS)
- Canada (STATCAN)
- UK (ONS)
- Netherlands (CBS)
- Norway (NPD)
- Russia (MNRE)
- US (EIA / USGS)

International Data

- British Petroleum (BP)
- U.S. Energy Information Administration (EIA)
- U.S. Geological Survey (USGS)
- Organization of the Petroleum Exporting Countries (OPEC)



Data collected at the OECD

- Official data for 13 mineral and energy resources
- Key challenges:
 - Varying formats and need to translate into SEEA/UNFC
 - Limited coverage across countries
- https://stats.oecd.org/Index.aspx?DataSetCode=NAT_RES

Mineral and Energy Resources ⓘ

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Resource		Crude oil																				
Country		Australia ⓘ																				
Unit		Barrels, Billions																				
Year		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Class	Stocks and flows																					
Class A+B - Commercially recoverable resources + potentially commercially recoverable resources	Opening stock	1.51	1.356	1.267	1.226	1.167	1.132	1.088	1.031	1.055	1.111	1.07	0.968	0.907	0.902	0.894	0.863	0.836	0.816	0.8	0.781	
	Reductions in stock	Extractions	0.207	0.187	0.17	0.154	0.134	0.12	0.122	0.12	0.106	0.104	0.103	0.088	0.073	0.058	0.067	0.076	0.065	0.054	0.054	0.057
		Total reductions in stock	0.207	0.187	0.17	0.154	0.134	0.12	0.122	0.12	0.106	0.104	0.103	0.088	0.073	0.058	0.067	0.076	0.065	0.054	0.054	0.057
	Closing stock	1.356	1.267	1.226	1.167	1.132	1.088	1.031	1.055	1.111	1.07	0.968	0.907	0.902	0.894	0.863	0.836	0.816	0.8	0.781	0.771	
	Discrepancies	0.053	0.098	0.128	0.095	0.099	0.077	0.065	0.144	0.162	0.064	0.001	0.027	0.067	0.05	0.036	0.048	0.045	0.037	0.036	0.047	

Data extracted on 20 Oct 2020 20:17 UTC (GMT) from OECD.Stat



Main conclusions

- Countries engaged or interested in the statistical reporting of physical stocks of natural resources should **provide sufficient metadata** to enable clear understanding of how the **reported volumes** fit into the international classification standards
- **National data sources are preferred**, even if this implies a focus on a limited number of resources and the main producing countries in a first stage
- All **countries are kindly invited to share their experience** and the difficulties they encounter for the volume measurement of stocks of natural resources
- **Further work on** implementing guidance on **valuation** of mineral and energy resources



Thank you for your attention!

For more information, please contact:

Daniel Clarke

(email address: Daniel.CLARKE@oecd.org)