



Impact of the onshore upstream oil and gas industry on the Romanian economy

Energy and Natural Resources

February 2016



Important notice

Any person intending to read this report should first read this notice

- KPMG Advisory SRL, Energy and Natural Resources Department (hereinafter referred to as "KPMG", "the consultant", "we"), has been appointed by Romanian Petroleum Exploration and Production Companies Association (hereinafter referred to as „ROPEPCA“, the „Client“), to prepare a study on the impact of the multiplier effect of investments in the oil and gas sector in the Romanian economy (the "Study" or the "Analysis") in accordance with the terms of an Advisory Service Contract between ROPEPCA and KPMG.
- The work was undertaken based on the agreed scope and terms of the engagement between ROPEPCA and KPMG, in order that KPMG might state to ROPEPCA those matters on which it agreed to issue such judgments, findings, conclusions, recommendations or opinions and for no other purpose. KPMG work excludes taxation, legal, accounting, auditing, technical, environmental protection and any industry, corporate or other type of specialized matters. Therefore, the Study may not be suitable for any purpose other than the purpose set out herein.
- The Study was prepared and delivered by KPMG on the basis that it is for ROPEPCA's exclusively benefit and information only. Accordingly, KPMG does not accept or assume responsibility to any party other than ROPEPCA in connection with this Study, for any judgments, findings, conclusions, recommendations or opinions that KPMG has formed or made. Should any third-party choose to rely on this Study they do so at their own risk.
- There should be no action taken that relies on the information in this Study without consultation with competent professional legal or other relevant assistance. Any decision which will be based on the information presented in this Study is the responsibility of the party who takes that decision.
- The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. This Study is not intended to address or provide an analysis of relevant legal matters and circumstances nor was it based on professional legal counsel. Although we endeavor to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future.
- The information contained in this Study is selective and is subject to update, expansion, revision and amendment. It does not purport to contain all of the information that any interested third party may require. Any statements, estimates and projections contained in this report reflect various assumptions of the anticipated results, assumptions which may or may not prove to be correct.
- This study has relied upon the relevant official publicly available information from the European Commission, ANRE, ANRM, ROPEPCA, relevant Institutions, Associations, Organisations, Banks and Governmental Authorities, as well as the official public documents or communications of relevant companies and bodies active in the oil and gas sector and the applicable legislative and regulatory framework.
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Executive Summary

1 Executive summary

1.1. Impact analysis of the onshore upstream oil and gas sector on the Romanian economy

The report demonstrates that an investment of approximately EUR 1 billion in the onshore upstream oil and gas sector generates a significant direct and indirect impact in terms of GDP, employment and government tax contributions, and by its chain of interdependencies, these effects cascade into other economic sectors, creating a considerable induced impact, as well

Key highlights of the study

- This study was commissioned by the Romanian Petroleum Exploration and Production Companies Association ("ROPEPCA") and aims to describe and underline the impact that onshore upstream oil and gas activities have on the Romanian economy.
- Romania's oil and gas industry has an impressive history in very mature fields, making a significant contribution to the country's economy (in terms of GDP and number of employees). Also, the industry brings additional benefits to Romania in terms of security of supply and affordable oil and gas products.
- Romania has the largest number of direct employees in upstream oil and gas industry according to EU Energy Statistics which is the result of several factors, including the specifics of Romania's onshore upstream oil and gas sector, with very fragmented small-sized fields and the highest number of producing wells in Europe, but the lowest well productivity.
- The estimated annual spend by the onshore upstream oil and gas exploration and production sector in Romania, in order to bring new wells into production or to invest in existing technology to increase the recovery rates of mature oil and gas fields is approximately EUR 1 billion. This sustained annual capital investment is considered mandatory to allow the exploration and production companies to maintain production levels and to meet demand requirements and it is assumed that the required capital will be deployed for this purpose over the next years.
- The Eurostat mapping of the Romanian economy and the data presented by INSSE show that the GDP from the upstream oil and gas industry (including other related services) in Romania increased from EUR 1.59 billion in 2010 to an estimated EUR 1.61 billion in 2014, with an average of approximately 25,000 direct jobs in the sector.

Summary of economic impact

The investment in onshore upstream oil and gas industry

- The report demonstrates that the estimated spend of approximately EUR 1 billion generates significant value added and maintains steady levels of employment in the sector and, by its chain of interdependencies, these effects cascade into other economic sectors.

Economic impact

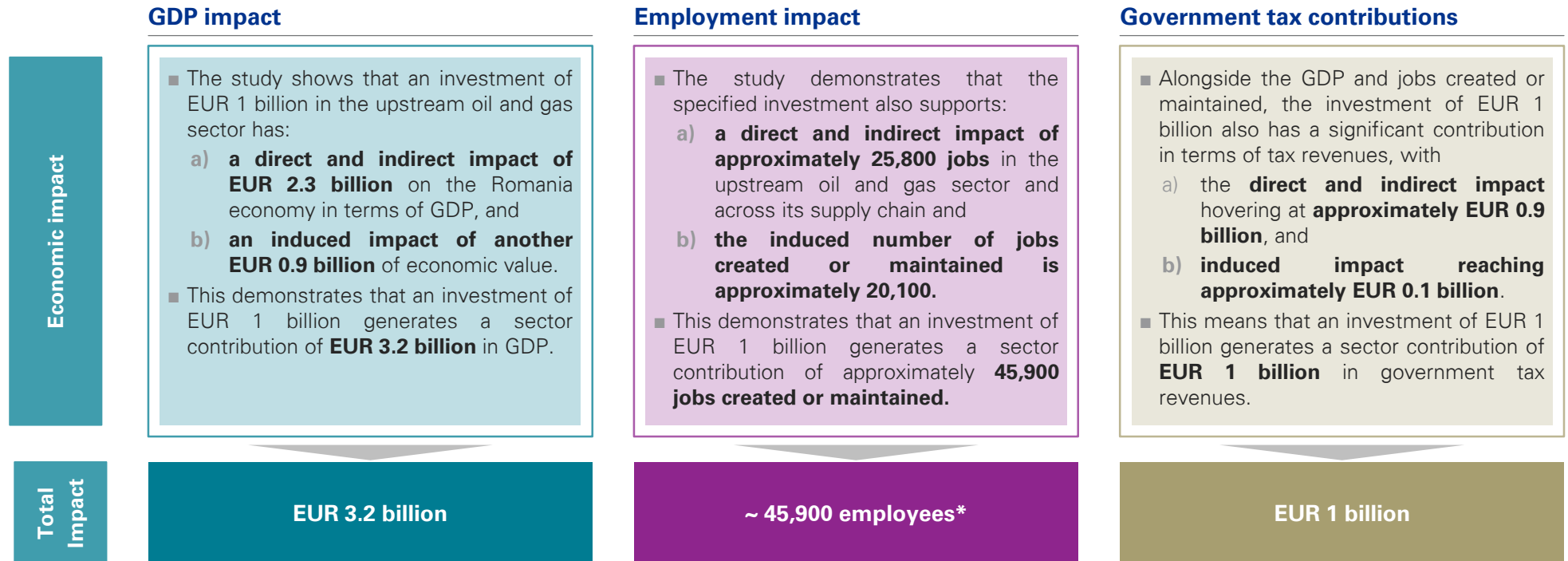
- The onshore upstream oil and gas sector's activities generate
 - a) **direct and indirect** and
 - b) **induced impacts** on the economy.
- These impacts are the result of the inter-sector dependencies of the economic system, because of which a change in an economic sector leads to further consequences in the connected sectors, stimulating the supply chain and the overall social and economic system.

Types of impact generated

- The impacts generated by the oil and gas sector's activities can be further classified based on the type of effect generated (on economic income, social welfare and government income) in terms of:
 - a) **gross value added,**
 - b) **number of jobs** and
 - c) **tax contribution,**in the form of corporate income tax, value added tax, royalties and social security contributions.

1.2. Key highlights of economic impact

We have applied Leontief methodology and our analysis builds on the inter-sector dependencies of the economic system as presented in the symmetric input-output tables, provided by Eurostat, to derive the direct and indirect as well as induced impacts on the economy, in terms of GDP, number of jobs and consequently, tax revenues



* Creating and/or maintaining approximately 15,000 jobs during the year of investment and on average about 3,000 jobs yearly during each of the 10 production years.

- In our assessment we have relied upon the relevant official publicly available information from the European Commission, ANRE, ANRM, ROPEPCA, relevant Institutions, Associations, Organisations, Banks and Governmental Authorities, as well as the official public documents or communications of relevant companies and bodies active in the oil and gas sector and the applicable legislative and regulatory framework.
- This study refers to the economic impact of an estimated investment of EUR 1 billion in the onshore upstream oil and gas industry and is dependent on the availability of consistent information, therefore in our assessment we have relied on either the latest publicly available information and, where available, on the forecasted publicly available information.



Upstream oil and gas industry overview

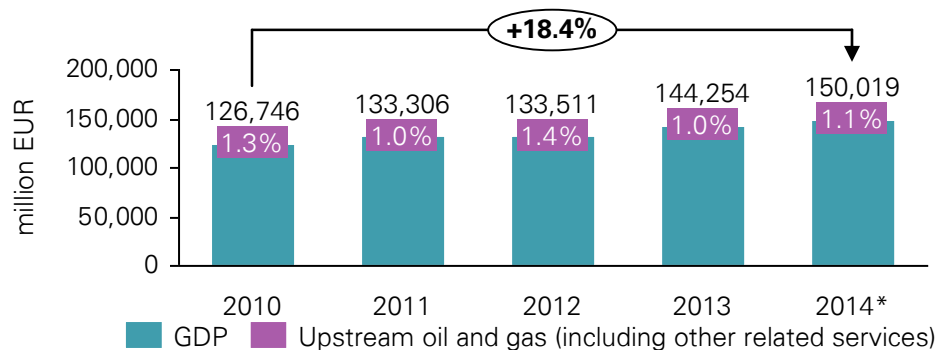
2.1. Upstream oil and gas industry in Romania

The upstream oil and gas industry has been of great importance to the Romanian economy since its development

The Romanian upstream oil and gas industry at a glance

- In Romania, oil production has a history of over 150 years and gas production of over 100 years. The oil and gas industry in Romania emerged in 1857 with three worldwide oil debuts: Bucharest was the first city in the world to be illuminated by kerosene lamps, the world's first refinery was set up in Ploiesti and Romania became the first country in the world with an internationally registered petroleum production.
- The Romanian onshore upstream oil and gas market is at a mature stage, but in order to secure local demand and energy independence, both suitable technologies and further exploration are required. Currently, in Romania there are over 400 fields and 13,000 producing wells.
- The contribution of the upstream oil and gas industry, in terms of value added, has been above 1% in the total GDP of Romania, during the last 5 years. However, the industry's total contribution is much higher if the inter-sectorial impact is factored in. This inter-sectorial impact is presented in the current analysis and detailed in Sections 3 and 4.

GDP development and upstream oil and gas sector contribution



Source: INSSE, Eurostat

Note: * The data for the year 2014 was estimated based on INSSE data

Key facts on the upstream oil and gas industry

Major contributor to the Romanian economy

- The onshore upstream oil and gas industry is a major contributor to the Romanian economy by the value added created and the inter-sectorial impact.
- The main industries impacted by upstream oil and gas industry comprise oil refining and electricity and heat production, along with their supply chain.

Major employer

- The upstream oil and gas industry in Romania is a major employer, with more than 25,000 direct employees according to INSSE and the largest in EU according to Eurostat.
- The industry's employees cover a wide range of disciplines including engineers, geo-scientists, environmental, health and safety specialists, park and well operators, electricians, lawyers, accountants and many others.

Major government tax revenue generator

- The industry makes a major contribution to the economy in terms of tax revenues (through corporate income tax, value added tax, royalties and social security contributions).
- OMV Petrom is the largest contributor to the Romanian state budget, followed closely by Romgaz, which is part of the top 10 contributors.

Capital intensive industry

- The onshore upstream oil and gas industry requires sustained investments in order to secure a stable level of production.
- As the sector is highly capital intensive, the companies are experiencing increased efforts to maintain profitability margins in the midst of constant pressures on prices at global and regional levels.

2.2. Gas industry in Romania

Unlike other CEE countries, Romania has a unique position in the region, with a limited dependency on external natural gas sources

Key highlights on the natural gas market in Romania

- **Romania is the largest gas producer in the CEE**, with a production of natural gas of up to 71.5 million boe in 2014 (92.5% of consumption). Natural gas consumption is covered mainly through domestic production.
- Natural gas consumption in Romania has decreased in the last 5 years by a CAGR of 3.4% from 88.9 million boe in 2010 to 77.3 million boe in 2014.
- Romania is not highly dependent on imported gas as compared to the EU average, where above 65% of demand is covered by net imports.
- Moreover, the decrease in natural gas consumption had a direct impact on natural gas net imports (a negative CAGR of 19.5% in the analysed period).
- **Romania is one of the countries with the largest natural gas reserves in Europe**, with proven reserves of above 640 million boe. However, in the absence of significant investments, current reserves will cover only approximately 9 years of natural gas production.

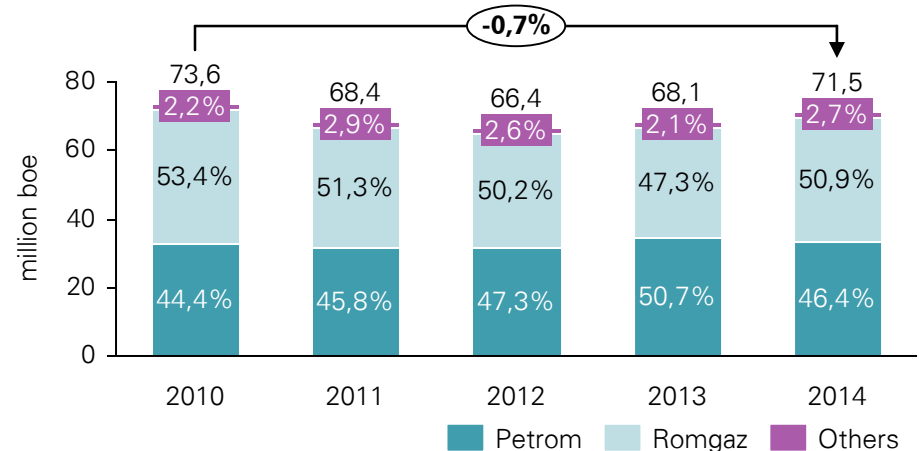
Natural gas consumption and supply sources in Romania

- The decrease of natural gas consumption in Romania was mainly a consequence of:
 - the structural change of GDP which reflects the economic development of the tertiary and services sectors, with a reduced gas consumption level as compared to industrial and construction sectors;
 - the increase of wholesale prices for domestic gas and end-user prices.

	2010	2011	2012	2013	2014
Total consumption (million boe)	88.9	91.4	87.6	80.3	77.3
out of which:					
Domestic production	82.8%	74.8%	75.7%	84.7%	92.5%
Net import	17.2%	25.2%	24.3%	15.3%	7.5%

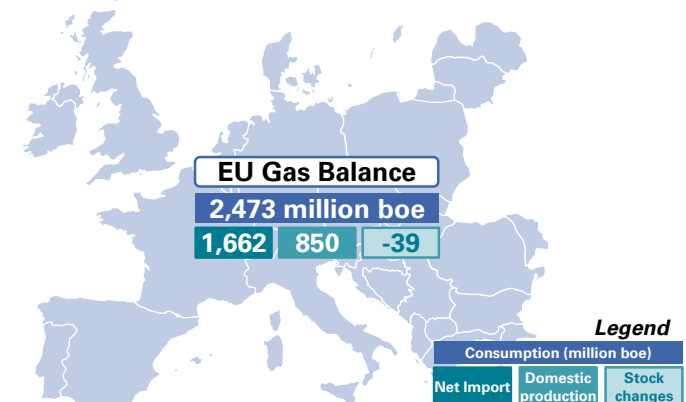
Source: ANRE Annual Reports

Natural gas production in Romania



Source: ANRE Annual Reports

Natural gas supply sources at EU level in 2014



Source: EUROSTAT

2.3. Upstream oil industry in Romania

Romania was the ninth largest oil producer in Europe and Eurasia in 2014, with a considerable share of total consumption covered by national oil production

Key highlights on the oil market in Romania

- Oil consumption increased over the past 5 years by a CAGR of 0.7%, from 72.5 million boe in 2010 to 74.5 million boe in 2014.
- During the last 5 years, the annual oil production in Romania decreased by a CAGR of 1.9% from 30.6 million boe annin 2010 to 28.4 million boe in 2014.
- Consequently, during the analysed period, the annual net oil imports increased by a CAGR of 2.4%, from 41.8 million boe in 2010 to 46.0 million boe in 2014.
- Romania is one of the countries with the largest oil reserves in Europe**, with proven reserves of above 315 million boe, according to OMV Annual Report for 2014, as OMV Petrom produces approximately 99% of the Romanian oil production. However, in the absence of significant investments, the current reserves will cover only approximately 12 years of oil production.

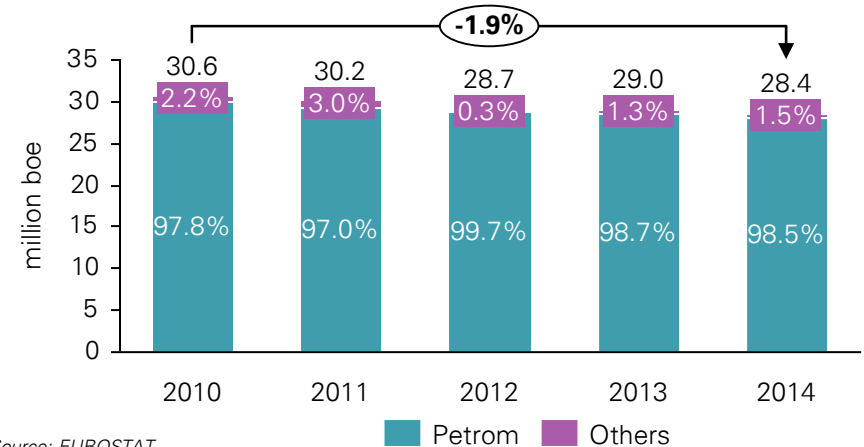
Oil consumption and supply sources in Romania

- Romania was the ninth largest oil producer in Europe** and Eurasia in 2014, according to BP's Statistical Review of World Energy 2014.
- Romania is not highly dependent on imports as compared to the EU average, where almost 90% of demand is covered by net imports.

	2010	2011	2012	2013	2014
Total consumption (million boe)	72.5	69.4	63.7	66.7	74.5
out of which:					
Domestic production	42.3%	43.5%	45.1%	43.5%	38.2%
Net import	57.7%	56.5%	54.9%	56.5%	61.8%

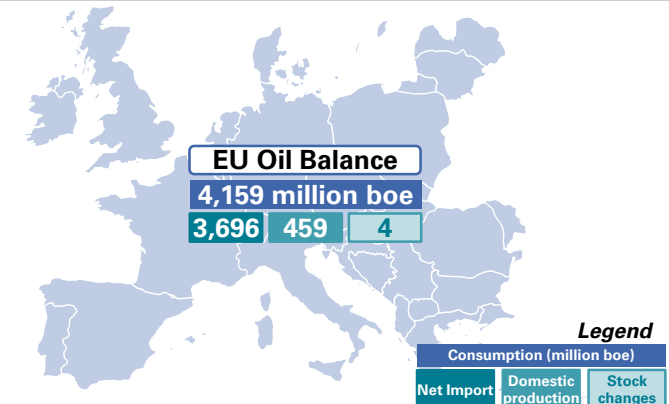
Source: Eurostat

Oil production in Romania



Source: EUROSTAT

Oil supply sources at EU level in 2014



Source: EUROSTAT



Methodology Overview

3.1. Leontief methodology

Wassily Leontief received the Nobel Prize for the input-output methodology and in 1984 was awarded the highest civilian honor in Japan, the world leader in the use of input-output analysis

Leontief Input-Output Model

- The economic impact quantification through input-output analysis was developed by Wassily Leontief, who became the first Nobel Laureate in 1973 and the founding father of a new field for empirical research on the border between microeconomics and macroeconomics.
- In 1984, Japan, the world leader in the use of input-output analyses, awarded him the highest civilian honor.

Leontief methodology

- The Leontief model is build based on the symmetric input-output tables and describes the whole economy in a compact, simplified form, as well as the interactions and dynamics of a sector with respect to the other sectors.
- **Since its development, one of the main applications of the input-output analysis is to determine how the change in the demand for one industry has an impact on the whole economy.**
- The inter-sectorial dependence is represented by Leontief in a matrix format. For each industry, the entries for the Leontief matrix represent the relationships between the inputs that the respective industry absorbs and the output that is produced. Based on the symmetric input-output table, the GDP of an economy or a specific industry can be calculated.
- Interdependence between industries is described in the Leontief matrix by a set of linear equations which illustrate the balances between total input and output of each good and service produced, based on the symmetric input-output table.

Eurostat manual and symmetric input – output tables

- The increased interest in the input-output analysis in the past few years, both in the business and academic sectors, determined **Eurostat to publish a detailed and comprehensive Manual of Supply, Use and Input-Output tables** (hereinafter the “Eurostat Manual”) whose main focus is on the Leontief methodology and its applications.
- **The main objective of the Eurostat Manual is to serve as a reference book for national financial experts who are involved in carrying out an economic impact analysis based on the input-output framework according to international standards.**
- In addition to the Manual, Eurostat publishes symmetric input-output tables for all EU member states, including Romania.
- Consequently, Eurostat offers the opportunity to any third party to use the symmetric input-output tables as input data in order to apply the Leontief methodology and determine the economic impact of a sector on national levels within the EU.

Our analysis on the impact of the onshore upstream oil and gas sector in the Romanian economy was calculated using the Leontief methodology as detailed in the Eurostat Manual. Also, our analysis was conducted based on the publicly available symmetric input-output tables for the year 2010, published and verified by Eurostat.

3.2. Economic impact methodology

The onshore upstream oil and gas sector has an extensive direct and indirect, as well as induced economic impact throughout all economic sectors, on Romanian GDP, employment and governmental tax contributions

Total economic impact

- The **total economic impacts** are quantified in terms of the **direct and indirect** as well as **induced impacts**.

Direct and Indirect impact

Direct and indirect impact results from the value added, employment and consequent government tax contributions within the onshore upstream oil and gas industry and throughout its entire supply chain, as a result of changes in final demand triggered by an estimated investment of approximately EUR 1 billion in the onshore upstream oil and gas industry, over its construction period and production levels generated thereof.

Induced impact

Induced impact results from the value added, employment and consequent government tax contributions from household expenditure of direct and indirect earnings resulting from changes in final demand triggered by an estimated investment of approximately EUR 1 billion in the onshore upstream oil and gas industry, over its construction period and production levels generated thereof.

Onshore upstream oil and gas industry



Types of impact generated

- The **types of impact generated** are classified in terms of **GDP, employment** and **government tax contributions impacts**.

GDP impact

The economic impact on GDP in Romania, which results from changes in final demand triggered by an estimated investment of approximately EUR 1 billion in the onshore upstream oil and gas industry, over its construction period and production levels generated thereof.

Employment impact

The impact on the employment figures in Romania, which results from changes in final demand triggered by an estimated investment of approximately EUR 1 billion in the onshore upstream oil and gas industry, over its construction period and production levels generated thereof.

Government tax contributions*

The impact generated by means of additional revenue for government in the form of tax revenues from corporate income tax, value added tax, royalties and social security contributions on account of the impact on GDP and employment.

* The supplementary tax on gas (GO no. 7/2013) and oil (GO no. 6/2013) and construction tax are not included in the tax impact as the application term is only until 31.12.2016. Additionally, does not include any supplementary taxation on upstream profits for which government prepares a draft law which was not published.

3 Methodology overview

3.2. Economic impact methodology

We have applied Leontief methodology and our analysis builds on the inter-sector dependencies of the economic system as presented in the symmetric input-output table for Romania, provided by Eurostat, to derive the direct and indirect as well as induced impacts on the economy, in terms of GDP, number of jobs and consequently, tax revenues

Input – Output table <i>million EUR</i>	Input of Production activities					Final demand				Total Output at basic prices
	Agriculture	Mining and quarrying*	Industry**	Construction	Services	Private consumption	Governmental consumption	Gross fixed capital formation	Exports	
	Quadrant I					Quadrant II				
Agriculture	4,357	0.02	5,388	18	47	2,837	473	332	1,839	15,291
Mining and quarrying*	6	792	2,540	144	13	245	81	208	177	4,207
Industry**	918	418	13,808	7,044	10,748	21,215	880	1,606	27,194	83,832
Construction	83	65	1,830	3,240	4,521	3,231	0	18,217	514	31,700
Services	1,335	556	13,063	4,283	24,413	34,113	19,599	4,576	9,723	111,661
Domestic products	6,699	1,831	36,629	14,729	39,743	61,641	21,034	24,938	39,447	246,692
Imported products	1,239	233	11,495	4,370	9,512	11,861	785	7,623	2,161	49,279
Net taxes on products	251	73	2,186	1,007	3,446	5,082	-	1,453	-	13,497
Intermediate consumption	8,189	2,138	50,309	20,106	52,700	78,585	21,819	34,014	41,608	309,468
	Quadrant III					Quadrant IV				
Compensation of employees	3,214	1,190	10,927	2,808	26,918	In quadrant IV normally no transactions are denoted, as very few market transactions are reported in this sphere				
Other net taxes on production	(634)	64	333	27	223					
Gross operating surplus	4,522	815	22,106	8,550	32,187					
Gross value added	7,102	2,069	33,366	11,385	59,327					
Production redistribution			158	209	(366)					
Output at basic prices	15,291	4,207	83,832	31,700	111,661	78,585	21,819	34,014	41,608	
GDP for Romania ***	7,353	2,142	35,551	12,391	62,773	5,082	-	1,453	-	126,746

We applied the **Leontief methodology**, as presented in the **Eurostat Manual**

GDP impact	Direct and indirect coefficient	Induced coefficient	Employment impact	Direct and indirect coefficient	Induced coefficient
	0.84	0.35		9.53	7.44

Source: Eurostat symmetric input-output table for Romania, 2010;

Notes: *Mining and quarrying in Romania is significantly represented by oil and gas exploration and production **Except mining and quarrying; ***GDP calculated as gross value added plus net taxes on products



Economic impact analysis

4 Economic impact analysis

4.1. Economic impact overview

We have applied GDP and employment coefficients derived in accordance with the Leontief methodology and determined the economic contribution in terms of value added, employment and consequent government tax revenues, as a result of a steady investment level of EUR 1 billion in the onshore upstream oil and gas industry

Key highlights of the study

- This study was commissioned by ROPEPCA and aims to describe and underline the impact that onshore upstream oil and gas activities have on the Romanian economy.
- The impact analysis of onshore upstream oil and gas sector on the Romanian economy was developed according to **Leontief methodology**, that is elaborated based on symmetric input-output tables with the aim to determine how the change in the demand of one industry impacts the whole economy of a country.
- Furthermore, the study builds on the inter-sector dependencies of the economic system as presented in the **symmetric input-output tables**, provided by Eurostat for each European country.
- GDP and employment coefficients in accordance with the above presented Leontief methodology are presented below.

Leontief methodology - GDP and employment coefficients

GDP impact	Direct and indirect coefficient 0.84	Induced coefficient 0.35
Employment impact	Direct and indirect coefficient 9.53	Induced coefficient 7.44

Upstream oil and gas investment

Investment in the onshore upstream oil and gas industry EUR 1 billion

- The estimated spend by the onshore upstream oil and gas exploration and production sector in Romania, to bring new wells into production or to invest in existing technology which increases the recovery rates of mature oil and gas fields is approximately EUR 1 billion.
- This investment level generates significant value added and maintains steady levels of employment in the sector and, by its chain of interdependencies, these effects cascade into other economic sectors.

Construction period

- The construction period (main activities) for onshore upstream oil and gas industry in Romania, in connection with EUR 1 billion capital investment, lasts on average about 1 year, based on ROPEPCA's internal assessment.

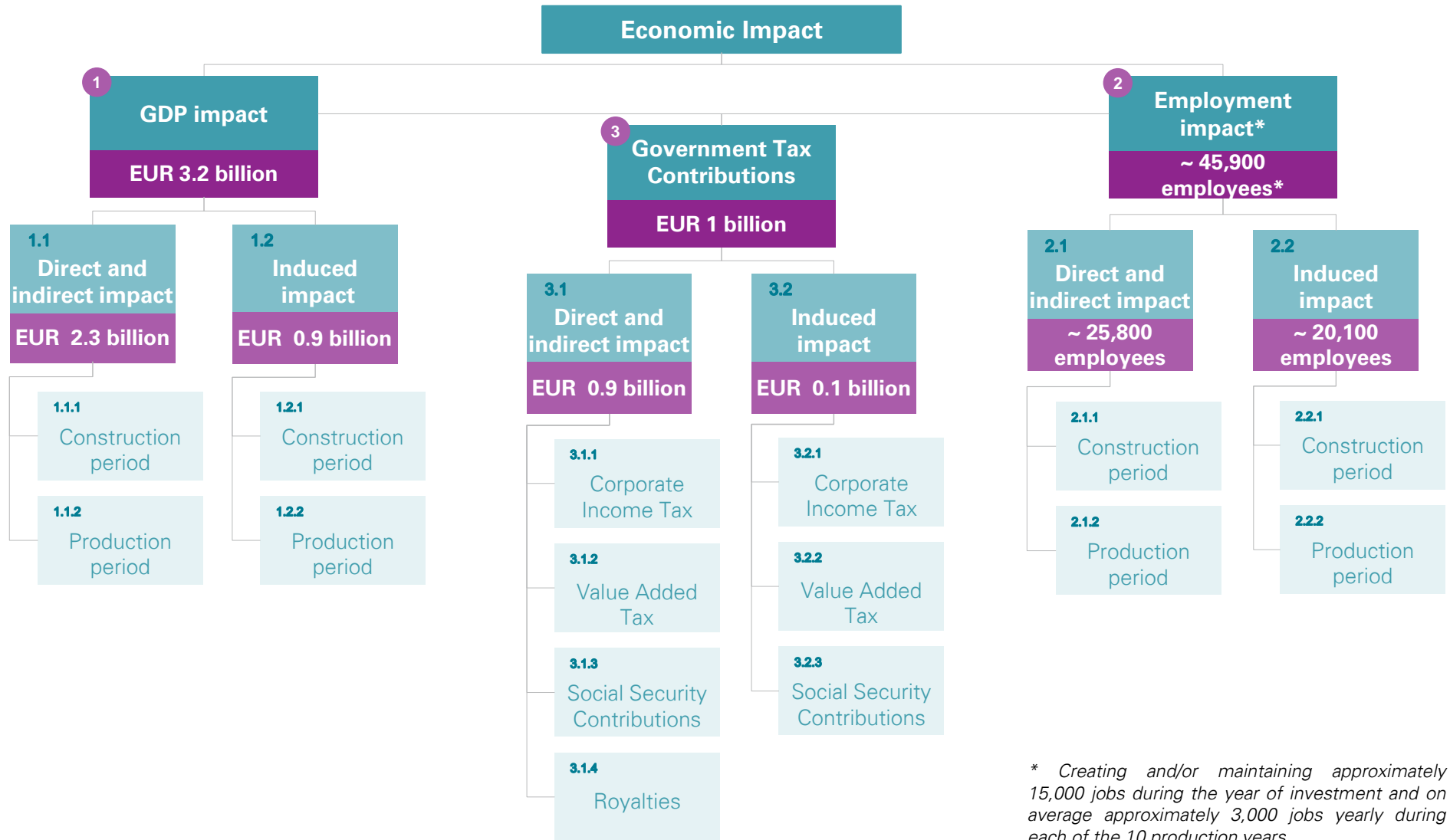
Production period

- The production period for onshore oil and gas industry in Romania, in connection with EUR 1 billion capital investment, lasts on average about 10 years, based on ROPEPCA's internal assessment.

The analysis on the following pages demonstrates that an investment of approximately EUR 1 billion in the onshore upstream oil and gas sector generates a significant direct and indirect impact in terms of GDP, employment and government tax contributions, and by its chain of interdependencies, these effects cascade into other economic sectors, creating a considerable induced impact, as well

4 Economic impact analysis

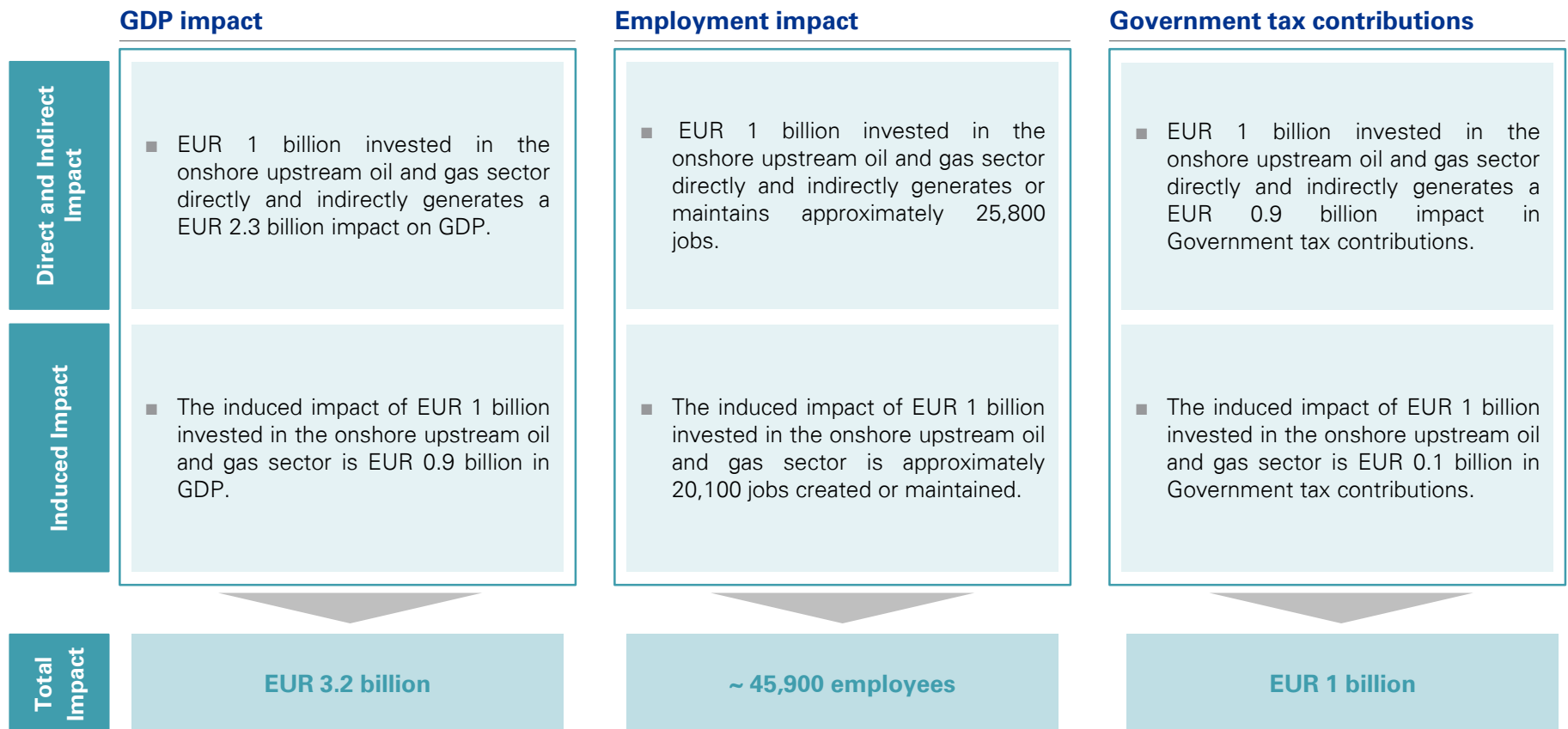
4.1. Economic impact overview



* Creating and/or maintaining approximately 15,000 jobs during the year of investment and on average approximately 3,000 jobs yearly during each of the 10 production years.

4.1. Economic impact overview

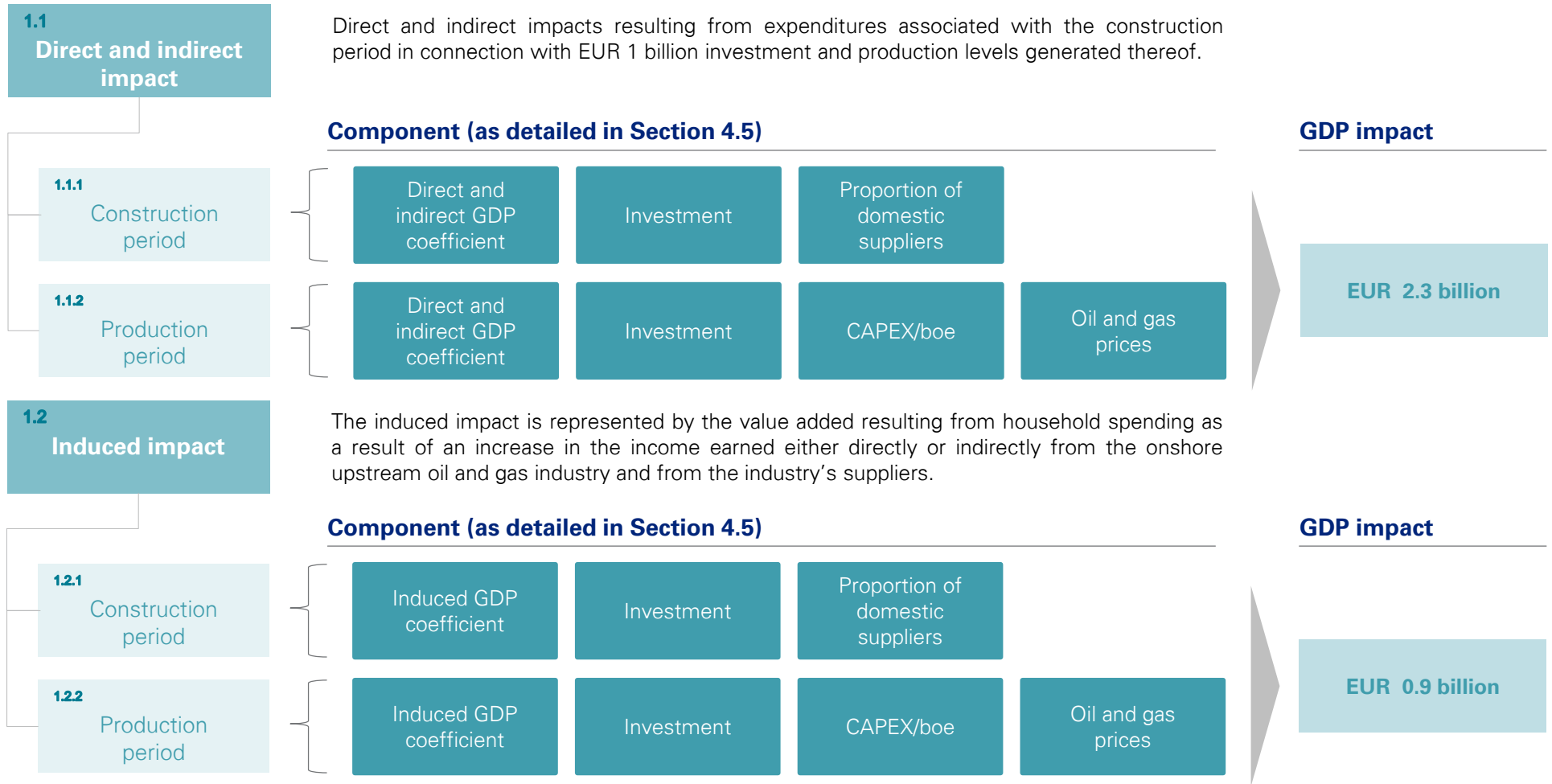
The report demonstrates that an investment of approximately EUR 1 billion in the onshore upstream oil and gas sector generates a significant direct and indirect impact in terms of GDP, employment and government tax contributions and, and by its chain of interdependencies, these effects cascade into other economic sectors, creating a considerable induced impact, as well



4. Economic impact analysis

4.2. GDP impact

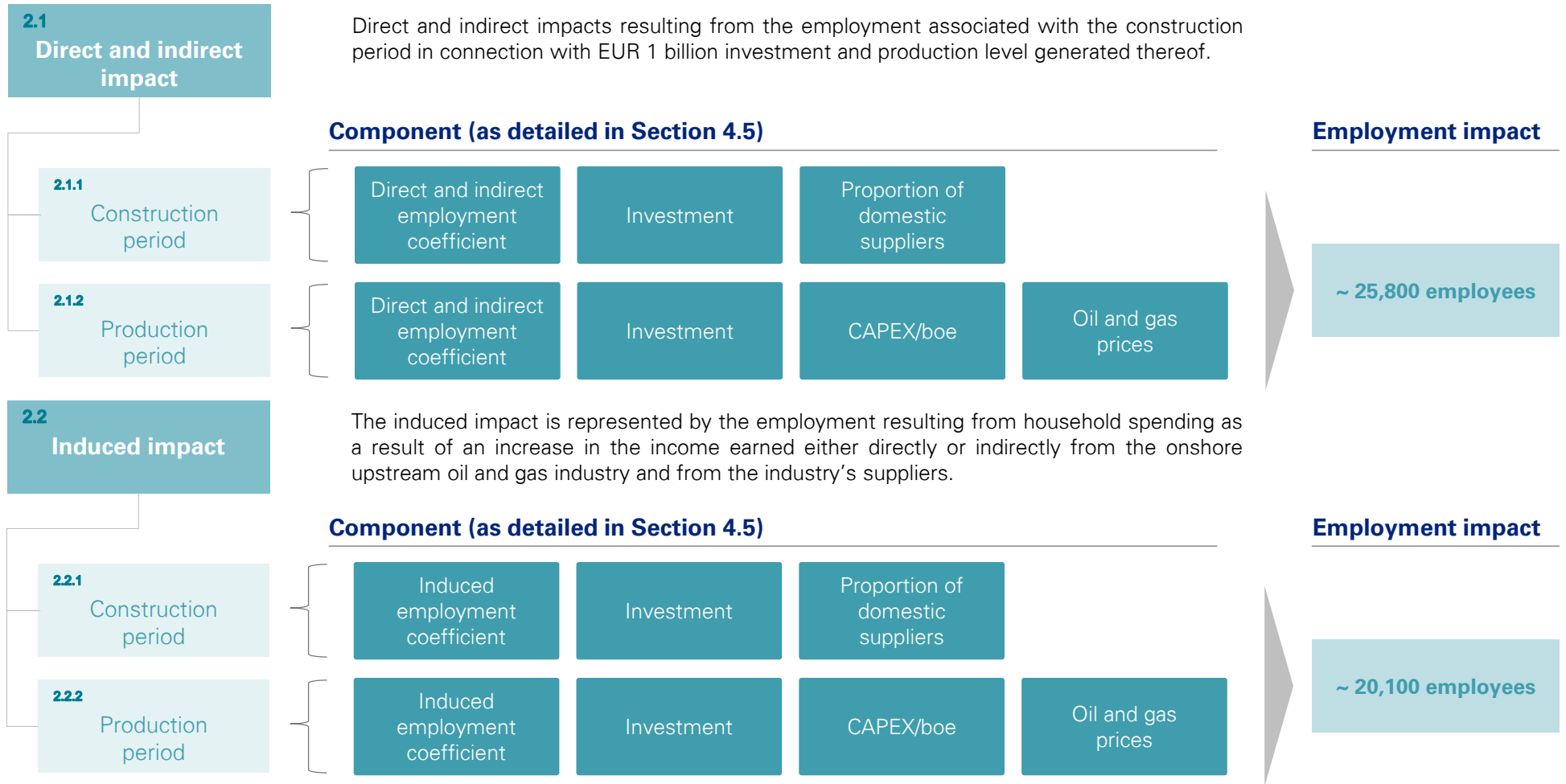
This section presents the estimated direct and indirect as well as induced economic impact of the onshore upstream oil and gas industry on Romanian national GDP during the construction period in connection with EUR 1 billion investment and production levels generated thereof



4. Economic impact analysis

4.3. Employment impact

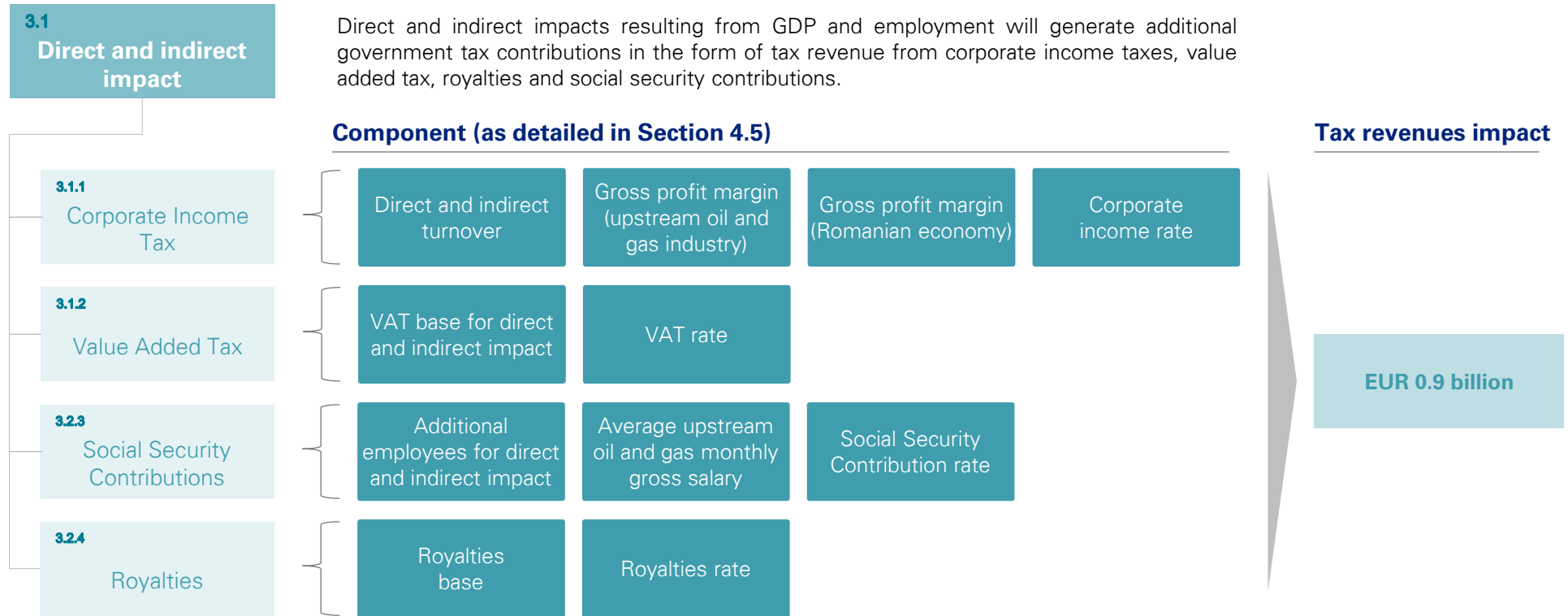
This section outlines the estimated direct and indirect as well as induced economic impact on the employment figures in Romania, which results from an increased demand in the onshore upstream oil and gas industry during the construction period in connection with EUR 1 billion investment and production levels generated thereof



4. Economic impact analysis

4.4. Government tax contributions - direct and indirect economic impact

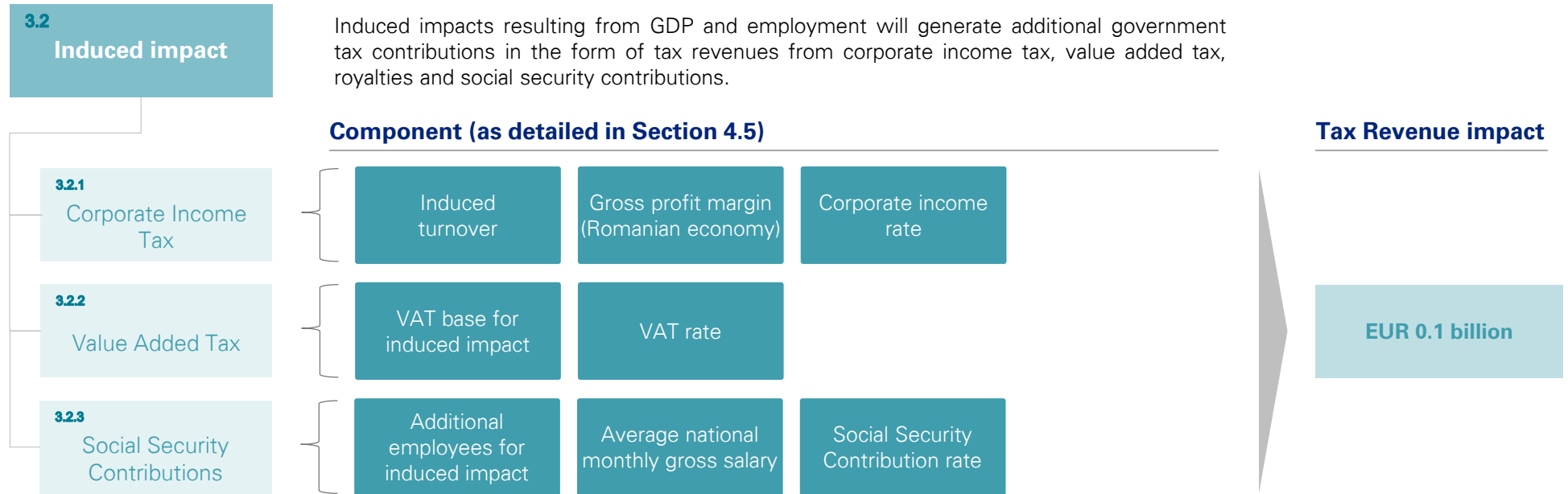
This section presents the estimated direct and indirect economic impact on Governmental Taxes paid by the onshore upstream oil and gas industry and its supply chain to the Romanian State Budget



4. Economic impact analysis

4.4. Government tax contributions – induced economic impact

This section presents the estimated induced economic impact on Governmental Taxes generated by the onshore upstream oil and gas industry and its supply chain and reflected in all economic sectors



4. Economic impact analysis

4.5. Detailed components of impact analysis

This section presents the detailing of the components used for the calculation of the economic impact of the onshore upstream oil and gas industry in Romania

Component	Description	Component	Description
Direct and indirect GDP coefficient	<ul style="list-style-type: none"> Using the Leontief Input-Output methodology (for further details see Section 3), a direct - indirect coefficient of 0.84 was calculated. 	Investment	<ul style="list-style-type: none"> An average of EUR 1 billion, evenly divided between the oil and gas sectors, was considered based on the historical CAPEX level of companies in the onshore upstream oil and gas industry.
Induced GDP coefficient	<ul style="list-style-type: none"> Using the Leontief Input-Output methodology (for further details see Section 3), an induced coefficient of 0.35 was calculated. 	Proportion of domestic suppliers	<ul style="list-style-type: none"> Estimated at a level of 90%, based on the ROPEPCA internal assessment.
Direct and indirect employment coefficient	<ul style="list-style-type: none"> Using the Leontief methodology (for further details see Section 3), a direct and indirect coefficient was calculated, which is 9.53. 	CAPEX/boe	<ul style="list-style-type: none"> The equivalent investment for producing 1 boe was estimated at 30 USD/boe in emerging countries, according to Gazprombank "Oil and gas weekly" report, dated 26 September 2014.
Induced employment coefficient	<ul style="list-style-type: none"> Using the Leontief methodology (for further details see Section 3), an induced coefficient was calculated, which is 7.44. 	Average upstream oil and gas monthly gross salary	<ul style="list-style-type: none"> Estimated at RON 7,050 (EUR 1,587) in the oil and gas industry, based on the latest publicly available INSSE data for November 2014 – October 2015 period.
Direct and indirect turnover	<ul style="list-style-type: none"> Calculated using the total turnover generated by the onshore upstream oil and gas industry and its supply chain corresponding to a EUR 1 billion investment in the onshore upstream oil and gas industry. 	Average national monthly gross salary	<ul style="list-style-type: none"> Estimated at RON 2,510 (EUR 565) at the entire economic level, based on the latest publicly available INSSE data for November 2014 – October 2015 period.
Induced turnover	<ul style="list-style-type: none"> Calculated using the total induced GDP impact generated by the onshore upstream oil and gas industry and its supply chain corresponding to a EUR 1 billion investment in the onshore upstream oil and gas industry. 	Oil and gas prices	<ul style="list-style-type: none"> A sustainable oil price of USD 60/bbl is based on the 2016 and 2017 forecasts provided by EIA and EIU, out of which the Romanian oil price differential was deducted. A sustainable gas price of EUR 18/MWh (USD 34/boe) is based on CEGH yearly futures average prices for the years 2016 and 2017.

4. Economic impact analysis

4.5. Detailed components of impact analysis

This section presents the detailed assumptions used for the computation of economic impact of the onshore upstream oil and gas industry in Romania

Component	Description	Component	Description
VAT base for direct and indirect impact	<ul style="list-style-type: none"> Calculated using the total GDP impact generated in the onshore upstream oil and gas industry and the industry's suppliers deducting the EUR 1 billion investment. 	Additional employees for direct and indirect impact	<ul style="list-style-type: none"> Estimated at approximately 25,800 employees (for further details please see Section 4.3).
VAT base for induced impact	<ul style="list-style-type: none"> Calculated based on the total induced GDP impact generated in the Romanian Economy by the onshore upstream oil and gas industry and its supply chain. 	Additional employees for induced impact	<ul style="list-style-type: none"> Estimated at approximately 20,100 employees (for further details please see Section 4.3).
VAT rate	<ul style="list-style-type: none"> As from January 2016, the VAT rate is 20% according to the Romanian Fiscal Code. 	Social Security Contribution rate	<ul style="list-style-type: none"> Estimated at approximately 58%, both for employer and employee contributions, as derived from the Romanian Fiscal Code.
Corporate income tax rate	<ul style="list-style-type: none"> Set at 16% according to the Romanian Fiscal Code. 	Royalties base	<ul style="list-style-type: none"> Calculated using oil and gas prices and the estimated production level generated as a consequence of a EUR 1 billion investment in the onshore upstream oil and gas industry.
Gross profit margin (Romanian economy)	<ul style="list-style-type: none"> The national average gross profit margin was estimated at 2.64% based on the information provided by INSSE for 2013, the latest available year. 	Royalties rate	<ul style="list-style-type: none"> Estimated average rate at 7.3% for the upstream oil and gas industry based on Romgaz's 2014 Annual Report and Petrom's 2014 Annual Financial Statements.
Gross profit margin (upstream oil and gas industry)	<ul style="list-style-type: none"> Estimated at 34.4% for the upstream oil and gas industry based on Romgaz's 2014 Annual Report and Petrom's 2014 Annual Financial Statements. 	Exchange rate	<ul style="list-style-type: none"> The average exchange rates for 2015 of 1.11 USD/EUR and 4.44 RON/EUR were used, as reported by the European Central Bank.



Appendix

List of abbreviations and conversion factors

List of abbreviations

ANRE	Romanian Energy Regulatory Authority	EU	European Union
ANRM	Romanian National Authority for Mineral Resources	EUR	European Union monetary unit
bbl	Barrel	GDP	Gross Domestic Product
boe, mboe	Barrel of oil equivalent, million barrels of oil equivalent	INSSE	National Institute of Statistics and Economic Studies
CAGR	Compound Annual Growth Rate	mn	Million
CAPEX	Capital Expenditure	MWh	Megawatt per hour
CEE	Central and Eastern Europe	OPEX	Operational Expenditure
CEGH	Central European Gas Hub		Romanian Petroleum Exploration and Production Companies Association
GO	Governmental Ordinance	ROPEPCA	
EIA	Energy Information Administration	TWh	Terrawatt per hour
EIU	Economist Intelligence Unit	USD	United States monetary unit
		VAT	Value Added tax

Conversion factors

1 mtoe	=	7.19 mboe	1 TWh	=	0.09 bcm
1 bcm	=	6.54 mboe	1 bcm	=	10.79 TWh
1 mtoe	=	1.10 bcm	1 MWh	=	0.61 boe
1 boe	=	0.15 mcm			



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