

The Future for the World Market of Hydrocarbons and MENA

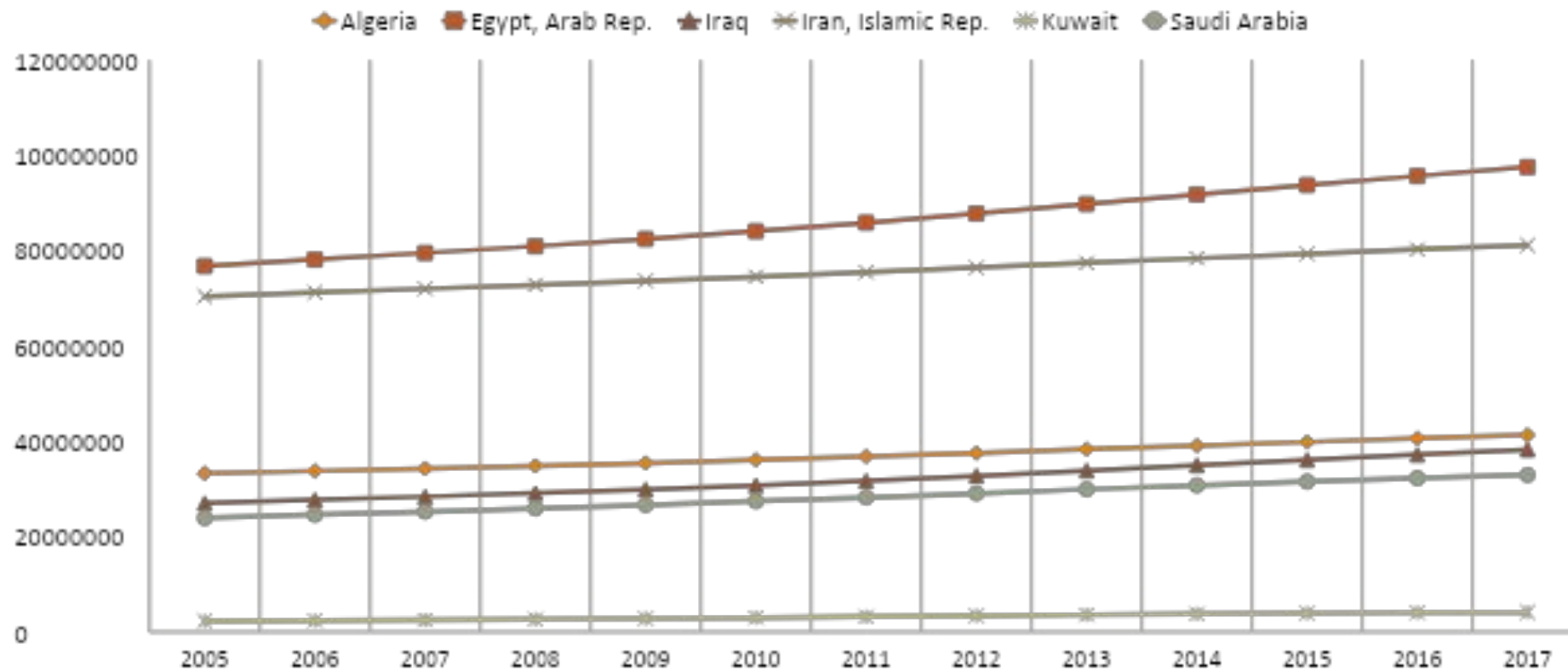
20 of March 2019

Professor Leonid Grigoryev

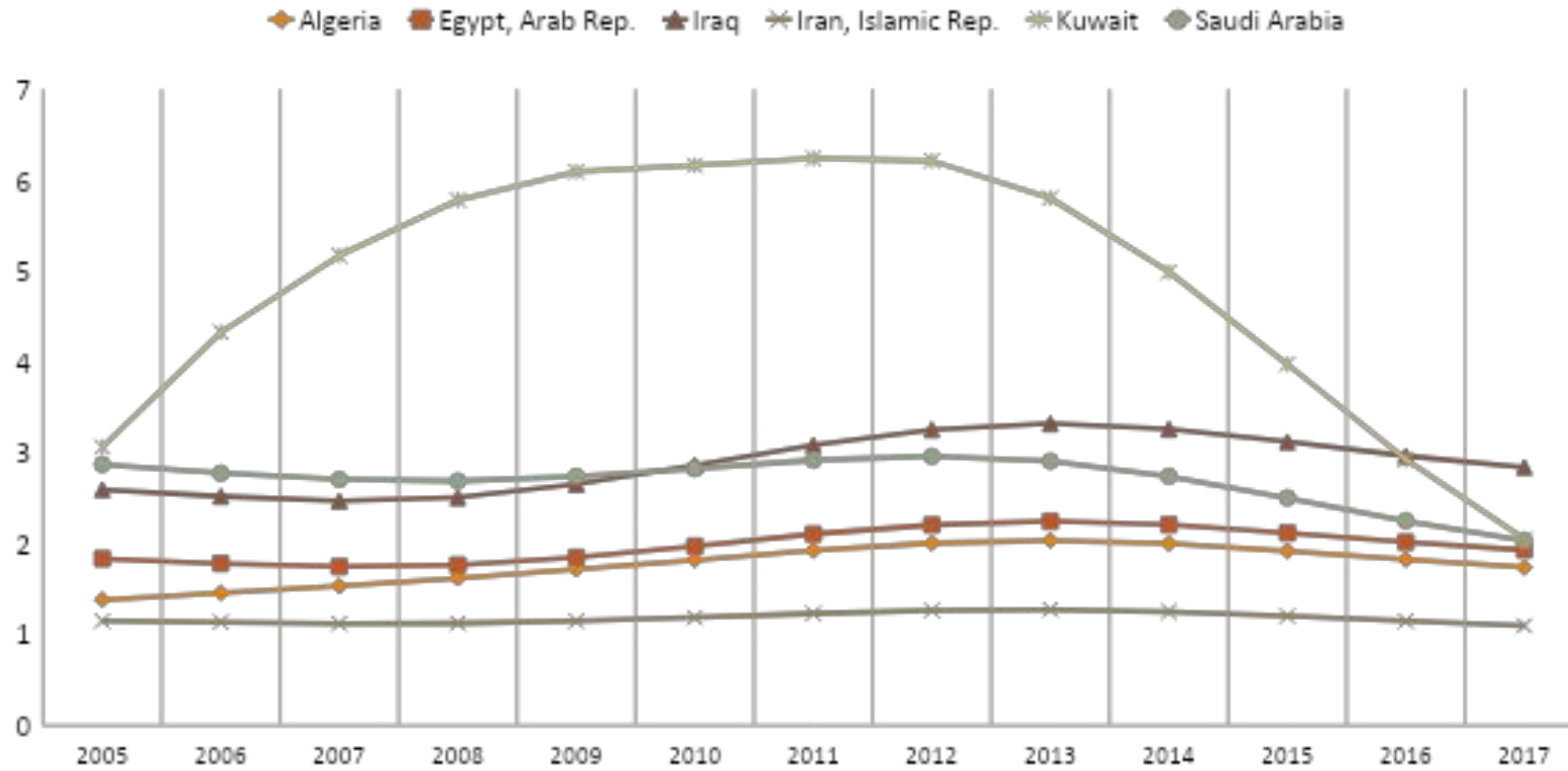
WWW.LEONIDGRIGORYEV.COM

MENA – key countries

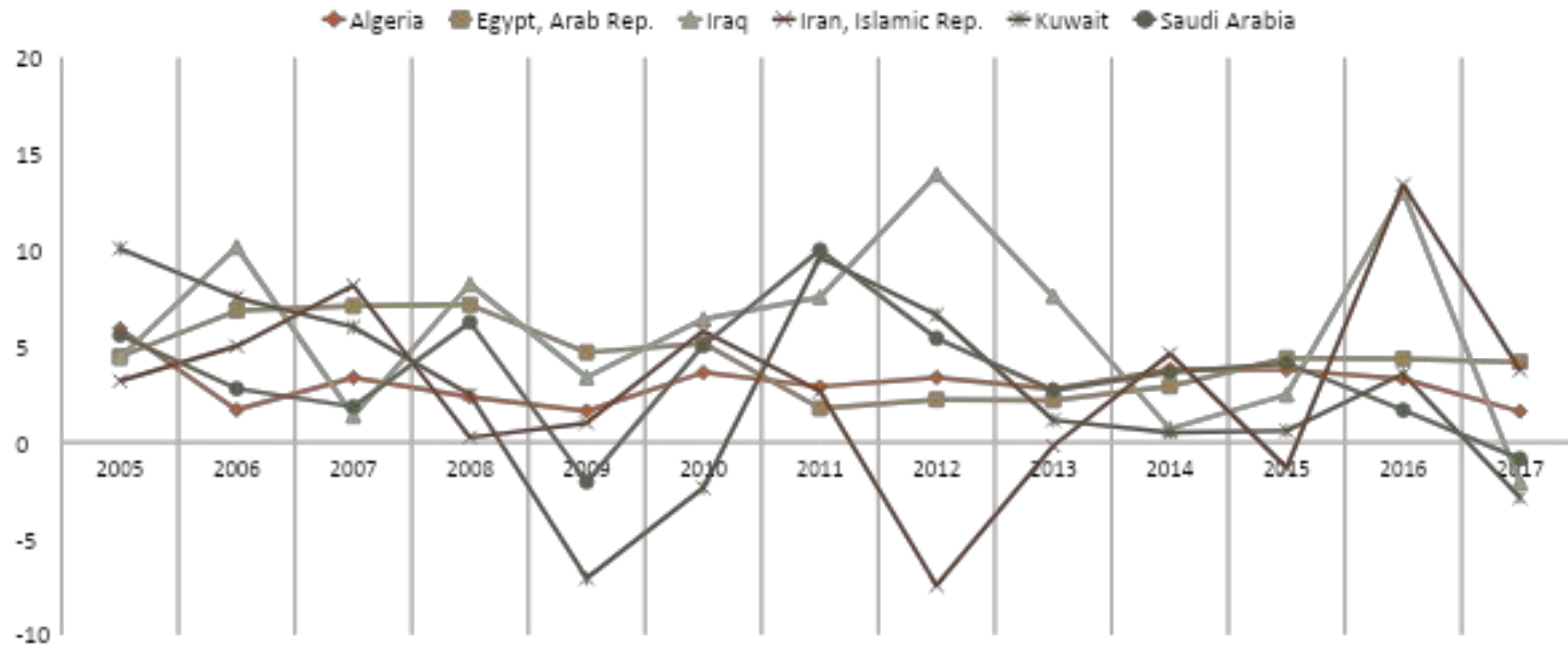
Population total, 2005-2017



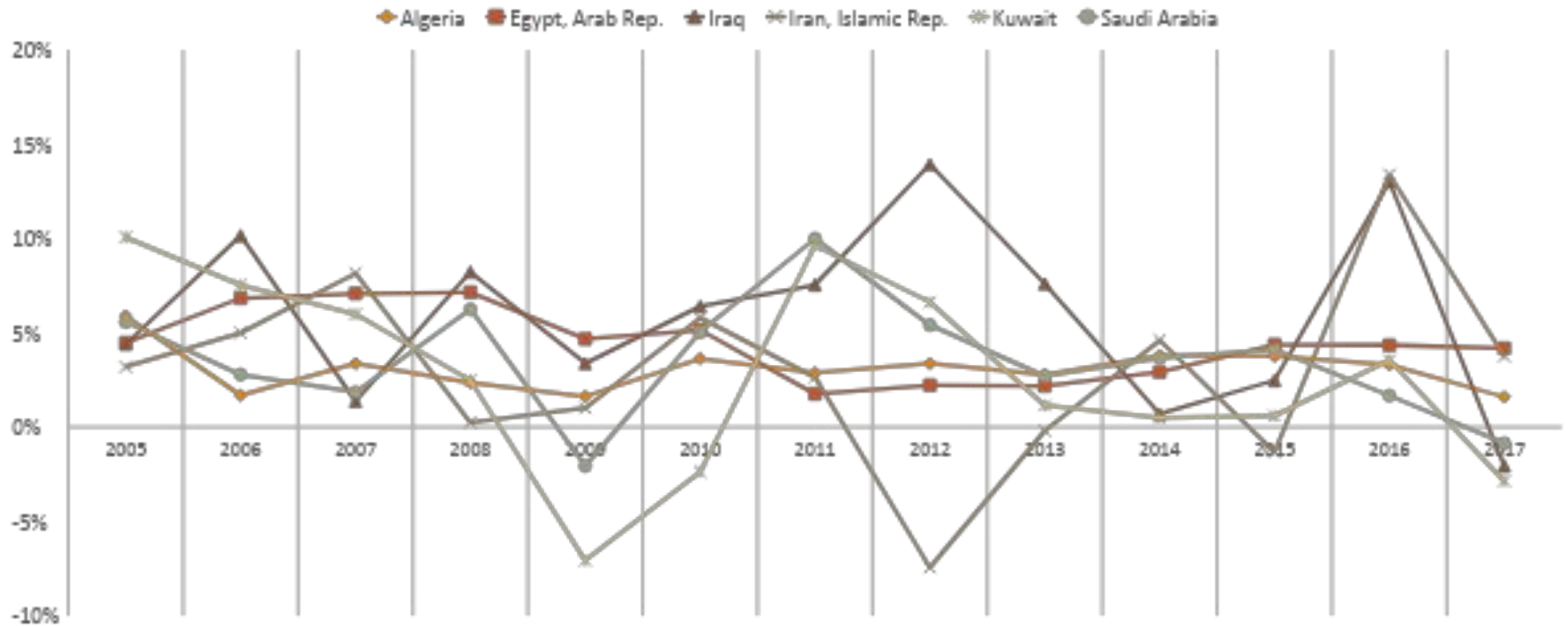
Population growth, 2005-2017 (annual %)



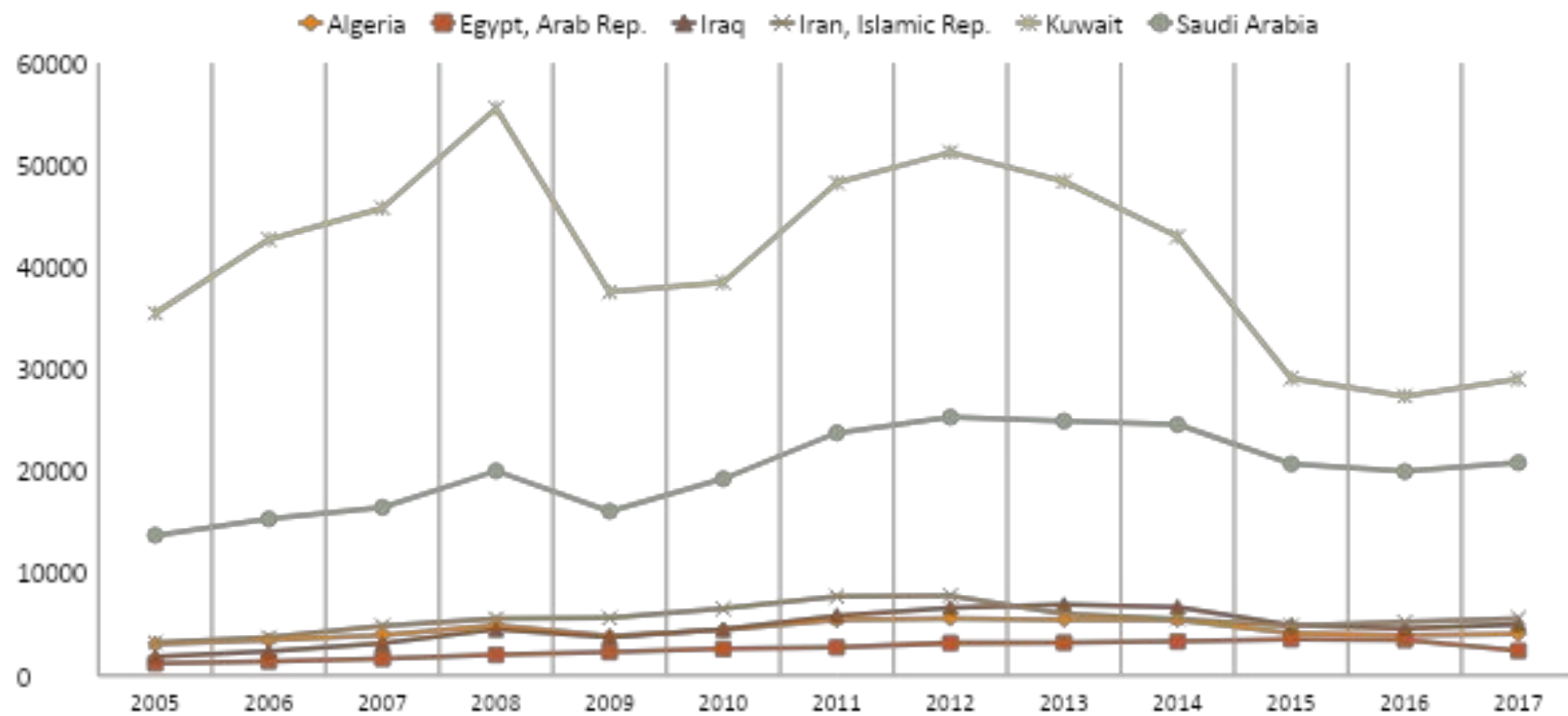
GDP nominal growth, 2005-2017 (annual %)



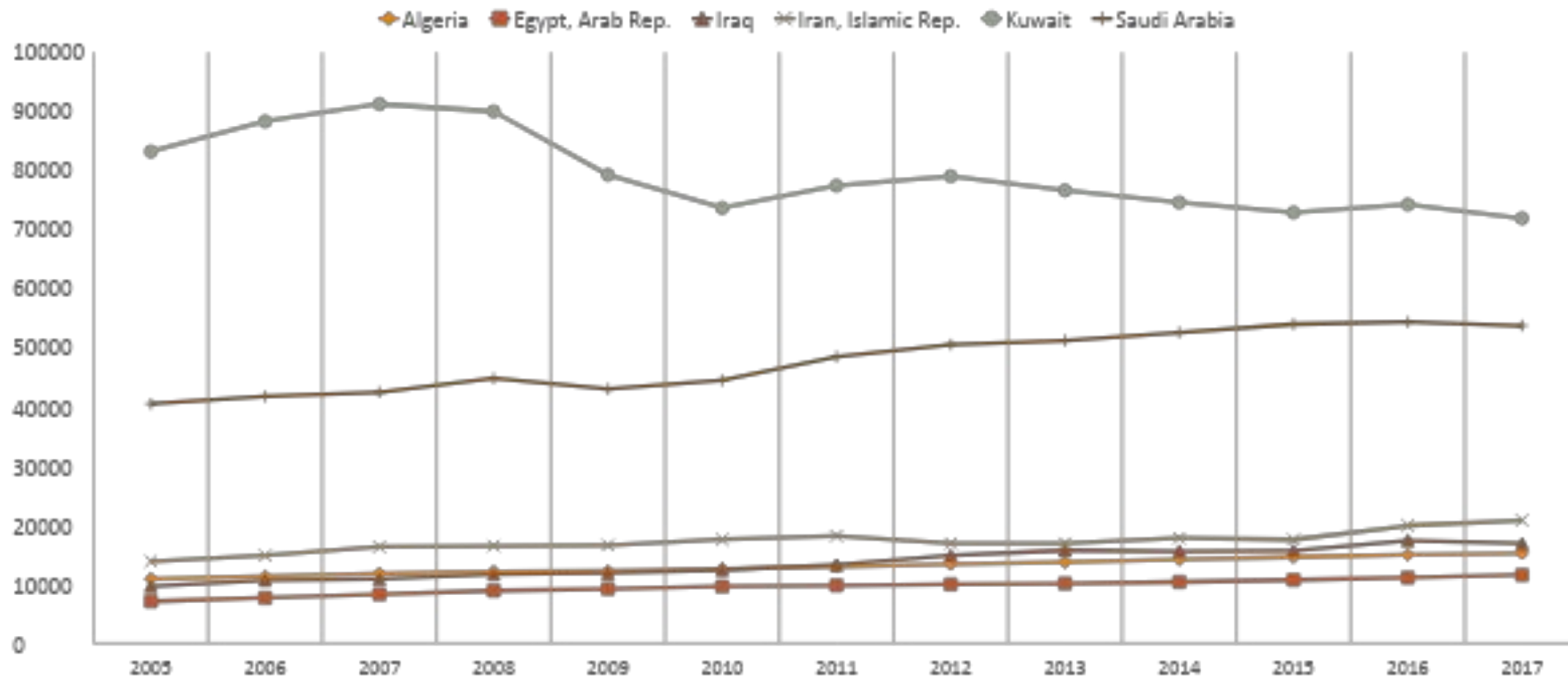
GDP growth, constant 2010 US\$ (annual %)



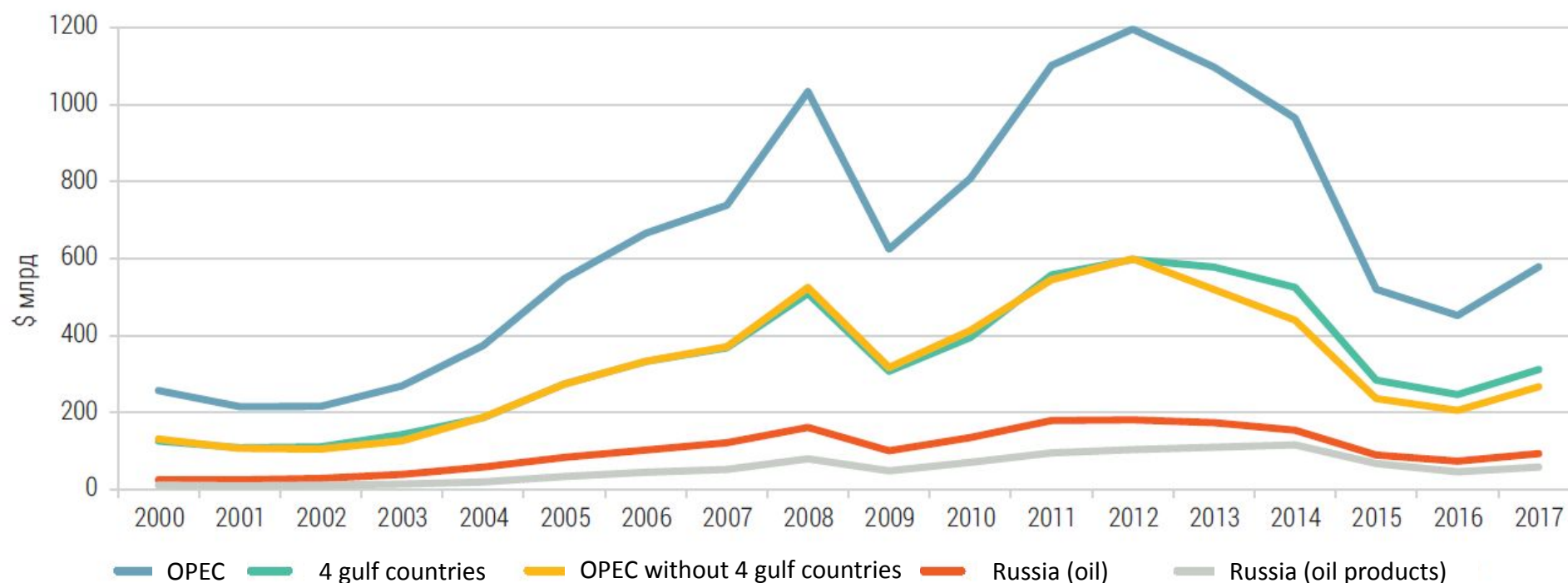
GDP per capita, 2005-2017 (current US\$)



GDP per capita, PPP (current international \$)



Export Incomes in OPEC countries and Russia, bln. \$, 2000-2017



Источник: Аналитический центр при Правительстве РФ

Conclusions

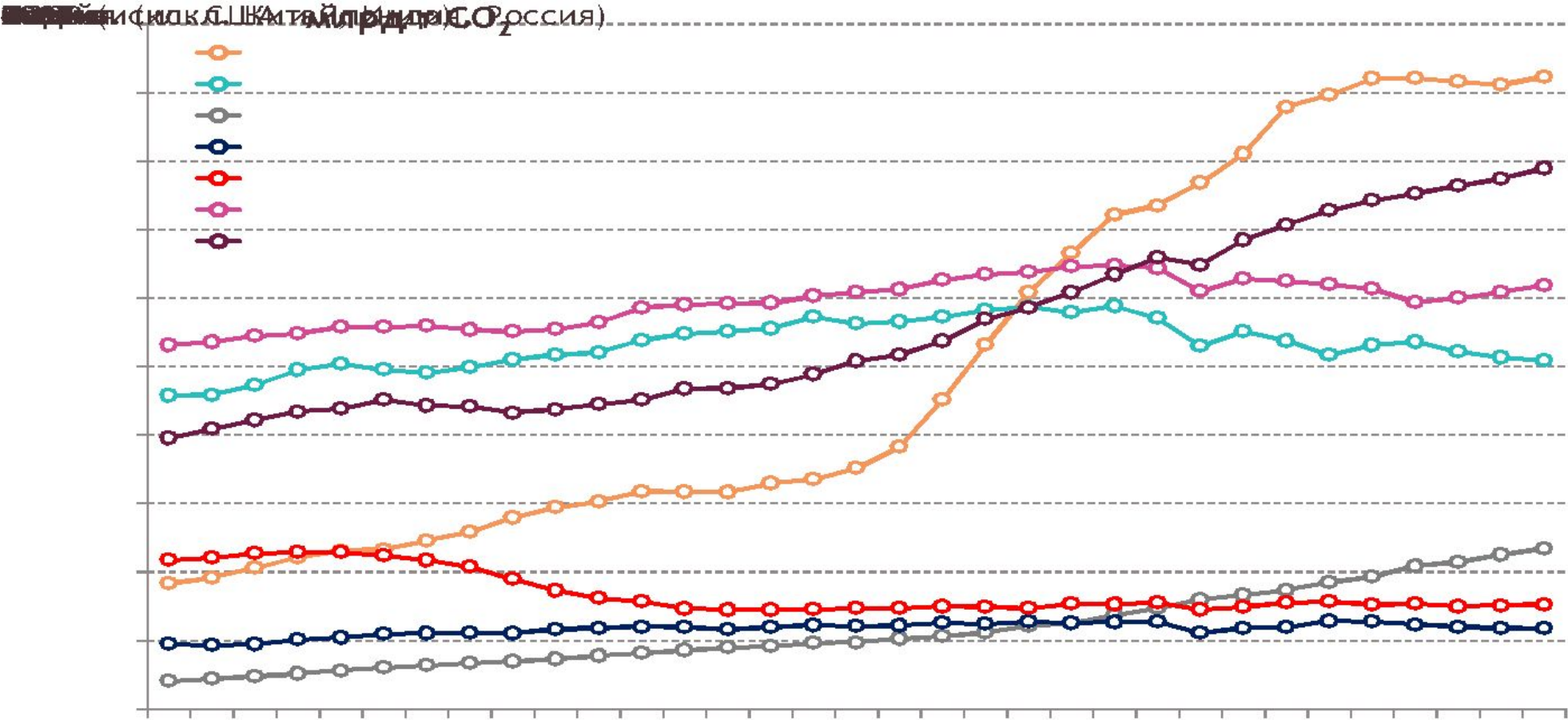
- Oil prices of \$55 - \$70 helped to Global growth restoration in 2016-2018.
- Global forecast for 2040 is still open page. May be 110 mbd. of oil extraction.
- Incomes are more important than records of output.
- Energy transition is inevitable, but speed and scope are not rigid.
- Investments needs for transition, reducing energy poverty are huge.
- China, India and Africa are still in coal...
- Emission of GHG is still growing, Paris 2015 is to be reviewed soon.
- OPEC+ - to reinvest export incomes into development, beware demography.

World Energy Transition and Future

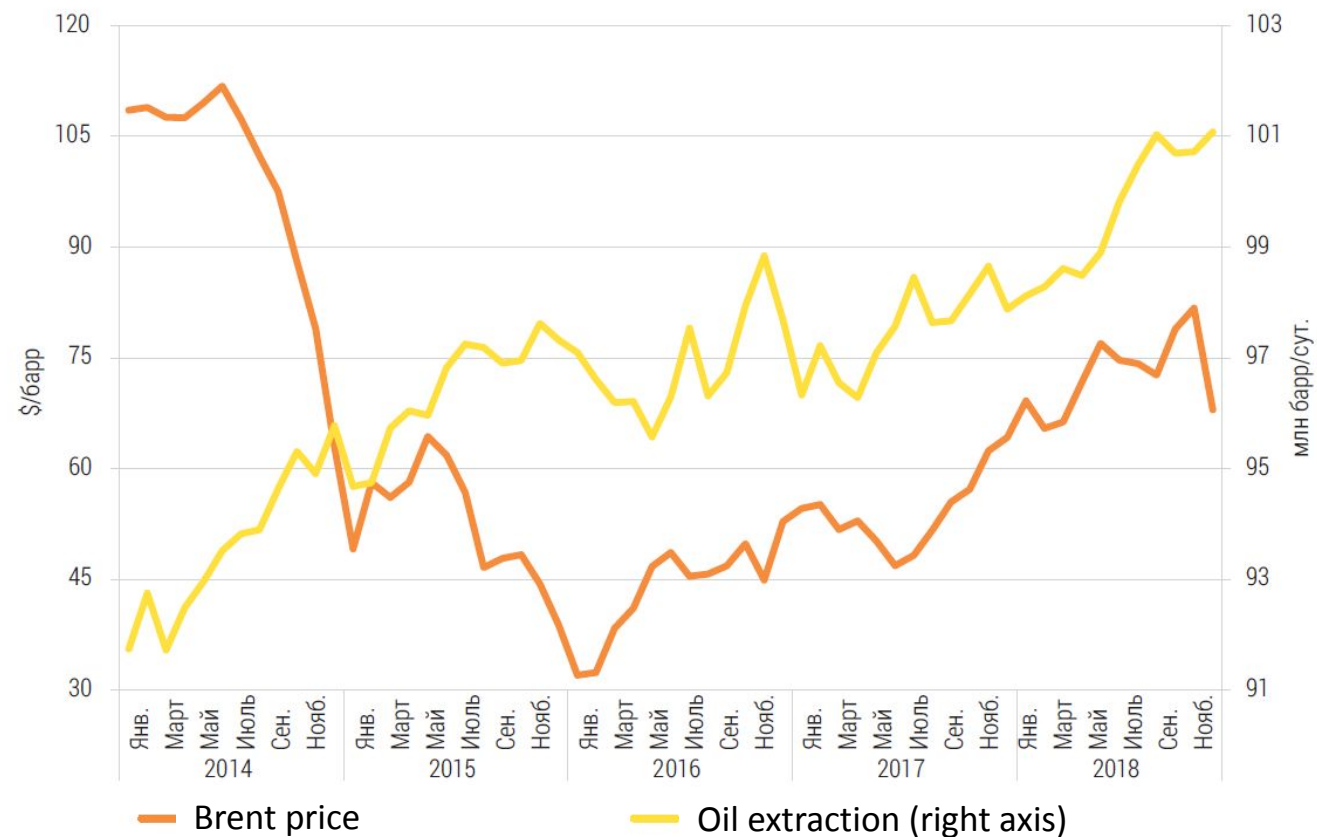
- World is undergoing Energy transition, but still not that fast as Green people hope.
- Current oil prices are secured the Global Growth in 2016-2018.
- Car are still mostly non-electric in stock and in annual sales.
- Energy sector and any changes in its structure require huge investments.
- One mbd a day per year = looking to 100 mbd in 2019.
- Climate Change prevention V Energy Poverty and Development needs ...
- American oil takes quite a bite from others in 2018.
- Prices are stable due to growing demand and decline of output.
- Sanctions as a factor of pricing – Fall of 2018.
- Stability of pricing corridor depends on coordination – to assure price wars avoidance.

Current situation

Carbon Dioxide Emissions, 1985-2017

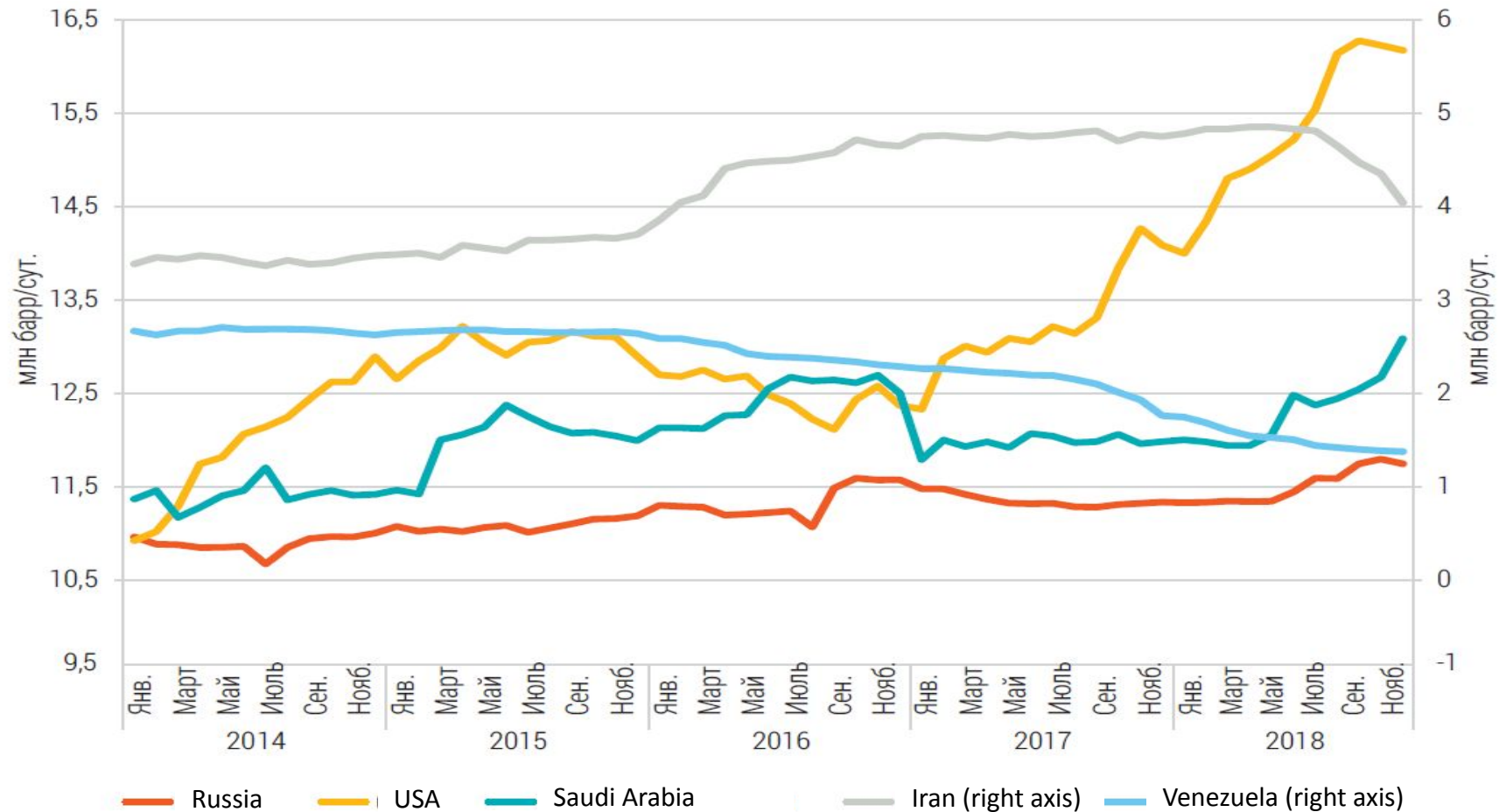


Oil Prices and World Oil Extraction, 2014-2018



Источник: Аналитический центр при Правительстве РФ

Oil Extraction by countries, 2014-2018



Источник: Аналитический центр при Правительстве РФ

Oil Production and Exports by country, 2016

	Oil production	Exports
USA	11,7%	1,1%
Russia	13,6%	11,5%
Saudi Arabia	13,8%	16,9%
OPEC	44,1%	56,6%

Source: OPEC Annual Statistical Bulletin

Oil Production and Consumption, 2017, million barrel a day

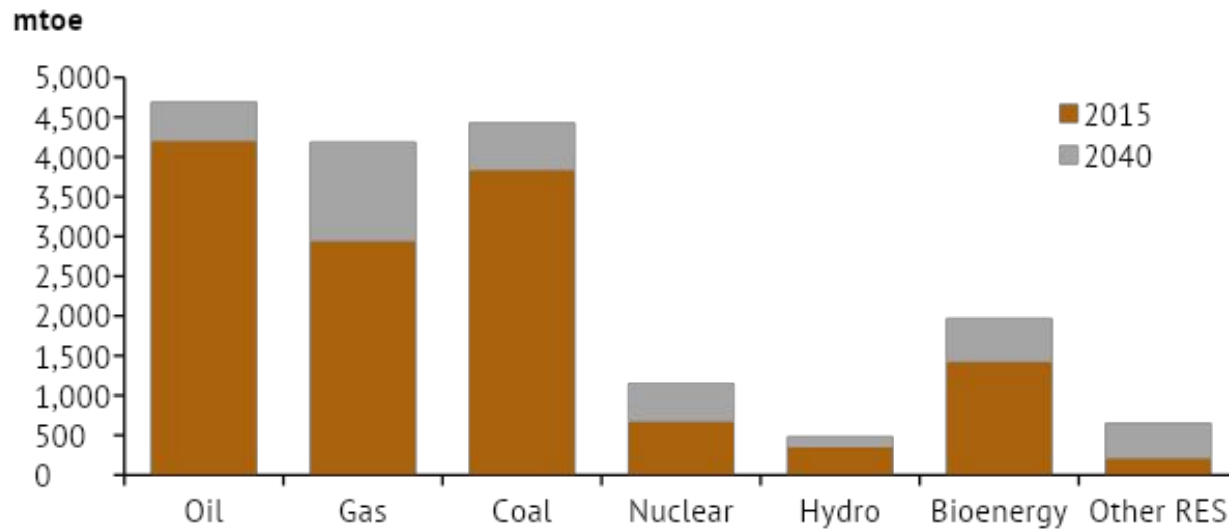
Consumers	Consumption volumes, mln barrel a day	Producers	Production volumes, mln barrel a day
USA	19,9	USA	13,2
Europe (OECD)	14,4	Saudi Arabia	12
China	12,5	Russia	11,4
India	4,7	Canada	4,8
Japan	3,9	Iran	4,7
Russia	3,6	Iraq	4,6
Saudi Arabia	3,2	China	3,9
Brazil	3,1	United Arab Emirates	3,8
Korea	2,7	EU	3,5
Canada	2,4	OPEC	39,2
World	97,8	World	97,4

Source: International Energy Agency

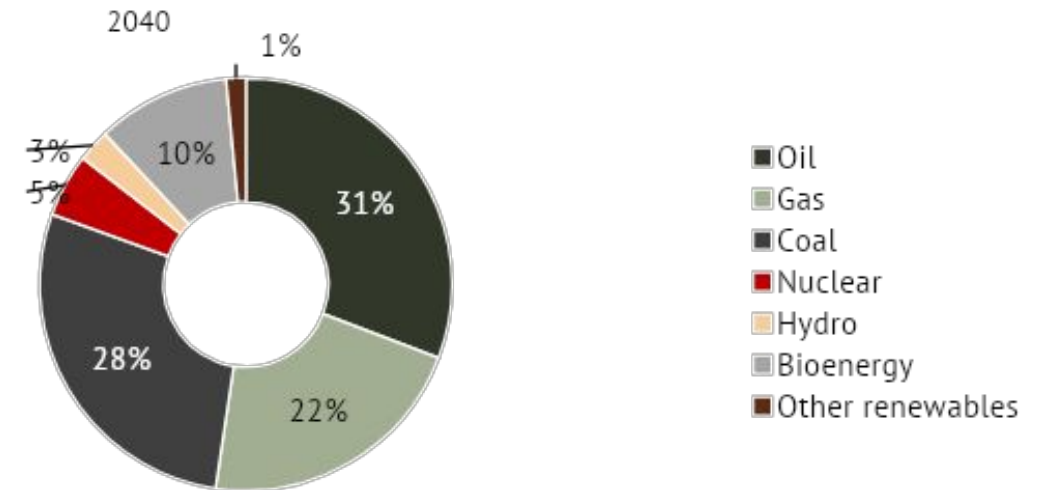
Global Balance and Future

Global fuel mix is becoming more diversified, gas and RES are demonstrating the highest growth (2016)

**Primary energy demand by fuel
(in 2015 and increase by 2040),
Probable Scenario**

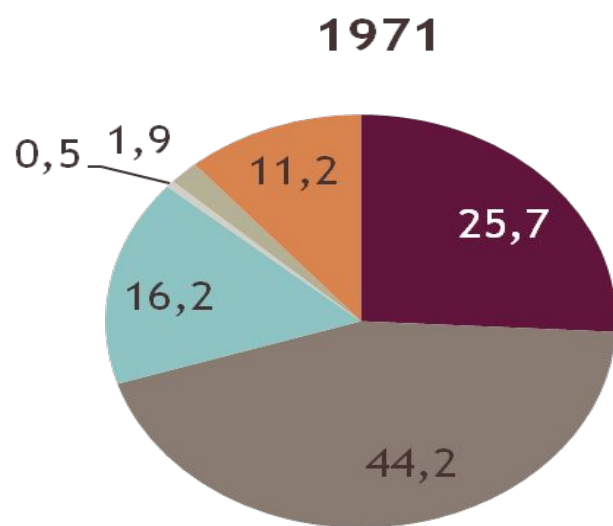


**Structure of primary energy demand by fuel in 2015 and in
2040, Probable Scenario**

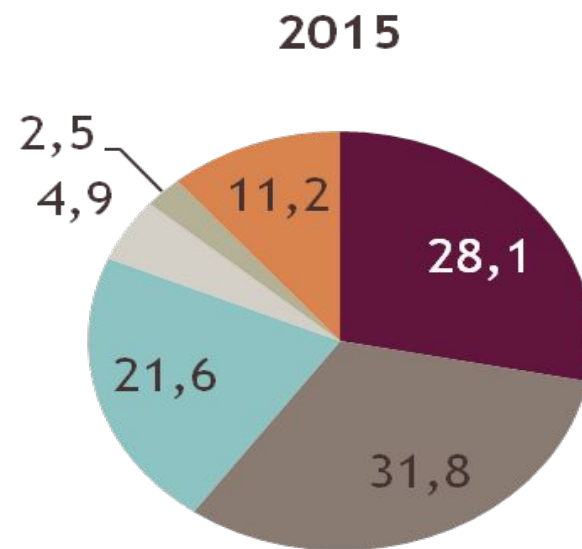


Source: Global and Russian Energy Outlook-2016, ERI RAS-AC

The Structure of World Energy Consumption, 1971 and 2015, % total consumption

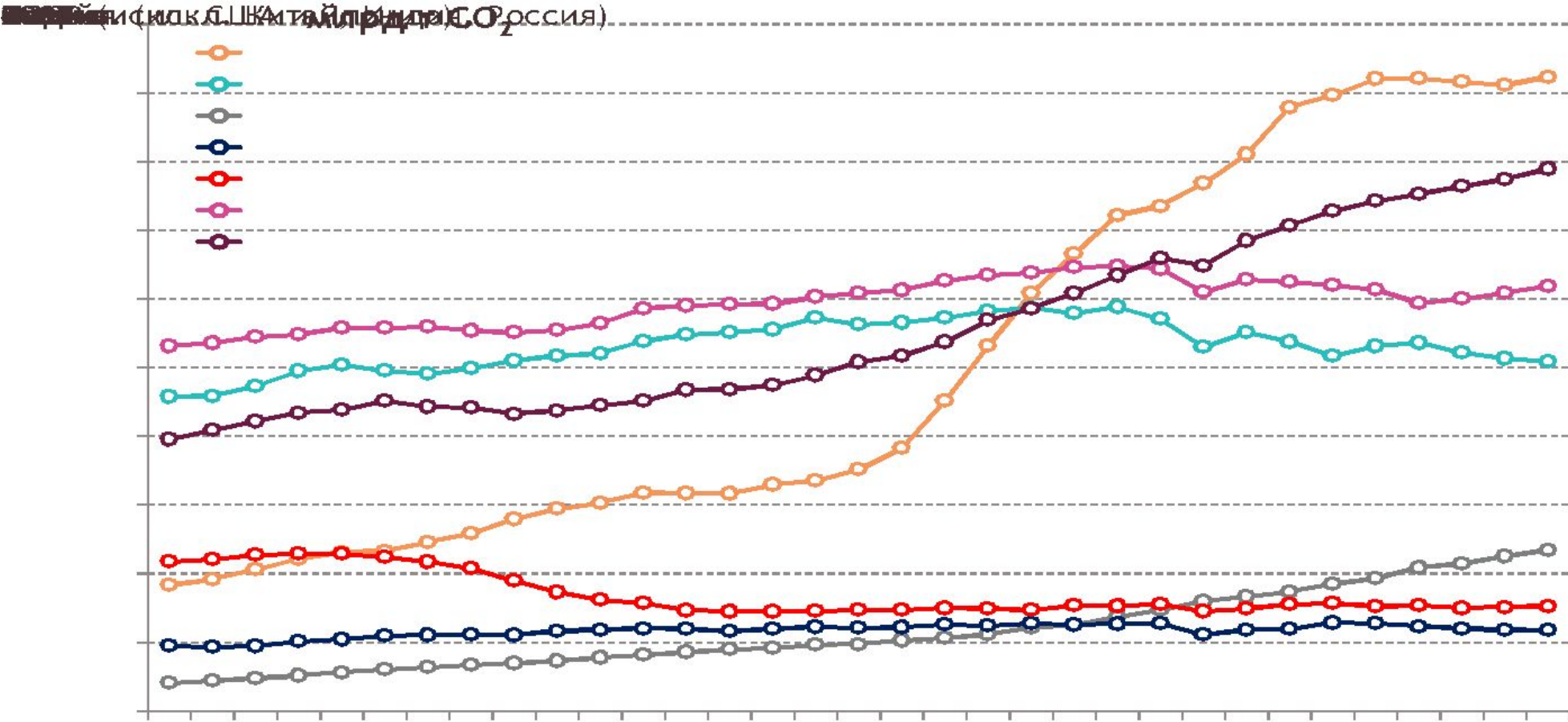


- Coal
- Natural gas
- Hydro

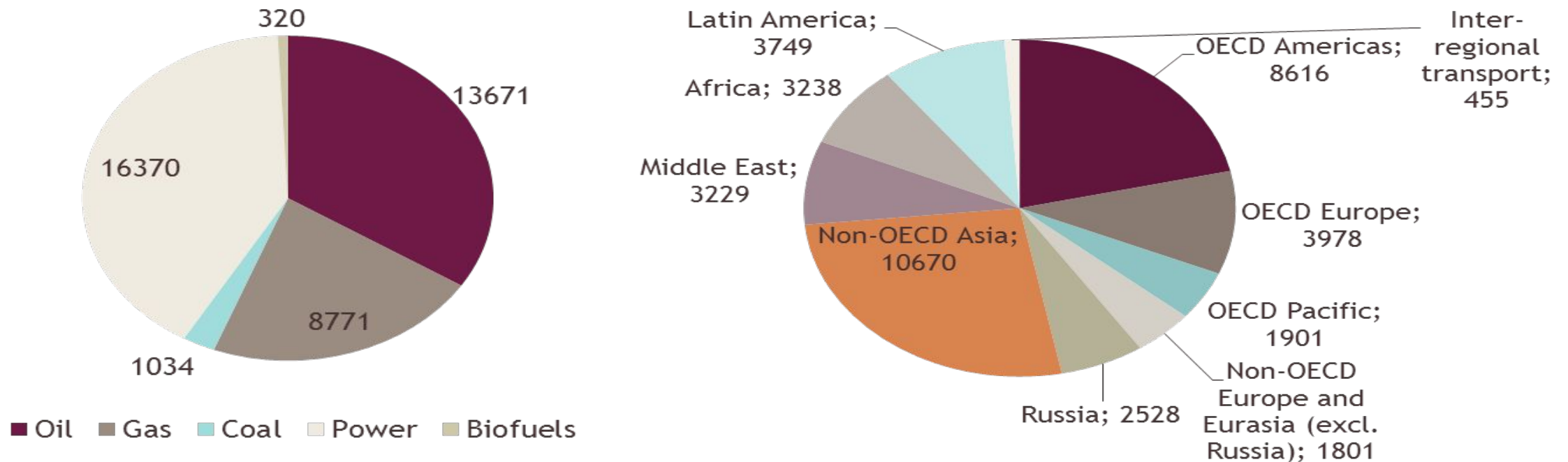


- Oil and oil products
- Nuclear energy
- Renewable energy sources

Carbon Dioxide Emissions, 1985-2017



Global Energy Supply Investment in 2014 – 2035, IEA estimate (2014), bln USD-2012, by industry, by region



Total: 40 165 bln USD (year-2012 prices)

Source: IEA, World Energy Investment Outlook 2014

GDP and Primary Energy Consumption, annual growth rates, 1991 - 2017

	GDP (PPP const. 2011, World Bank)				Primary energy consumption			
	1991-2002	2003-2008	2009	2010-2017	1991-2002	2003-2008	2009	2010-2017
World	3,0	4,7	-0,4	3,5	1,6	3,2	-1,6	1,6
OECD	2,7	2,4	-3,5	2,0	1,4	0,5	-4,8	0,1
USA	3,4	2,2	-2,8	2,1	1,4	0,1	-4,8	0,0
EU	2,3	2,5	-4,3	1,5	0,4	0,1	-5,8	-0,7
Japan	0,9	1,2	-5,4	1,1	1,2	0,0	-8,6	-1,4
Non-OECD	3,5	7,6	3,0	4,9	1,8	6,1	1,4	2,7
Brazil	2,6	4,8	-0,1	0,4	3,5	4,4	-0,6	1,6
Russia	-2,2	7,1	-7,8	1,4	-2,8	1,3	-4,7	0,6
India	5,8	8,0	8,5	6,8	4,4	6,6	7,5	4,9
China	10,2	11,6	9,4	7,6	4,5	10,5	4,4	3,3
Energy consumption (p. %) minus GDP (p.%)								
World					-1,4	-1,5	-1,2	-1,9
OECD					-1,3	-1,8	-1,4	-1,9
Non-OECD					-1,7	-1,4	-1,6	-2,1

Oil and Gas Consumption, annual growth rates, 1991 - 2017

	Oil consumption				Gas consumption			
	1991-2002	2003-2008	2009	2010-2017	1991-2002	2003-2008	2009	2010-2017
World	1,4	1,5	-1,7	1,3	2,1	3,3	-2,8	2,1
OECD	1,2	-0,3	-4,9	0,0	2,6	1,6	-3,2	1,2
USA	1,5	-0,5	-4,6	0,4	1,5	0,9	-1,8	1,9
EU	0,5	-0,1	-5,3	-0,9	2,6	0,9	-6,3	-1,6
Japan	-0,1	-2,2	-10,4	-1,6	3,3	3,3	-6,7	2,4
Non-OECD	1,6	4,0	2,2	2,7	1,5	5,2	-2,4	2,8
Brazil	3,4	4,2	0,2	1,4	14,5	9,6	-19,5	4,6
Russia	-6,1	1,2	-4,1	1,5	-1,1	1,9	-5,5	0,1
India	6,1	4,4	5,1	4,9	6,8	7,1	20,9	-1,3
China	6,7	6,5	3,8	4,2	5,9	19,1	10,1	12,0
Oil / Gas consumption (poins %) minus GDP (points %)								
World	-1,6	-3,1	-1,3	-2,1	-0,9	-1,4	-2,4	-1,4
OECD	-1,5	-2,7	-1,4	-2,0	-0,1	-0,8	0,4	-0,7
Non-OECD	-1,8	-3,4	-0,8	-2,1	-1,9	-2,3	-5,2	-2,0

*Calculated index

Source: World Bank, BP

Coal consumption and Electricity generation, annual growth rates, 1991 - 2017

	Coal consumption				Electricity generation			
	1991-2002	2003-2008	2009	2010-2017	1991-2002	2003-2008	2009	2010-2017
World	1,1	5,3	-1,5	0,5	2,7	3,8	-0,8	2,4
OECD	0,4	0,3	-10,5	-2,8	2,2	1,6	-4,0	0,0
USA	1,3	0,1	-12,0	-5,6	2,1	1,2	-4,2	-0,4
EU	-2,7	-1,8	-11,9	-2,5	1,6	0,9	-4,9	-0,3
Japan	2,7	2,4	-15,5	0,6	1,8	1,6	-5,9	-1,8
Non-OECD	1,8	8,4	2,9	1,7	3,5	6,9	2,9	4,6
Brazil	1,1	1,4	-19,3	1,9	3,6	4,9	0,7	2,0
Russia	-4,3	-0,7	-8,5	0,3	-1,6	2,6	-4,5	0,7
India	3,6	7,4	8,3	5,6	6,0	5,4	6,2	6,9
China	3,6	10,7	4,8	1,1	8,5	12,8	6,3	6,4
Coal consumption / Electricity generation (p %) minus GDP (p %)								
World	-1,9	0,5	-1,2	-2,9	-0,4	-0,9	-0,4	-1,1
OECD	-2,3	-2,1	-7,3	-4,7	-0,5	-0,8	-0,5	-1,9
Non-OECD	-1,6	0,7	-0,1	-3,0	0,0	-0,6	-0,1	-0,2

*Calculated index

Source: World Bank, BP

Global Energy Balance

mln tons, 2015

	Production	Import	Export	Stocks (reserves) change	Consumption	The share in consumption%
Coal	3865,0	791,7	820,3	-7,1	3829,2	28,1
Oil and oil products	4416,3	3562,1	3612,7	-31,3	4334,3	31,8
Natural gas	2975,7	868,7	883,4	-17,2	2943,7	21,6
Nuclear energy	670,7	0,0	0,0	0,0	670,7	4,9
Hydropower	334,4	0,0	0,0	0,0	334,4	2,5
Renewable energy sources (except hydro)	1519,6	20,7	16,6	0,3	1524,0	11,2
Total	13790,0	5307,9	5395,5	-55,1	13647,4	100,0

Literature 1

1. Григорьев Л.М., Чапыгина А.В. «Саудовская Аравия – нефть и развитие», «Мировая Энергетическая политика», №7, 2002.
2. Григорьев Л.М., Крюков В.А. «Мировая энергетика на перекрестке дорог: какую дорогу выбрать России?» - «Вопросы экономики», №12, 2009.
3. Россия, Газпром и Центральная Азия-Центр: интересы и отношения. В “Russian Energy Security and Foreign Policy”, Ed. By A. Dellecker and Th. Gomart, London and New York, IFRI, Routledge, 2011, стр.147-169.
4. «Энергетические субсидии в современном мире». Страны «Группы двадцати», под редакцией Л. М. Григорьева, А. А. Курдина –, АЦ, 2014.
5. Григорьев Л.М., Курдин А.А. «Дисбаланс нефтяного рынка: технологии, экономика, политика.» - «Энергетическая политика», №1, 2015.
6. «Прогноз энергетики мира и России до 2040 года», Научный руководитель А.А.Макаров, Т.А.Митрова, Л. М.Григорьев и др. ИНЭИ РАН и АЦ, М. 2016.
7. Л.М.Григорьев , «Бочки миллиардов», «Нефтегазовая вертикаль», январь 2019, стр. 74-79.

Literature 2

- “Domestic Debates on Climate in Russia”, L.Grigoryev, I.Makarov, A.Salmina, “Climate Change, Sustainable Development, and Human Security”, Ed. Dhirendra K. Vajpeyi, Lexington Books, 2013, chap. 9, pp. 249-280.
- 2018 Outlook for Energy: A View to 2040 [online] IEA: <http://cdn.exxonmobil.com/~/media/global/files/outlook-for-energy/2018/2018-outlook-for-energy.pdf>.
- Макаров И.А., Соколова А.К. «Оценка углеродоемкости внешней торговли России», «Экономический журнал ВШЭ», №3, 2014.
- I.Makarov and A. Sokolova “Carbon Emissions Embodied in Russian trade: implications for Climate Policy” - Review of European and Russian Affairs 11 (2), 2017.