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Atomexpo

Nuclear Power – Impulse for BRICS Countries Development

Atomexpo 2015

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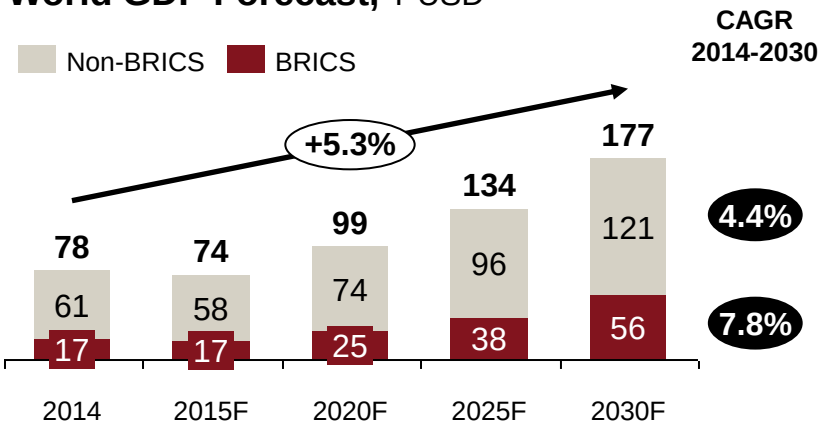
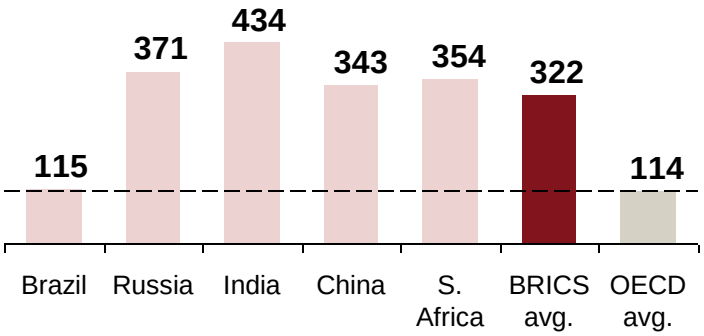
Being a locomotive of world economy BRICS countries are characterized by a very high energy intensity of GDP

World GDP Forecast, T USD



BRICS Energy Intensity, toe / M USD of GDP[1]



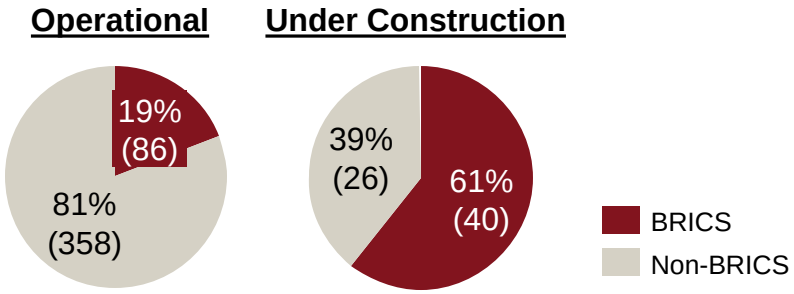
Source: Oxford Economics, International Energy Agency, World Nuclear Association
1) 2012 data

Comments

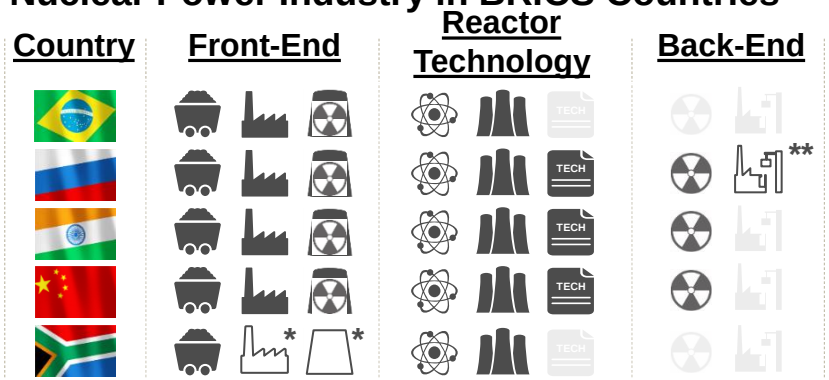
- Within the next 15 years BRICS countries will be a locomotive of the world GDP with the **average growth rate of ~8%**
- On average BRICS economies are almost **3 times more energy intense** than economies of OECD countries
- BRICS energy agenda is **critical for both the successful development** of these countries and the world economy

All BRICS countries have experience in nuclear sector and account for 2/3 of new reactors under construction

World Nuclear Reactors, #, 2015



Nuclear Power Industry in BRICS Countries



- mining - conversion/enrichment - fabrication - research reactors - power reactors - technology - used fuel reprocessing - decommissioning

Source: World Nuclear Association, press research, Strategy& analysis
** Previously South Africa had enrichment and fabrication facilities but the operations were discontinued*
*** Works started on Beloyarskaya NPP but currently put on hold*

Comments

- More **than 60% of the new world's nuclear reactors** are constructed in BRICS countries
- All BRICS countries have **experience in nuclear sector…**
- …but are characterized by **different scale and position** in the global marketplace

BRICS countries have successfully passed the Fukushima "test" and confirmed their commitment to nuclear energy

BRICS View on Nuclear Energy after the Fukushima Accident – Examples

Nuclear energy will continue to be an **important element in future energy mix** of BRICS countries.

BRICS Sanya Summit Declaration

Nuclear power is an important **driver** for the national economic growth.

Energy Minister of South Africa

Russia **will continue developing** nuclear power industry but taking into consideration the lessons of Fukushima.

Rosatom General Director

I do not see any reasons to give up plans to construct new nuclear power generating units.

Minister of Mines and Energy of Brazil

The accident at Japanese nuclear power plant was quite serious and we are in touch with international organizations, but there is **no need for panic or for stopping** our nuclear infrastructure development.

Executive Director of the Nuclear Power Corp.

China **would not swerve** from its goal of greater reliance on nuclear power.

Vice-Director of NDRC

Note: not direct quotes
Source: press search, Strategy& analysis

Nuclear power industry offers BRICS countries numerous advantages and benefits

Important part of energy balance

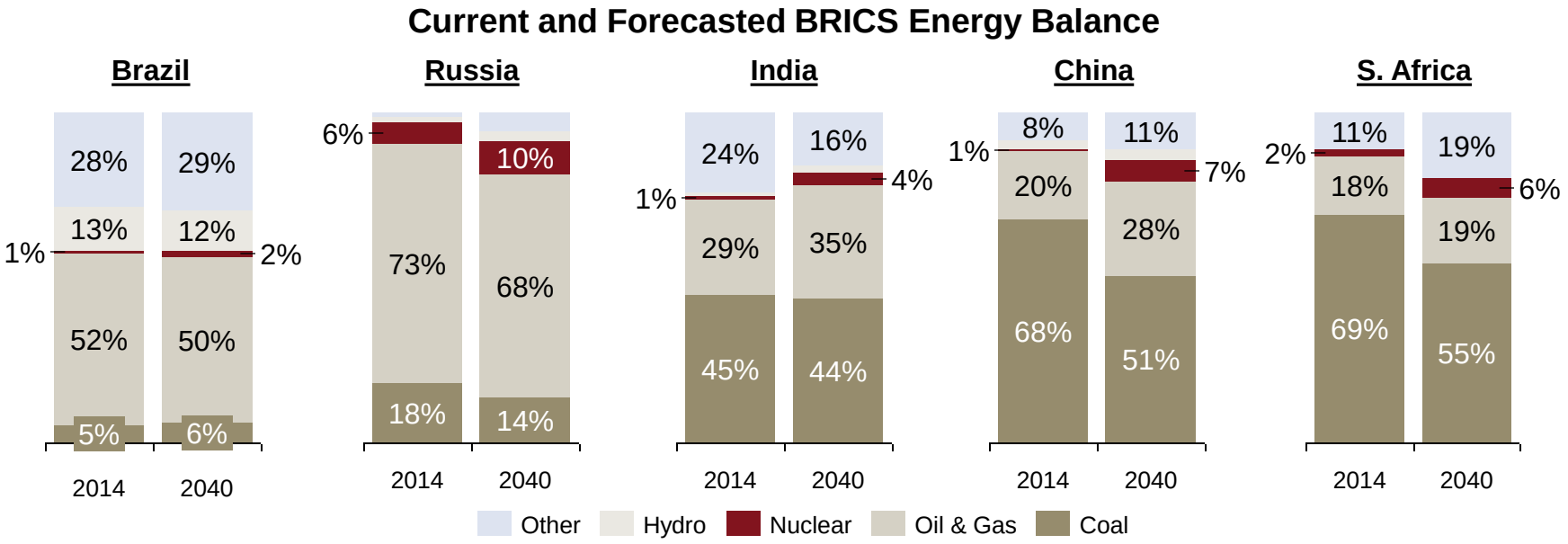
Driver of economic development

Source of high value added export

Platform for deeper collaboration within BRICS

1

BRICS countries see nuclear power as part of their energy balance and plan to increase its share



Comments

- Utilization of nuclear energy is a way to **reduce emissions** and negative environmental impacts
- Nuclear power is an important factor of BRICS countries' **national energy security**
- Nuclear energy can provide **benefits in terms of economic viability and costs** in the long run

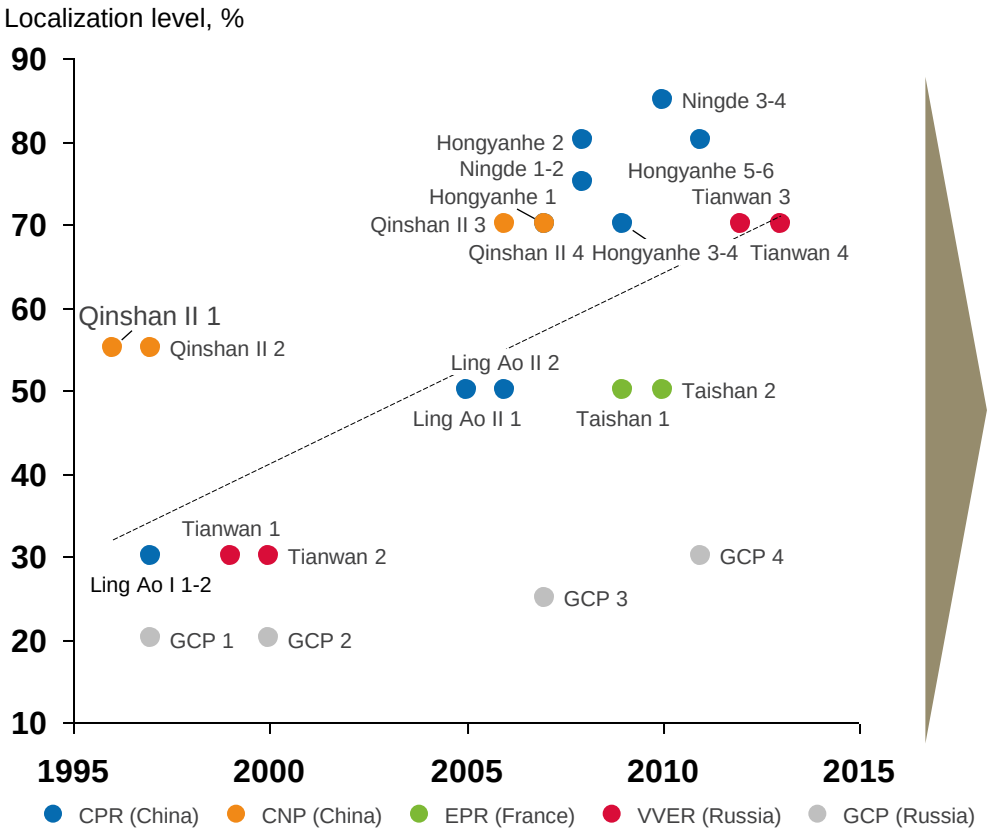
Source: World Energy Outlook 2014

2

EXAMPLE

Localization of nuclear energy sector fosters the economy and human resources development in China

China Nuclear Plants Localization Level, %



Comments

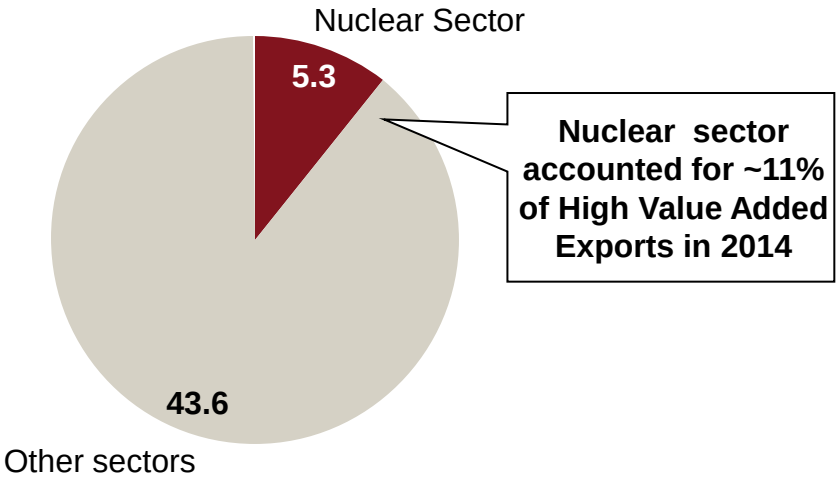
- By 2020 China will be **supplying locally 80%** of nuclear power plants equipment
- The nuclear program is estimated to engage up to **100,000 local employees**
- The local “Nuclear Power College” combining 13 local universities provides **nuclear power skills training**
- Technology transfer allowed China to become an **exporter of nuclear technology** and know-how

Source: WNA, Energy Research Institute of China, China 12th Five-Year Plan for Energy Technology (2011-2015), press research

EXAMPLE

In Russia nuclear sector is an important contributor to high value added exports

Russia Export of High Value Added Goods and Services, Bn USD, 2014



Rosatom foreign contracts portfolio for 2015-2025 → **101.4 Bn USD**

Comments

- Currently nuclear sector composes a **significant part** of high value added exports of goods and services from Russia
- Russian Government set an ambitious goal of increasing **high value added exports** at ~15% p.a. till 2020
- Nuclear sector with a **10-year foreign contracts portfolio of ~100 Bn USD** will continue to play an important role in high value added exports in the future years

Source: Agency for Strategic Initiatives, Rosatom, VNIKI, Strategy& analysis

EXAMPLE

Development of nuclear power sector in South Africa promotes intensive cooperation with other BRICS countries

South Africa Nuclear Sector Development Plans

- South Africa is planning to build **six new nuclear power plants** by 2030
- The sector development plan implies addition of **9600 MWe of new nuclear capacity**
- South Africa intents to re-establish its **nuclear fuel cycle**

South Africa Nuclear Cooperation with BRICS Countries

Participants	Subject
	• **Strategic nuclear cooperation agreement** – Potential NPP construction – Technology exchange – Localization – Financing framework – Personnel training
	• **Nuclear cooperation agreement** – Potential NPP construction – Nuclear power cycle partnership – Financing framework – Training on nuclear power plant construction and project management

Source: press research, Strategy& analysis

Key conclusions

- ✓ BRICS countries are **critical for the future** of the global nuclear industry

- ✓ Nuclear energy offers **numerous benefits** to BRICS countries

- ✓ Nuclear industry is a **great platform for deeper cooperation** within BRICS