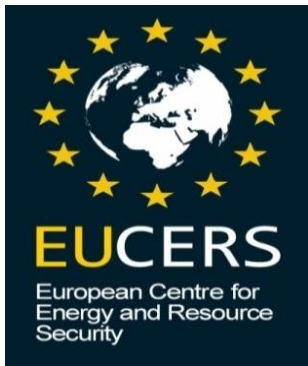


Emerging Energy Security Challenges and Europe

**"Central European Energy Conference (CEEC): EU Energy Policy and Energy Security of Central Europe VII – The North-South Energy Corridor and Emerging Regional Energy Market",
Bratislava, 24-26 November 2013**



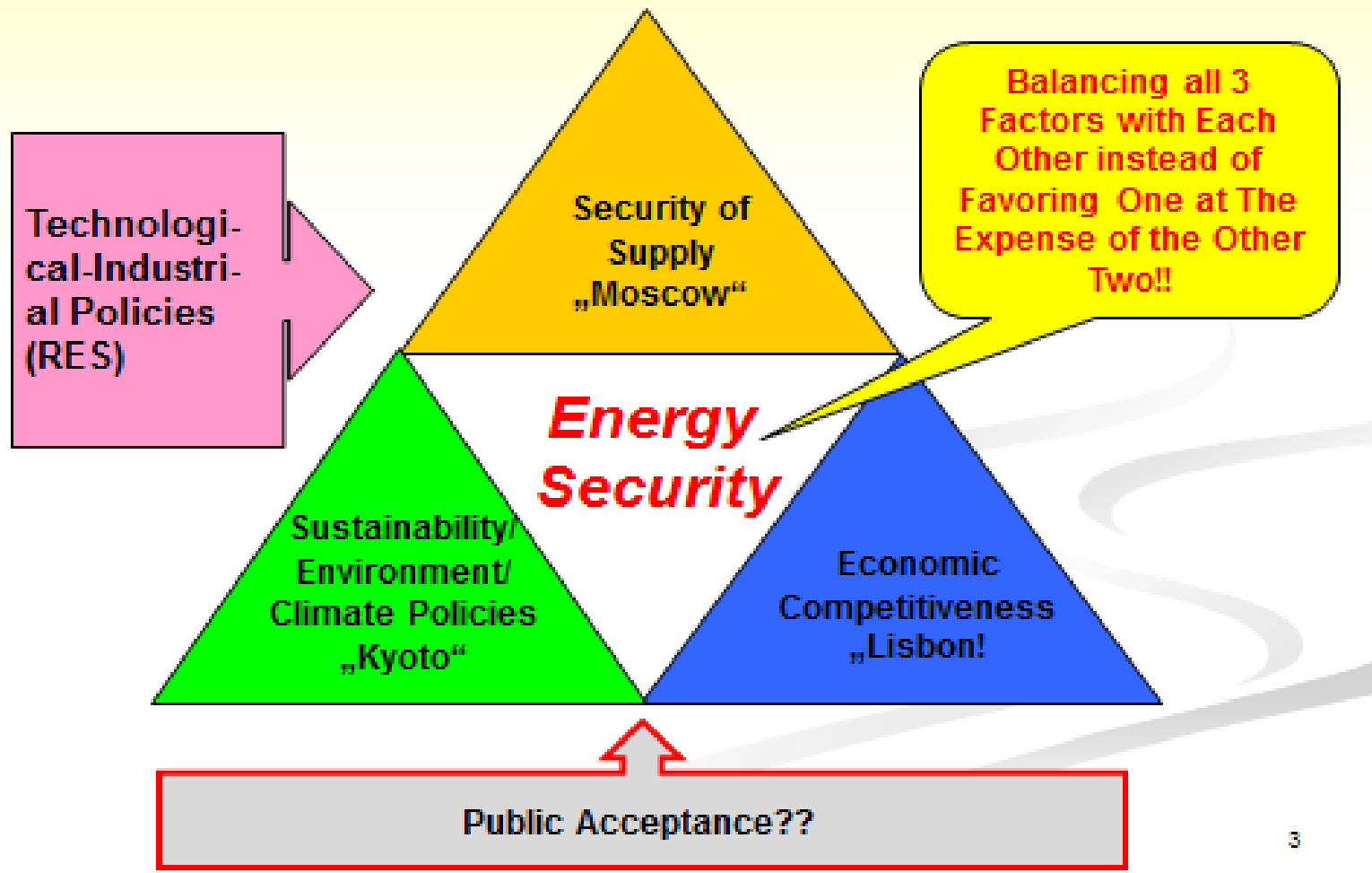
Dr. Frank Umbach

Associate Director of EUCERS (London); Senior Associate, CESS GmbH (Munich) & Non-Resident Senior Fellow, Atlantic Council (Washington D.C.)

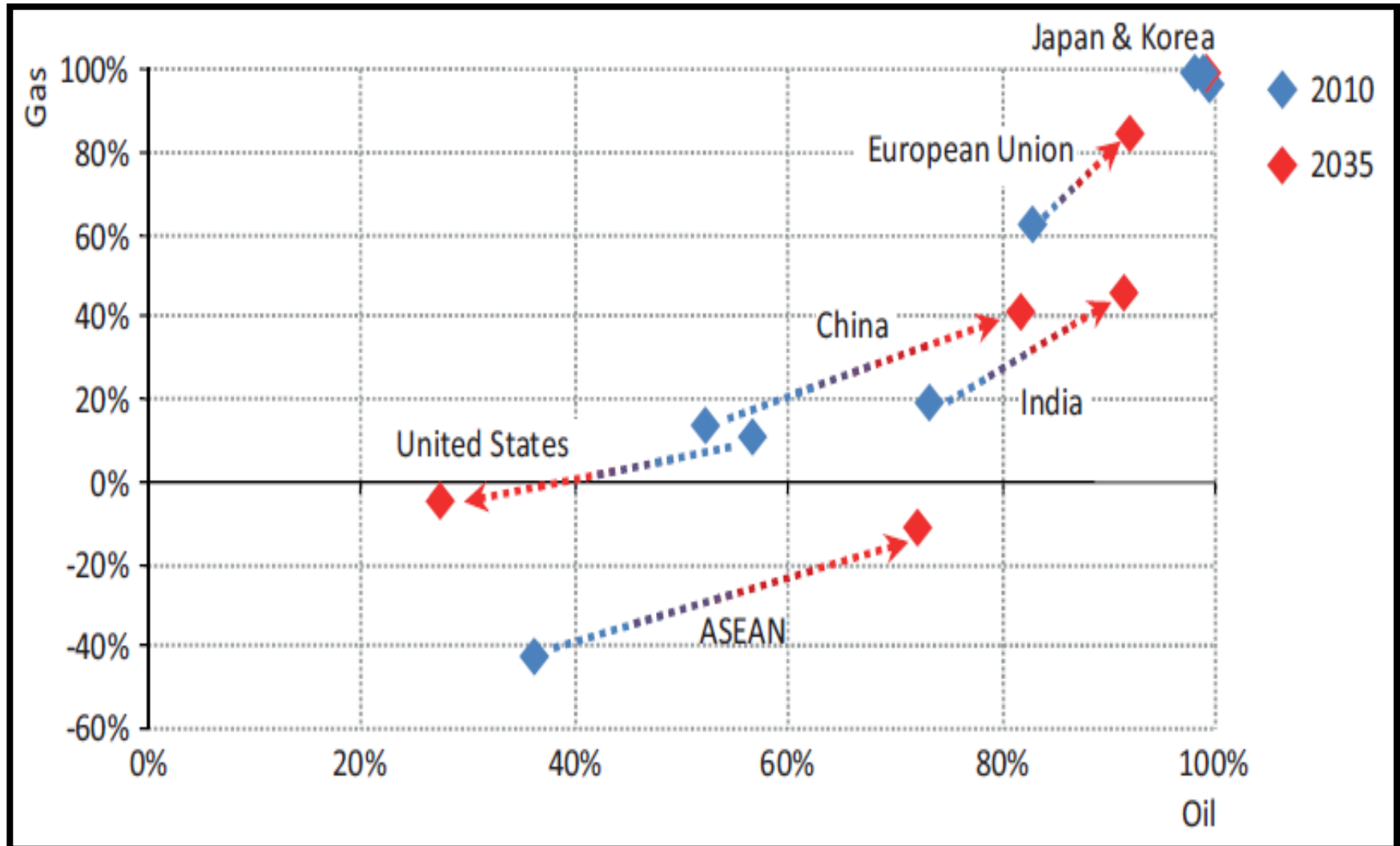
E-Mail: Umbach@CESS-NET.EU

Maintaining the Balance within the Energy Triangle and between its Three Objectives

Energy Triangle – Objectives of Energy Security



Net-Oil- and Gas Dependency of Different Countries and Regions 2010-2035



Implications of U.S. Shale Gas Revolution to U.S. Industry I

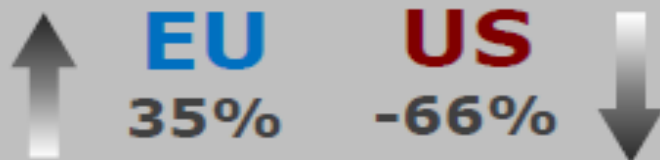
- EU energy and climate policy driving energy-intensive industries out of Europe?
- EU Industry Commissioner Antonio Tajani: EU Facing „*Systemic Industrial Massacre*“ (09/2013);
- **US vs. European Gas Prices 2005-2012:**
 - US industry sector: -66%;
 - European industry sector: +35% (+27% in real terms);
- **Global Impact:**
 - End of 2011: Largely non-subsidised US gas prices lower than heavily subsidised gas prices in Russia;
- **Re-Industrialisation Objective: 20% Industry Share of EU-GDP by 2020 - Reality:**
 - Year 2000: 22.0%
 - 2011: 15.5%
 - 2012: 15.1%.

Impacts on U.S. Energy Intensive Industries I

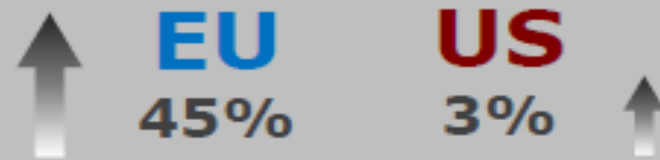
- **Revival of U.S. Manufacturing Industries:**
 - 2009-2012: Production of mining machinery risen by 42%;
 - U.S. Department of Energy: U.S. LNG Exports will generate up to U.S.\$47 bn in economic activity;
 - Forecast: Manufacturing costs to be 8-18% lower than in Europe and Japan;
- **Revival of U.S. Chemical;Manufacturing Base:**
 - KPMG: Building new business operations worth US\$95 bn;
 - „U.S. becoming one of the most advantageous markets for chemical production in the world“;
 - Cheap raw materials such as for ethylene production fueled by local ethane and polyethylene (i.e. for plastic production);
 - Costs to be 29% lower than in Germany by 2015.

Trends in energy price indexes 2005-2012

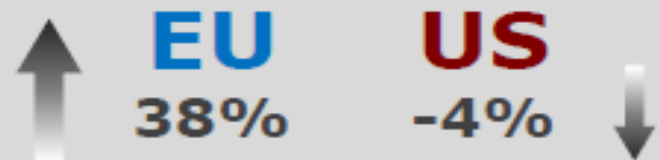
Gas price index Industry



Gas price index Households



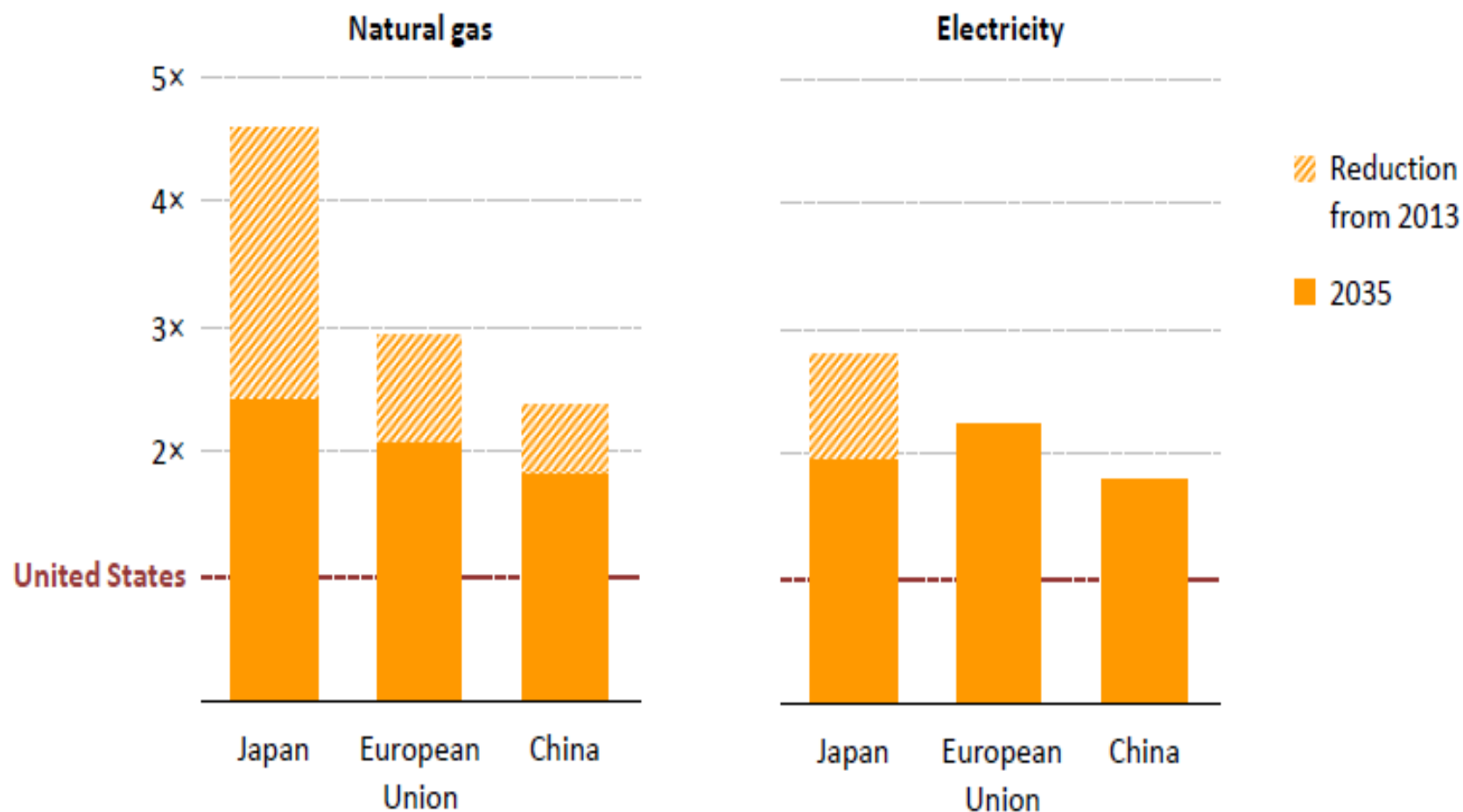
Electricity price index Industry



Electricity price index Households

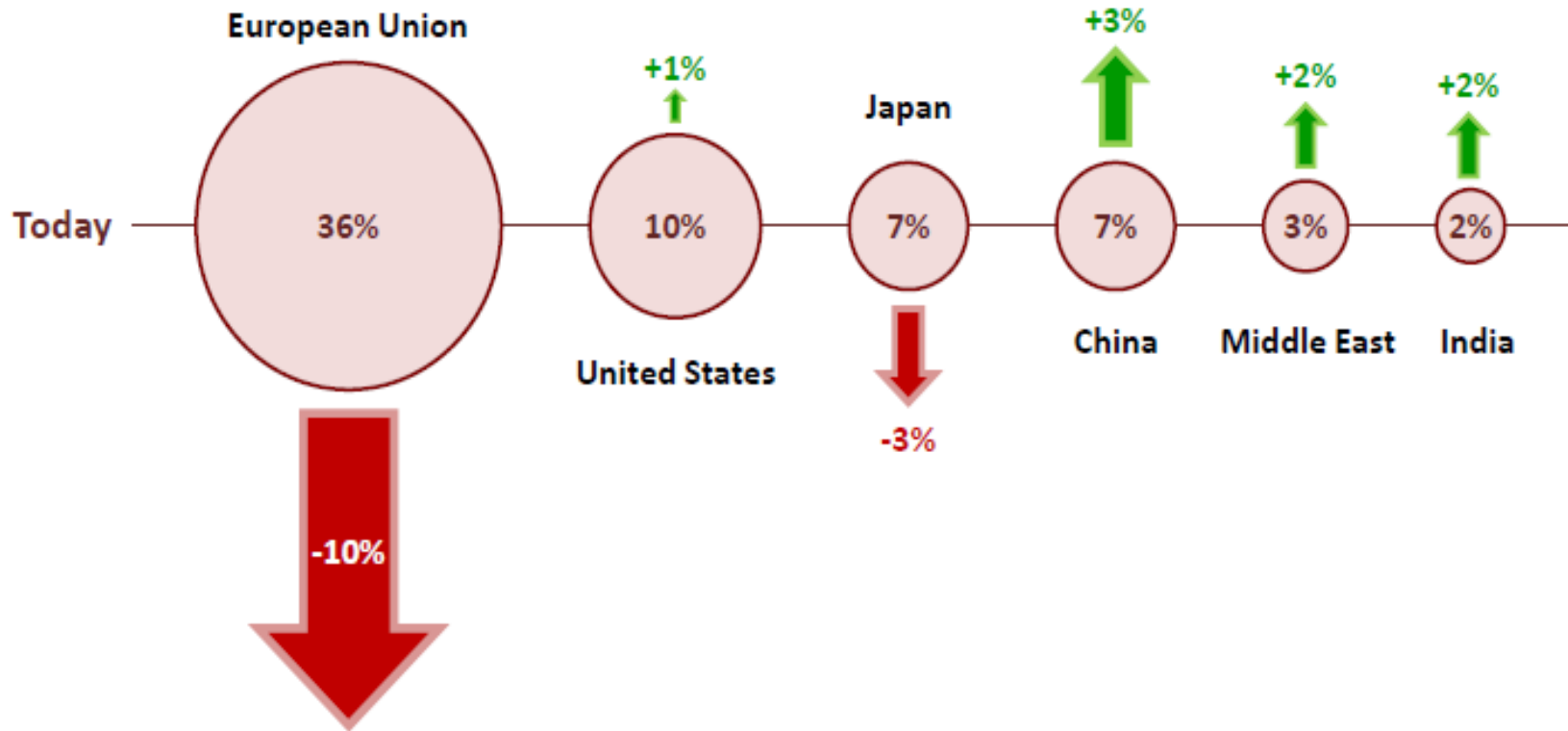


Ratio of industrial energy prices relative to the United States



Regional differences in natural gas prices narrow from today's very high levels but remain large through to 2035; electricity price differentials also persist

Share of global export market for energy-intensive goods



The US, together with key emerging economies, increases its export market share for energy-intensive goods, while the EU and Japan see a sharp decline

EIA – New Shale Gas and Shale Oil Assessment 06/2013

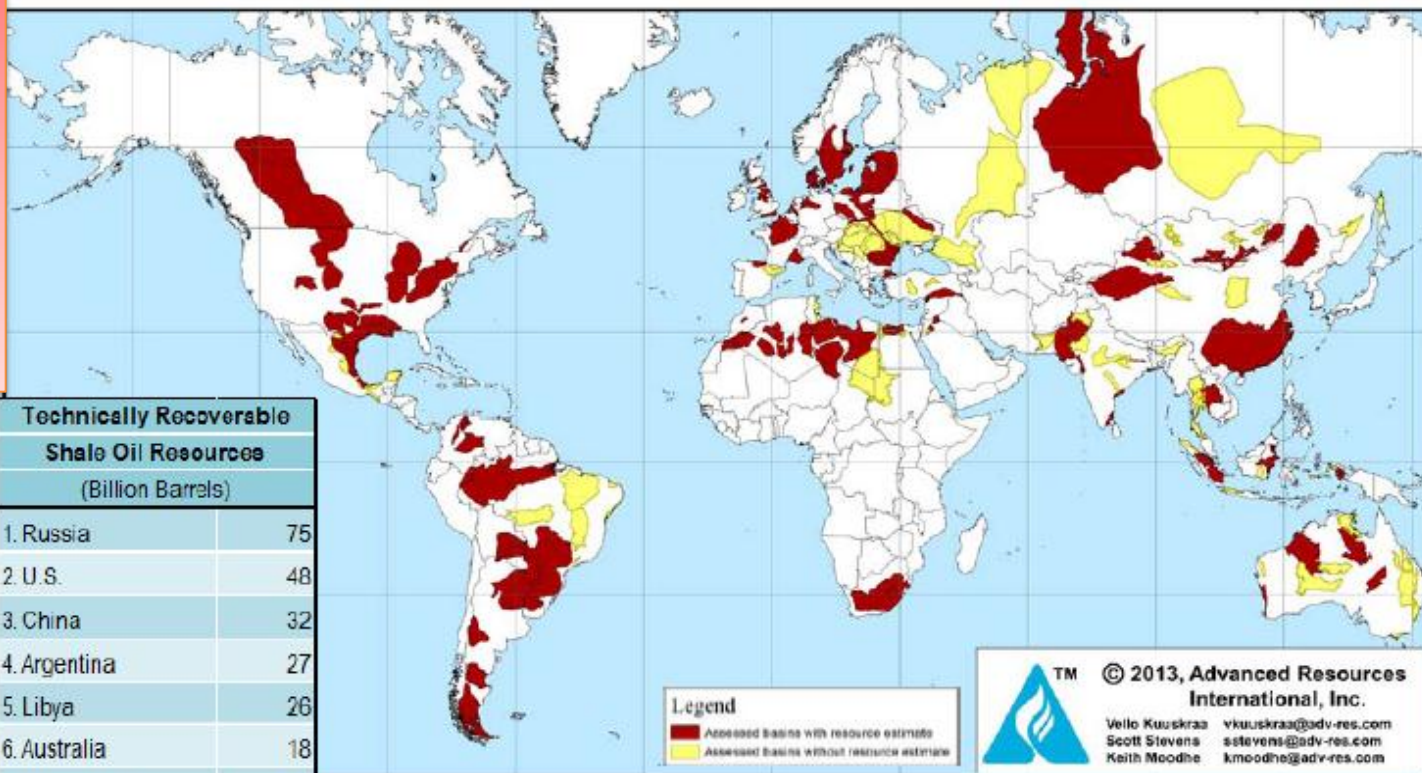
Figure 2. Assessed World Shale Gas and Shale Oil Resources (42 Countries, including U.S.)

Increase in Total Recoverable & Unproved Oil and Gas Resources:

Shale Gas: +47%

Shale Oil: +11%

Technically Recoverable Shale Gas Resources (Tcf)		Technically Recoverable Shale Oil Resources (Billion Barrels)	
1. U.S.	1,161	1. Russia	75
2. China	1,115	2. U.S.	48
3. Argentina	802	3. China	32
4. Algeria	707	4. Argentina	27
5. Canada	573	5. Libya	26
6. Mexico	545	6. Australia	18
7. Australia	437	7. Venezuela	13
8. South Africa	390	8. Mexico	13
9. Russia	285	9. Pakistan	9
10. Brazil	245	10. Canada	9
11. Others	1,535	11. Others	65
TOTAL	7,795	TOTAL	335

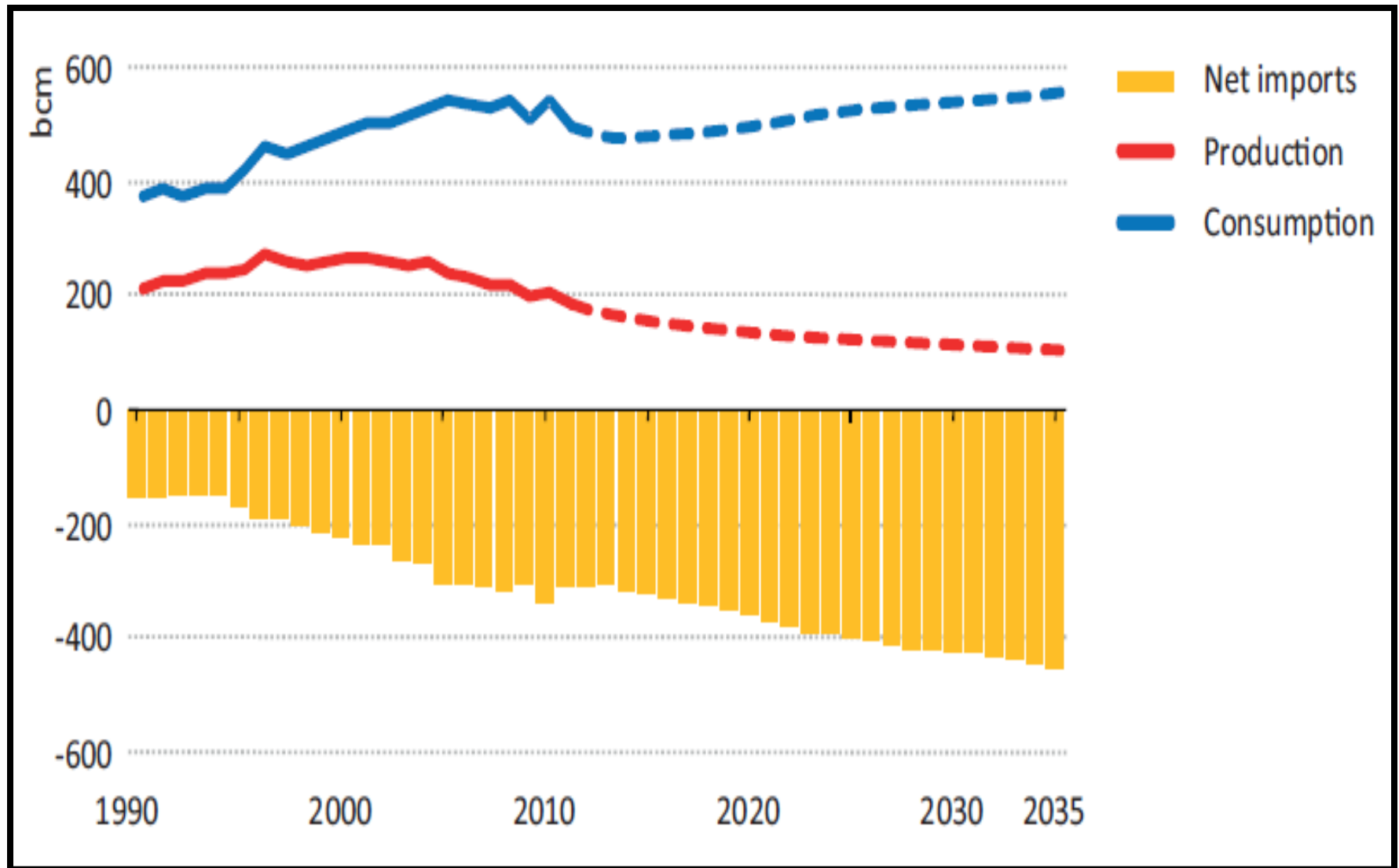


Technically Recoverable Worldwide Shale Gas and Shale Oil Unproved Resources:

Shale Gas: 32% of Total Wet Natural Gas;

Shale Oil: 10% of Total Crude Oil.

IEA: EU Natural Gas Supply and Demand Balance in the New Policy Scenario



New Gas Import Options for Europe

- **Global Gas Market:**

- North America/U.S.: may become a Net Gas Exporter in 2016;
- Australia: becoming a bigger LNG producer and exporter than Qatar by 2018/2019 (the world's largest one since 2006 ahead of Indonesia, Malaysia and Algeria).
 - Brazil and Argentina: LNG-Exporter?

- **Europe/Eurasia:**

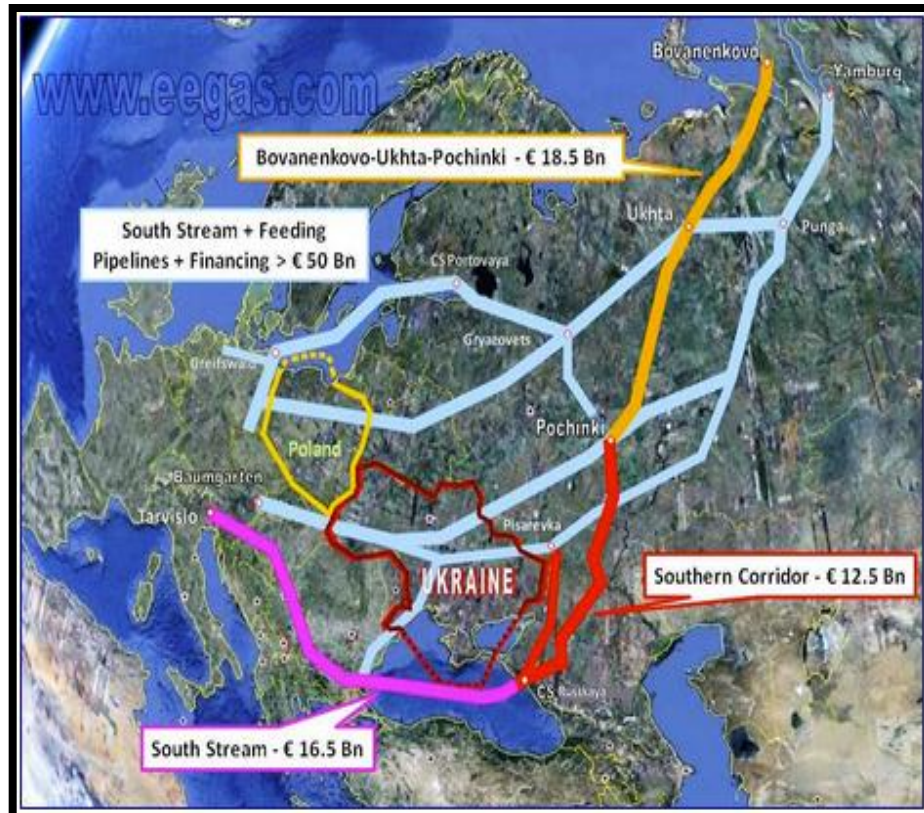
- Shell, IEA and others demand long-term EU gas plan;
- North Sea gas supplies may play a longer and more important source of supply for EU gas imports than forecasted just few years ago:
 - new large oil and gas discoveries in Norway;
 - record capital investment, new field allowances and decommissioning cost tax relief for investors in UK.
- CACR: Azerbaijan and Turkmenistan;
- Kurdistan/Iraq; in the future also Iran;
- New Potential Offshore Gas Exports from Offshore Gas Fields in the EEZ of Bulgaria, Romania, Greece and the East Mediterranean Sea.

Russia's South Stream Project: „First-Mover Advantage“?

Investment: €25-30 bn of the South Stream pipeline itself + another > €30 bn of the Bovanenkov-Russkaya gas interconnector



Source: Interfaxenergy.com - Natural Gas Daily



Source: Mikhail Korchemkin

Will make CSEE dependent on the most expensive gas supplies (by taking the future high production costs from new and much more remote gas fields as well as their longer transport ways into account).

Russian Gas Pipeline Capacities: Existing & Planned Ones

Existing Russian Gas Export Capacity to Europe:

Nord Stream 1	27.5 bcm
Nordstream 2	27.5 bcm
Yamal-Europe	33.0 bcm
Ukraine-Pipelines	140.0 bcm
Blue Stream	16.0 bcm
Total	244.0 bcm

Planned New Russian Gas Export Capacity to Europe:

Nord Stream 3	27.5 bcm
Nord Stream 4	27.5 bcm
South Stream	63.0 bcm
Yamal-Europe 2	15.0 bcm
Total Planned	133.0 bcm
Total Existing/Planned	377.0 bcm

Summary and Perspectives

- **New Gas Options for Europe – Projects Different from 2006 and 2009 → Leading to much more Competition:**
 - indigenous shale gas resources,
 - conventional offshore gas resources in the territorial waters of Romania and Bulgaria in the Black Sea as well as
 - those in **the East-Mediterranean Sea**;
 - are all cheaper when the much shorter transport costs toward future Russian pipeline gas are considered in long-term price developments;
- **Caspian Gas/Eastern Mediterranean Gas Supplies:**
 - important for reducing overdependence on Gazprom supplies;
 - but will have to compete with Russian gas supplies (commercial and geopolitical competition) and other non-Russian gas exports (commercial competition).
- **Objectives of the EU's SGC:**
 - Breaking Russian monopoly of gas supplies from the Caspian region **(+)**
 - Reducing gas dependence of CSEE on Gazprom/Russia **(?)**
 - Direct control of gas supplies from Caspian region **(-)**;
 - **Conclusion: EU's SGC will become dependent on conditions and developments outside most of the EU's influence and control.**