Oil and Gas in the Czech Republic

PhDr. Tomáš Vlček, Ph.D.

International Relations and Energy Security

Department of International Relations

and European Studies

EVROPSKÁ UNIE

esf

MINISTERSTVO ŠKOLSTVÍ, MLÁDEŽE A TĚLOVÝCHOVY

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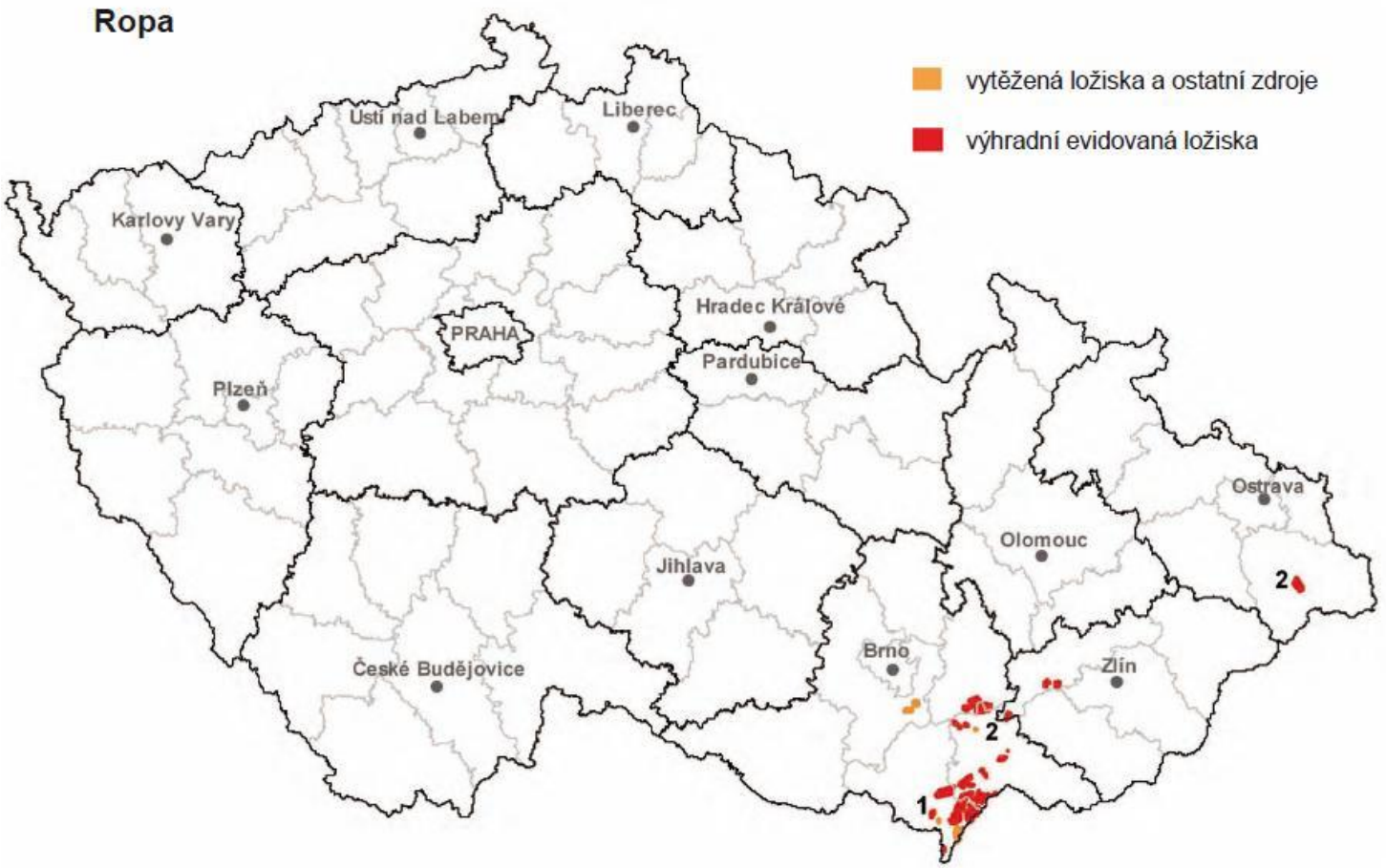
INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Crude Oil Supply Issues

- Oil production in the Czech Republic in 2016 reached the value of 0.116 milion tons, ie 2% of imports in the Czech Republic in 2016

  Total imports in the Czech Republic is between 5.3 and 7.3 milion tons of oil



Deposits, reserves and mine production of oil in the Czech Republic							
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Deposits – total number	34	33	34	39	37	38	39
- exploited	27	27	27	30	29	28	33
Total mineral reserves	29 015	30 891	30 781	28 811	27 094	28 953	28 959
- economic explored reserves	15 424	20 326	21 108	21 236	21 100	21 402	21 428
- economic prospected reserves	4 475	3 983	4 092	1 758	1 747	1 735	3 355
- potentially economic reserves	9 116	6 582	6 581	5 817	5 816	5 816	5 816
- exploitable (recoverables) res.	1 415	1 664	1 628	1 534	1 449	1 379	1 504
Mine production	173	163	150	152	148	126	116

Note: reserves numbers in kilotons (kt).

Source: Ministerstvo životního prostředí / Česká geologická služba – Geofond.

Pipeline Routes in the Czech Republic		
	Druzhba	**IKL**
Start of Supply	1962 (Slovakia), 1964 (Czech Rep.)	1996
Transport Capacity (Mt/y)	9	10
Supply Volume (tons, 2014)	4.981	2.359
Percentage Rate (%, 2014)	67.6	32.4
Supply Volume (tons, 2015)	4.727	2.405
Percentage Rate (%, 2015)	66.3	33.7
Supply Volume (tons, 2016)	3.729	1.596
Percentage Rate (%, 2016)	70.0	30.0
Utilization (%, 2014/2015/2016)	55.3 / 52.5 / 41.4	23.6 / 24.1 / 16.0
Source	Russia, Kazakhstan	Algeria, Azerbaijan, Italy, Kazakhstan, Libya, Nigeria, Norway, Russia, Syria
Pipeline Transit Countries	Russia, Belarus, Ukraine, Slovakia	Italy, Austria, Germany

Note: The route of the south branch of the Druzhba pipeline, which transports supplies to the Czech Republic, crosses Almetevsk - Kuybyshev - Unecha - Mozyr - Brody - Uzhhorod - Sahy - Litvinov. Also, crude oil coming from Russia is not necessarily Russian.

Source: Ministry of Industry and Trade of the Czech Republic, 2009d, p. 1, Czech Association of Petroleum Industry and Trade, 2010, p. 8; "Druzhba Pipeline", 2009, p. 56; Ministry of Industry and Trade of the Czech Republic, 2011, p. 15


Litvinov
Kralupy
nad Vltavou
CTR Nelahozeves
Hradec Králové
N.Město
Pardubice
Praha
Plzeň
Ostrava
IKL
Družba
Regensburg
Velká Bíteš
Brno
Klobouky u Brna
Vohburg


Boundary representation is not necessarily authoritative.
North Sea
Baltic Sea
DENMARK
SWEDEN
LATVIA
LITHUANIA
RUSSIA
Moscow
Ufa
Samara
Saratov
Kazakhstan
Aral Sea
Atyrau
Tengiz
Aqtau
Uzbekistan
Turkmenbasy
Turkmenistan
Caspian Sea
Caspian Pipeline Consortium project
Northern Early Oil
Western Early Oil
Baku
Tbilisi
Georgia
Azerbaijan
Armenia
Makhachkala
Novorossiysk
Tuapse
Sea of Azov
Black Sea
Bosporus
Dardanelles
Aegean Sea
Mediterranean Sea
Ionian Sea
Tyrrhenian Sea
Adriatic Sea
Rostock
Gdansk
Berlin
Leipzig
Minsk
Belarus
Poland
Plock
Warsaw
Friendship
Friendship (Druzhba)
Friendship (Druzhba) II
Germany
NETH.
BEL.
LUX.
France
Ingolstadt
Karlsruhe
Trans-Alpine (TAL)
Prague
Czech Republic
Friendship I
Brody
Kiev
Ukraine
Switz.
Vienna
Bratislava
Slovakia
Austria
Budapest
Friendship II
Hungary
Slovenia
Ljubljana
Trieste
Zagreb
Adria
Omisalj
Croatia
Moldova
Yuzhnyy
Odesa
Kherson
Romania
Bosnia and Herzegovina
Belgrade
Yugoslavia
Bucharest
Constanta
Italy
Rome
Sofia
Bulgaria
Burgas
Albania
Tirana
Skopje
F.Y.R.O.M.*
Vlore
Thessaloniki
Alexandroupolis
Saros
Kiyikoy
Istanbul
Kocaeli (Izmit)
Samsun
Ankara
Erzurum
Baku-Tbilisi-Ceyhan Pipeline (BTC)
Turkey
Greece
Aliaga
Athens
Batman
Ceyhan
Tabriz
Neka port
Tehran
Iran
Iraq
Syria
*The Former Yugoslav Republic of Macedonia
Existing pipeline
Existing bypass pipeline
Planned pipeline
Proposed bypass pipeline
Tanker route
Selected refinery
Selected tanker terminal
0 100 200 Kilometers
0 100 200 Miles
Pipeline alignments are approximate.

- The Czech oil market can be vertically divided into five levels

  - *international carrier oil (MERO ČR, a.s.)*
  - *processing plants (Unipetrol RPA, Paramo, a.s.)*
  - *distributor (ČEPRO, a.s.)*
  - *traders in crude oil and oil products (such as Unipetrol, a.s., BENZINA, s.r.o., Shell Czech Republic a.s., OMV Česká republika, s.r.o., EuroOil, a.s., RoBIN OIL s.r.o., LUKOIL Czech Republic s.r.o.)*

  - Outside these four there is a fifth level, the Czech *production companies (Moravské naftové doly a.s., Česká naftařská spol. s.r.o., UNIGEO a.s.)*

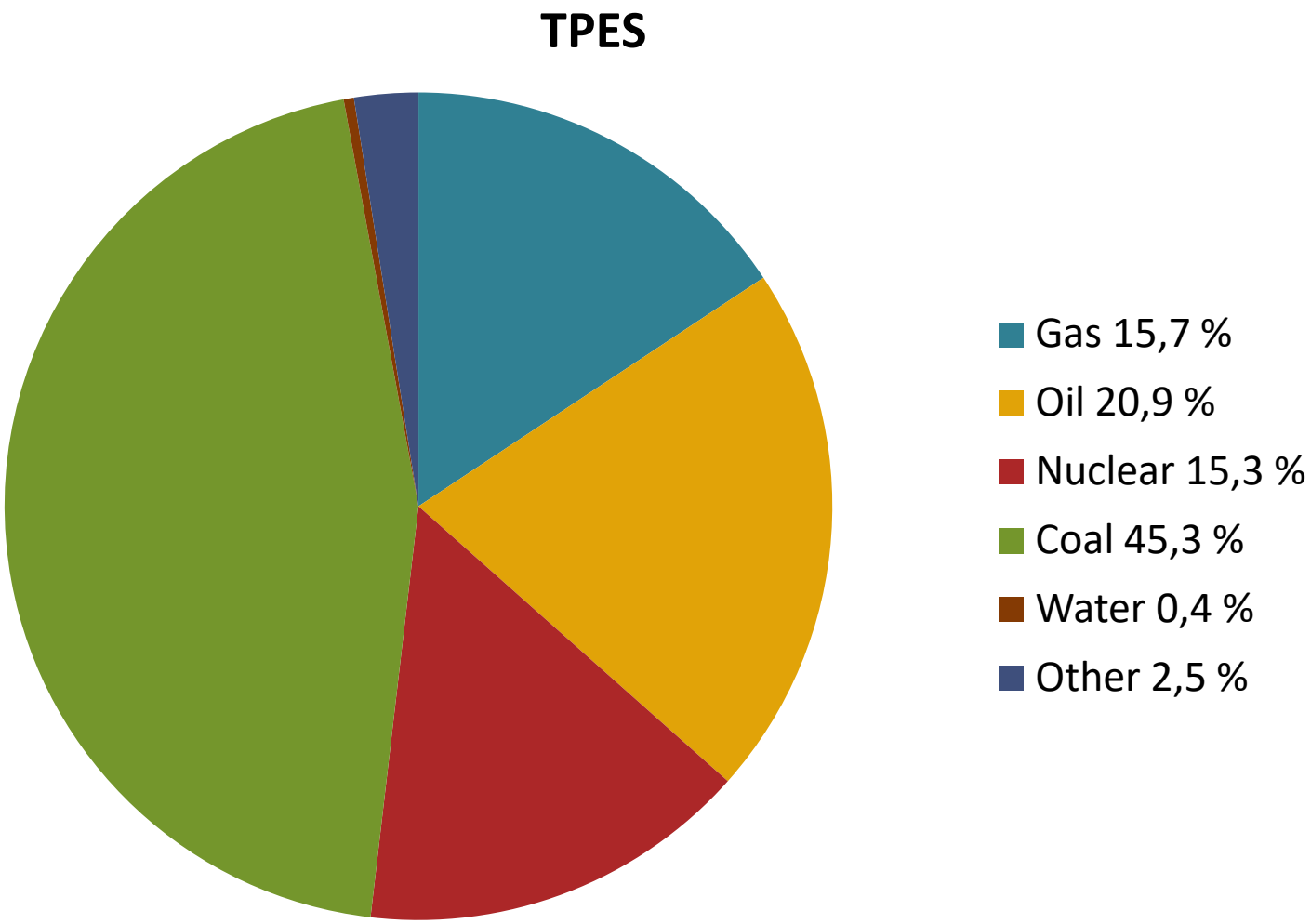
Oil Consumption in the Czech Republic by sector		
Total Consumption	**9.927**	**(100 %)**
Transformation	**0.452**	**(4.55 %)**
Industry	**2.695**	**(27.15 %)**
Transport	**6.408**	**(64.55 %)**
- Petrol	2.099	
- Diesel	3.691	
- Aviation Fuels	0.370	
- Other	0.248	
Other Sectors	**0.372**	**(3.75 %)**

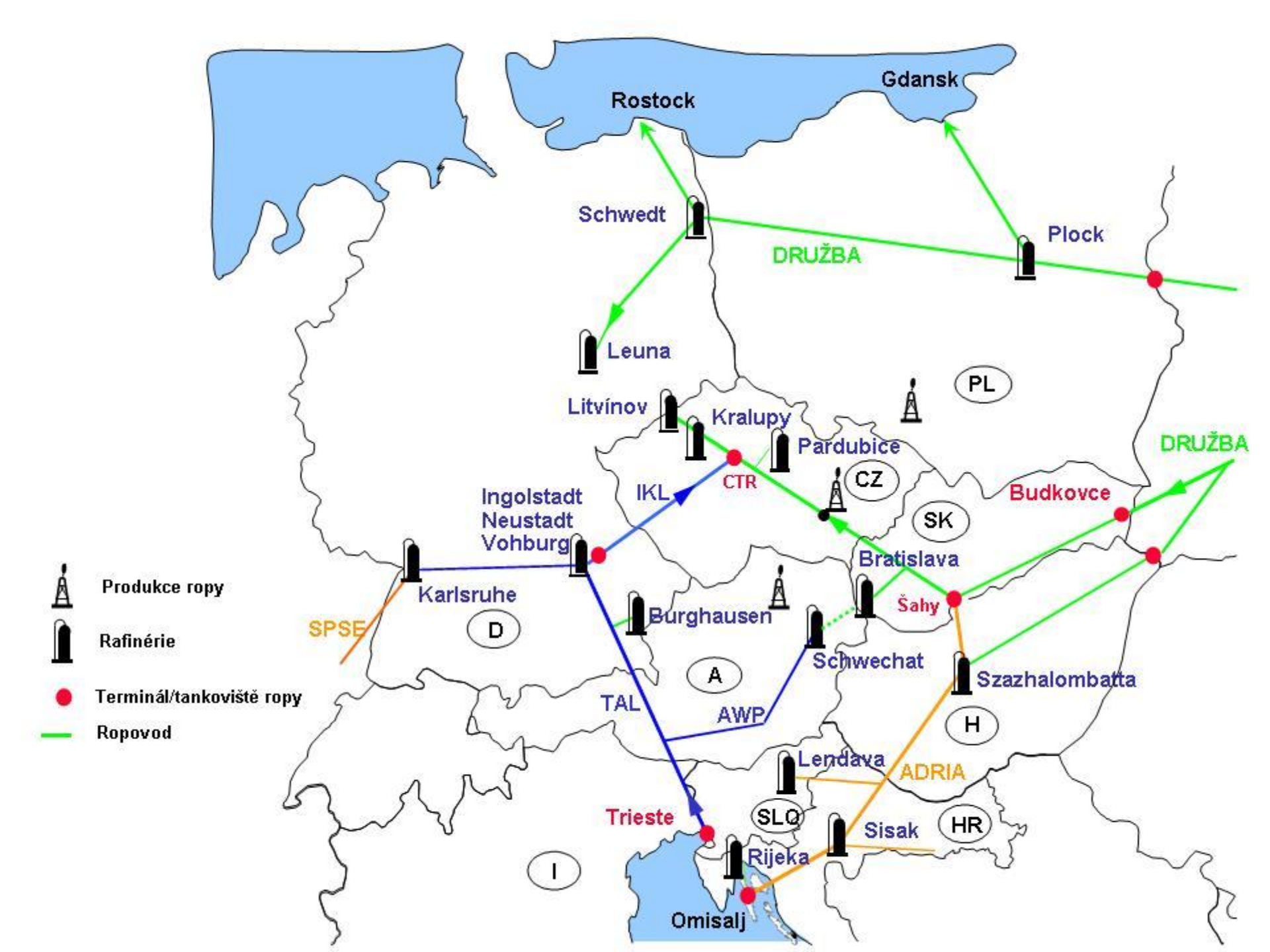
Note: 2007 data in Mt. Data including oil products imports, which reached 2.25 Mt in 2007. Net imports of crude oil had reached 7.26 Mt, and domestic production of crude oil amounted to 0.25 Mt.

Source: International Energy Agency, 2009g, p. III.139.

Oil Refining in the Czech Republic		
Total Rafinery Intake	**8.780**	
Refinery Losses	**0.042**	
Total Refinery Output	**8.738**	**(100 %)**
- LPG and ethane	0.210	(2.40 %)
- Naphtha	0.838	(9.59 %)
- Kerosene	0.170	(1.95 %)
- Petrol	1.622	(18.56 %)
- Diesel	3.595	(41.14 %)
- Fuel Oil	0.335	(3.84 %)
- Other Products	1.968	(22.52 %)
Note: Assessment of IEA for 2008, in Mt. Data including total domestic production of oil and natural gas (0.566 mil. ton). Source: International Energy Agency, 2009g, s. III. 139.		

+3 million tons of oil products import


TPES
Gas 15,7 %
Oil 20,9 %
Nuclear 15,3 %
Coal 45,3 %
Water 0,4 %
Other 2,5 %


Rostock
Gdansk
Schwedt
DRUŽBA
Plock
Leuna
PL
Litvínov
Kralupy
Pardubice
DRUŽBA
CTR
CZ
IKL
Ingolstadt
Neustadt
Vohburg
Budkovce
SK
Bratislava
Karlsruhe
Šahy
SPSE
D
Burghausen
Schwechat
Szazhalombatta
A
TAL
AWP
H
Lendava
ADRIA
Trieste
SLO
Sisak
HR
Rijeka
I
Omisalj
Produkce ropy
Rafinérie
Terminál/tankoviště ropy
Ropovod

Natural Gas

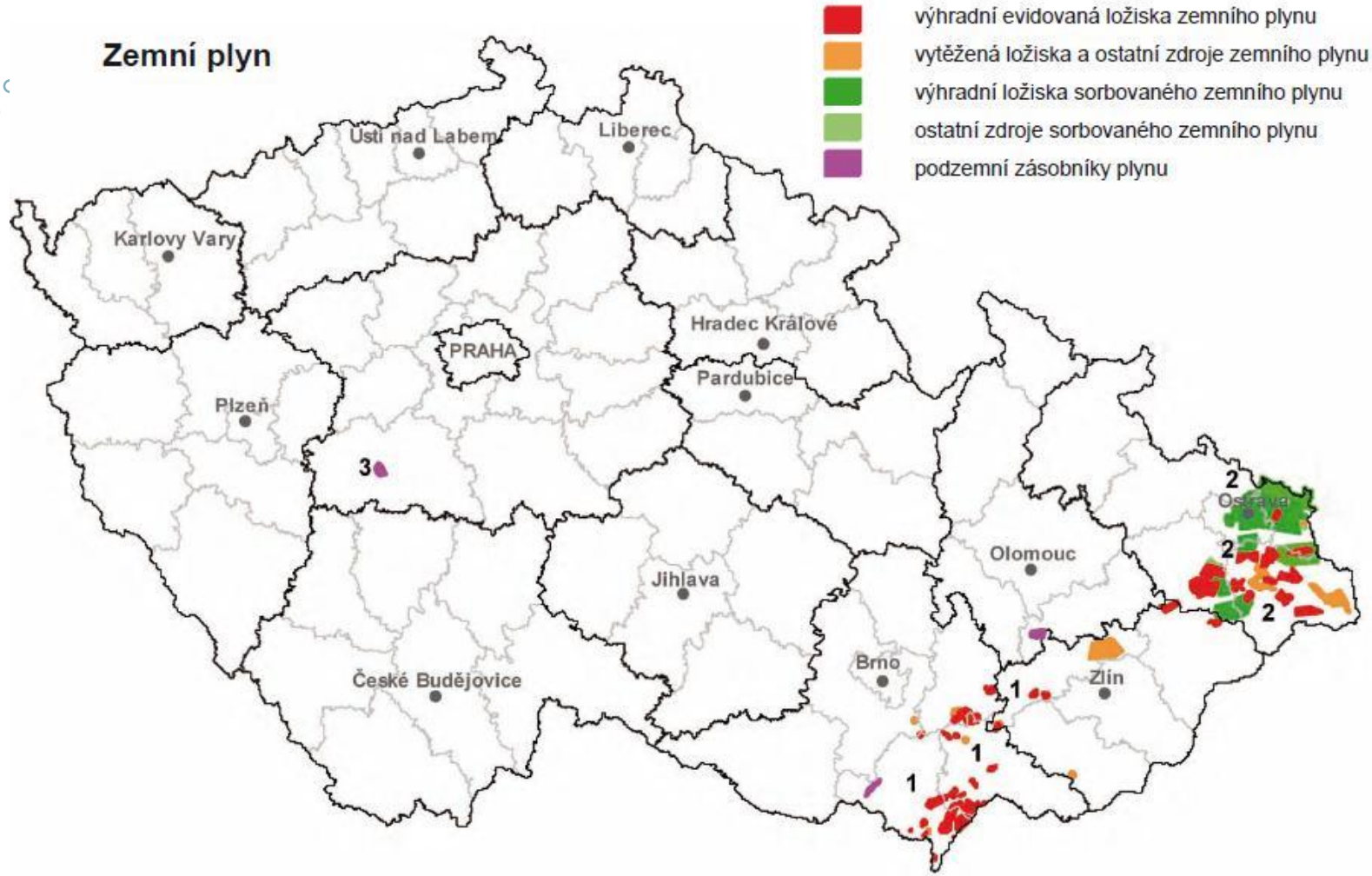
Natural Gas Diversification and Liberalization Issues

- Natural Gas production in the Czech Republic in 2016 reached the value of **0.169 bcm/y**, ie 2% of imports in the Czech Republic in 2016
- Total imports in the Czech Republic in 2016 amounted to **8.12 bcm/y**

Deposits, reserves and mine production of natural gas in the Czech Republic							
	2010	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Deposits – total number	94	83	90	96	93	95	96
- exploited	52	48	46	40	40	46	64
Total mineral reserves	28 924	30 172	30 506	31 085	27 949	30 948	30 839
- economic explored reserves	6 123	7 374	7 243	7 646	7 491	7 494	7 381
- economic prospected reserves	2 281	2 335	2 791	2 981	2 956	2 998	2 977
- potentially economic reserves	20 520	20 463	20 472	20 458	20 458	20 456	20 481
- exploitable (recoverables) res.	4 767	4 660	4 886	5 512	5 064	5 057	4 918
Mine production	201	187	204	207	198	200	169

Note: reserves numbers in bcm.

Source: Ministerstvo životního prostředí / Česká geologická služba Geofond.


Zemní plyn
výhradní evidovaná ložiska zemního plynu
vytěžená ložiska a ostatní zdroje zemního plynu
výhradní ložiska sorbovaného zemního plynu
ostatní zdroje sorbovaného zemního plynu
podzemní zásobníky plynu
Ústí nad Labem
Liberec
Karlovy Vary
Hradec Králové
PRAHA
Pardubice
Plzeň
Olomouc
Jihlava
Brno
Zlín
České Budějovice
1
2
3

Natural Gas Supplies and the Most Important Companies in the Gas Sector		
	Russian Federation	**Kingdom of Norway**
Launch of Supply	1967	1997-2017
Volume of Supplies (bcm/y, 2009)	5,099	3,0
Share (%, 2009/2016)*	58.81 / 99.975	34.60 / 0.025
Resource Areas	Mostly from the fields of Urengoy, Yamburg and Medvezhye	Fields Draupner E, Sleipner, Troll A, Mikkel, Kristin and other fields in the continental shelf of the Norwegian Sea
Transit Countries	Ukraine, Slovakia	Germany
Conclusion of Current Contract	October 1998, 2006**	May 1st, 1997***
Contract	Until 2035****	Until 2017
Volume of contract	8-9 bcm/y	53 bcm in total, ca. 3,0 bcm/y

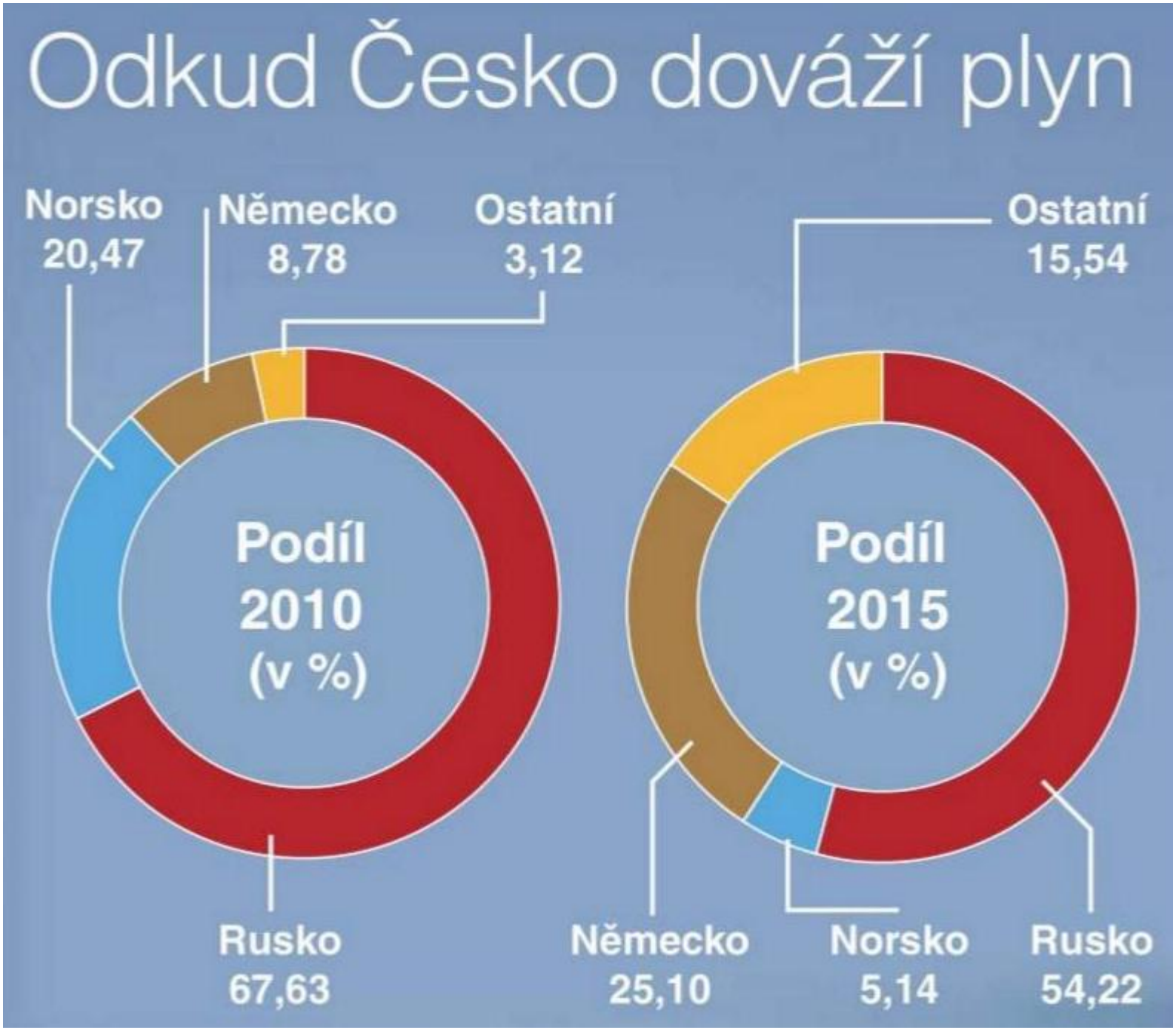
* Zbylých 4,59 % představuje dovoz ze Spolkové republiky Německo, v objemu 571 mil. m^3.

** In October 1998, a contract between Transgas, a. s. and OOO Gazexport was signed for the supplies of 8 to 9 bcm/y of natural gas for the period of 15 years. Thee contract with a defined price and transport route should run until 2013. In 2006, RWE Transgas, a. s. (successor to Transgas, a. s.) extended the contract until 2035. This extension nevertheless did not include the definition of the gas price or transport route.

*** With Statoil, Norsk Hydro a Saga Petroleum

**** This, at the same time, means the definite securing of the Czech Republic's transit position until this year, as one third of the natural gas supplied by Russia to Western Europe will continue to be transported through Czech territory.

Source: T. Vlček; supply volumes and contracts according to Ministerstvo průmyslu a obchodu ČR, 2010g, s. 4-5; Kastl, 2008.


Odkud Česko dováží plyn
Norsko
20,47
Německo
8,78
Ostatní
3,12
Podíl
2010
(v %)
Rusko
67,63
Ostatní
15,54
Podíl
2015
(v %)
Německo
25,10
Norsko
5,14
Rusko
54,22


Gas pipeline
Proposed gas pipeline
Member States of the European Union
Russia
0
500 Kilometers
0
500 Miles
To Shtokman field
To Yamal fields
Barents Sea
Nadym
Teriberka
Ukhta
Punga
Yamal-Europe
Northern Lights
Finland
Norway
Vyborg
Volkhov
Gryazovets
Gryazovets–Vyborg
Russia
Sweden
Gulf of Finland
North Sea
Kattegat
Bacton Gas Terminal
BBL
Greifswald
NEL
Nord Stream
Rehden
JAGAL
JAMAL
OPAL
Germany
Belarus
Moscow
Brotherhood
Olbernhau
Poland
Yamal-II
Soyuz
Central Asia
Kazakhstan
Baumgarten Gas Hub
Austria
Transgas
TAG
Ukraine
Hungary
Subotica
Romania
South Stream
Italy
Adriatic Sea
Beregovaya Compressor Station
Caspian Sea
Pleven
Bulgaria
Varna
Black Sea
Blue Stream
Ankara
Durusu Terminal
Greece
Turkey
Mediterranean Sea
Iraq
Iran

Underground Natural Gas Storage Reservoirs in the Czech Republic and their Maximum Capacity as of January 1st, 2009				
Reservoir	**Owner**	**Type of Reservoir**	**Peak Withdrawal / Injection Capacity (mcm/d)**	**Capacity (mcm)**
Lobodice	RWE Gas Storage, s. r. o.	Aquifer*	36.5 / 26.9	177
Tvrdonice	RWE Gas Storage, s. r. o.	Depleted Field		460
Štramberk	RWE Gas Storage, s. r. o.	Depleted Field		480
Dolní Dunajovice	RWE Gas Storage, s. r. o.	Depleted Field		900
Háje	RWE Gas Storage, s. r. o.	Cavern**		64
Třanovice	RWE Gas Storage, s. r. o.	Depleted Field		240
Uhřice	Moravské naftové doly, a. s.	Depleted Field	6 / 2.9	180
Dolní Bojanovice	SPP Bohemia, a. s.	Depleted Field	9 / 7	576
		Total in the Czech Republic:	**51.5 / 36.8**	**3077**
Láb I-III*** (Slovakia)	Nafta, a. s., divize PZPP	Depleted Field	27.5 / 22	500
		Total:	**79 / 58.8**	**3577**

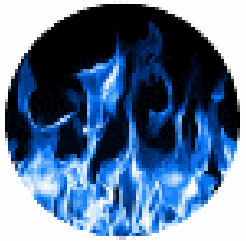
***** Aquifer is an underground layer of a water-bearing permeable rock from which groundwater can be extracted by using a water well. An aquifier reservior functions by pressing gas to the underground water-bearing bedrock so that that pressure artificially causes water to release to the lower layers.

****** Cavern reservoir is created artificually, usually at places of former salt and coal mines. Haje reservoir is built at the space where uranium mines originally lied.

*** Overall capacity of the reservoirs is 2130 mcm of natural gas. Aside from Láb I-III, there is also the Láb IV reservoir in Slovakia, owned by the Pozagas a. s. company. This reservoir's capacity amounts to 620 mcm and the maximum withdrawal and injection capacity is 6.85 mcm/d.

Source: „GSE Storage Map"; Česká plynárenská unie, 2009b; compiled by T. Vlček.

PODZEMNÍ ZÁSOBNÍKY ZEMNÍHO PLYNU



z Norska:
8 mil m³ denně

Hora Sv. Kateřiny

SČP, a.s. Ústí n.L.

VČP, a.s. Hr. Králové

Waidhaus

ZČP, a.s. Plzeň

STP, a.s., PP, a.s. Praha

Háje

výstavba zásobníku Rožná

SMP, a.s. Ostrava

Lobodice

Třanovice

Štramberk

JMP, a.s. Brno

Uhřice

Dolní Bojanovice

JČP, a.s. Č.Budějovice

Tvrdonice

Dolní Dunajovice

Lanžhot

z Ruska:
při běžném provozu zhruba 22 mil m³ denně

Láb (rezervace tuzemských obchodníků na Slovensku)

plynovod vnitrostátní

tranzitní plynovod mezinárodní

hraniční předávací stanice

kompresní stanice

podzemní zásobník plynu

ČTK

- The biggest player on the Czech gas market is the German RWE concern**, it owns** 2 key companies:
  - **RWE Transgas, a.s.** (gas and power trader, responsible for two contracts for the purchase of natural gas from Russia and Norway)
  - **NET4GAS, s.r.o.** (owner of the gas network in the Czech Republic that procures the transit of Russian natural gas to Western European countries as well as supplies gas to particular regions through the pipeline system, RWE decided to sell NET4GAS, s. r. o. for more than 41 billion CZK to the Consortium of German Allianz Insurance Company and Canadian Borealis Investment Fund in 2012)
  - **RWE Gas Storage, s.r.o.** (the biggest owner of underground natural gas storage facilities, 6 of 9)

- Other important players include:
  - *Česká plynárenská, a.s.* (gas trader, the company focuses solely on direct supplies to licensed natural gas traders and on small and middle businesses with many off-take points)
  - *E.ON Česká republika s.r.o.* (provides the regional distribution network and supplies to local customers in the South Bohemian Region since 2007)
  - ~~*VEMEX s.r.o.*~~ (is the main alternative supplier of natural gas in the Czech Republic. At the end of April 2010, VEMEX acquired 10% of the Czech natural gas market . The German company ZMB GmbH is a majority owner of VEMEX (51%) and is fully owned by the Russian OAO Gazprom. The remaining share is split between the companies Centrex Europe Energy & Gas AG, which owns 33 % of stocks, and EW East-West Consult AG with a roughly 16 % share.) Because of serious debts in 2018 shut down and was taken over by *Wingas* (also Gazprom).

- The Czech system of gas pipeline operators who participate in the gas market is constituted by three different kinds of players: those involved in gas transit, gas distribution and gas sales :

- 1) The current holder of an exclusive license for gas transit is NET4GAS, s. r. o., which operates more than 3600 km of gas pipeline

- 2) Eight operators of regional distribution networks, who own their own facilities, are directly connected to the transit network

- 3) more than 80 operators of local distribution networks, who own their own facilities, are not connected to the transit network

- 4) Gas traders

- Trade with gas is specific in that it proceeds on the bases of long term contracts, in spite of the developing EU liberalization activities

- 96% of natural gas supplies are provided by two companies.
  - Moravske naftove doly, a. s. procures the supplies from domestic production. These amount to less than 1% of the demand in total.

  - RWE Transgas, a. s. has concluded contracts with OOO Gazprom Export, the supplier of Russian gas, until 2035 and with a consortium of Norwegian producers (ExxonMobil Production Norway Inc., Statoil Hydro ASA, Norske ConocoPhillips AS, TOTAL E&P NORGE AS, ENI Norge AS) until 2017.

  - WINGAS GmbH & Co.KG. (formerly VEMEX s. r. o.) has contracts with OOO Gazprom Export until 2012 with a possibility of further extension.

  - Since 2008, other companies have also started to import natural gas to the Czech Republic: **Ceska plynarenska, a. s**., which obtained the purchase contract for gas in Norway (0.1 % of total Czech import of natural gas in 2008), company **Lumius**, spol. s r. o., which buys natural gas mainly in Germany (0.5 % of total Czech import of natural gas in 2008) and German company **WINGAS GmbH & Co.KG**. (1.7 % of total Czech import of natural gas in 2008).
  - Although the expansion of suppliers with natural gas becomes a modern trend, the extent of contracts is still rather insignificant and it does not have a major impact on the gas market.

- Since 2007 the gas sector is fully liberalised (98/30/EC, 2003/55/EC, 2009/73/EC)
- There were **122 licensed gas traders** on 1. 1. 2011
- The Czech Republic is provided with gas supplies on the basis of the long term contracts with producers, which limits its implementation of EU liberalization measures, but, on the other hand, provides stability and guarantees to both exporters and importers.
- The Czech Republic will, therefore, with great likelihood remain an important transit country, while the natural gas producers will continue using the Czech territory for transit purposes, which is by itself a safeguard of the maintenance of supplies for its own needs.
- The long term contracts with suppliers, however, limit its liberalization efforts. If the greatest part of natural gas is provided to the Czech Republic on the basis of the long term contracts, intrastate liberalization and the growth of new traders would de facto face the fact that one and the same gas is being traded only with more mediators in between.
- Almost all of the gas the gas traders sell comes from Transgas
- Liberalization is in that manner still unfinished and it will not take place in an effective manner in the forthcoming period either.

Natural Gas Consumption in the Czech Republic by sector		
Total Consumption	**8 622**	**(100 %)**
Transformation Purposes	**1 145**	**(13.3 %)**
Electricity Generation	12	
Combined Heat and Electricity Generation	506	
Heat Generation	627	
Energy Industry	**142**	**(1.6 %)**
Distribution Losses	**106**	**(1.2 %)**
Industry	**3 073**	**(35.7 %)**
Transport	**55**	**(0.6 %)**
Other Sectors	**4 101**	**(47.6 %)**
Trade and Public	1 485	
Households	2 495	
Agriculture (inc. Fishery)	81	
Other	40	
Note: 2007 data in bcm. Source: International Energy Agency, 2009f, s. IV. 116.		

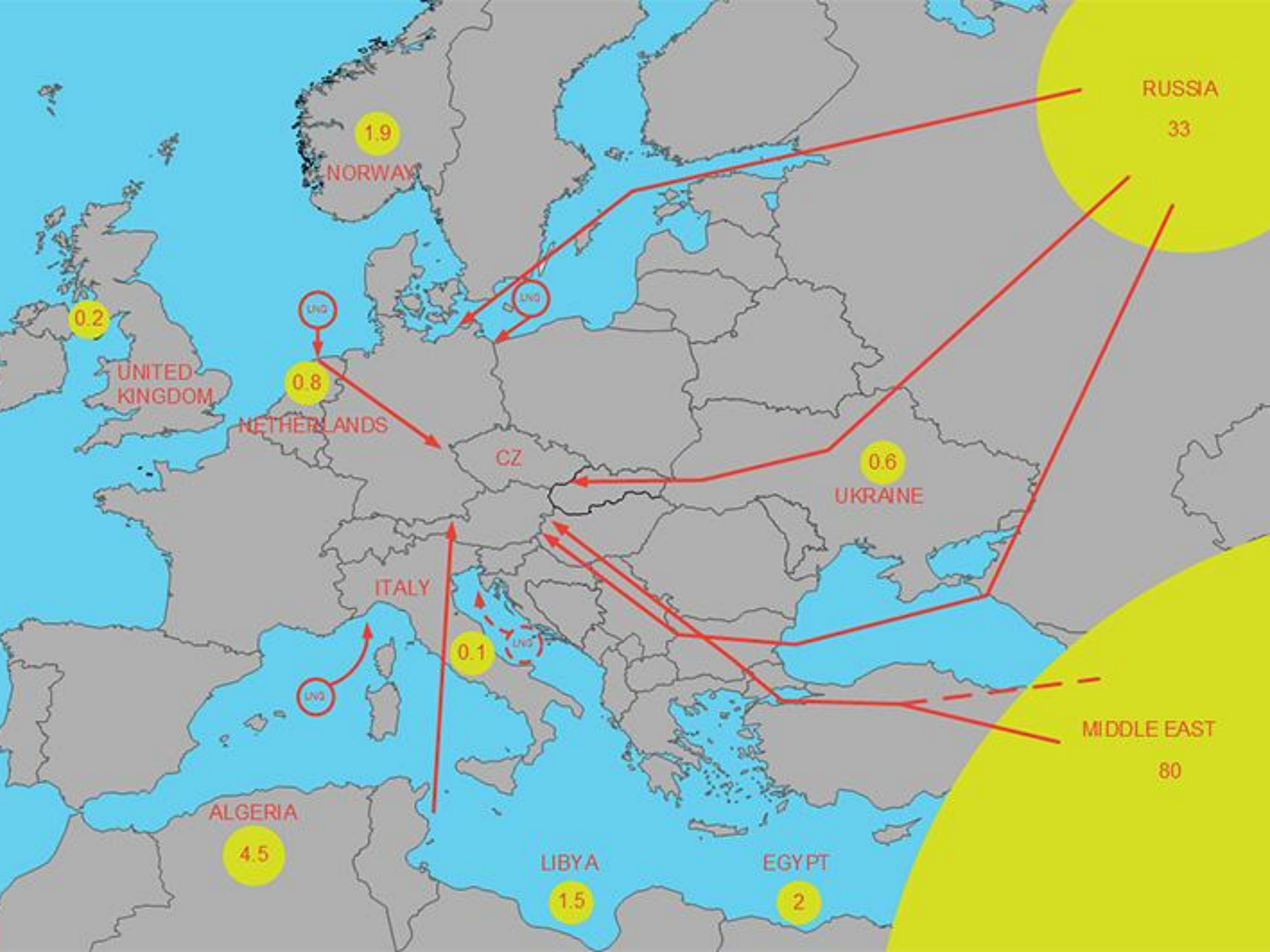
- Czech Republic as EU gas transit country

  - Geography
  - Great infrastructure (still the only reverse flow system in Eastern Europe)
  - Czech and EU projects strengthen this position

  - Enhancement of the strategic reservoirs

  - Increase in consumption due to natural gas use in electricity production and transportation

  - Infrastructure developments related to SEP 2015


RUSSIA
33
1.9
NORWAY
0.2
UNITED KINGDOM
0.8
NETHERLANDS
CZ
0.6
UKRAINE
ITALY
0.1
MIDDLE EAST
80
ALGERIA
4.5
LIBYA
1.5
EGYPT
2

Current projects in the gas sector

1 –Stork II pipeline until 2020 (connection to Poland, 7 bcm to PL, 5 bcm to CR)

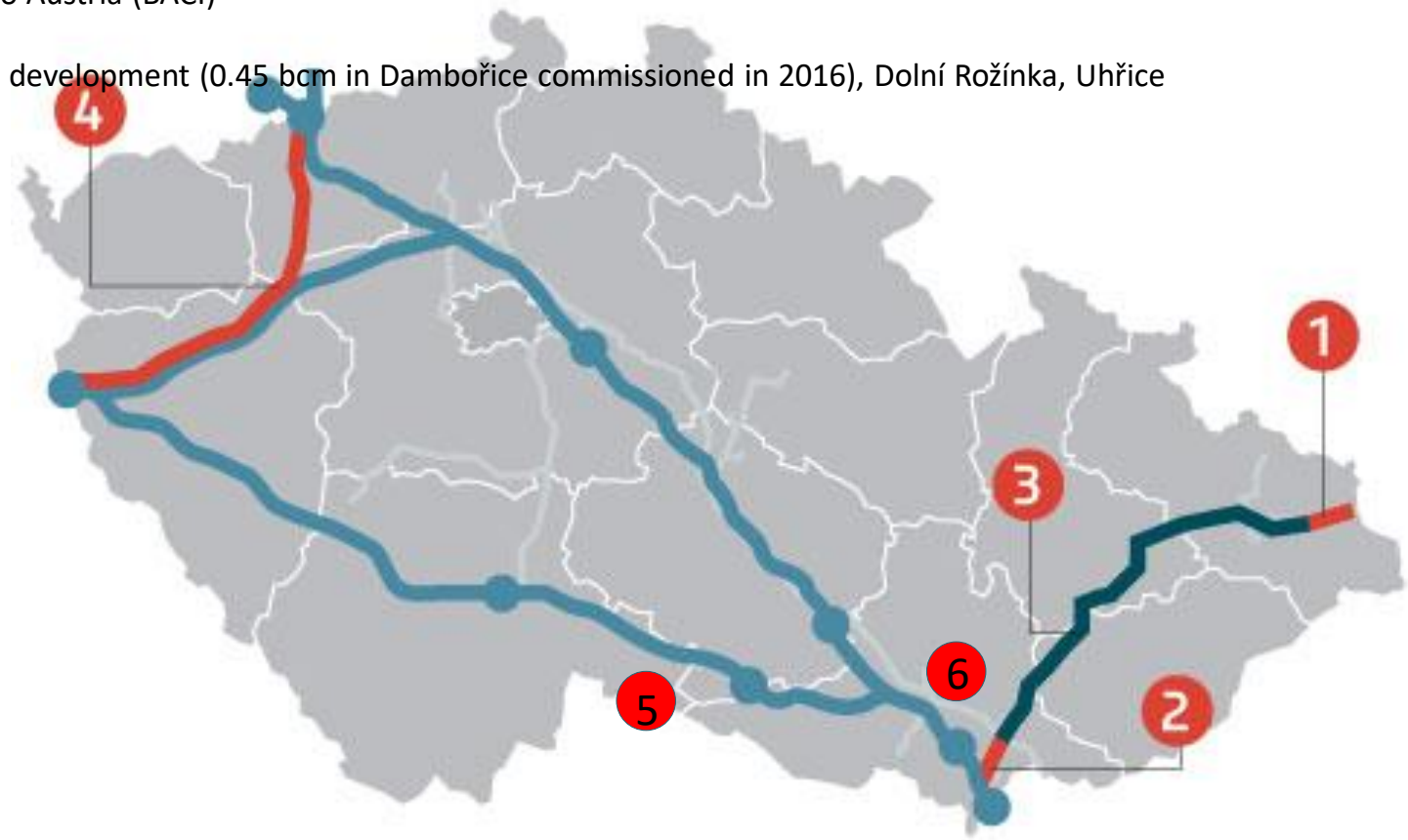
2 – Increasment of the connection of the underground reservoirs Tvrdonice and Dolni Dunajovice in the Southern Moravia to the transit system

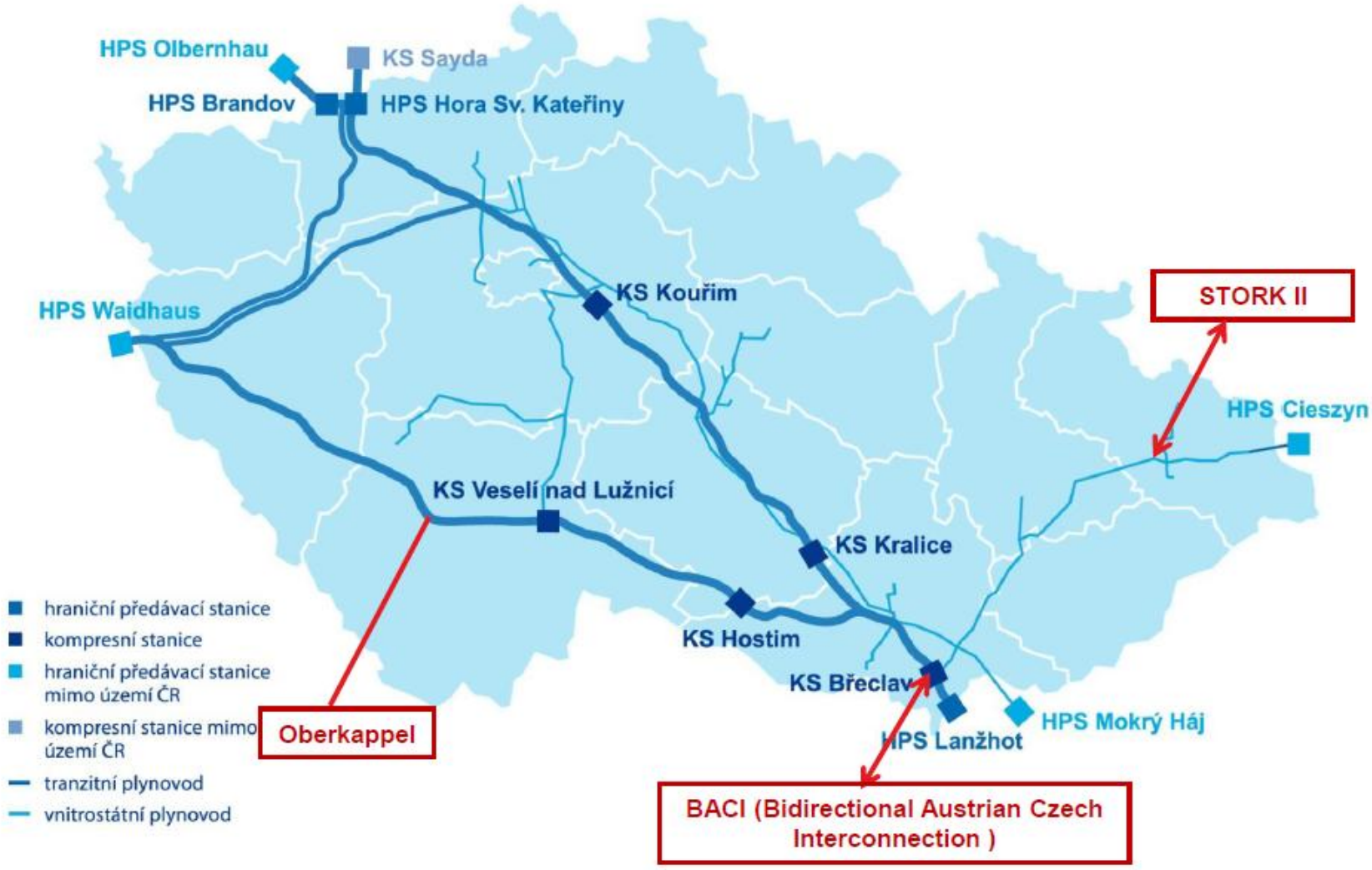
3 – North-South gas corridor enhancement and reverse flow capacity enhancement (Moravia pipeline, 32 km, 14 bcm)

4 – Gazela pipeline (166 km, Brandov-Weidhaus, 33 bcm)

5 – pipelines to Austria (BACI)

6 – reservoirs development (0.45 bcm in Dambořice commissioned in 2016), Dolní Rožínka, Uhřice





http://www.gasconnect.at/en/Fuer-Kunden/Sales-Transmission%20neu/Netzentwicklungsplanung/BACI

Planned Projects to Increase the Capacity of Existing Reservoirs or to Develop New Underground Gas Storage Facilities in the Czech Republic

Reservoir	Owner and Investor	Increase in Capacity (mcm)	Year of Completion of the Project
Lobodice	RWE Gas Storage, s. r. o.	-	-
Tvrdonice	RWE Gas Storage, s. r. o.	+ 45 +105	April 1st, 2010 2012
Štramberk	RWE Gas Storage, s. r. o.	-	-
Dolní Dunajovice	RWE Gas Storage, s. r. o.	-	-
Háje	RWE Gas Storage, s. r. o.	+ 14	2014
Třanovice	RWE Gas Storage, s. r. o.	+ 290	2012
Uhřice	Moravské naftové doly, a. s.	+ 150	2012
Dolní Bojanovice	SPP Bohemia, a. s.	-	-
Rožná - Julie	Česká plynárenská, a. s., investor GSCeP, a. s.	80	2017-2018
Rožná - Sára	Česká plynárenská, a. s., investor GSCeP, a. s.	100	2017-2018
Okrouhlá Radouň - Helena	Česká plynárenská, a. s., investor GSCeP, a. s.	100-150	2015-2016
Dambořice	Moravské naftové doly, a. s., with Gazprom Germania	448	2016
Total new capacities in the Czech Republic:		**1332-1382**	2018
Prospective total capacities in the Czech Republic (including the existing ones):		**4409-4459**	2018
Prospective total capacities of the Czech Republic (including Láb I-III):		**4909-4959**	2018

Source: compiled by author.

- The capacity of the reservoirs is about was increased to 4.3 bcm by 2018 and thus cover almost half of the annual consumption of the country.