

EuropeAid 2008/155-683

Transport dialogue and interoperability

between the EU and its neighbouring countries and Central Asian countries

*TRACECA – Freight Model
Forecast Land Use Data Assumptions*

October 2010



This project is implemented by
TRT Trasporti e Territorio, Alfen Consult GmbH, Dornier Consulting GmbH and PTV AG

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1 Introduction

The TRACECA IDEA Project is currently developing a multimodal freight model for the TRACECA area. This includes a base year model for 2008 as well as forecast models for the time horizons 2020 and 2030. Intensive investigations for base year land use data input have been commenced and have been finalized in large parts.

This document comprises the essential input data for the forecast demand model, including:

- ▶ Population development
- ▶ Economic development
- ▶ Industrial development

Own investigations and assumptions for population development and economic development are presented in Sections 2.1 and 2.2 requiring an official approval to use this data as input for the forecast models.

Furthermore, additional data input is requested for industrial development and potential target values for transit flows between Europe and Asia.

To allow for a seamless progress after finalizing the base year model, an official approval of the proposed forecast data (including modifications of the assumptions where appropriate) as well as the provision of the requested data input is required by 31st of March 2010.

2 Assumptions on Forecast Land Use Data

The freight demand model calculates the demand mainly based on generation and consumption rates of inhabitants. Having different population groups with specific rates, the demand is highly influenced by population and prosperity development. Thus, the following assumptions on population and economic development are crucial input data for splitting the population into different prosperity groups, which in turn has important impact on the generated forecast demand.

2.1 Population Data

The proposed population data is available on national level from unitary UN data source. A breakdown to regional level will be conducted according to the land use data structure on traffic zone level of the base year.

Armenia

The proposed population development for Armenia is demonstrated in Table 1 and Figure 1. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	3,065	1,084	1,981	2,025
2010	3,090	1,082	2,008	2,124
2015	3,139	1,067	2,072	2,134
2020	3,175	1,028	2,147	2,109
2025	3,181	961	2,220	2,060
2030	3,170	879	2,291	2,028

Table 1: Population Forecast Armenia (Source: UN World Population Prospects)

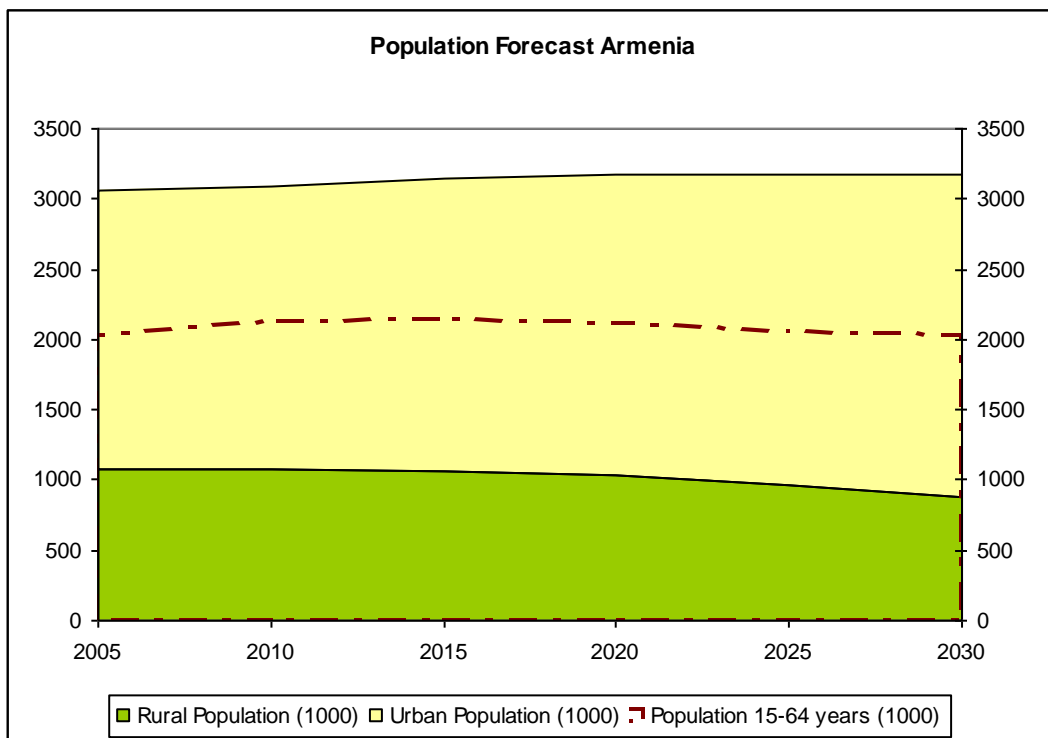


Figure 1: Population Forecast Armenia (Source: UN World Population Prospects)

Azerbaijan

The proposed population development for Armenia is demonstrated in Table 2 and Figure 2. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	8,453	4,079	4,374	5,633
2010	8,934	4,208	4,726	6,208
2015	9,426	4,284	5,142	6,567
2020	9,838	4,280	5,558	6,732
2025	10,128	4,170	5,958	6,860
2030	10,323	3,959	6,364	6,937

Table 2: Population Forecast Azerbaijan (Source: UN World Population Prospects)

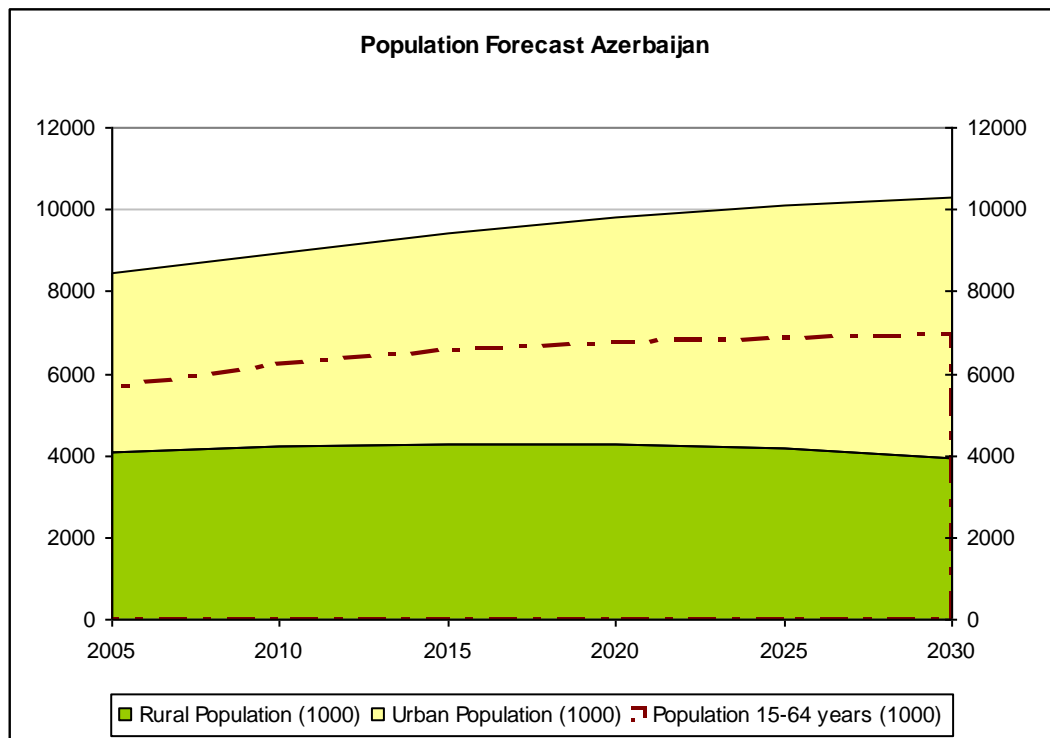


Figure 2: Population Forecast Azerbaijan (Source: UN World Population Prospects)

Bulgaria

The proposed population development for Bulgaria is demonstrated in Table 3 and Figure 3. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	7,739	2,317	5,422	5,348
2010	7,497	2,135	5,362	5,166
2015	7,263	1,946	5,317	4,841
2020	7,017	1,755	5,262	4,555
2025	6,752	1,564	5,188	4,322
2030	6,469	1,384	5,085	4,107

Table 3: Population Forecast Bulgaria (Source: UN World Population Prospects)

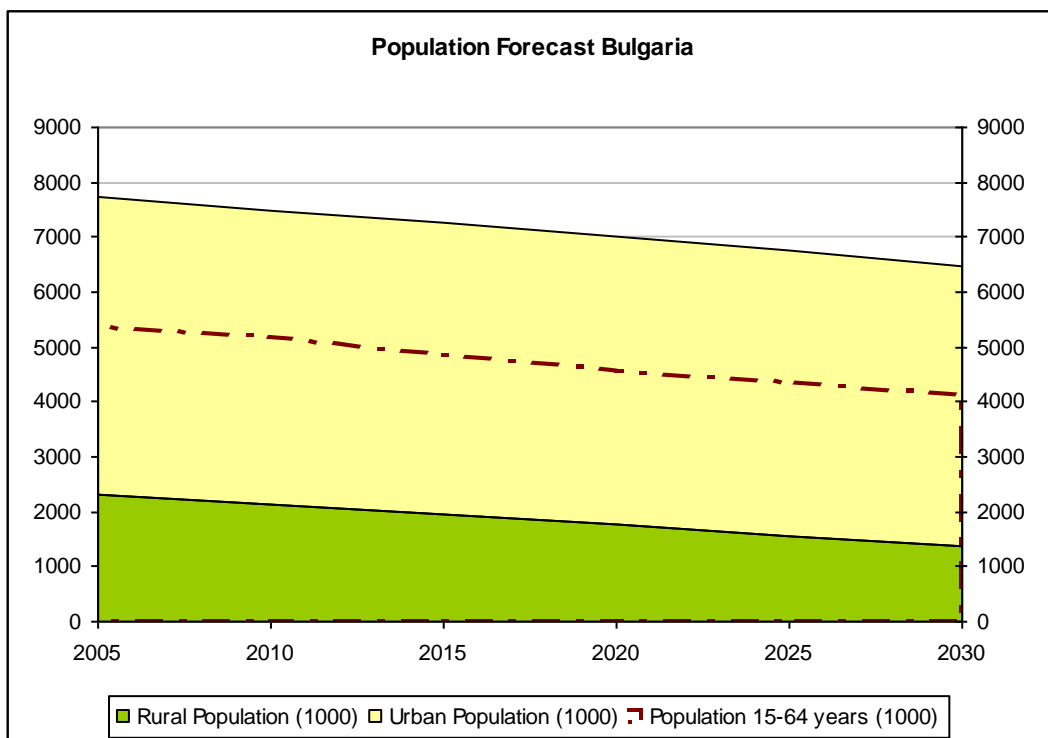


Figure 3: Population Forecast Bulgaria (Source: UN World Population Prospects)

Georgia

The proposed population development for Georgia is demonstrated in Table 4 and Figure 4. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	4,465	2,138	2,327	2,997
2010	4,219	2,033	2,186	2,912
2015	4,084	1,933	2,151	2,784
2020	3,982	1,808	2,174	2,647
2025	3,888	1,657	2,231	2,525
2030	3,779	1,487	2,292	2,390

Table 4: Population Forecast Georgia (Source: UN World Population Prospects)

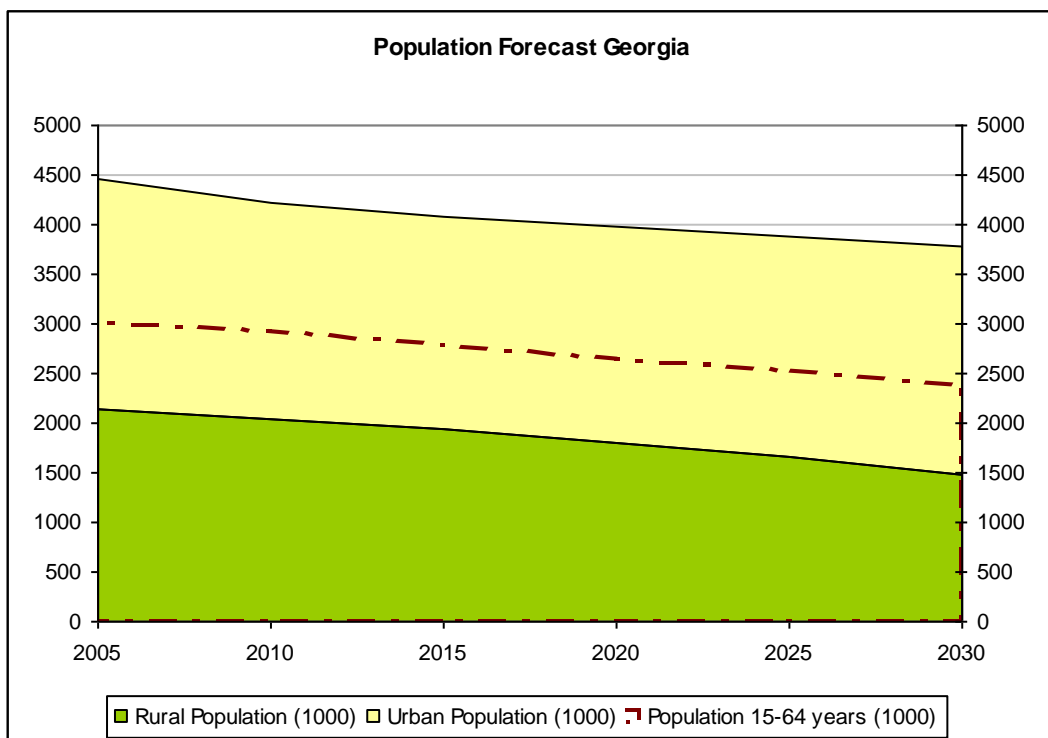


Figure 4: Population Forecast Georgia (Source: UN World Population Prospects)

Kazakhstan

The proposed population development for Kazakhstan is demonstrated in Table 5 and Figure 5. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	15,194	6,328	8,866	10,305
2010	15,753	6,125	9,628	10,903
2015	16,289	5,913	10,376	11,044
2020	16,726	5,625	11,101	11,117
2025	17,025	5,253	11,772	11,423
2030	17,244	4,818	12,426	11,697

Table 5: Population Forecast Kazakhstan (Source: UN World Population Prospects)

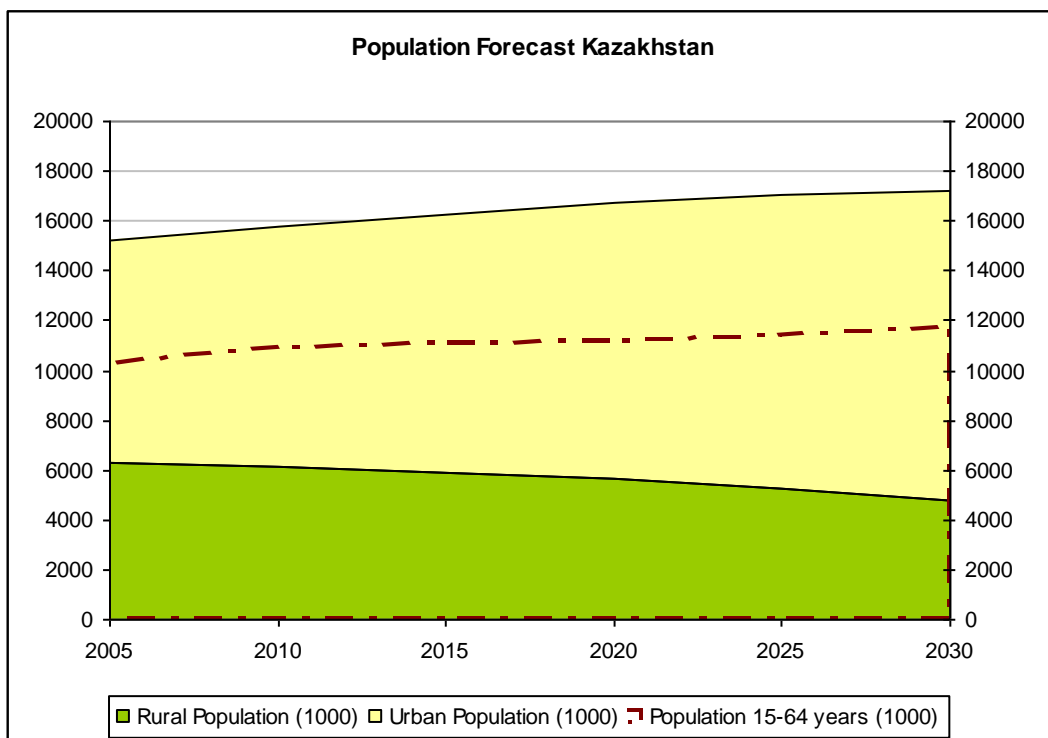


Figure 5: Population Forecast Kazakhstan (Source: UN World Population Prospects)

Kyrgyzstan

The proposed population development for Kyrgyzstan is demonstrated in Table 6 and Figure 6. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	5,221	3,379	1,842	3,283
2010	5,550	3,527	2,023	3,658
2015	5,877	3,623	2,254	3,930
2020	6,159	3,648	2,511	4,106
2025	6,378	3,590	2,788	4,299
2030	6,543	3,463	3,080	4,472

Table 6: Population Forecast Kyrgyzstan (Source: UN World Population Prospects)

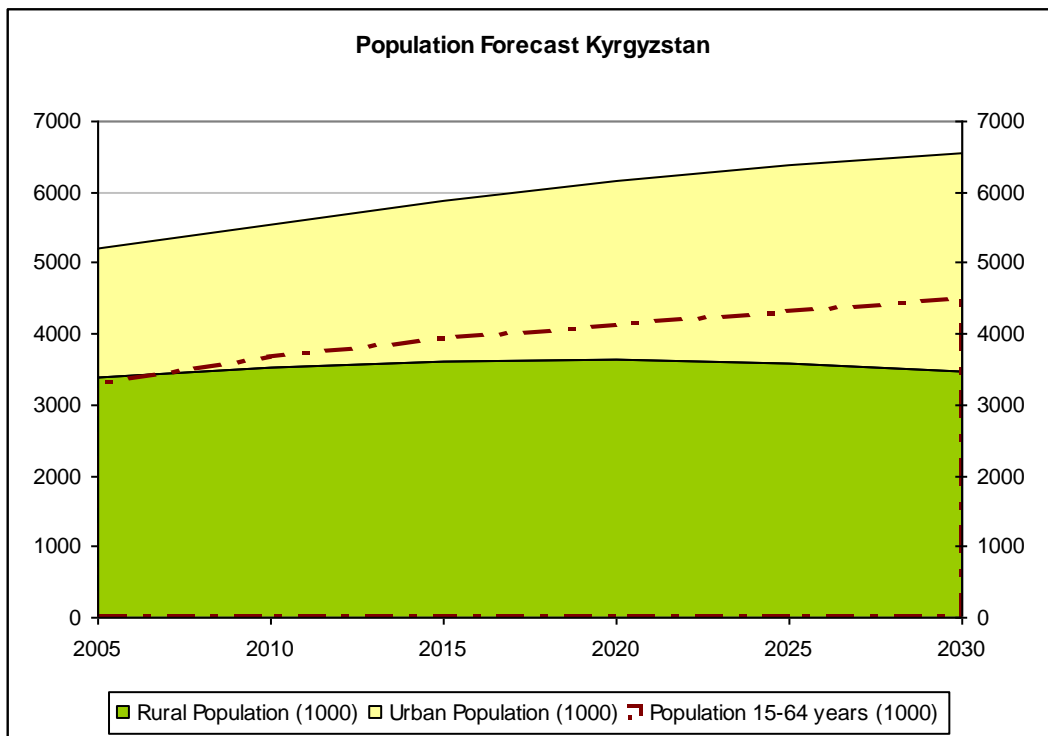


Figure 6: Population Forecast Kyrgyzstan (Source: UN World Population Prospects)

Moldova

The proposed population development for Moldova is demonstrated in Table 7 and Figure 7. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	3,759	2,243	1,516	2,629
2010	3,576	2,165	1,411	2,583
2015	3,462	2,058	1,404	2,462
2020	3,378	1,916	1,462	2,296
2025	3,291	1,755	1,536	2,182
2030	3,182	1,591	1,591	2,094

Table 7: Population Forecast Moldova (Source: UN World Population Prospects)

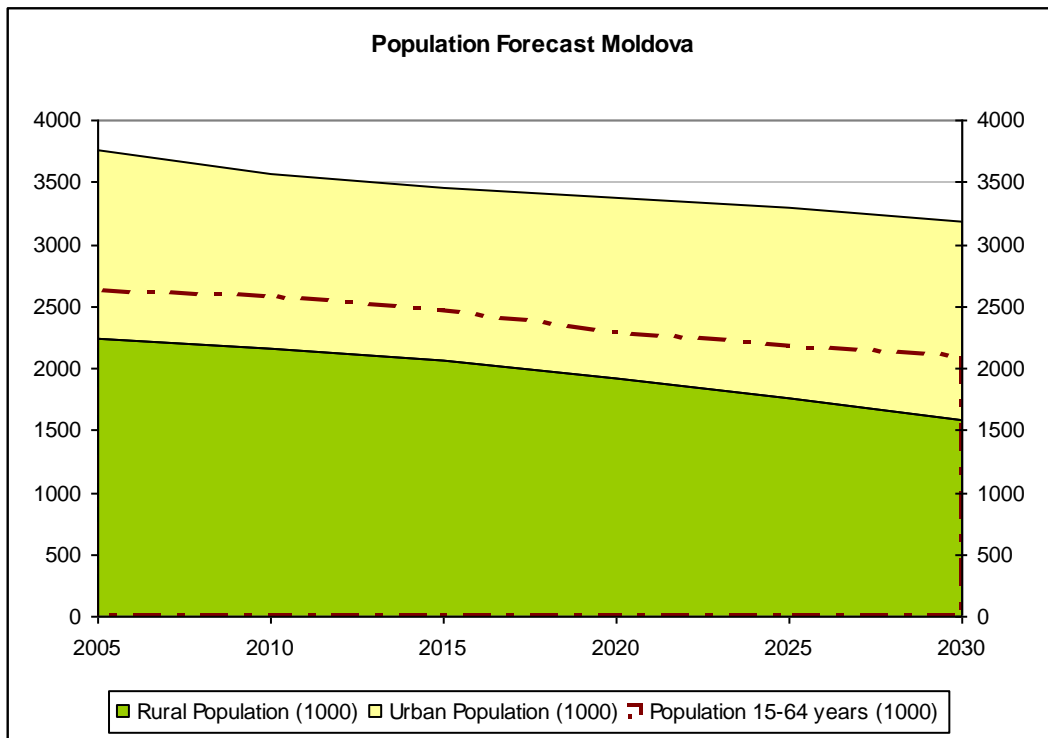


Figure 7: Population Forecast Moldova (Source: UN World Population Prospects)

Romania

The proposed population development for Romania is demonstrated in Table 8 and Figure 8. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	21,635	10,061	11,574	15,046
2010	21,190	9,654	11,536	14,816
2015	20,787	9,159	11,628	14,432
2020	20,380	8,555	11,825	13,866
2025	19,961	7,855	12,106	13,386
2030	19,489	7,110	12,379	13,139

Table 8: Population Forecast Romania (Source: UN World Population Prospects)

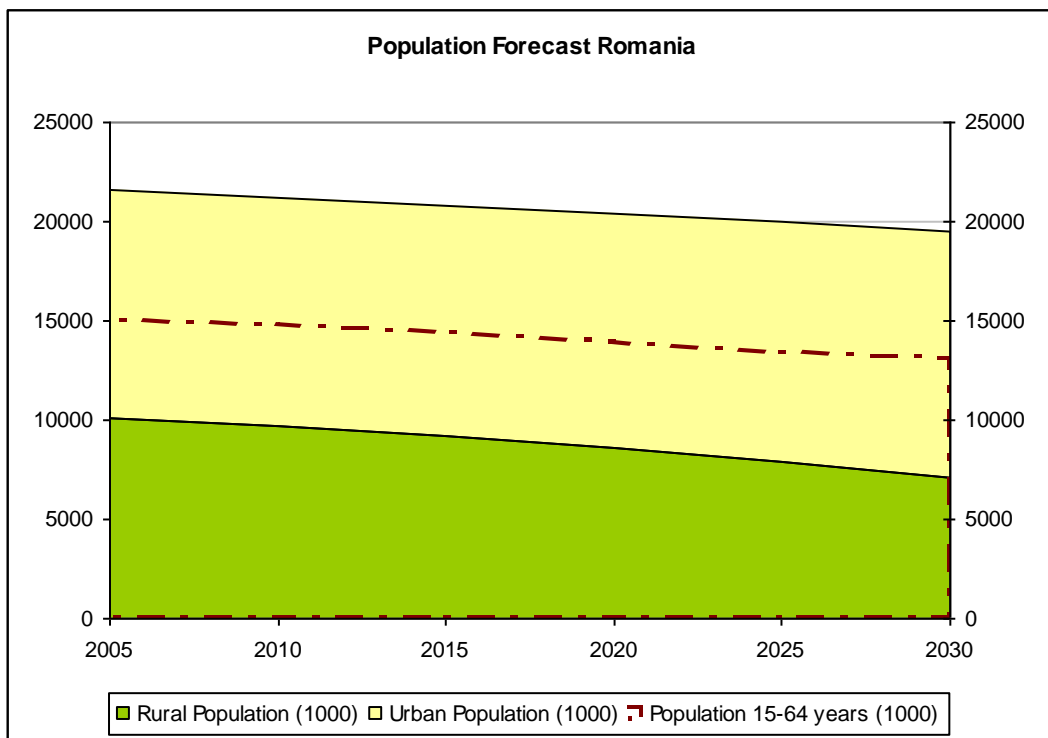


Figure 8: Population Forecast Romania (Source: UN World Population Prospects)

Tajikistan

The proposed population development for Tajikistan is demonstrated in Table 9 and Figure 9. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	6,536	4,901	1,635	3,704
2010	7,075	5,297	1,778	4,249
2015	7,761	5,733	2,028	4,836
2020	8,446	6,091	2,355	5,350
2025	9,075	6,310	2,765	5,822
2030	9,618	6,369	3,249	6,299

Table 9: Population Forecast Tajikistan (Source: UN World Population Prospects)

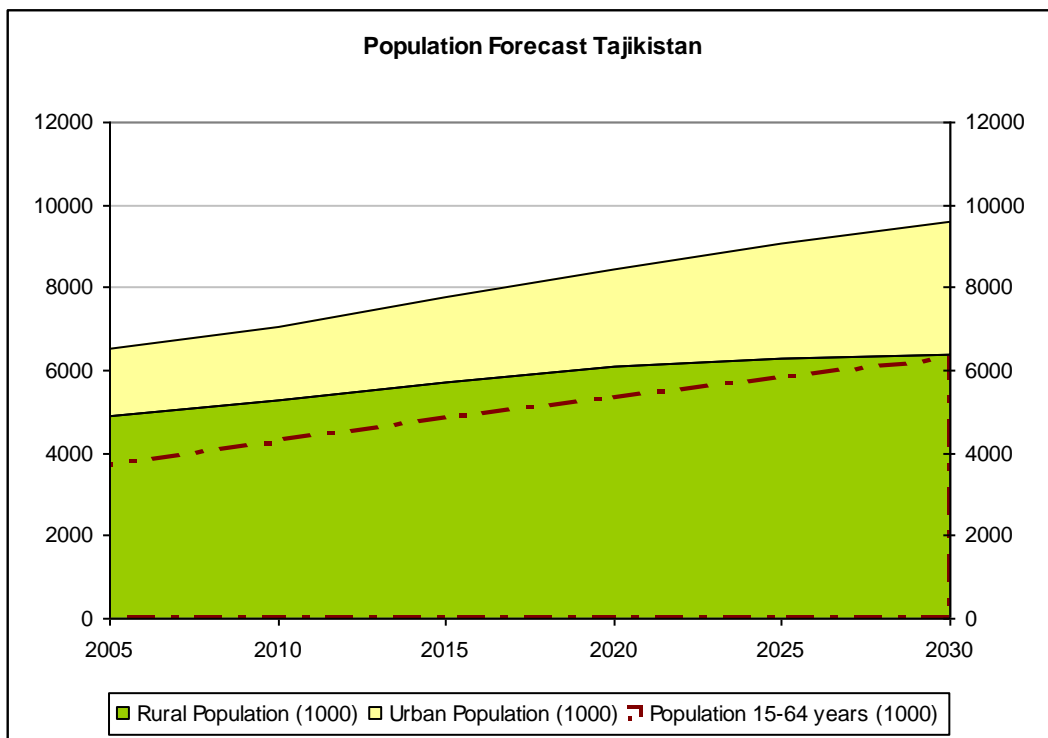


Figure 9: Population Forecast Tajikistan (Source: UN World Population Prospects)

Turkey

The proposed population development for Turkey is demonstrated in Table 10 and Figure 10. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	71,169	23,945	47,224	46,865
2010	75,705	23,698	52,007	51,206
2015	79,966	23,243	56,723	55,160
2020	83,873	22,596	61,277	58,227
2025	87,364	21,819	65,545	60,731
2030	90,375	20,908	69,467	62,502

Table 10: Population Forecast Turkey (Source: UN World Population Prospects)

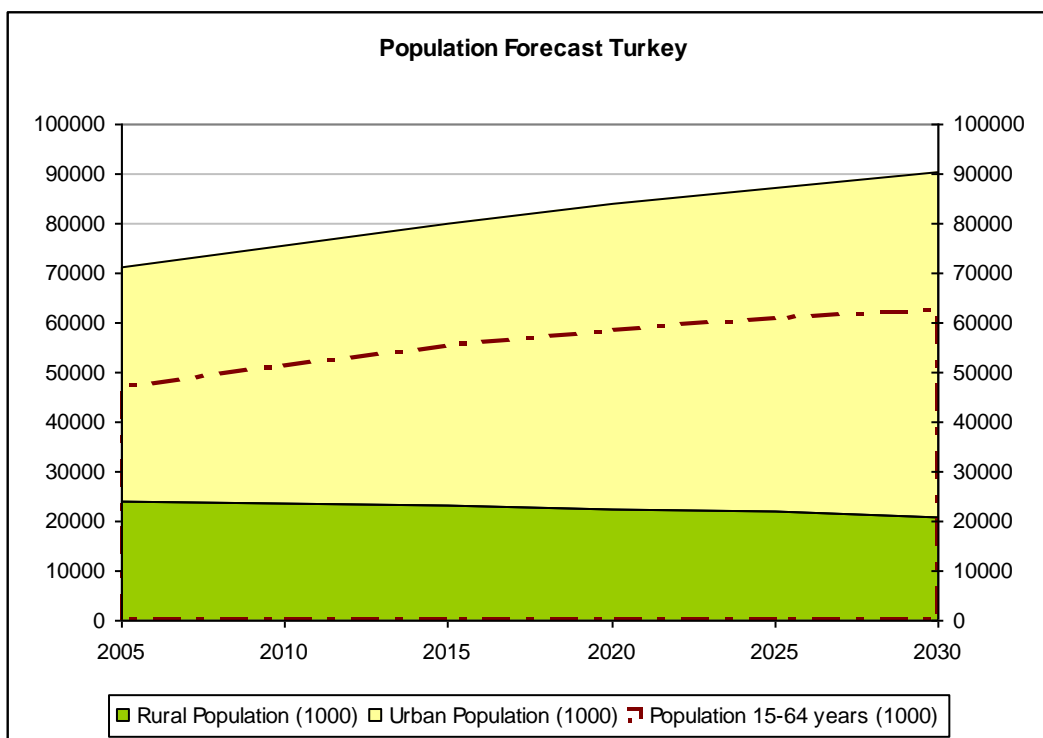


Figure 10: Population Forecast Turkey (Source: UN World Population Prospects)

Turkmenistan

The proposed population development for Turkmenistan is demonstrated in Table 11 and Figure 11. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	4,843	2,598	2,245	3,057
2010	5,177	2,678	2,499	3,460
2015	5,509	2,706	2,803	3,738
2020	5,816	2,681	3,135	3,987
2025	6,072	2,614	3,458	4,189
2030	6,276	2,513	3,763	4,364

Table 11: Population Forecast Turkmenistan (Source: UN World Population Prospects)

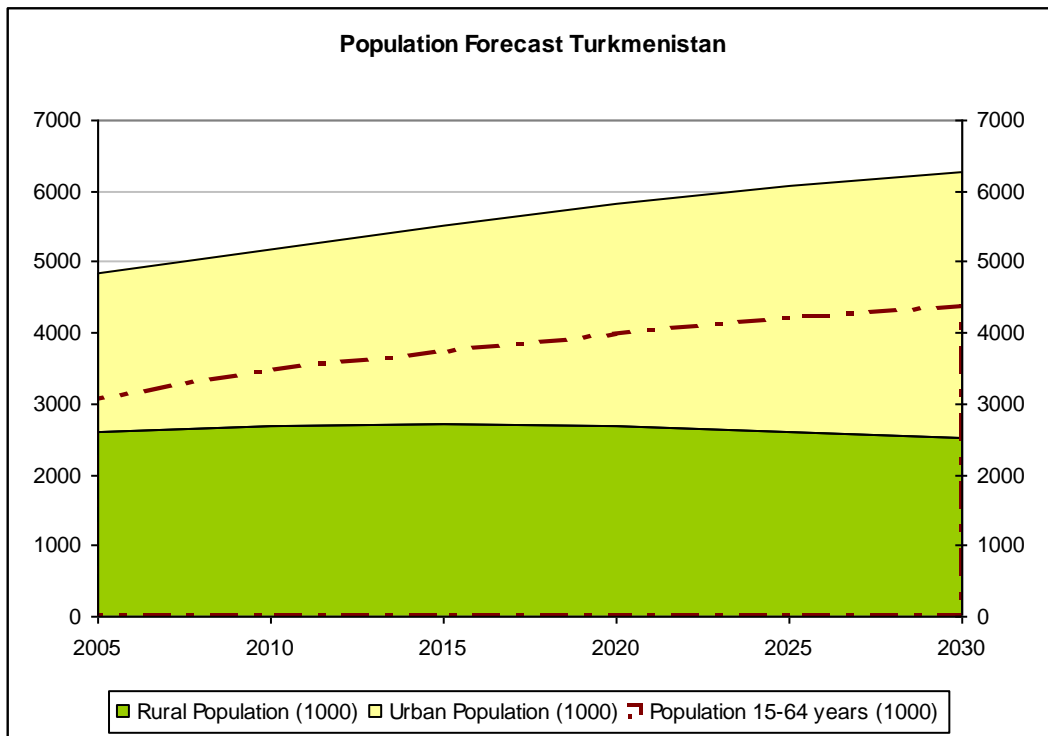


Figure 11: Population Forecast Turkmenistan (Source: UN World Population Prospects)

Ukraine

The proposed population development for Ukraine is demonstrated in Table 12 and Figure 12. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	46,936	14,971	31,965	32,508
2010	45,433	13,727	31,706	32,042
2015	44,165	12,468	31,697	30,612
2020	42,945	11,204	31,741	28,802
2025	41,617	9,934	31,683	27,178
2030	40,188	8,691	31,497	25,971

Table 12: Population Forecast Ukraine (Source: UN World Population Prospects)

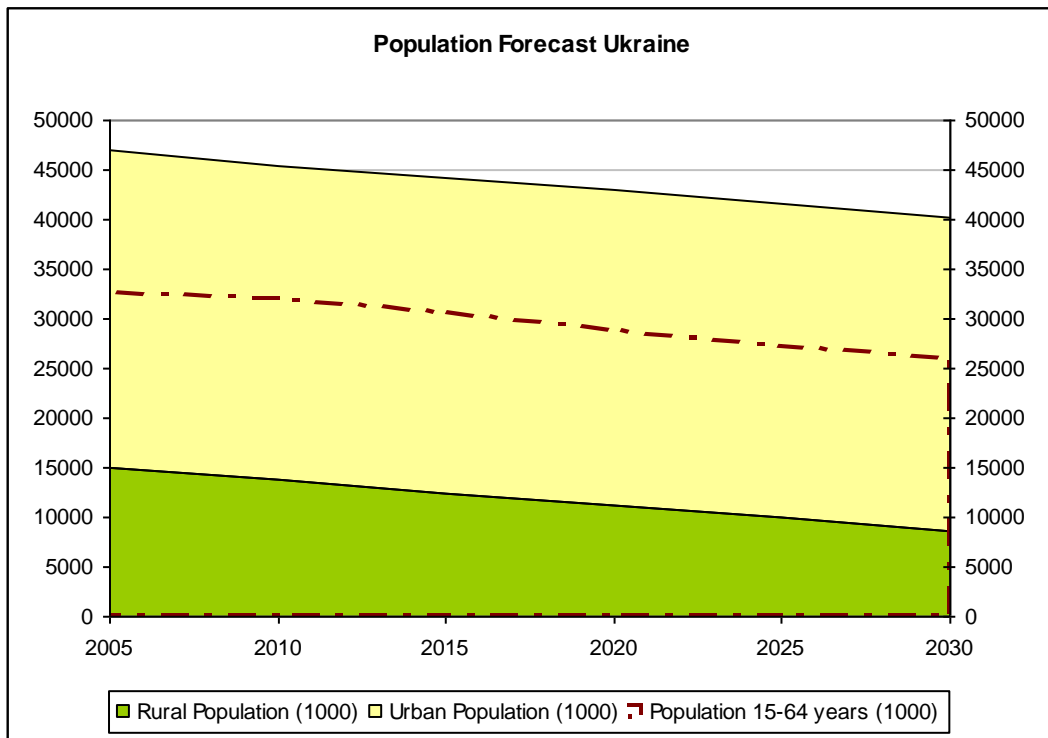


Figure 12: Population Forecast Ukraine (Source: UN World Population Prospects)

Uzbekistan

The proposed population development for Uzbekistan is demonstrated in Table 13 and Figure 13. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	26,320	16,838	9,482	16,435
2010	27,794	18,021	9,773	18,612
2015	29,456	18,993	10,463	20,268
2020	31,185	19,508	11,677	21,472
2025	32,715	19,447	13,268	22,365
2030	33,933	19,025	14,908	23,207

Table 13: Population Forecast Uzbekistan (Source: UN World Population Prospects)

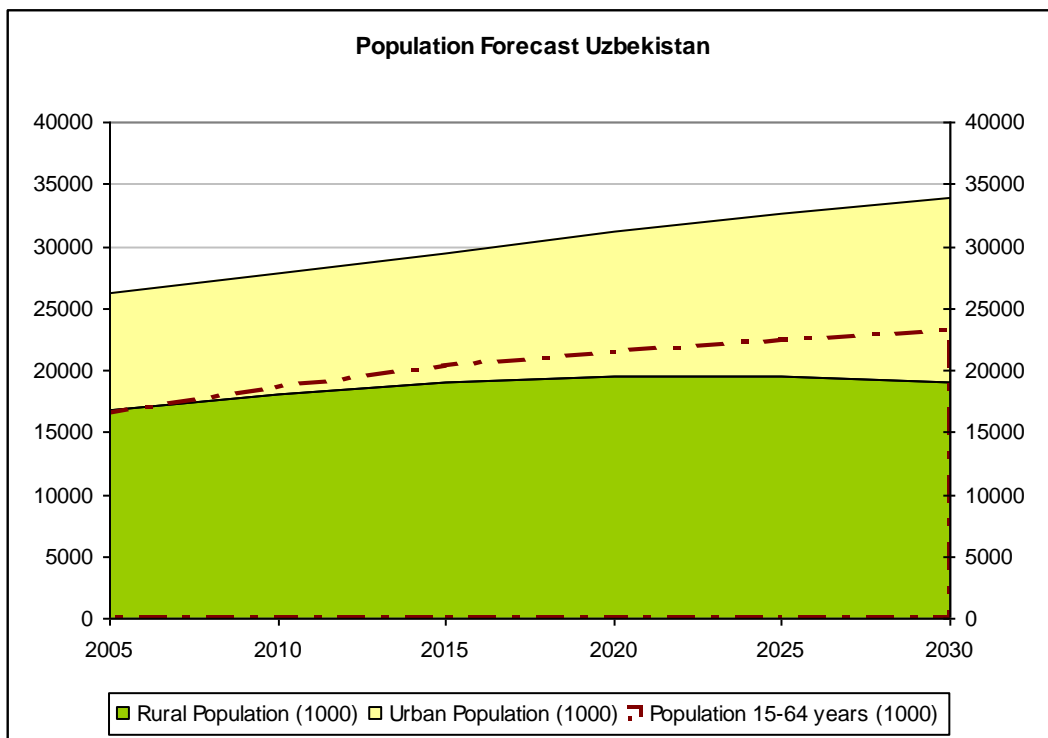


Figure 13: Population Forecast Uzbekistan (Source: UN World Population Prospects)

Russian Federation

The proposed population development for the Russian Federation is demonstrated in Table 14 and Figure 14. The population figures are taken from the UN World Population Prospects.

Year	Population (1000)			
	Total	Rural	Urban	15 - 64 Years
2005	143,170	38,672	104,498	101,828
2010	140,367	38,431	101,936	101,236
2015	137,983	37,438	100,545	96,848
2020	135,406	35,717	99,689	91,895
2025	132,345	33,348	98,997	87,392
2030	128,864	30,500	98,364	84,239

Table 14: Population Forecast Russian Federation (Source: UN World Population Prospects)

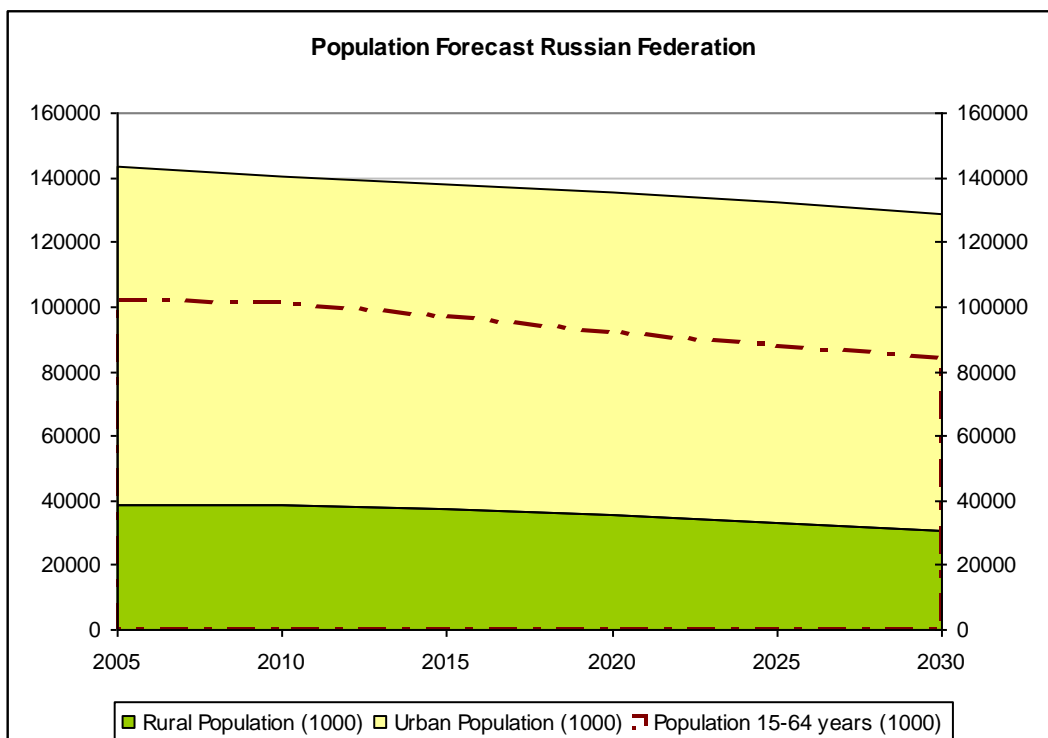


Figure 14: Population Forecast Russian Federation (Source: UN World Population Prospects)

2.2 Economic Growth

The following table demonstrates the proposed annual growth rates of the GDP and the GDP (PPP) for each TRACECA country and for Russia. In this context the GDP is defined as the gross domestic product in US Dollars considering current prices. The GDP (PPP) additionally considers the purchasing-power-parity (PPP) valuation of countries.

For the years 2009 - 2014 the figures have been taken from the World Economic Outlook Database of the International Monetary Fund. The annual growth rates for the years 2015 - 2030 are own assumptions based on the previous growth rates and the proposed population growth.

	Average Annual Growth Rate					
	2009 ¹⁾	2010 ¹⁾	2011 - 2014 ¹⁾	2015 - 2020 ²⁾	2021 - 2025 ²⁾	2026 - 2030 ²⁾
Armenia						
GDP	-27,1%	-5,1%	7,1%	7,0%	6,5%	6,0%
GDP (PPP)	-14,3%	2,8%	5,6%	5,5%	5,0%	5,0%
Azerbaijan						
GDP	-8,4%	22,1%	6,1%	7,5%	7,0%	6,0%
GDP (PPP)	9,2%	9,0%	4,1%	5,5%	5,0%	4,5%
Bulgaria						
GDP	-10,3%	1,5%	6,4%	3,5%	3,5%	3,0%
GDP (PPP)	-5,0%	-1,0%	5,9%	2,5%	2,5%	2,0%
Georgia						
GDP	-14,6%	-2,0%	7,5%	7,0%	6,5%	6,0%
GDP (PPP)	-2,5%	3,6%	6,6%	6,0%	5,5%	5,0%
Kazakhstan						
GDP	-21,1%	12,8%	13,4%	7,5%	7,0%	6,5%
GDP (PPP)	-0,5%	3,6%	8,1%	6,5%	6,0%	5,5%
Kyrgyzstan						
GDP	-7,3%	2,1%	7,3%	8,5%	8,0%	8,0%
GDP (PPP)	3,0%	4,6%	6,6%	8,0%	7,5%	7,5%
Moldova						
GDP	-11,9%	-10,9%	6,3%	6,5%	6,5%	6,0%
GDP (PPP)	-7,6%	1,5%	6,4%	6,5%	6,5%	6,0%

	Average Annual Growth Rate					
	2009 ¹⁾	2010 ¹⁾	2011 - 2014 ¹⁾	2015 - 2020 ²⁾	2021 - 2025 ²⁾	2026 - 2030 ²⁾
Romania						
GDP	-19,7%	3,3%	13,4%	5,0%	5,0%	4,5%
GDP (PPP)	-7,0%	2,0%	7,7%	5,0%	5,0%	4,5%
Tajikistan						
GDP	-10,9%	5,3%	16,0%	11,0%	10,0%	9,0%
GDP (PPP)	3,6%	4,6%	7,9%	9,5%	9,5%	9,0%
Turkey						
GDP	-18,7%	-0,5%	4,7%	5,0%	4,5%	4,5%
GDP (PPP)	-5,0%	5,3%	5,5%	6,0%	5,5%	5,5%
Turkmenistan						
GDP	-2,0%	32,7%	19,0%	10,0%	9,0%	8,0%
GDP (PPP)	5,6%	17,0%	10,3%	8,0%	7,0%	6,5%
Ukraine						
GDP	-35,6%	4,0%	4,0%	6,5%	6,5%	6,5%
GDP (PPP)	-12,7%	4,2%	6,9%	6,0%	5,5%	5,0%
Uzbekistan						
GDP	8,6%	12,9%	14,2%	10,0%	9,0%	9,0%
GDP (PPP)	8,6%	8,6%	8,3%	9,0%	8,5%	8,0%
Russia						
GDP	-25,2%	8,7%	11,8%	8,0%	7,5%	7,0%
GDP (PPP)	-6,1%	3,1%	5,8%	5,5%	5,0%	5,0%

1) Source: International Monetary Fond (World Economic Outlook Database)

2) Source: Own Assumptions

Table 15: Assumptions for Annual GDP Growth Rates per Country

A comparison of the GDP and GDP (PPP) development is shown Figure 15 and Figure 16 with 2008 as base year.

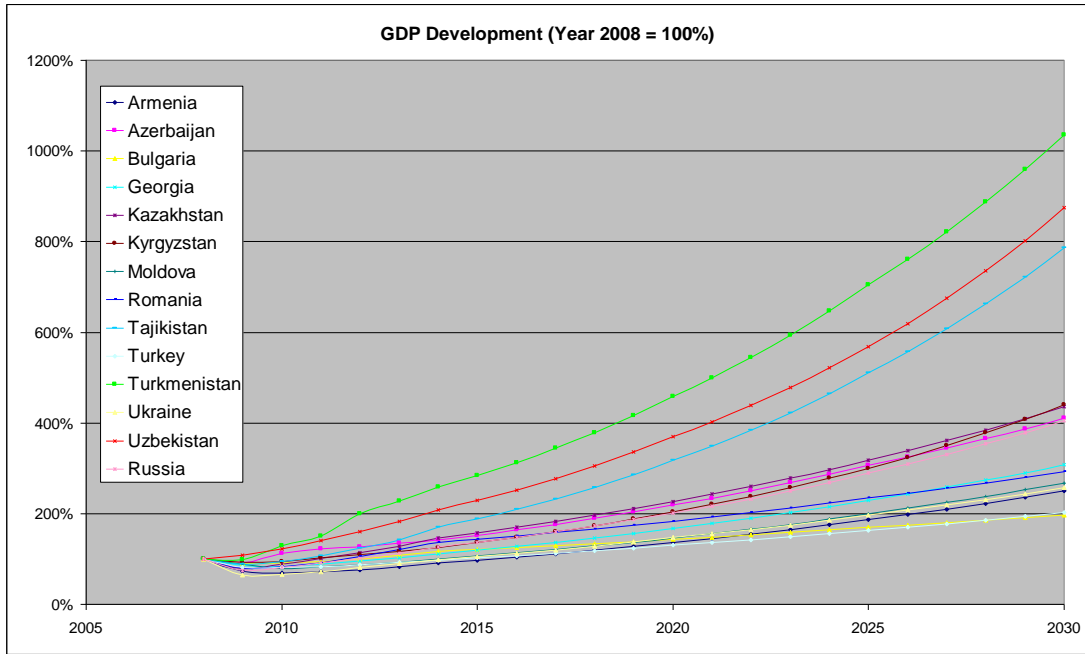


Figure 15: Comparison of GDP development (Sources: International Monetary Fund; own assumptions)

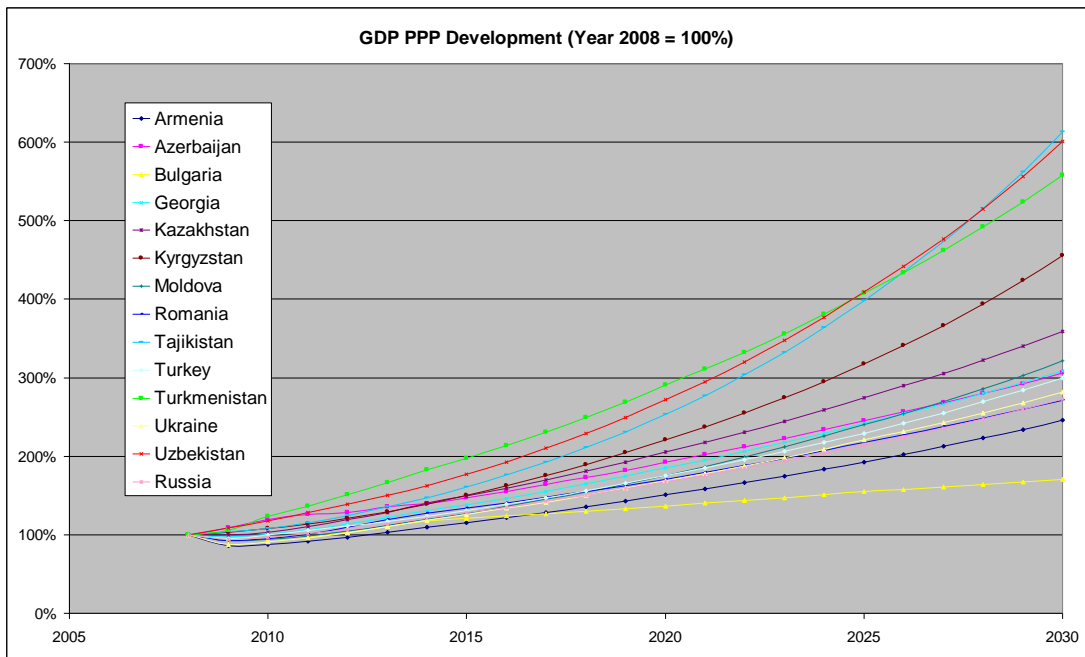


Figure 16: Comparison of GDP (PPP) development (Sources: International Monetary Fund; own assumptions)

2.3 Industrial Production

Data input from the TRACECA countries is required regarding the development of the industrial production.

This includes:

- ▶ Information about proposed major plants or industrial facilities until 2030 to
 - ▶ increase the current production capacity or
 - ▶ produce completely new products or commodities
- ▶ Major changes of output volumes of current freight generators until 2030 (e.g. mines, oil and gas fields, refineries, steel factories, other major factories, etc.)

If no information is provided, it will be assumed, that the existing industrial facilities will meet the generated demand in the future.

3 Transit Flows Europe - Far East and TRACECA countries Balance of Trade

Transit flows between Far East and Europe as well as the balance of trade of TRACECA countries do have a considerable potential influence on the transport infrastructure of the TRACECA countries and may be subject to changes on a large scale in the future.

If there are any target figures by the EU Commission for the road or rail based freight transport between Europe and Far East, this would be an important input for the forecast horizon years. Otherwise a linear growth of transport flows between Far East and Europe according to the economic development will be assumed.

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