

# Weekly Report

## Russia: Inadequate priority given to energy efficiency and climate protection

*Russian energy production has increased substantially in recent years, with production of natural gas now actually exceeding the levels reached in the early 1990s. The growth in energy production has gone hand in hand with a rise in Russian energy exports. The European Union is an extremely important sales area for Russia. Vice versa, energy deliveries from Russia account for a very sizable share of all energy supplies to Europe and Germany. Russia insists that it can continue to guarantee a stable supply of energy to Europe in the future. The energy strategy pursued in Russia foresees (similar to the energy plans of the past) significant increases in production and exports of the most important energy sources – crude oil and natural gas. Natural gas exports have remained below target to date, however. If energy export growth is to be accelerated, then besides higher investment in the energy sector, measures to improve energy efficiency and thus reduce domestic consumption are also required.*

Similar to the question of energy efficiency, little importance has been given to date in Russia to climate protection. While Russia's role was decisive for the entry into force of the Kyoto Protocol, the country is very slow to implement crucial aspects of the climate agreement at national level. This applies in particular to Joint Implementation projects, which could facilitate collaboration with foreign companies in the energy sector, especially. Russia probably has little interest at present in joining a post-Kyoto agreement because its economy – and therefore its energy consumption and greenhouse-gas emissions – are all growing robustly. Moreover, Russia views the effects of climate change on its own economy in a positive light.

### Significant growth in energy production and exports

Few areas of the Russian economy survived the transformation period of the 1990s as unscathed as the energy sector. Whereas other branches of industry suffered noticeable production losses, the declines in energy output were comparatively moderate.

Russia's primary energy output has been rising perceptibly again overall since 2000 (Table 1). The positive trend was particularly evident in the production of crude oil and natural gas in the period 2000-2006, where increases of 48% and 12%, respectively, were achieved. According to preliminary figures, in 2006 output amounted

Hella Engerer  
hengerer@diw.de

Claudia Kemfert  
ckemfert@diw.de

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to 480 million tonnes for crude oil and to 656 billion cubic meters for natural gas. Production of natural gas in the Russian Federation has thus not only returned to the levels achieved at the beginning of the transformation period, but has actually exceeded them (Figure 1).

Only some of the additional output of crude oil and natural gas is consumed within the Russian Federation, with the result that the country has been able to quantitatively increase exports of these energy sources in recent years (Table 2).<sup>1</sup> With an export volume of 203 billion cubic meters, Russia is the world's largest exporter of natural gas, while it lies in second place behind Saudi Arabia with respect to exports of mineral oil. Exports of coal and electricity, by contrast, are much less significant.

Looking at the regional breakdown of energy export volumes, it emerges that Russia mainly supplies mineral oil and natural gas to countries outside the Commonwealth of Independent States (CIS). Exports to the European Union (EU-25) account for a highly significant share.<sup>2</sup> In 2005, around 70% of Russian crude oil exports, a third of exports of mineral oil products, and 70% of natural gas exports were destined for the EU-25. All in all, both the growth and the regional distribution of Russian exports indicate that the European Union is an important sales area for Russia.

Vice versa, the European Union relies on Russia for energy supplies, and especially for natural gas (Table 3). In 2005, the EU-25 imported around 29% of its crude oil supplies and around a third of its natural gas supplies from Russia. These shares reflect the importance of Russian energy sales to the Eastern European accession countries, which relied substantially on Russian energy supplies in the past and only some of which have diversified their energy imports since then. But a large share of Germany energy supplies also originates in Russia. Around a third of German crude oil imports and over 40% of its natural gas imports came from the Russian Federation in 2005.<sup>3</sup>

1 In purely mathematical terms, domestic consumption ??of crude oil?? (output minus exports) rose in the period 2000–2005 from 178.5 million tonnes to 217 million tonnes, and thus by 22%. The difference between output and exports of natural gas amounted to around 390 billion cubic meters in 2000, compared to almost 450 billion cubic meters in 2005, which corresponds to an increase of over 15%.

2 Bulgaria and Romania joined the EU only in 2007.

3 On the importance of Russian energy exports for Europe, also cf. H. Engerer and M. Horn: "Europäische Erdgasversorgung erfordert Diversifizierung und Ausbau der Infrastruktur", Wochenbericht des DIW Berlin No. 42/2006; and U. Thießen: "Perspektiven der Wirtschaftsbeziehungen der EU zu Russland", Wochenbericht des DIW Berlin No. 16/2007.

Table 1

**Russian energy production**

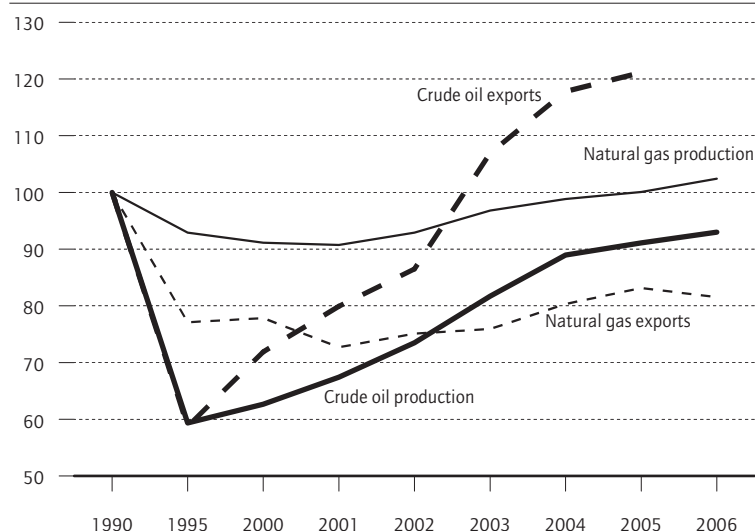
	Unit	1990	1995	2000	2001	2002	2003	2004	2005	2006
Lignite	mill. t	137.3	101.0	86.2	83.0	74.2	79.4	70.4	75.3	–
Hard coal	mill. t	257.4	161.0	172.0	187.0	182.0	197.0	211.0	223.0	–
Crude oil <sup>1</sup>	mill. t	516.2	306.3	323.4	348.1	379.3	421.7	459.2	470.3	480.0
Natural gas	bill. m <sup>3</sup>	640.5	595.0	583.6	581.2	595.0	620.0	633.0	641.0	656.0
Hydro power	bill. kWh	166.8	176.4	165.0	175.0	164.0	158.0	178.0	175.0	–
Nuclear power	bill. kWh	118.3	99.5	131.0	137.0	142.0	150.0	145.0	149.0	–

1 Including gas condensates.

Sources: Goskomstat; Bofit.

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Figure 1

**Russian production and exports of mineral oil and natural gas**  
index 1990 = 100

Sources: Goskomstat; Bofit; calculations by DIW Berlin.

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**Growing importance of the energy sector for the Russian economy**

The rise in mineral oil and natural gas prices means that exports of these energy sources have expanded even more in terms of value than in terms of quantity (Table 4). This development has also had consequences for the structure of Russian external trade. In terms of value, the share of goods exports accounted for by energy sources recently amounted to 61%.

In light of the growing energy bias of the Russian export economy and its potential consequences for the economy as a whole (for example, as a result of price fluctuations), in 2004, Russia established a "Stabilisation Fund". As demonstrated in an analysis carried out by Deutsche Bank Research, this fund alleviates the direct effects of oil-price changes on economic development.<sup>4</sup> The Stabilisation Fund is

4 Deutsche Bank Research: "Der Finanzsektor in Russland. Vielver-

financed through the revenue from crude oil exports that exceeds US \$ 20 per barrel. The global oil-price rises of recent years have sharply increased the volume of the fund, which amounted to US \$ 141 billion at the beginning of October 2007. From 2008 onwards, the Stabilisation Fund will be split into two new components – a Reserve Fund and a National Prosperity Fund.<sup>5</sup> The purpose of the Reserve Fund (like the Stabilisation Fund to date) is to dampen the effects of currency inflows and to stabilise the economy in the event of falling oil prices. The capital accumulated in the Reserve Fund is intended to amount to around 10% of Gross Domestic Product and will be invested in safe assets. The National Prosperity Fund, by contrast, will assume the function of a savings fund. Its aims are thus largely envisaged in a long-term perspective (and include, for example, intergenerational equity).<sup>6</sup> Because the fund has only been recently established and there is as yet little information available on the management and utilisation of the accumulated capital, it is difficult for the present to estimate its effectiveness.

### Uncertain future for production and export trends

Russia's energy strategy foresees further increases in production and export volumes over the coming decade.<sup>7</sup> Production figures for the vital energy sources of crude oil and natural gas have indeed corresponded to the expected scenarios. In fact, in 2005, the production volumes of these two types of energy actually reflected the respective optimistic scenarios rather than the moderate scenarios. Parallel to this, mineral oil exports also expanded, whereas natural gas exports were much less substantial than expected.

Future trends for production and exports depend on numerous factors, including extraction potential and energy reserves, investment in the energy sector and energy policy parameters, and domestic energy needs and international energy price trends. Russia's energy strategy specifies assumptions and target values concerning some of these factors.<sup>8</sup> The fol-

sprechende Entwicklung der Finanzmärkte sollte Wirtschaftswachstum langfristig stützen", Aktuelle Themen No. 402, 27 November 2007.

5 The two new funds will additionally be financed through revenue from exports of oil products and natural gas.

6 For a comparative description and discussion of such funds, cf. U. Fasano: "Review of the Experience with Oil Stabilisation and Savings Funds in Selected Countries", International Monetary Fund Working Paper No. WP/00/112; J. Davis, O. Rolando, J. D. Barnett and S. Barnett: "Stabilisation and Savings Funds for Non-renewable Resources. Experience and Fiscal Policy Implications", International Monetary Fund Occasional Paper No. 205.

7 Energeticeskaja strategija Rossii na period do 2020. Moscow, August 2003, www.minprom.gov.ru/docs/strateg/1.

8 For instance, in the moderate scenario described in the Russian energy strategy, GDP is expected to increase by 230% over the period 2000–2020 (compared to 260% in the optimistic scenario). Investment

Table 2

### Russian energy exports

	1990	1995	2000	2001	2002	2003	2004	2005	2006 <sup>1</sup>
Crude oil in mill. t	235.0	122.3	145.0	160.0	175.0	232.0	258.0	253.0	252.0
Other CIS	–	26.1	16.9	22.5	18.0	46.0	40.1	47.5	–
Other countries <sup>2</sup>	–	96.2	128.1	137.5	157.0	186.0	217.9	205.5	–
Mineral oil products in mill. t	54.0	47.5	62.7	71.0	75.0	77.0	82.4	97.1	–
Other CIS	30.0	3.5	3.5	2.5	2.0	2.8	4.1	3.9	–
Other countries <sup>2</sup>	24.0	44.0	59.2	68.5	73.0	74.2	78.3	93.2	–
Natural gas in bill. m <sup>3</sup>	249.0	192.0	193.8	181.0	187.0	189.0	200.0	207.0	203.0
Other CIS	140.0	70.0	60.0	50.0	50.0	47.0	55.1	47.5	–
Other countries <sup>2</sup>	109.0	122.0	133.8	131.0	137.0	142.0	144.9	159.5	–
Lignite in mill. t	–	–	0.3	0.2	0.1	0.1	–	–	–
Hard coal in mill. t.	–	–	1.6	2.1	3.2	3.5	–	–	–
Electricity in bill. kWh	–	–	15.1	19.6	18.0	21.1	19.2	22.6	–

<sup>1</sup> Preliminary figures.

<sup>2</sup> Primarily to the EU.

Sources: Goskomstat; Bofit.

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Table 3

### EU-25 and German imports of crude oil, mineral oil products and natural gas from the Russian Federation

	2000	2001	2002	2003	2004	2005
Volume of imports from Russia						
Crude oil in mill. t						
EU-25	109.3	128.6	146.3	162.8	179.6	177.7
Germany	–	30.3	31.6	33.5	37.1	38.2
Mineral oil products in mill. t						
EU-25	–	–	–	26.8	29.1	32.0
Deutschland	0.9	1.2	0.9	1.6	1.7	1.4
Natural gas in bill. m <sup>3</sup>						
EU-25	135.1	131.9	135.3	145.2	146.5	146.3
Germany	41.0	38.9	39.4	44.1	46.2	44.9
% share of total imports						
Crude oil and mineral oil products						
EU-25	–	–	–	34.0	36.6	35.5
Germany	–	23.5	25.9	27.5	31.4	31.8
Natural gas						
EU-25	39.0	37.2	35.3	35.9	34.5	32.2
Germany	45.7	41.9	40.8	43.9	43.3	41.7

Source: Eurostat; calculations by DIW Berlin.

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lowing issues, in particular, are given consideration in the international debate:<sup>9</sup>

in the energy sector is expected to increase by 360% over the same period (compared to 410% in the optimistic scenario). An ambitious goal is specified for energy intensity, which is expected to be less than half as strong in the year 2010 than in the year 2000 in the moderate scenario (additional improvements of between 2% and 5% are foreseen over the period 2010–2020 in the optimistic scenario).

9 Cf. R. Götz: "Prognosen für die Ölförderung in Russland", Stiftung Wissenschaft und Politik Discussion Paper, December 2005; R. Götz: "Russlands Erdgas und Europas Energiesicherheit", Stiftung Wissenschaft und Politik, SWP-Studie 21, August 2007; C. G. Gaddy: "Perspectives on the Potential of Russian Oil", Eurasian Geography and Economics No. 45/5, 346–351; L. Dienes: "Observations and the Problematic Potential of Russian Oil and the Complexities of Siberia", Eurasian Geography and Economics No. 45/5, 319–345; International Energy Agency: "Optimising Russian National Gas", Reform and Climate Policy, 2006; S.-E. Ollus: "How Much Oil Can Russia Produce? – A Study in the Russian Oil Sector", Bank of Finland, Bofit online 2004, No. 9; A. Riley: "The Coming of the Russian Gas Deficit", CEPS Policy Briefs No. 116, October 2006.

*Reserves.* Although Russia is the world's second-largest oil producer, it is ranked only seventh as regards proven reserves.<sup>10</sup> At current production levels, reserves will be consumed within about 22 years. Under this scenario, the output of large oil fields would decline, and smaller fields in more remote regions would have to be developed. Natural gas will follow a similar path, though the pace will be less rapid and the trend will be more favourable. At current production levels, natural gas reserves will last for around another 75 years.<sup>11</sup> The natural gas deposits on the Jamal peninsula mean that additional large gas fields can be developed for production. Natural gas will thus reach its production peak much later than crude oil. Nonetheless, the development of new fields will still be more costly in the future than to date.

*Investments.* Despite the ambitious goals laid out in the Russian energy strategy, investments in the energy sector have increased only slightly in recent years. They rose by an average of around 7.5% per annum between 2000 and 2005, actually stagnating towards the end of this period.<sup>12</sup> Accordingly, the share of total investments accounted for by investment in energy production has fallen constantly over time (2005: 11.8%, 2000: 16.7%). The involvement of foreigner investors in the energy sector has also declined again recently. In 2005, foreigners invested US \$ 5.1 billion in energy production (compared to US \$ 8.7 in 2004).<sup>13</sup> This only corresponds to 9.6% of total foreign investment in the Russian Federation. The reticence of foreigners is clearly a consequence of the still inadequate (energy) policy parameters.

*Energy efficiency.* The Russian energy strategy foresees a substantial improvement in energy efficiency. A reduction in domestic energy consumption could be a decisive factor in creating scope for additional energy exports (Figure 2).<sup>14</sup> A noticeable decrease in specific energy consumption has not yet become evident, however. One reason is that domestic energy prices remain highly subsidised.

10 At the end of 2006, the oil reserves classified as proven amounted to between 60 billion barrels (Oil and Gas Journal, 18. December 2006) and 79.5 billion barrels (BP Statistical Review of World Energy 2006, June 2007, [www.bp.com/liveassets/bp\\_internet/globalbp/globalbp\\_uk\\_english/reports\\_and\\_publications/statistical\\_energy\\_review\\_2007/STAGING/local\\_assets/downloads/pdf/statistical\\_review\\_of\\_world\\_energy\\_full\\_report\\_2007.pdf](http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2007/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_report_2007.pdf)). Russia's prospective resources are much larger than its proven resources, however. On the problem of classifying Russian resources, also cf. V. Kryukov and A. Moe: "Russia's Oil Industry: Risk Aversion in Risk-Prone Environment", Eurasian Geography and Economics No. 48/3, 341–357.

11 Russian natural gas reserves are estimated at 47.8 trillion cubic meters.

12 Russian statistics do not include a breakdown of investment activity in the individual sectors of the energy economy.

13 Cf. Goskomstat 2006.

14 Another long-term goal for domestic consumption is to partially substitute natural gas with coal.

Table 4

### Russian exports of mineral oil and natural gas in US \$ billions

	2000	2001	2002	2003	2004	2005
Total mineral oil	36.2	34.0	39.2	52.9	77.5	117.2
Crude oil	25.3	24.6	28.3	38.8	58.3	83.4
Oil products	10.9	9.4	10.9	14.1	19.2	33.8
Natural gas	16.7	17.8	15.9	19.9	21.9	31.3
Oil and natural gas combined	52.9	51.8	55.1	72.8	99.4	148.5
% share of goods exports	50.4	50.8	51.4	53.6	54.3	61.0

Source: Goskomstat; calculations by DIW Berlin.

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Table 5

### Production of energy sources

volumes and scenarios for the years 2005, 2010 and 2020

	Unit	Actual figures 2005	2010		2020	
			moderate	optimistic	moderate	optimistic
Crude oil	mill. t	470.3	445	490	450	520
Natural gas	bill. m <sup>3</sup>	641.0	635	665	680	730
Coal	mill. t	298.3	310	330	375	430
Electricity	bill. kWh	953.0	1 015	1 070	1 215	1 365

Sources: Russian Energy Strategy 2003; Goskomstat.

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Table 6

### Russian exports of mineral oil and natural gas

volumes and scenarios for the years 2005, 2010 and 2020

	Unit	Actual figures 2005	2010		2020	
			moderate	optimistic	moderate	optimistic
Mineralöl	mill. t	350.1	305	340	305	350
Natural gas	bill. m <sup>3</sup>	207.0	250	265	273	281

Sources: Russian Energy Strategy 2003; Goskomstat.

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All in all, what will be decisive for future energy export growth will be higher investment in Russian energy production and lower domestic energy consumption. And this applies in particular to natural gas. While the fact that Russian natural gas exports are expanding more slowly than foreseen in the country's energy strategy will not affect European energy supply in the short or medium term, bottlenecks could emerge in the long term, also because Europe competes for Russian supplies with other potential buyer countries such as China.

### Climate policy: Russia's poor relation

Russian energy policy has usually sought to increase energy production. Improved energy efficiency and climate policy goals, by comparison, have always been given lower priority. And yet Russia played a decisive role in achieving the entry into force of the Kyoto Protocol on greenhouse-gas emissions reductions. The condition for the Protocol to take effect



was that at least 55 countries, together accounting for over 55% of carbon dioxide emissions in 1990, ratify the agreement. The first condition was fulfilled in 2002 when Iceland became the 55<sup>th</sup> country to sign the Protocol; the second was fulfilled when Russia ratified it in November 2004.

Under the Kyoto Protocol, the so-called Annex B countries or regions have committed themselves to reducing greenhouse gas emissions. Thus, the European Union has agreed to reduce emissions (converted into CO<sub>2</sub> equivalents) by 8%, while Japan and Canada have committed themselves to reductions of 6% each. Russia, Ukraine and Australia are unlikely to exceed the levels they each reached in 1990. Emissions initially fell sharply in Russia subsequent to 1990 as a result of production declines, and they are unlikely to exceed 1990 levels during the period of validity of the Kyoto Protocol (2008–2010). As a result, Russia will be able to sell emissions allowances on the basis of the Kyoto Protocol (Figure 3).<sup>15</sup>

The Kyoto Protocol foresees various instruments for reducing emissions, including emissions trading and Joint Implementation (JI). The allocation of and right to trade emissions allowances are intended to lead to a decline in emissions where this is possible at a reasonable price. It is unlikely, however, that Russia will introduce emissions trading at national level in the medium term. The use of the instrument of JI, by contrast, which was developed in the context of the Kyoto Protocol especially with the eastern European countries in mind, could become important in future with respect to foreign collaboration with Russia. For example, under the JI scheme, a domestic enterprise can participate in climate protection measures in another country where emissions reductions can be achieved more easily and at lower cost and in this way acquire additional emissions credits, which it can then make use of under the emissions trading regulations. While the ratification in May 2007 of the decree on implementing JI measures created an important legal basis for the instrument in Russia,<sup>16</sup> there is still a need for additional implementing provisions before JI projects can actually commence.<sup>17</sup>

15 Cf. C. von Hirschhausen, C. Kernfert and F. Holz: "Russische Energie und Klimapolitik bleibt widersprüchlich – Herausforderungen für die EU", Wochenbericht des DIW Berlin No. 10/2005.

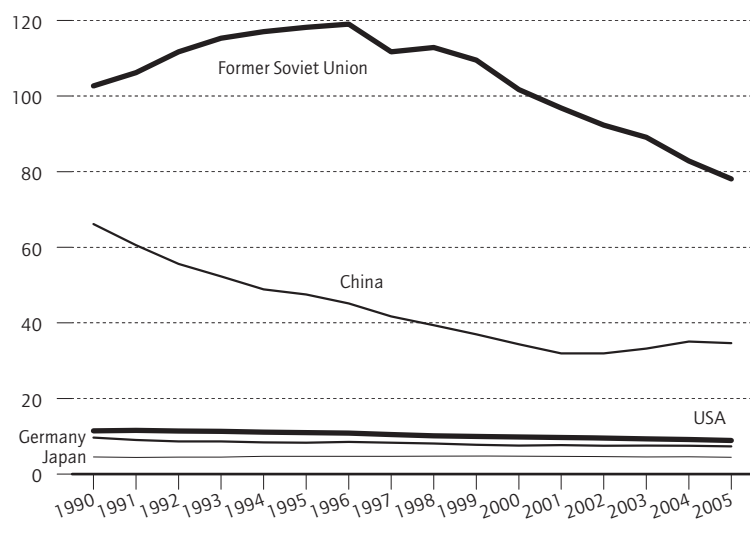
16 Postanovlenie ot 28 Maja 2007, No. 332: "O porjadke utverzdenija i proverki choda realizacii projektov", Osušestvljaemych v sootvetstvii so stat'ej 6 Kiotskovo protokola k Ramocnoj konvencii OON ob izmenenii klimata, [www.government.ru/government/governmentactivity/rfgovernmentdecisions/archive/2007/05/30/4771693.htm](http://www.government.ru/government/governmentactivity/rfgovernmentdecisions/archive/2007/05/30/4771693.htm); also cf. A. Korppoo and A. Moe: "Russian JI Procedures: More Problems Than Solutions?" Fridtjof Nansen Institute, Climate Strategies Briefing Paper, June 2007.

17 By the end of September 2007, 38 JI projects located in Russia had been submitted to the Joint Implementation Supervisory Committee (JISC). Cf. A. Korppoo: "Joint Implementation in Russia and Ukraine: Review of Projects Submitted to JISC", Fridtjof Nansen Institute, Climate

Figure 2

**Energy efficiency in selected countries**

in gigajoules per US \$ 1000 of GDP at 2000 prices



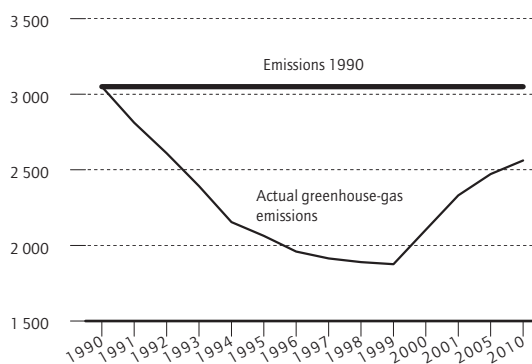
Source: International Energy Agency.

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Figure 3

**Russian greenhouse-gas emissions**

in 1000 t of CO<sub>2</sub> equivalents



Source: Russian government: National Report on the Emissions Commitments, Moscow 2007.

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Moreover, Russia's role in the coming climate policy negotiations is still uncertain. The Post-Kyoto Agreement has been rejected first and foremost up to now by rapidly growing economies, as well as by industrialised countries such as the USA and Australia. In particular, it is uncertain whether these countries will agree to concrete targets for emissions reduction or whether indexed targets, related, for example, to the intensity of emissions, will play a more important role in the new agreement. Russia is likely to find it difficult to fulfil concrete emissions reduction targets because of its current strong rate of economic growth. Moreover, Russia sees the

Strategies Briefing Paper, October 2007.

expected consequences of climate change for the country in a positive light.<sup>18</sup> Because Russia also has a major interest in continuing to export fossil energy sources, it is more likely to try to impede a Post-Kyoto strategy based on concrete emissions reduction targets.

## Conclusion

Russia has been able in recent years to once again substantially increase its production of energy. In the case of some energy sources (including natural gas), the production decreases of the 1990s have been recuperated. Exports of energy sources have also grown significantly. In the context of this trend, sales of mineral oil and natural gas to the European Union have risen sharply. Vice versa, Russian supplies have now come to represent an important quota of European energy supply. Imports from Russia account for around 29% of total crude oil imports to the EU, while the Russian share of natural gas imports amounts to a third.

The importance of the energy sector for the Russian economy has increased further in recent years.

18 Y. Izrael: "Climate: Putting Panic in Perspective", RIA Novosti No. 18, April 2007.

The share of total exports accounted for by energy exports has risen constantly. In view of the growing energy bias in its export economy, Russia needs to rethink its one-sided structural policy – at least in the long term.

The growth of energy production and exports has proceeded up to now in many areas in line with the scenarios laid out in the Russian energy strategy. However, exports of natural gas are tending to follow the moderate scenario, while it has not yet proved possible to decisively improve energy efficiency. A reduction in domestic energy consumption thus remains the central task facing Russian energy policy.

Although Russia ratified the Kyoto Protocol on climate protection, it has only partially created the conditions for its implementation. There is reason to fear that Russia, because of its strong economic growth and the resulting increase in climate gas emissions, and because of its export goals for fossil energy sources, might tend to delay the post-Kyoto process. This is also suggested by the fact that the possible consequences of climate change for Russia are frequently seen in a positive light within the country itself.