

The shadow of Chernobyl. Ukraine thirty years after the disaster

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Thirty years after the Chernobyl nuclear power plant disaster, its aftermath and consequences are still a permanent element of the economic, environmental and social situation of Ukraine, Belarus and some regions of Russia. Ukraine, to which the scope of this text is limited, experienced the most severe shock because, among other factors, the plant where the accident took place was located just 100 km away from Kyiv. Its consequences have affected the course of political developments in the country, and have become part of the newly-shaped national identity of independent Ukraine. The country bore the huge cost of the clean-up effort but did not give up on nuclear energy, and today nuclear power plants generate more than half of its electricity. The system of social benefits for people recognised as disaster survivors, which was put in place by the Soviet government, has become a huge burden on the country's budget; if implemented fully, it would account for more than 10% of total public spending, and is therefore being implemented to only a partial extent. This system has reinforced the Ukrainian people's sense of helplessness and dependence on the state. The disaster has also become part of the 'victim nation' blueprint of the Ukrainian national myth, which it has further solidified. The technological and environmental consequences of the disaster, and hence also its economic costs, will persist for centuries, while the social consequences will dissipate as the affected generation passes away. In any case, Chernobyl will remain an important part of the life of the Ukrainian state and society.

The Chernobyl disaster and its direct consequences

On 26 April 1986, a chemical explosion occurred in reactor number 4 of the Chernobyl Nuclear Power Plant, triggering the worst disaster in the history of nuclear energy and one of the worst manmade disasters in human history¹. The reasons for the incident included irresponsible actions taken by the plant operators and the technological methods employed at the RBMK-type reactor which made such an explosion possible.

¹ The collapse of the Banqiao dam in China in 1975 was the worst disaster of this kind; it claimed 171,000 lives and made around 11 million people homeless.

As a result of the explosion and the ten-day fire that followed, heavy radioactive contamination occurred in an area covering around 150,000 km² in the Soviet Union (54,000 km² in Ukraine), while light and temporary contamination affected nearly the entire globe. Two people were killed directly in the incident, 134 became seriously ill with acute radiation syndrome in the course of the rescue operation (of a total of around 200,000 involved), and 28 of them died within weeks. Within several days of the disaster, around 120,000 people were re-settled from the contaminated zone (including 91,000 in Ukraine), and by 2000, another 230,000 had been resettled (including 72,000 in Ukraine);

the numbers of people resettled were relatively low because the contamination affected areas that were not densely populated.

In 1986 a protective sarcophagus was erected over reactor number 4 in order to prevent any further emission of radioactive isotopes and allow constant monitoring of the situation inside the ruined reactor, in which processes not hitherto studied by science had been taking place. The structure was inevitably experimental in nature, and turned out to be insufficient. Since 2012, the construction of a new shield has been underway, financed largely by EU aid.

While the advocates of nuclear energy are prone to play down the negative consequences of the Chernobyl disaster, its opponents tend to exaggerate them, sometimes to absurd levels.

It is scheduled to be completed in late 2016 and will make it possible to gradually dismantle the ruins and safely dispose of the fissile material inside. The power plant continued operating for some time despite the disaster. In 1991 reactor number 2 was decommissioned, in 1996 reactor number 1 was put out of operation, and in 2000, under strong international pressure, reactor number 3, located in the direct vicinity of the sarcophagus, was decommissioned. However, that did not mean that they completely stopped functioning, only that they no longer produced electricity. The gradual removal of nuclear fuel from the reactors will be completed in 2016, and the job of processing the fuel so that it can be stored in a stable manner for millennia will take many more years (these processes cannot be accelerated because they depend on the physical transformations taking place in the fuel rods). Currently 2500 people are employed at the power plant, and several tens of thousands more work in the entire exc-

clusion zone², which covers around 2600 km². Over the thirty years that have passed since the disaster, the levels of contamination in most of the areas affected by the fallout have decreased considerably as a result of the decay of the radioactive isotopes. Currently the impact of the disaster is limited to the area directly surrounding the power plant and some very difficult-to-detect hotspots, i.e. places where the radioactive fallout was concentrated, usually as a result of rainfall in the days of the disaster; such hotspots have also been discovered in locations far away from the area under constant monitoring. In most parts of the exclusion zone, including the city of Chernobyl itself, the level of radiation measured in 2008 was markedly lower than in central Warsaw³. Since 2002 it has been possible to take part in organised trips to the exclusion zone, including the power plant itself, and a hotel has been operating in Chernobyl for several years.

The causes and consequences of the Chernobyl disaster are still the subject of disputes closely related to the debate on the future of nuclear energy. Advocates of nuclear power are prone to play down the negative consequences of the disaster, while opponents often exaggerate them, sometimes to absurd levels. On occasion journalists exacerbate the problem with their own incompetence; for instance every couple of years a report emerges claiming that a nuclear explosion took place in Chernobyl, which in reality would not have been possible in a nuclear reactor. The dispute also has a political significance: nuclear energy is opposed not only by environmental movements and organisations,

² In Ukrainian: зона відчуження; an area with a radius of around 30 km surrounding the nuclear power plant (the zone is not determined geometrically but rather based on the local radiation levels; its borders have been changed on several occasions).

³ Krzysztof Fornalski, *Jakie jest promieniowanie w Czarnobylu [What are the radiation levels in Chernobyl]*, http://www.fornalski.rootspoland.com/Jakie_jest_promieniowanie_w_Czarnobylu.pdf accessed on 18 April 2016. The paper is a report on the research conducted by the author, a PhD candidate at the National Centre for Nuclear Research.

but also by big exporters of natural gas, including Russia and the Arab states, which currently offers the principal alternative to coal and nuclear energy.

Chornobyl and Ukraine's nuclear energy sector

Shortly after the disaster, the Soviet leadership scrapped the plans to further expand the Chornobyl power plant, which was initially intended to become the Soviet Union's largest nuclear power plant (in 1986 two new reactors were under construction and another five were planned), suspended the construction of the Crimean Nuclear Power Plant (which had been underway since 1975), as well as works on the plants in Kharkiv, Odessa and Chyhyryn. In 1991 the parliament of Ukraine suspended the expansion of the power plants in Zaporizhia, Khmelnytsky and Rivne, all of which were 80% complete.

Nuclear power plants currently provide around 60% of Ukraine's electricity. Their importance has increased considerably in view of the problems experienced by the coal energy sector.

Two years later, work on them was resumed. All nuclear power plants currently in operation in Ukraine are WWER-type reactors, in which an incident like the one in Chornobyl is not possible. As Ukraine started co-operating with the International Atomic Energy Agency, the country was able to modernise its nuclear safety systems, including in the older reactors. Currently two new reactors are under construction at the Khmelnytsky power plant (scheduled to be put into operation in 2018 and 2020). However, the progress of work has been stopped by the Russian reactor provider, as Ukraine broke off co-operation with Russia in 2014. Kyiv is now considering installing Czech-made reactors at

the plant. There are plans to build several new reactors, and the Ukrainian leadership is considering building new nuclear power plants, although in the current economic situation those plans are not realistic. The fact that the Ukrainian nuclear industry does not produce nuclear reactors or other necessary elements (while it does produce energy turbines) has been impeding its development potential.

Despite the trauma of the disaster, which is also shared by the Ukrainian elites, and demands to phase out all nuclear power plants, which had already been raised in the final years of the Soviet Union, Ukraine has maintained this branch of the energy sector, which accounted for 24% of its domestic electricity production in the early 1990s, 46% around the year 2000 and currently 60% (the proportion of nuclear power production has been expanding more rapidly recently because of the declining output of the coal power plants, due to disrupted anthracite supplies from the Donbas mines). The nuclear sector has gained much more significance as a result of the problems faced by Ukraine's coal energy sector in connection with the war.

Ukraine does not possess the technology needed to handle the whole cycle of nuclear fuel processing. It mines considerable quantities of uranium ore (around 800–900 tonnes of uranium, mainly in Zhovti Vody, Dnipropetrovsk oblast), which it preliminarily enriches; it then sends the concentrate to Russia, the only state in the post-Soviet area with the capacity to produce fuel rods for reactors.

After the cycle is completed, the spent fuel is again sent to Russia to be processed before it can be safely put into long-term storage; this process has been disrupted on several occasions in connection with tensions between Kyiv and Moscow. As of 2018, the processed fuel rods are to be returned to Ukraine for permanent storage (this refers to fuel that has been through the entire cycle in a reactor; rods whose usage has been prematurely interrupted require a different

approach). To this end, a nuclear storage site has been established at the Zaporizhia nuclear power plant, and a new one is under construction in the Chernobyl exclusion zone.

The Chernobyl zone offers a rare opportunity to observe changes that occur in the natural environment once there is no more pressure from human development, which was relatively low in the area even before the disaster.

Ukraine has attempted to end its dependence on the supplies of nuclear fuel from Russia; in 2008 it started co-operation with the US-Japanese Westinghouse concern, but the initiative has stumbled on serious technological difficulties. US-made rods have been used on an experimental basis at the South Ukrainian Nuclear Power Plant for several years. In 2014 a contract was concluded with the company to supply rods to other reactors, but its implementation is uncertain, among other reasons because of opposition from Russia. Nonetheless, in February 2016 the first batch of the company's rods, manufactured in Sweden, were delivered to the Zaporizhia nuclear power plant.

The plans the Ukrainian leadership has been considering to build a plant to produce fuel rods in Ukraine are unrealistic in the present economic situation, and would also be opposed by the United States, which does not want to see more countries developing advanced nuclear technologies.

The exclusion zone

A large part of the Chernobyl exclusion zone, which has been contaminated with uranium and plutonium isotopes, will never be habitable again. However, economic activity is possible there. Companies are already operating in the zone, processing waste of low-to-medium radio-

activity (mostly remaining waste from the 1986 rescue operation); in 2015 around 10,000 m³ of such waste was collected and secured, but its total quantity (including the waste already processed) is estimated at 2.5 million m³. There are also plans to build a plant to process highly radioactive waste, and three large disposal sites for the nuclear waste generated in Ukraine and the spent nuclear fuel returned from Russia; however, there have been problems financing the work⁴. Plans have also been developed to build a wind farm in the zone that would use the now idle energy grid built for the Chernobyl power plant. The plans for the disposal site have often been criticised in Ukraine as exacerbating the risks, but they seem reasonable; the exclusion zone is irreversibly contaminated anyway, and has an extensive contamination monitoring network. Moreover, unlike in other locations, there is no problem with protecting the local population, and with state-of-the-art construction methods it is possible to ensure that the groundwater is 100% protected (the river Pripjat runs through the exclusion zone, and further downstream it flows into the Kyiv Reservoir on the river Dnieper which, contrary to widespread belief, is not the main source of drinking water for Kyiv).

Parts of the exclusion zone and the entire, much larger, compulsory resettlement zone are habitable again and land may be safely cultivated there. Around 10,000 people live in the area (and partly also in the exclusion zone); some have been living there for twenty to twenty-five years, and some had never moved. However, it seems to make no sense to rebuild the abandoned villages in a country in which the rural population is steadily shrinking and ever

⁴ Cf. the transcript of the parliamentary hearing '30 years after Chernobyl: lessons learnt and outlook for the future' of 16 March 2016, http://static.rada.gov.ua/zakon/new/par_sl?SL160316.htm last accessed on 23 March 2016, and the interview with the head of the state Exclusion Zone Management Agency, <http://dazv.gov.ua/novini-ta-media/vsi-novyny/kerivnik-chornobilskoji-zoni-govoriti-pro-mozhlivist-prozhivannya-na-tsi-teritoriji-mi-ne-mozhemo.html> accessed on 16 April 2016.

more villages have become entirely depopulated, even in places with much better soil quality. The areas affected by the disaster were among the most underdeveloped and poorest parts of Ukraine (also in terms of infrastructure).

The very large group of those entitled to special benefits for the disaster victims (along with their family members) constitutes an important slice of the electorate, and is courted by nearly all political groups in Ukraine.

One of the Chernobyl zone's great assets is that it offers a rare opportunity to observe changes that occur in the natural environment once there is no more impact of constant human presence and activity on the environment, which was relatively low in the area even before the disaster. The changes taking place in the ecosystem of the Polesie region since 1986 have been closely studied, although more resources should be devoted to the research. In 2007 the area was declared a nature conservation site, and currently Kyiv is planning to transform parts of the zone into a UNESCO Biosphere Reserve, a move that would enable it *inter alia* to raise funds to study this natural phenomenon. Eco-tourism could probably also be developed in the area.

Social and health impacts

The Soviet state broke up five years after the disaster, and Ukraine and Belarus, the two most severely affected republics, had to continue organising and financing the clean-up operation on their own (previously it had been an all-Union task; in the years 1986-1991 around US\$17 billion from the Union budget was spent on clearing up the consequences of the disaster, compared to US\$6 billion from the budget of the Ukrainian SSR). One consequence of this

is that is not possible today to determine what happened to those who took part in the rescue operation in Chernobyl, or even compile a full list of such people, and the same applies to a large number of people resettled at that time. This renders it impossible to reliably assess the long-term health impacts of the irradiation experienced at that time.

Meanwhile the original healthcare system has collapsed and access to healthcare has become much more difficult, and the majority of people in Ukraine became dramatically impoverished in the first half of the 1990s, which also affected their health situation. The idea that any contact whatsoever with radiation must lead to disastrous consequences, which had been spread by the media and by spoken word, has reinforced the belief that anyone affected must become seriously ill, if not now then in the future.

Soon after the disaster it turned out that it was in the interest of the very large group of people entitled to welfare benefits related to the Chernobyl disaster and the subsequent clean-up effort to spread this belief. Even in Soviet times, the rescue workers and people recognised as affected by the operation were granted extra pension allowances and numerous welfare benefits; several attempts have been made since to cut those benefits, but have so far been unsuccessful. A dispute is currently underway about abolishing the benefits for people living in the so-called fourth zone (a monitored zone whose inhabitants were not resettled); Ukrainian President Petro Poroshenko has vetoed a new attempt at restoring this group's special benefits. Because allowances started to be paid out while the initial decontamination operation was still underway, many functionaries would briefly come to the contaminated zone (for just a few hours) in order to become eligible for the benefits. The beneficiary lists compiled in 1986-1988 could never be verified. Later the 'Chornobylets' status became inheritable: children of the disaster victims are entitled to free school meals (these are children born twenty

or more years after the events), a 50% reduction of communal charges, etc. The Ukrainian government has estimated that the full cost of paying for the Chernobyl welfare benefits would account for 17% of the state budget⁵, but not all of these benefits are being paid out.

‘Post-Chernobyl depression’, whose causes include certain actions by the government, the people’s ‘learned helplessness syndrome’ and the media’s tendency to amplify every piece of nonsense about Chernobyl, has been a social disease in Ukraine for many years.

The welfare benefits granted to people recognised as victims of the Chernobyl disaster were in line with the Soviet strategy of offering numerous and varied benefits and rights to reduced payments to various categories of citizens, with the intention of reinforcing their awareness that they depended on the state and that the state was the benefactor, especially of those who had done something special (from the state’s point of view). This motivation no longer applies in independent Ukraine, but the system of benefits remains, conserving the people’s Soviet habit of relying on the state instead of their own efforts. This habit has transformed into a syndrome of learned helplessness (especially among the older generation), and has been hindering social change. On the other hand, this large group of beneficiaries (along with their family members) constitutes an important slice of the electorate, which is courted by nearly all political groups in Ukraine. Any attempts at cutting their benefits are met by strong opposition from organisations of ‘Chernobyl veterans’, which constitute a strong, well organised lobbying group. There are two political parties with ‘Chernobyl’ in their names in

⁵ Transcript..., *op. cit.*

Ukraine (which are in fact lobbying groups, as are several associations of the ‘Chernobyl veterans’), and the programmes of nearly all significant political parties include special measures for the ‘Chernobyltsy’. No politicians have had the courage to say publicly that some of the benefits and discounts, especially those granted to the grandchildren of those affected thirty years ago, are not justified.

According to the newest figures, there are currently around 1.95 million people formally recognised as affected by the Chernobyl disaster in Ukraine (4.4% of the country’s population), including 108,000 disabled people and 418,000 children, and only 201,000 rescue workers. Over the last three years, the number of affected persons fell by 170,000, and the number of rescue workers by 33,000⁶. However, there are no sufficient justifications to assume that all the deaths in this group are attributable to the Chernobyl disaster.

The long-term health consequences of the incident are the subject of heated disputes. Some argue that the radiation released in the disaster has already killed tens of thousands and will kill hundreds of thousands more, while others claim that the main effect of the disaster has been to give rise to an irrational ‘radiophobia’, and that the effects of irradiation are negligible and in any case unmeasurable⁷.

There is a fairly widespread tendency to attribute the increased incidence of rheumatic diseases or diabetes to radiation, even though it is entirely unclear whether the incidence has actually increased, given the absence of epidemiological data for the period before 1986. Likewise, mental disorders in children born years after the disaster, as well as lower birth rates, have also been blamed on the consequen-

⁶ Transcript..., *op. cit.*

⁷ Detailed figures on the Chernobyl victims can be found in Paweł Sekuła, Czarnobyl. Społeczno-gospodarcze, polityczne i kulturowe konsekwencje katastrofy jądrowej dla Ukrainy [Chernobyl. Social, economic, political and cultural consequences of the nuclear disaster for Ukraine], Kraków 2014, p. 79.

ces of Chernobyl. All this is despite the fact that the quality of life and the health situation deteriorated rapidly throughout the Soviet Union in the final years of its existence, and especially

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in the first decade after its break-up, and that all the post-Communist countries subsequently experienced a demographic breakdown (which in Ukraine has been blamed on Chernobyl, too). The only soundly documented consequences of exposure to ionising radiation include the radiation syndrome (curable in its milder forms but with possible long-term effects) in the rescue workers, and a higher incidence of thyroid cancer in people who were children in 1986.

However, the health impacts of the disaster are not limited to the effects of radiation. The official propaganda which dismissed 'radiophobia' obscured another dangerous phenomenon which had already set in during the 1990s, namely 'post-Chernobyl depression' (including depression in the strict medical sense) induced by the government's actions, especially its criticism of 'radiophobia' and its attempts at blaming the consequences of other, often more serious environmental threats on the disaster, and exacerbated by the learned helplessness syndrome mentioned before as well as by the media, which jumped to amplify every new piece of nonsense about Chernobyl. 'Chernobyl depression' has been a social disease in Ukraine for many years.

The fact that most of the Chernobyl energy workers who moved to Kyiv after the disaster had already been pronounced unable to work twenty years ago, while those who remained at the power plant were in general healthy and energetic, despite being exposed to higher ra-

diation on a daily basis, may suggest that indeed some of the conditions experienced by the 'Chornobyltsy' may have a psychosomatic background⁸. Another piece of evidence suggesting there is such a background comes from a 2008 study conducted among the 'Chornobyltsy', in which as many as 30% said that they had lost the will to live after the disaster, and 40% said that they did not intend to do anything to improve their situation⁹. However, as far as the author is aware, no-one in Ukraine has comprehensively studied this phenomenon, and certainly nothing is being done to counter it.

Ukraine post-Chernobyl

The Chernobyl disaster was a greater shock for the Ukrainians than it was for the people in other republics, partly because the power plant was located only around 100 km from Kyiv and the evacuation route from Pripyat and Chernobyl ran through the city, so the evacuation effort could not be hidden from view. Unlike in Belarus and Russia, the Ukrainian elite did pay attention to the disaster. The fact that the authorities initially tried to cover it up, for instance by not cancelling the 1 May festivities, provoked a widespread outcry, and the Soviet leadership's decision to proclaim a policy of public transparency (*glasnost*) in the aftermath of the catastrophe contributed to the dynamic development of civil activities and movements, especially the environmental movement.

The 'post-Chernobyl' movements in Ukraine very quickly assumed a national character: the Ukrainian national flag, banned in Soviet times, was first publicly raised during an environmental demonstration in Kyiv on the third anniversary of the disaster. The environmental elements were soon overshadowed, and Chernobyl became one of the symbols of the Ukrainians' national fate and an argument for separating

⁸ Cf. Наталья Куриленко, Ничего не зная о Чернобыле, *Киевские ведомости*, 19 April 1996.

⁹ http://gazeta.zn.ua/HEALTH/sindrom_vechnoy_zhertvy.html

from the Soviet Union. In the first years, people fairly commonly distrusted the official reports about the causes and consequences of the disaster, and a theory spread that the explosion was a criminal act targeting the Ukrainian people. Bizarre para-scientific views or views with no basis in science were also widely circulated, such as the story about a massive number of various mutations in the contaminated area, which were largely inspired by American popular culture to which the Ukrainians gained access around that time. On the other hand, the term 'Ukraine's Golgotha' was also coined, which put the disaster in a religious context.

The very name of Chernobyl also contributed to the disaster, acquiring a nearly eschatological status. It translates as 'black weed', and is a folk name for the absinthe wormwood. In a society that was just beginning to rediscover its Christian faith, associations with the apocalyptic wormwood Star (Revelations 8:11) were inevitable, especially since the disaster had been 'prophe-sied' several years before by the distinguished and popular poet Lina Kostenko, who wrote: *And the bitter star – wormwood – descends above the river Dnieper. / Somewhere an explosion. Somewhere volcano. Ruin. Destruction*¹⁰.

Initially it was quite common for people to interpret the Chernobyl disaster as a deliberate act on the part of the Soviet authorities: some people even considered it to have been an act of genocide, or would say things like: "This disaster was a logical consequence of all the misfortunes and tragedies that the Ukrainian nation has had to endure since 1914"¹¹, or "the empire of Moscow which has treacherously laid a nuclear mine in the very heart of Ukraine..."¹². Similar voices can still be heard today, although they are rarer now. The once widespread opinion, that the Chernobyl disaster split the history of the entire world into two epochs,

'before and after', is also seldom heard today. Several tens of monuments to the Chernobyl victims have been erected in Ukraine (including five in Kyiv); most of them are monuments to the rescue workers who came from the places where the monuments are located (persons who participated in the rescue and decontamination operation, awkwardly called 'liquidators' in Ukrainian). Several museums to the disaster have been established (including one in the town of Pripjat itself, intended for tourists, and called the Museum of the Wormwood Star); and the principal hall of the Chernobyl museum in Kyiv has the character of a religious sanctuary of sorts, combining Orthodox and pagan elements. Several icons of the Chernobyl Saviour and the Mother Mary of Chernobyl have been painted, and numerous literary, visual and musical works commemorate the disaster.

The Chernobyl disaster has become inscribed into the Ukrainian national myth as an event of significance comparable to that of the *Holodomor* (the catastrophic famine of the years 1932-3 which claimed more than 3 million lives); the two events are often mentioned side by side, as the Soviet regime's crimes against the Ukrainian nation. The Chernobyl rescue workers are often referred to as 'veterans' and treated in the same way as the veterans of the war in Afghanistan (to whom the Ukrainians have also erected a large number of monuments), and even veterans of World War II. All this reinforces the Ukrainians' self-stereotyping as a victim nation, a post-genocidal people bearing an indelible trauma of fourfold genocide (the *Holodomor*, the Soviet repression, the German occupation and the Chernobyl disaster). The title of a monograph recently published in Kyiv, *The post-Chernobyl library. Post-modern literature in Ukraine*, may serve as a good illustration of this thread in the Ukrainian national elite's reflection¹³.

¹⁰ Lina Kostenko, *A terrifying kaleidoscope...*, translated by Michael M. Naydan.

¹¹ The words of the renowned historian Stanislav Kulchytsky, <http://day.kyiv.ua/uk/article/panorama-dnya/chornobil-zhittya-do-y-pislya>

¹² *Українське Слово*, No 19, 1996, cover story.

¹³ Тамара Гундорова, *Післячорнобильська бібліотека. Український літературний постмодерн*. – Київ, Критика, 2005 and 2013.

Conclusion

On the one hand, the Chernobyl disaster gave a new dynamic to the Ukrainian anti-Soviet and independence movements. On the other, however, it imposed an immense burden on the new state, hindering its potential for development. The Ukrainian budget will continue bearing the cost of mitigating the disaster's consequences for many more years (even if admittedly the cost will fall). The country will also continue to struggle with the equally serious social consequences, even if these are more difficult to measure. In a 2011 poll, up to 87% of respondents in Ukraine feared the negative health impacts of

the Chernobyl disaster, and 70% were afraid that a new nuclear plant disaster could occur¹⁴. It is not clear what the answers would be today, nearly two years into the war, which has changed priorities and social attitudes. However, even if the disaster is overshadowed by other things in the memory of the generation born after it occurred, this will not change the fact that Chernobyl has become a permanent element of the Ukrainian national identity; like other parts of it, it will continue to be discussed and reinterpreted, but will remain present.

¹⁴ A study by the Kyiv-based Gorshenin Institute, *Gorshenin Weekly*, No 14, 25 April 2011.

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