The Vienna Institute for International Economic Studies
Wiener Institut für Internationale Wirtschaftsvergleiche (WIIW)

The K2/R4 Completion Decision in light of Ukraine's Recent History of and Prospects for Economic Transition

Helen BOSS

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2C.1 Overview and problématique: to complete K2/R4 or to use the funds elsewhere in Ukraine's energy sector

Assuming the safety concerns can be adequately addressed, the decision on whether or not to recommend completion of nuclear power stations at Khmelnitsky and Rovno (K2 and R4) is by mandate intended to depend on whether the economic benefits of such an expensive project, currently costed at USD 1.725 bn (USD 865 mn for K2 alone), sufficiently outweigh the costs as to be chosen in preference to alternative projects that would refurbish Ukraine's thermal plants, hydro plants or transmission system, or promote conservation or energy efficiency in the economy.

2C.1.1 Importance of reassuring Ukraine that MOU funding commitments firm

It apparently needs to be stressed to all involved that the some USD 1.8 bn worth of funds committed in the August 1996 final Memorandum of Understanding on the closing of Chernobyl[1] will still be available for projects in the energy sector if it is found that completing K2 and R4 would not be least-cost.

Otherwise there is a risk that what ought to be an economic decision about how best to allocate scarce investment funds that have alternative uses will be subordinated to decisions dominated by geo-strategic or other non-economic factors.

If it is fair to assume that a 'hidden agenda' may affect the final decision, it might be wise to ensure that it can accommodate the possibility that geo-strategic and non-economic concerns may be more successfully addressed were the funds spent to upgrade existing parts of the energy sector rather than adding capacity at K2 and R4. There appears to be an unspoken fear that if K2 and R4 are not approved, Ukraine will lose out, economically or in some wider fashion. Ukraine deserves renewed assurance from the donor agencies and G-7 governments involved that their commitments to help Ukraine solve its energy problem will not be reduced in either amount or sequence should K2/R4 be rejected on least-cost grounds.

2C.1.2 Main reasons why K2/R4 may not be least-cost

As exhaustively analysed by the Surrey panel in its February 1997 reports to the European Commission and by its main authors' August 1998 reports to the Austrian Energy Agency[2], there are many reasons to doubt that completing the plants will be economic. The Stone & Webster Consultancy's May 1998 results on cost obtained using the EGEAS computer model[3] are far from robust. Upfront construction costs, operating costs and decommissioning

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1 Ukraine – G-7 Memorandum of Understanding on the Closure of Chernobyl Nuclear Power Station. Terms of Reference. final version, 2 August 1996.

2 Panel of Experts Chaired by Professor John Surrey, Economic Assessment of the Khmelnitsky 2 and Rovno 2 Nuclear Reactors in Ukraine, Report to the EBRD, the EC and the US AID, Science Policy Research Unit, University of Sussex, vol. 1, 4 Feb. 1997 and vol. 2, 18 Feb. 1997; and P. Bradford et. al, The Case for Completing the K2/R4 Nuclear Plants in Ukraine: a critque of the Stone & Webster Report of May 1998, Sept. 1998, in this volume.

3 Stone & Webster Management Consultants Inc., Least-Cost Electric Power System Development Analysis for the EBRD: Ukraine, Completion of Khmelnitsky 2 and Rovno 4, Nuclear Power Generators, Economic Due Diligence, Englewood, Colorado, May 1998.

costs may be higher, capacity utilization may be lower, and various thermal and transmission options may be cheaper to build or revamp, and/or better suited to peaking demand. Small changes in the S & W parametric assumptions reverse the model's conclusions that completing K2 and R4 is probably least-cost.

On the benefit side, estimated benefits will be lower if GDP and demand for power are lower than Stone & Webster assume. This could be the case for example were GDP to remain below or near present depressed levels for a good deal of the period in question, instead of growing at 4 % per year beginning in 1997. That number now seems fanciful given Ukraine's disappointing performance on a range of transition indicators before the financial crisis of August 1998. The ongoing financial crisis in Russia bodes ill for both stabilization and structural change in Ukraine. This will delay any return to growth, and likely make recovery, when it finally resumes, more feeble than earlier hoped.

2C.1.3 Critique of Stone & Webster: dubious methodology, questionable input data, non-robust conclusions

WIIW is convinced by just about all the technical and economic points made by the Surrey panel in its detailed critiques of February 1997 and August 1998. In WIIW's view, the following points bear repetition or elaboration:

- The Stone & Webster report of May 1998 may have underestimated K2/R4 construction costs. There is a history of major cost overruns in nuclear plant construction everywhere in the world.
- FSU enterprises, owing to their history of financial indiscipline, are likely to have worse cost overruns than those in 'ordinary' developing countries.
- S & W lift their cost-range estimates from a 1997 World Bank study of World Bank-supported *non-nuclear* power projects in the developing market economies. In economies like Brazil, budget constraints of firms, and global financial constraints on government fiscal mismanagement, are more stringent than in Ukraine, a country of the former Soviet Union where 7 years of transition have not yet produced much progress in the direction of hard budgets, normal tax collection, or ordinary payment for materials and labour.
- Stone and W b
  Low; 40 % that they will be Middle and, oddly, only 26 % that they will be High; High is precisely 28 % above Middle, a coefficient taken from the WB paper. The 28 % High is still just the boundary of a 90 % statistical confidence interval, implying that S & W accept a 10 % chance that costs will exceed their own High estimate.
- One reason for raising the probability that costs may be high is that the plants may well have deteriorated more than allowed for during the many years since work on them was stopped, that is, the assumption that they are '80 % complete' may be inappropriate.
- Operating performance ranges for K2, the other 11 WWERs, and various types of coal-fired stations appear to have been mis-specified in S & W. If the historic performance of WWER reactors, and of load-factor data on UK and US power stations are borne out, the high fixed costs of constructing K2 will be spread over an annual average output that may be considerably lower than S & W have allowed for. This would make total running costs correspondingly higher. Surrey dispute the S & W finding that a typical Ukrainian thermal station will have running costs about double those of K2.

One of the reasons for this is that it is unrealistic to assume Ukrainian non-fuel Operating & Maintenance costs for WWERs will be only about 40 % of current US costs; if they should be closer to the US average of USD 26.2/MWh, the margin of savings from installing K2/R4 virtually disappears; i.e. operating costs at existing Ukrainian coal plants would be about the same as a realistic estimate of K2/R4 operating costs.

- S & W's model recommends that Ukraine commit to a huge and costly programme of investment in an unproven Atmospheric Fluidised Bed Conversion AFBC technology that uses a low-grade fuel, schlamm, that Ukraine may not have enough of.
- S & W's data on the performance of Combined Cycle Gas Turbines (CCGTs) gives a false impression of high construction, operating and generating costs because it is up to 10 years out of date. Their data for Open Cycle Gas Turbines is also 10 years old.
- The lead-times in the EBRD et al. decision-making process now look to be such that even if K2 is approved and the financing package can be got together, which was not certain even before the Russian crisis, K2 can probably not be built and on stream before the middle of 2003. The EBRD and EU have already decided to forego the 9 % cost saving that S & W reckoned would result from joint completion. R4 could then not be completed before 2006, provided K2 passes the test re cost and performance. *This stretching-out of the original timetable* gives Ukraine plenty of time to commission cheaper, much more reliable, factory-built and supplier-guaranteed Combined Cycle Gas Turbine CCGT thermal plants instead. This is again assuming additional base-load capacity will be needed, which is far from evident.
- The power generation problem in Ukraine for the foreseeable future is not overall system capacity, of which there will likely be enough, but interruptions in peak-load supply. The Surrey panel point out that demand for load-following electricity might be better met by rehabilitating the power distribution (transmission) system and refurbishing (or even expanding) existing capacity to be more efficient and burn cheaper fuel, than by adding base-load WWERs.
- Of great interest to students of economic transition in formerly planned economies is the Surrey authors' critique of the use by S & W of the EGEAS model. Such a least-cost planning model mis-specifies the problem as one of calculating a least-cost path for a multi-plant national electricity *monopoly*. It also assumes the Ukrainian economy is closed, which it patently is not. Once competitive bidding between independent suppliers and generators is allowed, and once western boilers like CCGTs, and fuels such as higher-quality coal can be competitively imported (the latter reducing the need for co-firing with expensive Russian gas), and heat-only boilers converted to combined-heat-and power CHP ones, the S & W result that K2 and R4 are have a high likelihood of being least-cost is no longer robust.
- Discount rates. Surrey discuss the case for using a totally different, much lower (3 % rather than 10 %) discount rate to discount future decommissioning costs. That idea would gain cogency if for example decision-makers are concerned about possible long-term deflationary pressures affecting investment returns in the world economy. The case for using a different, low rate rises if it is thought wise to cordon off decommissioning funds, such as if there were concern that a privatized EnerhoAtom might run into financial difficulties. In the UK, an economy much less capital-scarce than Ukraine, estimates using the capital-asset pricing model find discount rates for the nuclear sector to be on the order of 13 %.
- WIIW think that the very great scarcity of capital in Ukraine might argue for a higher discount rate still, which would make it harder for the K2/R4 projects to overcome the hurdles of high initial outlays / high completion costs. For example, in March 1998 the Ukrainian government as sovereign borrower accepted to pay 16.3 % per annum to borrow ECUs for two years on the syndicated euro-currency market, mainly just to shore up the currency and keep short-term treasury-bill holders happy. Nominal yields on hryvnia-denominated treasury bills in the past year up to August 1998 hovered around 50 % per annum; given present perceptions of the risk of default, prices have plunged, so that T-bills now yield over 200 % on the secondary market.

The main point WIIW intends to elaborate on in Section 3 is that the Ukrainian economy is presently in such a deep and multi-faceted depression that power demand in Ukraine is unlikely to increase early enough to justify spending huge sums trying to bring K2 on stream by 2003. Reasons for doubting a swift end to economic decline or a rapid recovery after it have

gained in cogency in recent months. Ukraine's beleaguered economy has been further hit by spillover effects of the Russian devaluation, banking crisis and partial debt default that erupted on 17 August 1998. Even should Ukrainian GDP growth pick up strongly from about 2002 or 2003 ff., which WIIW now considers improbable, the various studies by GAGERU[4], IEA[5], TACIS[6] et al. project in the most dynamic cases only minor increases in primary energy consumption by the year 2010; several scenarios have growth at 'Central European' 5 % levels and final energy consumption in 2010 still no greater than in 1995.

2C.2 Economic transition in Ukraine: history and prospects

2C.2.1 Difficult legacy, stagnating performance, hybrid institutions

Despite its good location, large and well-educated population, diversified resource base and developed transport network, Ukraine has had only modest success since 1991 in dismantling and reforming the economic structures and institutions put in place during the 70-odd years of the Soviet experiment.[7] The present economic system is therefore an incompletely-transformed *hybrid economy* in which incentives to retain Soviet-era practices, such as non-payment for inputs, remain strong, while forces pushing to alter them are correspondingly weak. For instance, in the unrecorded economy budgets are mostly hard but barter and tax-evasion are endemic, hurting government efforts to fund expenditures, maintain the exchange rate and bring down interest rates.

Predictions about the economy's pace of institutional change and about the timing of recovery have proved *highly inaccurate.* Forecasts have erred grossly on the side of optimism in predicting (i) an early end to the declines in measured GDP and (ii) a vibrant rate of growth once recovery should begin. Current forecasts for modest pluses for 1998 and 1999 have been revised downward in light of the Russian crisis of August 1998, and more reductions may be needed. Furthermore, there is the possibility that even when the effects of the present Russian débâcle are worked through, growth will be a good deal slower than the 4-6 % observed in the successful east European economies. Failure of the FSU economies to reform enterprises and improve the balance between tax collection and state expenditure could condemn them to years of stagnation. That would mean for Ukraine a measured GDP languishing more than 60 % below the pre-independence peak.

Estimates of electric power demand turn on estimates of the timing of a return to growth, and of the pattern that restructuring will take when it eventually begins in earnest. This will determine the relationship between GDP change and energy consumption.

> *Demand for electric power could stagnate both if reforms falter and if they go ahead vigorously. It is only under the illogical scenario of rapid growth with slow structural change that one could expect power demand to grow rapidly in the period to 2010.*

The post-Soviet slump has lasted longer and been deeper than anyone expected. According to national statistics, the recorded economy bottomed out in 1997 with a GDP that was 46 %

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4 German Advisory Group on Economic Reform in Ukraine, Energy Demand in Ukraine [to the] Year 2010, working paper K33, Kiev, August 1998.

5 International Energy Agency, Energy Policies of Ukraine, 1996 Survey, Paris, 1996.

6 InnoTec Systemanalyse GmbH, IEAE, MARCH, RMK, Global Energy Saving Strategy for Ukraine – Forecasting and Energy Balance. Project by Order of the Commission of the European Communities (CEC – DG-1 under the TACIS Programme), Final Report, May 1995.

7 H. Boss, 'The Ukrainian economy in transformation: difficult tasks, hidden adjustments', a report to the Royal Institute of International Affairs (Chatham House), London, June 1996.

of the 1991 level and a shade over 40 % of the 1989 level. Electricity consumption in 1998 is projected to be about 61 % of the late Soviet peak level. (Tables 2C.1-3)

The IMF's growth forecast for Ukraine was revised downward in early September[8] to reflect the Russian contagion, from 3 % to 1 % growth for 1999, 3 % in 2000 and 4 % 2001 ff. The Ukrainian Ministry of Finance has just cut its estimate for 1998 to -1.5 %; it is still putting a brave face of plus 1 % on 1999. WIIW in September 1998 was forecasting zero growth in 1998, 1 % in 1999 and 2.5 % in 2000-2004, but recent events have forced a revision, to -1 % for 1998, -2 % for 1999 and zero growth in 2000. Some western banks have gone farther in slashing projections: Erste Bank sees a drop of 4 % for 1999. These results and forecasts are far cries from earlier forecasts which envisaged that Ukraine might achieve 3-4 % p.a. in 1997 and 1998 and 6 % p.a. 1999-2004.[9]

2C.2.2 Prospects in light of the August 1998 Russian crisis

The Russian débâcle of August 1998, for which there is no end in sight, has caused a sea-change in attitudes to the former Soviet region. It has impacted directly on Ukrainian prospects for export sales and FDI. Sadly, just as Ukraine was having its first quarters of positive year-on-year growth (GDP was up 0.2 % over January-June 1997 in the first 6 months of 1998) according to official statistics, the Russian crisis erupted and has cratered expectations of recovery in the region. The Russian economy had already begun to decline in the second quarter of 1998; recorded output was down 2.1 % year-on-year in the first 8 months, and GDP for the month of September was 9.9 % below September 1997: a GDP decline of -5 to -6 % is now Russia's official forecast for 1998, with similar for 1999. The exchange rate of the rouble was forecast by the State Statistics Committee to continue to sink, although it has stabilized for the month of October at around 16.8 to the USD, an over-60 % drop on pre-August levels.[10] The Ukrainian economy was sick before the crisis, and is now sicker still owing to contagion.

Ten percent of the funding for the completion of K2/R4 is supposed to come from Russia, and a large fraction from the Ukrainians themselves. At the summit meeting between Presidents Yeltsin and Kuchma in Moscow in mid September Russia reiterated its commitment to setting aside USD 180 mn from its 1999 budget to aid the completion, but absolutely no details were given as to how this will be possible in either cash or in kind, given Russia's changed current-account, reserves and budget situation.

More generally, the Russian crisis is significant because it is the outcome of a failure to solve incentive and structural problems that Ukraine shares in even greater measure. Ukraine stands to suffer similar consequences, mitigated only by lower expectations at the start and so perhaps a smaller degree of disappointment. The Russian default on domestic T-bill debt, its non-fulfillment of rouble hedge contracts and the devaluation of the rouble have paralysed the banking system and with it payment for imports and of taxes.

These events have caused a massive downward shift in near-term expectations among economists and investors regarding normalization in financial or corporate behaviour, and with them,

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[8] International Monetary Fund online, 'IMF Approves Three-Year Extended Fund Facility for Ukraine', Press Release 98/38 and accompanying table, 4 September 1998.

[9] 'Ukraine Minfin sees 1 pct growth real GDP in 1999', Reuters Kiev online, 26 October 1998; H. Boss, 'Ukraine: stunned by the Russian débâcle', WIIW *Monthly Report*, September 1998, Erste Bank Research in Wall Street Journal Europe, *Central European Economic Review*, November 1998, p. 29; A. R. Ghosh / IMF, 'A Macroeconomic Framework for Sustained Growth', paper prepared for IMF/WB seminar on a Medium-Term Strategy for Ukraine, Washington, 9 July, 1996, cited in GAGERU.

[10] WIIW Statistical Database incorporating CIS and national statistics, principally Mezhgosudarstvennyi Statisticheskii Komitet Sodruzhestva Nezavisimikh Gosudarstv, *Statisticheskie Biulleteni*, Moscow, July 1998 no. 198 and earlier issues; Ukrainian-European Policy and Legal Advice Centre, Kiev, *Ukrainian Economic Trends*, August 1998 and earlier issues; Reuters online; CNN online.

the interest of western firms and banks to invest or lend. The new Russian government contains several 'dinosaurs' from the late communist period whose understanding of economic fundamentals is suspect; there is again talk of a 'third way', 'controlled emissions', new controls on industry and seizure of firms in tax arrears to the state, in effect a form of renationalization. Until the fate of the banking system, dollar-denominated debt, emissions policy and the scale of capital flight become clearer, there is no reason to assume that Russia will have positive growth in 1999 or 2000. It is too soon to predict when, how and if confidence will return.

2C.2.3 Prospects for commodity and fuel prices

Fuel prices are very difficult to predict more than a year or two in advance. Past projections of growing scarcity and rising prices have not been borne out owing to new discoveries on the supply side and the introduction of more efficient technologies with long-term effects on the energy efficiency of the world's capital and housing stock, on the demand side. Despite strong economic growth in OECD countries (except Japan) and the 'tiger' economies of Asia and Latin America for most of the 1990s, oil prices have fallen to below those of the first oil shock in 1973 in real terms. A continued slump in oil and gas prices has increased in likelihood with events in the global economy in the past year. Contagion mainly via exports is forcing downward revisions of growth forecasts for Japan, the rest of Asia, North America, Latin America and Europe. Spill-over from the Asian crisis has plunged two thirds of the world's population into recession since mid-1997. The remaining motors of world economic growth, North America and western Europe, are experiencing decelerations in demand and output that may push them into recession territory in 1999.

These problems are increasingly coincident with the launch of the euro and the countdown to the year 2000. The Year 2000 problem in particular may be expected to have a negative effect on demand in countries like Ukraine with thousands of low-end computers but few resources to prepare for Y2K. There is therefore nothing on the immediate horizon to suggest an early reversal of the current trend of commodity prices, including fossil fuel prices, which are at 12 year lows, and steel prices, which affected over 35 % of Ukrainian goods exports in 1997.

2C.2.4 Political economy of Ukrainian reform

2C.2.4.1 Crisis in transition economics sending wrong message to Ukrainian policymakers

The economic crisis that began in August 1998 is also a crisis for the liberal economic theory that has underlain policy recommendations by international financial institutions to countries in transition. Faith in the IMF-promulgated strategy of pursuing financial stabilization as a necessary and possibly sufficient pre-requisite, a *sine qua non*, of structural reform has been shaken, and the IMF and international credit rating agencies have lost prestige for having grossly failed to foresee the scale of the débâcle. Many economists such as Jeffrey Sachs and Charles Wyplocz and pundits such as George Soros now claim to question the wisdom of getting fragile developing economies to liberalize capital flows to the extent that they have done, on account of the severity and often unjustified nature of contagion effects.

However it is unlikely the genie can be put back in the bottle. Central bankers and experts from Alan Greenspan on down appear at a loss for ideas about how to restore confidence in the future of world economic growth; interest rate cuts have helped, as has e.g. Brazil's imposition of a transactions tax on capital transfers, but these measures may not be enough. European and American commercial banks and hedge funds that trusted Russia to redeem its treasury bills and honour hedge contracts of the rouble-dollar exchange rate have lost lit-

erally hundreds of millions and even billions of dollars[11]; portfolio investors interviewed in the media have sworn not to commit a dime to Russia for the foreseeable future.

The scathing public attacks on the IMF et al. over their handling of the Russian and other recent currency crises is likely to undermine the cause of reform in Ukraine. The facile dismissals of financial stabilization and deficit reduction as worthy goals for policy makers will strengthen the populists' hand. The deepening of differences among professional economists regarding how best to promote transition is sure to weaken the leadership's commitment to and ability to stick to its budgetary and IMF promises. It is the best-educated reformers with the strongest commitment to financial probity and the creation of a true class of owners who are now the most beleaguered in Russia and Ukraine. They are taking the rap for the present crisis, though ironically their advice was never fully implemented. The crisis was the result of too little stabilization and structural change, not too much.

2C.2.5 Prospects for export-led growth

The course of Russian economic reform began to impact negatively on Ukraine's return to growth several quarters before the August 1998 crisis. There has been a long series of trade disputes between the two Slavic neighbours since the demise of the Union. Barriers to trade were raised by Ukrainian officials who felt a need to establish economic sovereignty over their own territory and thought restructuring would be aided by a trade reorientation towards the west. Russia in turn, while it still had a large current account surplus thanks to oil and gas, saw its local food and consumer goods industries evaporate in the face of competition from outside the FSU; local producers clamoured for protection, including from 'cheap' Ukrainian sugar and vodka. Ukraine's payment arrears for fuels began to bite at e.g. Gazprom when Russian reformers such as Chubais and Fyodorov stepped up the official campaign to collect taxes in 1997, dampeni Russia's incentive to supply gas to Ukraine on hard-to-enforce credit or barter terms.

Ukraine's exports to Russia began to fall off quite sharply already in late 1997, after several years of recovery from post-Soviet lows. Though the volume and trend of trade is very poorly captured in the statistics, with huge discrepancies in mirror statistics depending on the source and the accounting of gas payments and transit fees, Russia is on all measures by far Ukraine's most important trading partner. In the first half of 1998 Russia accounted on one measure for 26.5 % of Ukrainian exports and 49.6 % of imports. (Table 2C.5).

Ukraine's hard-won success at reorienting exports to the rest of the world is now in diminishing returns. Overall goods export growth came to a near-halt in 1997, after a 28 % increase in 1995 and 9 % in 1996. In the first half of 1998, the situation sharply worsened, with total commodity and service exports down 11.5 % and imports down 14 %. (Table 2C.1)

Again virtually all this was accounted for by the ongoing slump in trade with Russia and the FSU. Goods exports to the FSU plunged 15 % in the first half, and imports from the FSU fell 20 % year-on-year. Steel sales abroad, which accounted for 39 % of goods exports in the first half of 1997, fell 12 % during the first half of 1998 as producers struggled against reduced world demand and threats of anti-dumping action; in response e.g. steel tube production fell 23 %. Based on the reductions in world prices, energy imports by volume were forecast by the IMF to rise 7.6 % in 1998.

Population growth and per-capita GDP growth in energy-poor south Asia and China should affect demand and therefore probably prices of fuels, as well as demand and prices of Ukrainian exports of metals and chemicals in the first quarter of the next century, but not in the near term.

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[11] IBCA Fitch has estimated western private creditors' exposure to Russia at over USD 100 million; as the stock market is down over 90 % and T-bill investors were offered only pennies on the dollar, that implies western losses in Russia on the order of USD 90 billion, about double Ukraine's GDP. *Central European Economic Review*, November 1998, p. 22.

2C.2.6 Prospects for recovery in other sectors

Despite its vast potential, Ukrainian **agriculture** is still in deep depression. The 1998 grain harvest is predicted to come in at 15 % below 1997's mediocre level and 36 % below the average of the late 1980s. Thus, with

> ***industry*** *barely above water,* ***exports*** *to the FSU slumping and those to the rest of the world stagnating or falling,* ***agriculture*** *contracting further and the government promising the IMF to cut* ***budgetary spending*** *by 30 %, Ukraine's economy will sink back into recession for 1998 as a whole.*

2C.2.7 Effects of coming election season

1999 will be a presidential election year in Ukraine. President Kuchma must face the electorate before October 1999, and even if he were to 'get religion' on the need for radical structural reform, there is not time enough left for these to be passed and implemented in the hopes of delivering near-term growth, given the recent setbacks to Ukraine's prospects. He may therefore abandon attempts to stick to the IMF programme and his own tough budget. Populist measures would affect inflationary expectations, the exchange rate of the hryvnia and relationships with international lenders. There is widespread concern about the risk of open default on Ukraine's very large (USD 2 bn) foreign debt repayment obligations due in 1999 given the crisis and the present state of reserves; default would cause further untold harm to the reform cause.

Other political developments which WIIW considers conceivable but highly unlikely in 1998-1999 include: a more than cosmetic shift in Russian economic policy, early elections in Russia that produced a successor to President Yeltsin hostile to structural reform and tempted by foreign adventures, and the rise to prominence in either country of political groupings which intended seriously to challenge the territorial integrity and political independence of Ukraine. Popular disillusionment with the Kuchma government and with the meagre benefits of political independence and economic transition have often been predicted to give rise to an irredentist movement in the Russian-speaking eastern oblasts that would threaten territorial integrity and cause counter-reactions in western Ukraine. Nothing of the sort has yet happened, nor is it likely to turn into a future threat in WIIW's view, in part owing to low Russian interest in opening up full access to its market to a potential competitor. Still, a new irredentist party has just been formed in the Donbas region which can be expected to play on the theme.

WIIW's expectation is that either President Kuchma or ex-PM Marchuk will be elected in 1999, but if there is a serious leftward shift in Russia in the meantime, a left-wing candidate like ex-speaker Moroz might win, which would be very negative for reform in general and privatization in particular.

Even assuming no leftward shift at the presidential elections, both before and after October 1999 much will depend on how well the IMF EFF programme is adhered to, and as noted, on what happens to Prime Minister Evgenii Primakov's government in Russia and to President Yeltsin. Over two months after 17 August 1998, the Russian government still does not have a 'plan' for working out its debts or restoring confidence. Early evidence is that Primakov's strategy is to lay low, make vague promises of adherence to IMF conditions, keep Central Bank director Gerashchenko from saying any more in public about 'controlled emissions' or arrears clearance operations, and to hope that investors have short memories. The first delicate structures of Russia's emerging service and consumer-based economy have already begun to collapse however: as of end October 1998 hundreds of thousands of workers had been fired from Moscow banks, brokerages and insurance companies and from restaurants, schools, travel agencies and other establishments serving the new middle class; massive

layoffs are expected in e.g. the automobile industry. Ukraine having gone less far has somewhat less to lose, but that should be small consolation.

Slow reform thus may continue in Ukraine for several years owing to 'short-term factors'.

2C.2.8 When might the slump finally end?

The question then is, what factors could turn things around in the longer term, and when might that begin? As is well known, the Stalin-era and 1960s industrializations locked Ukraine in to heavy reliance on iron and steel and defence industries, and underdeveloped or misdeveloped its agricultural potential. Demand for ferrous metals and military goods effectively evaporated with the demise of the USSR and the end of the military's dominance of the economy. These industries are still languishing, and earlier gains in export share e.g. for metals and chemicals have levelled off due to the Asian crisis and the drop in trade with Russia.

2C.2.8.1 Lack of social consensus for restructuring

There is little enthusiasm for hard choices amongst the country's political and economic decision-makers. The former provincial status of Kiev has meant there were few cadres with international experience or an understanding of the price system or property rights. Few understood for instance the link between privatization of enterprises and energy efficiency.

There is almost no constituency for reform in the population at large, amongst enterprise directors or in the parliament, even though it now contains 118 independents, almost as many deputies as the Communist Party; a good sign is that many independents have business experience.

The **Kuchma government, such as it is, is just about the only pro-reform lobby.** President Kuchma has mouthed the right phrases from about the autumn of 1994, when mega-inflation was rife. However Kuchma and his ministers have not had the constitutional power, political credibility or popular charisma to implement structural reforms. The stand-off between government and parliament both before and after the March parliamentary elections has produced a sort of paralysis of decision-making and a widening pessimism that policy is able to bring about changes in outcomes, or, more broadly, that Ukraine can ever '[re]join Europe'. The speaker of parliament Tkachenko, elected after a months-long stand-off to the government's slight relief that it was not a further-left candidate, has come out strongly against full property rights to land and allowing non-citizens the right to acquire majority ownership stakes under 'large' privatization.

2C.2.8.2 Likelihood of more interruptions to IMF funding

Non-passage of structural legislation, such as that on the tax system, and the frequent missing of financial targets have led to repeated non-renewals or interruptions of IFI concessional lending. For example there was no IMF programme from March to September 1998 for failure to meet both financial and structural conditions; there was none for the first half of 1997 because parliament would not pass an acceptable budget.

IMF stabilization programmes have knock-on effects on more structurally-oriented lending. EBRD funding for the completion of K2 and World Bank funding to improve e.g. district heating in Kiev and to aid in rehabilitation of the coal sector are contingent upon Ukraine meeting IMF EFF conditions on a month-by-month basis.

IMF conditions cover a wide range of indicators, such as the budget deficit, reserves, emissions, hard-currency and T-bill debt of various durations, levels of subsidy to industry and households, large privatization, changes in the number and rates of various taxes, reductions in tax exemptions and the granting of state guarantees, levels of utility tariffs and legislation simplifying business registration.

The Russian débâcle has increased the probability of interruptions to IFI finance, as one result of it is apparently a stricter attitude on the part of the IMF to countries' relationships to western commercial financial institutions. The IMF, under criticism for appearing too soft (moral hazard) and allowing the crises to get out of hand, wishes to shift some risk of default on to western banks. In contrast to the situation in 1994-1997, when the IMF was urging e.g. Ukraine to move from printing money to attracting funds by sovereign borrowing on the eurodollar markets, giving them a community of interests with e.g. Nomura and Merrill Lynch, now the IMF may have changed its tune.

Ukraine's obligations to the IMF are presently in conflict with its obligations to commercial lenders, an issue often fudged in the past. A very real example is the ongoing September 1998 dispute over Ukraine's wish to use some USD 70 mn of National Bank currency reserves to make it possible for foreign investors to exchange proceeds from a repaid December 1997 treasury bill issue into dollars, as was guaranteed at the time by resolutions of the bank and the cabinet of ministers. To permit this would reduce NBU reserves below the agreed floor just stipulated in the EFF, and the IMF has said no deal. Western commercial investors may now sue Ukraine for default, triggering cross-default clauses in much of the country's external debt, and forcing USD 1.5 bn to be repaid at once, an impossibility given that reserves stood at just over USD 1.0 bn as of end September.[12]

2C.2.8.3 Slow 'large' privatization alienating potential investors

Weak leadership has meant a drawn-out battle to establish more favourable conditions for foreign direct investment. Domestic investment picked up a bit in the first half of 1998 but threatens to sink again given the shift in inflationary expectations and the colossal short-term interest rates that have accompanied the present currency and debt crisis.

'Large' privatization has gone very slowly, with mostly minority stakes on offer, and these only recently, such as the electricity generators which began to announce bidding terms from the autumn of 1997 ff. 'Red directors' have kept control of industrial enterprises, in league with workers who, while unpaid or on short hours, wish to remain on the books in order to retain social benefits, or the hope of social benefits, as preferable to outright unemployment. Enterprise directors have delayed full privatization in order first to strip assets and sell them or their outputs abroad, for a capital flight estimated in August 1998 by the finance minister of some USD10 bn.

FDI has suffered. Foreign direct investment was of minuscule importance to the Ukrainian economy in 1989-1997, totalling some USD 2.0 bn (USD 39.60 per capita) versus probably USD 6.7bn for Russia (USD 45 per capita). Worse, the rate of inflow fell 17 % in 1997, to USD 437mn, less than 8 % of gross fixed investment. There has been effectively zero 'greenfield' investment. Red tape, corruption, the opacity of barter, high taxes and restrictions on land ownership have irritated foreign investors and given Ukraine a reputation as a corrupt and difficult place to do business. The low level of FDI has deprived middle managers of the chance to learn marketing, accounting, IT systems and other skills through contact with people from major international companies.

2C.2.8.4 Baby-boomer effect turning negative

A further negative in Ukraine's and Russia's medium-term loss of attractiveness to global investors may come from the playing out of the baby-boomer effect. In the 1990s post-WW II demographic cohorts in Japan and the west, eager to boost their earnings in old age, have been prepared to accept greater risk in the search for higher yields on their savings, funding flows into emerging-market equity and debt. Even before the Asian crisis broke in the sum-

[12] *Financial Times*, 5 October 1998.

mer of 1997, there was reason to think that when these age groups in the OECD demographic pyramid started to retire, they might seek to cash out of equities and bonds. Some research saw this starting to happen in about 5 years as the first post-war babies in the west begin to retire from the labour force. Thus Ukraine's slow transition may mean the country misses a once-in-a-generation window of opportunity to attract foreign capital.

2C.2.8.5 Intractability of arrears phenomenon

Soft budget constraints for firms were what made the Soviet system socialist. Habits formed during the 70-year history of the command-administrative economy have proved hard to break, in part because many of the same people are in charge. Enterprises and budget organizations until recently suffered few sanctions when contracts to pay for supplies, such as gas, or labour went unhonoured.

There is an established network of barter and credit arrangements that has allowed this **hybrid economy** to function. One 'transition' benefit of the large shadow economy, variously put at 20-46 % of total GDP (i.e. implying that 'real' GDP may be 25-85 % larger than measured) and growing, is that in the unrecorded sector, budgets are mostly 'hard'. Despite numerous government promises to the IMF et al. to penalize non-payment with interest rates and eventually, bankruptcy, the phenomenon remains endemic. Various one-shot attempts to clear arrears and promise to 'go straight' in future have produced little but spikes in the deficit and inflation.

Six years after the end of the Soviet Union, **bankruptcy** laws and regulations are still being drafted. Judges and accountants sit in classrooms familiarizing themselves with the concept. The scale and prevalence of arrears makes it acceptable to pass the buck for non-payment up the chain to another enterprise*, avoiding the statutory responsibility needed for bankruptcy courts to work*. Everyone is guilty: the government has been enjoined by parliament in mid September 1998 not to raise charges for municipal utilities or transportation until it has itself cleared its backlog of unpaid wages and pensions.

Review and consideration of bankruptcy cases has however increased from nil to 2000 in 1995, 3600 cases in 1996, and 7082 cases in 1997. In the first quarter of 1998, the High Court of Arbitration reviewed 1,747 bankruptcy cases involving enterprises and approved decisions to liquidate a total of 540 enterprises, even though most of these enterprises were small.

The Surrey panel cites IEA findings that in the autumn of 1996 30-40 % of bills due for nuclear electricity sales went unpaid; the Ministry of the Economy put average non-payment by distribution companies at 44 % in 1997. There may have been some movement towards harder budgets thanks to some cut-offs of non-paying users, though it is unclear for how many days or hours the culprits were denied power. Energy Minister Shebertsov in August 1998 stated *that 20 % of electricity was by then delivered to users without expectation of payment*; 70 % of the debts belonged to villages and municipalities, mines and engineering works.[13] Informed commentators such as Surrey and the IEA underline the fact that it is not residents, but heavy industry which is to blame for the lion's share of arrears. Paralysis in the banking system in the wake of the Russian crisis is giving delinquents a beautiful new excuse for late or non-payment.

[13] BBC Monitoring online, 'Free Power to Blame for Fuel Crisis, Minister Says', 5 August 1998.

2C.2.8.6 Growth prospects for a hybrid economy

Ukraine was already "sick" before the August crisis hit in Russia, and is now suffering further from contagion from the country that was for the last 5 years seen as a more dynamic, hopeful reformer than it. The glacial rate of progress in dealing with basic problems in the economy is now likely to bog down further. This augurs poorly for a near-term return to recorded growth, and lowers the likelihood of any kind of rapid, "EU-candidate-style, 4-5 % growth" such as Poland has maintained, if and when Ukraine manages to create a more normal macroeconomic environment.

WIIW is now projecting zero growth in 2000 and 1 % in 2001. Recovery could pick up in 2002 or 2003 to say 3 % p.a. if Ukraine and Russia do everything right to restore confidence and push ahead with structural reform. GAGERU's low-growth variant (0 % p.a. in 1999, 1 % in 2000, 2 % in 2003 and 3 % 2006-2010) seems therefore to be in the right ballpark, though more turmoil on world markets would make even it a major achievement. GAGERU's high growth variant seems beyond the realm of likelihood at present.

2C.3 Recovery and energy demand – Notes on GAGERU

Electric power generation in Ukraine is still falling. It was down 2.9 % over 1997 in the first 8 months of 1998, which extrapolates to a 1998 output that is some 57 % of the 1990 level. This may be compared with an expected recorded GDP index for 1998 of about 42 % of the 1990 level and an index of industrial production at about 50 % of the 1990 level. (Table 2C.3)

GAGERU, the German Advisory Group on Economic Reform in Ukraine's paper 'Energy Demand in Ukraine [to the] Year 2010' of July 1998 presents two variants and two scenarios sketching possible relationships between measured GDP growth and demand for electricity. The estimates are usefully set against similar exercises by InnoTec et al. for the European Commission DG-1-TACIS (trend and energy-saving), the IEA (several variants, including rapid reform) and the Ukrainian government's 1995 programme. The GAGERU analysis is admittedly rough, based on a Cobb-Douglas production function, 1995/96 energy demand data in which they express less than perfect faith, and a simplified three-sector economy ('agriculture', 'industry' and 'services') that is too highly aggregated to handle structural change within industry itself. However the exercise throws up some interesting results.

2C.3.1 Energy use in major sectors

GAGERU repeat findings of the IEA cited by Surrey regarding Ukrainian energy intensity. Energy input per dollar of GDP in Ukraine is among the world's highest even when adjustments are made for climate, shadow activity and purchasing-power parity. The size of the industrial sector within the economy, its bias towards heavy industrial semi-fabricates such as steel and basic chemicals, and the outdated technologies used are the main culprits. Industry accounted for 50.4 % of total final energy consumption (TFC) in mtoe in 1991 and 48.4 % in 1995, according to the IEA as reported in volume 2 of the Surrey papers of February 1997. Residential / commercial use accounted for 38 % of 106.6 mtoe of TFC in 1995, in a ratio of 30 mtoe for residential and 10 for commercial.

To the extent that there are prospects that the Ukrainian economy will adjust in the direction of its long-tern dynamic comparative advantage, there is concern about the present and future energy intensity of major sectors of the economy.

In 1995 25 mtoe (46.0 %) of TFC was used in iron and steel production, and 12 mtoe (23.0 %) in chemicals. Energy use per tonne of **steel** is put at twice the OECD Europe average. NB

the ferrous metals sector was among the first to recover, even though that recovery is now in doubt. Still there are many reasons to suppose that the steel industry will be a key sector in future no matter how reform proceeds.

Energy consumption in **cement** production is said to be 50 % higher than in western countries, but it would have been interesting to know in what year as the investment slump has led to a 76 % decline in cement output 1991-1997. WIIW's databank of official statistics notes an 82 % decline in the output of the **building materials** industry in constant international prices, a decline of 73 % in housing construction in square meters, and a 79 % decline in investment expenditure in real terms.

GAGERU note with Surrey that **chemicals** production is biased towards ammonia for fertilisers at the expense of ethylene and propylene; in 1995 chemicals accounted for a third of industrial gas consumption of 30 bcm. Output of chemicals was USD 2.273 bn in 1997 (5.3 % of industrial output as a whole); this represented a decline of 68.6 % in constant international prices over 1990.[14]

Certainly were agriculture to recover and Ukraine to begin to realize its unquestioned comparative advantage in cereals and oilseed production, fertiliser demand should revive. However none of these are likely so long as investment incentives are not created in the agribusiness sector. Demand from Russia will also need to revive, and that means (i) reform and recovery there and (ii) predictable rouble/hryvnia exchange rates and (iii) the political will to settle the simmering disputes over vodka, sugar and all manner of other barterable goods that have depressed mutual trade. The fate of semi-fabricated exportables like petrochemicals hangs on developments in Asia and elsewhere.

Aluminium is cited by GAGERU as an energy intensive sector. It however is a tiny sector of the economy and has moreover seen its output devastated thanks to the economic depression, rises in the cost of electricity towards cost recovery, and trade and payments problems with Russia, the source of most of the raw materials. (Tables 2C.3 and 2C.4) Output of the sole operating smelter, Zaporizhe, stood at 90.7 thousand tonnes in 1997. Russian interests sponsored by tycoon *cum* CIS head Boris Berezovsky have been trying to participate in the privatization of the Mykolaiv Alumina works, but this has been strongly resisted by the firm's Ukrainian director on nationalist grounds. An upgrade costing USD 200 mn by the year 2005 has been announced according to the London Commodities Desk of Reuters, but presumably realization of any plan will depend on who is to finance it and on export demand closer to the date.

For Ukrainian aluminium output to recover, WIIW believes there must be foreign participation, an idea so far resisted in part because FDI looks to many Ukrainians, and not only communists, like giving Russia (sic) a chance to buy back what 'it' lost with the collapse of the Union in 1991. Russia's Siberian producers were under severe cost pressures already in 1995.[15] The August 1998 and further expected devaluations of the rouble may help such export industries regain competitiveness, which would increase demand from the Ukrainian plants. The further future, especially the timing of a recovery in global demand, is harder to predict.

[14] Ukrainian Economic Trends, June 1998, table 1.4; WIIW Tables 3 and 4 below.

[15] H. Boss, 'The Russian Economy in Sectoral Perspective', a report to Sun Group, Moscow, December 1995.

2C.3.2 Implications

In conclusion,

> **Ukrainian GDP growth is likely to be negative or zero through 2000 and to recover only modestly thereafter, with the consequence that demand for energy overall, and electricity in particular, will likely fall a bit further from present levels and then recover only slightly.**

Furthermore,

> **according to GAGERU's calculations, even a robust 5 % rate of GDP growth after 2003 (which WIIW does not think will happen) implies a recovery in final energy consumption by 2010 only marginally in excess of 1995 levels.**

Given the prospects for continued weak commitment to reform in Ukraine, the deep slump in Russia, Asia and now a growth slowdown or recession in North America and Europe, and given the extent to which output of energy-intensive industrial raw materials has fallen since the end of the USSR, it is hard to see how anything better than something like the low growth variant of GAGERU's Scenario I can have much likelihood of realization. That variant assumes technical change at 1 % p.a. but not 'east German' rates of improvement. In the GAGERU low-growth case of Scenario I, total primary energy consumption including that used in transformation falls from 143 mtoe in 1997 to 120-140 mtoe in 2010, and within that, electricity generation falls from 190 TWh in 1995 to 173 TWh in 2010, which is approximately the output expected for 1998.

2C.3.3 Under stagnant demand, coal-fired and nuclear electricity are substitutes

GAGERU emphasize that in Ukrainian conditions, nuclear and coal-fired electricity are economic if not technical *substitutes*. If demand for electricity remains stagnant or declines slightly from 1995 levels by 2010, as they project in their low-growth scenario, Ukraine will face the dilemma of what to do about its troubled coal sector. *If maintaining output and employment in the coal sector is a major priority for political or whatever reasons*, it is the nuclear sector which will have to bear the brunt of the low growth of demand.

According to GAGERU's calculations for both low growth scenarios, the nuclear contribution to total power generation would need to fall by an astonishing 50 %, from 71 TWh in 1995 to a mere 35 TWh in 2010, just to keep primary coal consumption constant at 35 mn tpa. Even if coal production is allowed to decline (extraction fell another nearly 10 % between 1995 and 1996 and has since almost stagnated; many mines are seriously unprofitable to keep open) nuclear power generation would not have to rise above the 1995 level.

It might be well to note here that according to S. Thomas, one of the main Surrey panel authors, if safety and other upgrades at the 11 existing Ukrainian WWERs improve reliability and therefore operating performance (output per year), output from completed K2 and R4 would not be needed: additional output from improvements at the plants already in operation would be sufficient to supply all the extra power expected from completion. This is referred to as a "Catch 22": no case for K2/R4 if the others perform well, but if K2 and R4 perform well, so will the 11 other WWERs, and their combined incremental output would be such that so K2 and R4 would be *superfluous*.

2C.3.4 Price and output elasticities in hybrid economies

Flexible market economies should have higher price elasticities than inflexible rigid non-market ones; that is what the competitive market system is supposed to deliver. In supply-constrained Soviet-type and transition economies, firms' budgets are imperfectly hard, meaning prices are not the signals they are in competitive economies; responses to price changes may be weak or perverse.

The reductions in energy use in Ukraine since 1990 have been the subject of several interpretations. The dissenting member of the original February 1997 Surrey panel report, Professor Hjalmarsson, argued that the reductions achieved between 1990 and 1995, from 146 TWh to 81 TWh, represented (i) bona fide restructuring and (ii) probably the most restructuring that Ukraine can hope for in the near term. His conclusion was that recovery would drive energy consumption right back up again towards late Soviet levels. WIIW thinks his view quite misguided, because there will be no economic incentive to raise output unless it will be profitable to do so. Reform will mean energy must be paid for, so it will be economized on.

2C.3.4.1 Restructuring vs. differential output collapse

During the immediate post-Soviet period the Ukrainian economy did not respond normally to price signals; firms shut their doors as opposed to restructuring their product mixes (with at least some retooling) to take better advantage of the new pattern of (world) relative prices. In WIIW's view 1990 and 1995 saw a collapse of effective demand for smokestack industrial goods, many of which were used in the armaments complex; demand for defense and light industrial goods was literally decimated.[16] The economy's apparent structural change was the result of 'differential output collapse'.

'Structural change via differential output collapse' arguably has different implications for energy input per unit of output than 'true' 'market oriented' structural change that is driven by incremental growth in the major components of demand for GDP, viz. (per textbook convention): C + I + G + (X-M) = Industry + Agriculture + Services, on the output side. The difference is that the latter involves positive investment, which incrementally endows an economy with a more appropriate capital stock.

In the immediate post-Soviet period the FSU countries experienced discontinuities in demand and supply effectively without precedent in world economic history. Factories were temporarily mothballed or forced to work short hours for lack of orders or of key raw materials. It is true that should Ukraine manage to realize a few years of low reform and high demand, given near-zero investment since the 1980s, input demand by firms, including energy per unit of output, might possibly not be significantly altered from say immediate post-Soviet levels in a very few selected production processes. There would however be reductions in outright waste and shortage-economy hoarding behaviour. A scenario of restoration of demand to the *status quo ante* might occur in production in individual plants for short periods before it was realized that raw materials could be sold abroad to better effect rather than squandered in rust-belt factories.

However high demand *cum* low reform seems totally implausible when generalized to the economy as a whole – barring some kind of return to Stalinist levels of terror and totalitarian control over supply, demand and prices in a hypothetical reconstituted closed command economy. That is an impossibility in the present age of instantaneous price information and given firms' hard-won and coveted freedom to trade inputs and outputs world-wide to the highest bidder.

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[16] H. Boss, 'The CIS in 1997 – early 1998: vulnerable stablizations, anaemic growth, Asian fallout', WIIW *Monthly Report*, June 1998.

2C.3.5 Improved corporate governance a precondition for recovery but a negative for energy demand

It is WIIW's view that most factory expansions or reopenings in Ukraine, when they occur, will not occur unless there is structural change at the enterprise level. This is most cases will be a consequence of 'large' privatization, which will affect corporate governance. In the typical large privatization in the FSU, the winner of the tender is the entity who promises to clear the most arrears and other debts and to make the biggest investments in maintenance, refurbishment and new plant and equipment. All of these imply business plans and probably, competitive domestic if not foreign bank financing, and thus harder budgets if not budgets that are absolutely implacable in the sense that any short-term loss drives the firm instantly into bankruptcy.

It is WIIW's belief that resumption of production or increased levels of production will not be economically efficient (profitable) under hard-budget conditions unless plants are upgraded and made more technically efficient. Exposed to the cold winds of the market, unrestructured firms will simply not be economic. Thus they cannot resume activity unless they restructure. With regard to the Ukrainian economy in general, the state can no longer afford the gigantic subsidies to e.g. the coal industry that inefficiency implies. Moreover, international lenders explicitly condemn such subsidies and make curtailment of them conditions for concessional loans such as the EFF.

The Surrey panel make the cogent observation that nuclear power plants wherever in the world they may be found are not privatizable at all during the construction stage, when they have no finished assets that might serve as collateral for a commercial loan. They are also rarely public companies even when up and running, because their low reliability and high risks make them uneconomic investments. If these observations turn out to apply to Ukraine, an Enerhoatom responsible for K2 and R4 could not be privatized until 2006 or later, if ever, implying a long-term risk for and likely drain on the state budget.

Some of the ways in which electricity generators and industrial users might be retooled and upgraded were noted in the Surrey 1997 report. They quote findings by the Battelle Laboratory, Hagler Bailly, Burns and Roe, Lahmeyer, Greenpeace, Pacific Northwest and other consultancies. Consultants reporting to the European Commission for example found that savings of 12 % could be achieved in industrial energy consumption at virtually no extra cost and with very short pay-back periods.

According to the InnoTec et al. TACIS study 'Global Energy Savings for Ukraine', there could be a reduction of 8 % in primary energy consumption between 1995 and 2010 if energy efficiency improvements were stimulated, even were GDP growth to follow their high-growth scenario. Similarly, according to GAGERU's 'high growth Scenario II', which projects energy demand on the assumption that Ukraine achieves 'eastern German' rates of specific efficiency increase in industry, agriculture and services and a 5 % annual GDP growth 2003-2010, energy consumption over the period 1995-2010 falls from about 160 mtoe to 150 mtoe. After the presumed trough of the post-Soviet recession in the year 2000 of 140 mtoe, the scenario yields only a tiny increase of 10 mtoe in the ensuing ten year period.[17]

In 1997, according to CIS statistics, Ukrainian industrial production stood at 51 % of the 1991 level overall, but in the following levels for the various sectors: electricity generation 67, fuel extraction 49, iron and steel 54, non-ferrous metals 60, chemicals and petrochemicals 43, machinery and vehicles 33, paper and forest products 44, building materials 20, light industry 23 and the food industry 42 per cent respectively of their 1991 levels. (Table 2C6) The Ukrainian-European Political and Legal Advice Centre, using different breakdowns of the sectors and a deflator of international prices, find industrial output in 1997 to be only 31.3 % of the 1991 level, and in the second quarter of 1998, only about a quarter of the comparable 1990 level.

[17] This estimate based on a visual reading of Bar Chart 12.

2C.4 Positive evolution of Ukraine's near-term bargaining power on fuel and equipment

Supply of fossil fuels to Ukraine is likely to remain buoyant. Russia has for now squandered its credibility in the western financial community and looks to have to solve its fiscal and financial problems with little foreign help. It runs serious risks of further debt defaults in 1999. This should mean more incentive than ever to pump oil and gas, and mine higher-grade coal to sell to the highest bidder. The poor public image and high cost record of the nuclear industry in the west is such that world uranium prices should remain under pressure as well. If world fossil fuel demand remains depressed, Ukraine will be in a good position to bargain for discounts. Until the Yamal pipeline is built, virtually the totality of Russian Gazprom's gas exports to Europe will continue to pass through pipelines crossing Ukrainian territory, giving Ukrainian entities multiple chances to "tap in".

The Surrey panel make the cogent point that western engineering firms are in keen competition with one another to supply CCGT and other off-the-rack boilers, other types of thermal and nuclear generating equipment, and to bid for refurbishment jobs such as converting heat-only boilers to combined-heat-and-power. Russia has announced plans to supply the lion's share of its promised 10 % contribution to K2/R4 in kind as machinery and WWER technical assistance. The present crisis situation in the Russian machinery sector augurs well for Ukraine getting good value for its barter buck as well as for cash.

2C.5 Rent-seeking and the K2/R4 decision

A possibly non-trivial aspect of the political economy of the K2/R4 decision not addressed in any of the cited contributions is that it may be desirable to diminish opportunities for rent-seeking by spreading the funds among several smaller rehabilitation projects rather than committing all the IFI eggs to the K2/R4 basket.

The present estimates of the cost of completing both stations in sequence effectively exhaust the funds envisaged in the MOU, leaving nothing over for thermal or energy saving.

Even K2 alone, with its expected near-billion dollars of outlays spent in a short time period, will naturally represent a tempting pool of capital which those involved will seek to divert in part to goods and services of benefit to themselves (perks and rents). The high probability of cost overruns ought to increase the weight of this argument in the decision-making process. Those on the payroll from the start may be able to stay on the gravy train for up to 45 % longer than presently projected, if overruns at Temelin are any guide.

Spending the USD 1.8 bn promised in the Chernobyl MOU on an array of smaller projects that seek to upgrade and refurbish existing thermal and nuclear power stations and improve energy efficiency in the non-profit sector (such as in district heating, conservation in public buildings and in public transport, and in reducing losses in transmission) would reduce the size of each perk and would spread perks geographically and by ministry and enterprise.

As rent-seeking, cronyism and corruption are now recognized by the G-7 donors and by IFIs as major problems in emerging market economies, particularly in Asia and the FSU, donors may be well-advised to take them into consideration when deciding on large projects such as K2 or K2 and R4.

Spreading the funds across a longer list of energy efficiency projects is in complete keeping with the final 1996 MOU on the closure of Chernobyl. Such an approach would have the additional benefit of increasing the depth and breadth of Ukraine's network of people who have been in contact with international best practice. This could have positive spin-offs on the country's safety culture and on its business culture more generally.

2C.6 Summary and conclusions

There are many reasons to doubt that completing the K2 and R4 nuclear stations will be economic. Upfront construction costs, operating costs and decommissioning costs may be higher, capacity utilization may be lower, and various thermal and transmission options may be cheaper to build or revamp than assumed in the Stone & Webster analysis. Using the latest and most realistic cost estimates, completing both K2 and R4 will effectively exhaust the sums promised to Ukraine in the MOU on the closure of Chernobyl, leaving nothing over for better and more certain projects in thermal and hydro power generation and energy conservation.

On the benefit side, estimated benefits of adding nuclear capacity are likely to be lower than Stone & Webster have calculated, because GDP and power demand are very unlikely to grow anything like as fast as they assume.

> *Demand for electric power could stagnate at around the 1995 level both if reforms falter and if they go ahead vigorously. It is only under the illogical scenario of rapid growth with slow structural change that one could expect power demand to grow rapidly in the period to 2010.*

WIIW expects the GDP of Ukraine's hybrid economy to sink back again into negative territory in 1998 and 1999 and to achieve 3 % growth only in 2003, instead of growing at 4 % per year beginning in 1997 as S & W assume.

The August crisis has caused a sea-change in expectations for the FSU region. Spill-overs from Russia were already hurting Ukraine's exports before August; now the damage has widened to affect much more than exports, dampening Ukraine's prospects for financial stabilization, direct and portfolio foreign investment, and consumer demand-driven changes in the industrial structure. According to IBCA, western private investors have lost nearly USD 100 *billion* on their Russian investments. Lenders and investors are unlikely to touch either country until there is visible progress in resolving hybrid-economy systemic problems such as minimal sanctions for non-payment of wages, bills or taxes. The financial débâcle threatens to unleash several more years of negative and flat growth. Recent history of disappointed expectations has provided many reasons to doubt that Ukrainian enterprises, institutions and farms will be able to generate rapid growth, when growth finally resumes.

Thus power demand in Ukraine is very unlikely to reattain depressed 1995 levels by the year 2010. The German Advisory Group on Economic Reform in Ukraine estimate that primary energy consumption in 2010 would only slightly exceed 1995 levels if growth is 5 % p.a. from 2003 onwards; if the low growth scenarios obtain, consumption would stagnate or decline. Electricity consumption also falls in their low growth scenarios. Returns to 1990 final-energy and electricity consumption levels are fanciful.

The setback to Ukraine's hopes of a 1998 end to its post-Soviet depression means small change of any need for K2 by 2003 (if indeed it will ever be needed). There is now time for the partly privatized regional utilities to line up sources of higher-grade coal and to install cheap and efficient CCGT thermal boilers. Both of these solutions reduce the need for co-firing with imported Russian gas. At the same time, inexpensive management and other changes will increase base-load output at Ukraine's 11 operating WWER nuclear stations.

These measures will reduce Ukraine's dependence on Russia for gas, an important strategic consideration for the Ukrainian government and also for the G-7 and IFI donors. That would be in addition to reductions in gas dependence that may be expected to come from improved corporate governance in heavy industry and mining, and from increases in the GDP share of services and agriculture. Thermal and energy conservation projects moreover are explicitly listed in the MOU on the closure of Chernobyl.

Allocating the USD 1.8 billion across several or many smaller projects rather than one or two big ones will diminish opportunities for corruption and rent-seeking, with positive effects on the social framework for business as Ukrainian transition proceeds.

APPENDIX

Tables 1: Ukraine: Selected Economic Indicators

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**
Population, th pers., end of period	51944,4	52056,6	52244,1	52114,4	51728,4	51334,1	50894
Gross domestic product, UAH mn, nom.	1,7	3	50,3	1482,7	12037,7	54516,4	80510
annual change in % (real)	-3,4	-8,7	-9,9	-14,2	-22,9	-12,2	-10
GDP/capita (USD at exchange rate)	5499	3294	480	593	734	721	865
GDP/capita (USD at PPP - WIIW)	4163	3897	3720	3299	2623	2344	2177
Gross industrial production							
annual change in % (real)	-0,1	-4,8	-6,4	-8	-27,3	-11,7	-5,1
Gross agricultural production							
annual change in % (real)	-3,7	-13,2	-8,3	1,5	-16,5	-3,6	-9,5
Goods transport, mn t	2442	2173	1804	1266	939	764	769
annual change in %	-	-11	-17	-29,8	-25,8	-18,6	0,6
Gross fixed investment, UAH mn, nom.	0,3	0,5	8,7	284	2280	9378	12557
annual change in % (real)	1,9	-7,1	-36,9	-10,3	-22,5	-20	-22
Construction output total (based on MPS)							
a nnual change in % (real)	-3,1	-6	-35,7	-9,7	-40,7	-	-
Dwellings completed, units	290300	232000	226600	188900	145400	118200	88100
annual change in %	-	-20,1	-2,3	-16,6	-23	-18,7	-25,5
Employment total, th pers., annl. average	25277,3	24977,1	24485	23924	23025	23726	23232
annual change in %	-0,5	-1,2	-2		-3,8	3	-2,1
Employment in industry, th pers., year av.	7829,8	7768	7400,8	7017	6403	5909	5478
annual change in %	-	-0,8	-4,7	-5,2	-8,8	-7,7	-7,3
Unemployed reg., th, end of period	-	6,8	70,5	83,9	82,2	126,9	351,1
Unemployment rate in %, end of period	-	0	0,3	0,4	0,4	0,5	1,5
Average gross monthly wages, UAH	0	0	0,1	1,7	15,3	80,6	137,8
annual change in % (real, gross)	9,6	19	-31,7	-54,7	-9	10,1	-5,1
Retail trade turnover, UAH mn 4)	0,8	1,3	14,6	438	3370	1964	17300
annual change in % (real)	12	-9,7	-18	-35	-13,6	-13,9	-5,1
Consumer prices, % p.a.	4,8	91,2	1210	5371	891	377	80,2
Producer prices in industry, % p.a.	4,5	125,4	2340,6	4667	1134	489	52,1
General government budget, UAH mn							
Revenues	-	-	17	568	5314	20425	30142
Expenditures	-	-	23,3	661	6453	24443	33759
Deficit (-)/surplus (+)	-	-	-6,3	-93	-1140	-4018	-3617
Deficit (-)/surplus (+), % GDP	-	-	-12,5	-6,3	-9,5	-7,4	-4,5
Money supply, UAH mn, end of period							
M0, Currency outside banks	0,2	0,3	4,8	127,7	793	2623	4040
Broad money	1,3	2,6	25,2	473,7	3188	6930	9365
Refinancing rate of NB % p.a.,							
end of period	-	-	80,4	240	268,8	110,4	40
Current account, USD mn	-	-	-621	-854	-1163	-1152	-1185
Gross reserves of CB incl. gold,							
USD mn	-	-	96	133	679	1167	2040
Gross external debt, USD mn	-	-	3513	4214	7167	8217	8840
Exports total, fob, US D mn	-	-	11308	10841	10272	13128	14331
annual change in %	-	-	-	-4,1	-5,2	27,8	9,2

	1990	1991	1992	1993	1994	1995	1996
Exports excl. CIS, fob, USD mn	-	-	6000	3766	4653	6168	6970
annual change in %	-	-	-	-37,2	23,6	32,6	13
Imports total, fob, USD mn	-	-	11930	12669	10745	15484	17624
annual change in %	-	-	-	6,2	-15,2	44,1	13,8
Imports excl. CIS, cif, USD mn	-	-	5500	2924	2908	5488	6519
annual change in %	-	-	-	-46,8	-0,5	88,7	18,8
Average exchange rate UAH/USD	0	0	0	0,04	0,31	1,47	1,83
Average exchange rate UAH/DEM	0	0	0	0,02	0,20	1,03	1,22
Purchasing power parity UAH/USD, WIIW	0	0	0	0,00	0,08	0,45	0,73

Tables 1: Ukraine: Selected Economic Indicators (cont.)

TABLE 1 cont.	**1997**	**1997 January-June**	**1998**	**1998 forecasts**	**1999**	**2000**	**2001**
Population, th pers., end of period	50478,5			50100	49900	49700	49500
Gross domestic product, UAH mn, nom.	92484	39736	43191	103461	127000	140000	
annual change in % (real)	-3,2	-7,5	0,2	-1	-2	0	1
GDP/capita (USD at exchange rate)	984	-		825	636		
GDP/capita (USD at PPP - WIIW)	2168	-		-	-		
Gross industrial production							
annual change in % (real)	-1,8	-4,5	0,7	1	0		
Gross agricultural production							
annual change in % (real)	-1,9	-20,6	2,8	-5	0		
Goods transport, mn t	757	-	189,5	-	-		
annual change in %	4	-	0,2	-	-		
Gross fixed investment, UAH mn, nom.	10416	4000	4419	-	-		
annual change in % (real)	-7	-11	9	5	0		
Construction output total (based on MPS)							
annual change in % (real)	-	-		-	-		
Dwellings completed, units	77100	-		-	-		
annual change in %	-12,5	-	1,7	-	-		
Employment total, th pers., annl. average	22500	-		21750	21000		
annual change in %	-3,1	-		-	-		
Employment in industry, th pers., year av.	5310	-		-	-		
annual change in %	-3,1	-		-	-		
Unemployed reg., th, end of period	637,1	520,6	790,9	850			
Unemployment rate in %, end of period	2,8	2,2	3,4	4			
Average gross monthly wages, UAH	156,2	147	162	-	-		
annual change in % (real, gross)	-2,3	-4,2	1,4	2	2		
Retail trade turnover, UAH mn 4)	29100	12400	13100	-	-		
annual change in % (real)	4,2	3	0,4	-	-		
Consumer prices, % p.a.	15,9	20,8	8,3	13	25	10	
Producer prices in industry, % p.a.	7,7	9,3	5,6	5	7		
General government budget, UAH mn							
Revenues	36890	15337	16346	36241	-		
Expenditures	43086	17561	18383	39199	-		
Deficit (-)/surplus (+)	-6196	-2224	-2037	-2958			
Deficit (-)/surplus (+), % GDP	-6,7	-5,6	-4,7	-2,8	-2		

TABLE 1 cont.	1997	1997 January-June	1998	1998 forecasts	1999	2000	2001
Money supply, UAH mn, end of period							
M0, Currency outside banks	6132	5102		6500	-		
Broad money	12021	11102		13223	15000		
Refinancing rate of NB % p.a., end of period	35	21	51,6	70	30		
Current account, USD mn	-1288	-984	-760	-1182	-1700		
Gross reserves of CB incl. gold, USD mn	2423	2351	1770	1500	2500		
Gross external debt, USD mn	9555	11147		11500	13500		
Exports total, fob, USD mn	14232	6852	6106	14500	15300		
annual change in %	-0,7	-3,1	-10,9	2	8		
Exports excl. CIS, fob, USD mn	8646	4154	3892	-	-		
annual change in %	24	-	-7,0	-	-		
Imports total, fob, USD mn	17128	8574	7046	16000	17100		
annual change in %	-2,8	-7,3	-17,8	-7	7		
Imports excl. CIS, cif, USD mn	7249	3413	2969	-	-		
annual change in %	11,2	-	-13,0	-	-		
Average exchange rate UAH/USD	1,86	1,85	2,01	2,5	4,0		
Average exchange rate UAH/DEM	1,07	-		-	-		
Purchasing power parity UAH/USD, WIIW	0,85	-		-	-		

Sources: Minstat Ukrayiny, Narodne Gospodarstvo Ukrayiny 1991 and 1992; Statkomitet SNG, Sodruzhestvo Nezavisimykh Gosudarstv v 1996 g. and v 1997 g.; IMF Staff Reports, August 1997 and Sept. 1998; Ukraine's Economic Monitor*, July 1997; Statkomitet SNG,* Statisticheskie Biulleteni*, January-July 1998; UEPLAC,* Ukrainian Economic Trends*, August 1998 and earlier issues.*

Table 2: Ukraine: Principal Industrial Indicators 1990-I H 1998

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1998
Indicator:									**1H**	**1-8**
Electricity, bn KW years	298	279	253	230	203	194	183	176	88	-2,90%
Domestic oil production, mn t	5,3	4,93	4,47	4,2	4,2	4,0	4,1	4,1	1,9	
Domestic gas production, bcm	28,1	24,3	20,9	19,2	18,3	18,2	18,4	18,1	8,9	
Coal, mn t	165	135,6	133,6	116	94,6	83,8	75,5	75,6	38,9	
Steel, mn t							22,3	25,6	12,9	
Rolled steel (prokat), mn t	38,6	32,8	29,55	24,2	16,9	16,6	17	19,5	9,1	
Steel tubes, mn t	-	5,56	5,09	2,611	1,61	-	2,25	1,8	0,791	
Aluminium, th t	?							90,73		
Alumina, th t	?							1214,5		
Gasoline, mn t	8,4	7,6	5,4	3,5	3,0	3	2,74	2,8		
Diesel, mn t	12,7	11,2	8,1	6,1	5,2	4,3	3,87	3,8		
Heating oil (mazout), mn t		24,8	17,7	10,3	8,0	6,8	5,1	3,6		
Synthetic fibres, 1000 t	179	136	119	76,3	38,9	41,3	33,2	26		
Calcium carbonate soda, mn t	1,1	1,1	1,1	0,8	0,61	-	0,374	0,367		
Electric Motors, ths	3100	2500					338,9	244		
Locomotives, sections	-	732	434	470 Sep	-	-				
Vehicles, 1000s	196	192,7	176,7	175	-	-				
Cars, 1000s	156	156	135	140	93,6	58,7	6,9	1,8	6,9	
Trucks, 1000s	27,7	25,1	33,4	23,1	11,7	6,5	4,0	3,1		
Tractors, 1000s	106	90,2	71,2	55,5	16	10,4	5,4	4,6		
Metal-cutting tools, 1000 units	37	37,7	33,9	27,5	9,2	5,9	2,7	2,1		
Particle board, mn cu m equiv.	-	36	32,5	30	-	-				
Plywood, th cu m	143,3	100	-	-	-	-				
Paper, 1000 t	369	353	279	181	94,1	98	95,2	87,6		

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1998
Cement, mn t	22,7	21,7	20,1	15	11,4	7,6	5,0	5,1		
Sheet rock, mn sheets	1463	1484	1491	1278	-	-				
Window glass, mn sq m	50,9	45,9	-	-	-	-				
Tyres, 1000 units							6356	7500		
Textiles, all types, mn sq m	1212	1031	926,4	597	283	168	109	80,5		
Cotton textiles, mn sq m	504,7	466,9	234	126	-	-				
Linen textiles, mn sq m	108,8	91,9	-	-	-	-				
Woollen textiles, mn sq m	66,8	65,2	-	-	-	-				
Silk textiles, mn sq m	237,1	190,2	-	-	-	-				
Knitwear, mn pieces	351	293	243	147	54,3	-	12,03	8,3		
Socks and stockings, mn prs	443	393	381	290	145	-	63,5	42,6		
Footwear, mn pairs	196	177	144	104	39,1	21	12,4	9,5		
Grains, processed wt., mn t	*47,431*	38,674	38,537	45,623	35,497	33,939	24,536	35,7	30,3	
Flax, 1000 t	*110*	-	-	-	49	48	18			
Sugar, 1000 t	6791	4786	3647	3993	3368	3839	3292	2000		
Sugarbeets, mn t	*43,845*	36,168	28,783	33,717	28,138	29,65	23,009	17,5		
Raw milk, 1000 t	*24059*	22409	19114	18376	18138	17274	15821			
Whole milk products, milk equiv., 1000 t	-	5709	4112	2801	2220	1103	758	517		
Fish and products, 1000 t	-	905	547	365	218	393	371			
Eggs, all types of farm, mn	-	15188	13496		11794	10154	8782			
Potatoes, all types of farm, 1000 t	*17965*	14550	20277	21009	16102	14729	18410			
Vegetable oil, 1000 t	1070	1004	858	803	634	684	598	412		
Vegetables, 1000 t	*7449*	5932	5310	6547	5142	5880	5070			
Fruits incl. grapes, 1000 t	*3376*	-	-	-	1548	2355	2423			
Baked goods, 1000 t	6701	6685	6458	-	-	-				
Macaroni, 1000 t	360	364	351	340	-	-	157	124		
Flour, mn t	7,7	7,4	6,6	5,7	4,5	-	S	3,5		

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1998
Animal fat, butter, 1000 t	444	376	303	312	254	219	155	109		
Meat, slaughter wt., all types of farm, 1000 t	4358	4029	3401	2815	2678	2294	2113			
Wool, 1000 t	*30*	-	-	-	19	14	9			
Television sets, 1000s	3774	3616	2570	1919	806	217	115	41,8		
Tape recorders, 1000s	-	2028	1828	1246	218	105	43,7	24,7		
Refrigerators, 1000s	903	883	838	757	653	554	448	404		
Washing machines, 1000s	788	830	805	643	422	212	144	147		
Vacuum cleaners, 1000s	1073	1044	888	920	405	285	114	128		
Telephones, 1000s of which, domestic						9087 6449	9255 6730			
Registered telex machines, 1000s						1367	1350			
Registered fax machines, 1000s						16,4				

Sources: Minstat Ukrayiny, Narodne Gospodarstvo Ukrayiny 1991 and 1992; Statkomitet SNG, Sodruzhestvo Nezavisimykh Gosudarstv v 1996 g.; IMF, Staff Report, August 1997; Ukraine's Economic Monitor, *July 1997; Statkomitet SNG,* Statisticheskii Biulleten', *January 1998.*

Note: figures in italics are 1986-1990 averages.

Table 3: Ukraine: GDP, Industrial Production and Electric Power Generation 1990-1998E

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1998	1998E
Indicator:									**1-6**	**1-8**	**1-12**
GDP per capita in USD at exchange rate	5500	3300	480	590	735	720	865	985	857		
GDP, total, annual % change	-3,4	-8,7	-9,9	-14,2	-22,9	-12,2	-10	-3,2	0,2		
Index, 1990=100	100	91,3	82,3	70,6	54,4	47,8	43,0	41,6	41,7		41,5
Industrial production, annual % change	-0,1	-4,8	-6,4	-8	-27,3	-11,7	-5,1	-1,8	0,7		
Index, 1990=100	100	95,2	89,1	82,0	59,6	52,6	49,9	49,0	49,4		49,9
Electric power generation, bn KW years	298	279	253	230	203	194	183	176	88	*-2,90*	
Index, 1990=100	100	93,6	84,9	77,2	68,1	65,1	61,4	59,1		57,4	57,3

Sources: Minstat Ukrayiny, Narodne Gospodarstvo Ukrayiny 1991 and 1992; Statkomitet SNG, Sodruzhestvo Nezavisimykh Gosudarstv v 1996 g.; IMF, Staff Report, August 1997; Ukraine's Economic Monitor, July 1997; Statkomitet SNG, Statisticheskii Biulleten', January 1998.

Table 4: Ukraine: Structure of Industry shares in percent, international prices, 1990- Q2 1998

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998 Q2**	***1998 Q2 as % of 1990 Q2***
Electric Power	7,3	7,7	8,5	9,8	12,7	14,4	15,9	15,8	13,8	*54,9*
Oil & Gas	9,5	9,9	8,4	7,7	9,1	10,4	10,8	10,7	12,1	*34,3*
Coal	7,0	6,5	7,8	8,3	10,2	10,3	10,1	11,5	11,3	*42,4*
Steel	14,4	13,5	15,0	14,5	15,6	18,3	21,9	25,1	26,3	*47,1*
Capital Goods	29,8	30,2	28,6	27,7	18,9	14,1	9,9	9,0	11,1	*9,7*
Food	14,0	14,0	13,4	14,4	17,1	17,4	17,0	13,6	11,1	*22,4*
Other*	18,1	18,2	18,4	17,6	16,3	15,2	14,3	14,2	14,3	*20,8*
Industry Index	100	97,9	73,0	57,6	39,2	32,9	28,1	27,5	26,4	*26,7*

* *incl. chemical products, forest products, construction materials, and light industry.*

Source: UEPLAC, Ukrainian Economic Trends, *June 1998, p. 24.*

Table 5: Ukraine: Destination of Foreign Trade

Country or Area	Exports (share in %)					Imports (share in %)				
	1924	**1987**	**1996**	**1Q 1997**	**1H 1998**	**1924**	**1987**	**1996**	**1Q 1997**	**1H 1998**
Russia	66,9	60,7	38,1	29,1	26,5	83,9	53,7	47,0	56	49,6
All other republics	16,8	25,5	16,0			6,9	18,0	20,4		
of wh. Turkmenistan			1,9	1,3				8,8	6,4	
Baltics	2,8	4,2	1,4	0,8		0,1	3,7	1,3	0,7	
EU	13,8	3,8	12,6			4,1	8,0	17,4		
of wh. Germany			2,9	3,3				5,5	5,2	
France			0,7	0,7				1,3	2,2	
Britain			0,8	0,7				1,0	0,9	
Italy			2,4	2,7				1,8	1,5	
USA	0,8	0,1	2,5	2,5		2,5	0,7	3,0	3,1	
Eastern Europe	0,2	5,4	8,2	10,7		0,8	13,1	6,5	6,2	
Other Countries	1,5	4,5	25,1			1,7	6,5	5,7		
of wh. China			5,4	8,7				0,5	5,3	
Turkey			2,9	4,0				0,6	0,7	
Total:	**100**	**100**	**100**	**100**		**100**	**100**	**100**	**100**	

Sources: A. Vavilov and O. V'iugin, 'Trade Patterns of former Soviet republics after integration into the world economic system', conference paper, Laxenburg, Austria, April 1992; Ukrainian-European Policy and Legal Advice Centre, Ukrainian Economic Trends*, June 1997, p. 64. Reuters*

Note: For 1924 and 1987, data in 1987 domestic prices; for 1996 ff. in current prices acc. to balance-of-payments statistics.