The Progress Report
on G7 Energy Sector Support for Ukraine

Foreword

The Energy Ministers of Canada, France, Germany, Italy, Japan, the United Kingdom, the United States, and the EU Commissioner for Energy met in Rome in May 2014. They discussed ways to strengthen collective energy security and issued the Rome Energy Security Initiative, which provided for a number of immediate actions to be taken. On the basis of this initiative, Italy compiled “Rome G7 Energy Initiative for Energy Security Implementation Report” and submitted to the Hamburg G7 Energy Ministerial Meeting in May 2015.

At the Hamburg meeting in May 2015, G7 Energy Ministers discussed progress since the meeting in Rome in strengthening collective energy security and decided on a further initiative to effectively improve sustainable energy security of G7 countries and beyond, taking into account recent market developments. In the G7 Hamburg Initiative for Sustainable Energy Security, G7 Energy Ministers declared concrete joint actions with non-G7 countries to further strengthen sustainable energy security. In the G7 Elmau Summit Communiqué published in June 2015, the G7 leaders welcomed the Hamburg Initiative and announced their commitment to continue to support vulnerable countries, including Ukraine, in its efforts to reform and liberalize energy systems and aimed to further diversify its energy mix, fuels, energy sources and routes.

This paper aims to report to the G7 Energy Ministers about the outcomes of support for Ukraine by G7 member countries, EU and the IEA after the “Rome G7 Energy Initiative for Energy Security Implementation Report”. Given that our support for reforming and liberalizing energy systems in most vulnerable countries including Ukraine, is one of the concrete actions described in the Hamburg G7 Initiative, this paper organizes the current state and progress of reforming Ukraine’s energy system and identifies unsolved issues.

1 Ukraine's Energy Reform and Its Evaluation

1.1 The Challenges for Ukraine

Ukraine has faced an energy crisis for a decade, caused in large part by a highly inefficient, opaque and an imperfectly regulated energy system. The escalation of Ukraine-Russia tensions in 2014 aggravated its energy situation as well as its economic recession and existing social vulnerabilities.

Before 2014, Ukraine relied on readily available domestic coal and by Russian gas delivered on the basis of a long-term contract with Gazprom. Particularly, Ukrainian heavy industry, including steel, fertilizer, machines, chemicals, etc. were dependent on relatively cheaper gas and coal supplies for their competitiveness, although periodic friction with Russia caused uncertainty for industry. Coal deliveries from coal rich areas under the rebel controlled areas of Donetsk and Lugansk were severely disrupted and at points entirely halted. Access to the vast majority of Ukraine's anthracite coal reserves was reduced as a result of the conflict with the separatist forces in its eastern regions.

The worsening of the energy situations has had a negative impact upon Ukraine's overall economy. Its sustainable growth requires stable access to sufficient and economically procurable energy supplies. Inefficient and irrational energy use is one of the bottlenecks hindering growth in the Ukrainian economy. Meanwhile, the social implications of the loss of winter heating are very serious, since large segments of society could not afford paying an unsubsidized energy bill with the current inefficient consumption patterns. Ukraine's potential of energy conservation is huge, but underutilized due to the delayed modernization of energy infrastructure and the lack of social awareness about energy saving.

Given that Ukraine's energy situations has further worsened against the escalation of the conflicts in Ukraine since 2014, implementation of countermeasures to strengthen the resilience of Ukraine's energy system has all the more become a matter of urgency. Limited short-term expansion of domestic production of natural gas and coal is technically possible, although it would require significant investment.

Above all, six priority areas requiring policy measures to overcome the vulnerability of Ukraine's energy system, including both supply and demand sides, can be addressed: 1) dependency on Russia for energy imports (volume/route); 2) inefficient energy system; 3) insufficient use of domestic energy production potential; 4) removal of political risks; 5) energy market reforms; and 6) renovation and replacement of energy infrastructure.

The fundamental basis for realization of these policy measures is the Ukrainian government's effort to accelerate energy market reform, where significant progress was already achieved at least in the gas sector in implementing legal reforms in line with the EU Third Energy Package in accordance with Ukraine's obligation under the Energy Community Treaty[1]. More efforts, in other areas including regulatory aspects, electricity reforms and energy efficiency policies, will be required in 2016.

Overall, a basic framework for Ukraine's policy measures, addressing diversification of energy import routes, domestic energy price reforms, strengthening of the independence of the energy regulatory authority, etc. is currently ongoing.

Consequently, it is expected that the Ukrainian government should continue and complete energy market reforms, including further increases in gas, electricity and other fuel prices, installation of gas and electricity meters at buildings and household levels, gradual abolishment of subsidy, enactment of the secondary legislation to carry out liberalization of gas and electricity markets and so on.

1.2 Ukraine's energy vulnerabilities and necessary measures

(1) Vulnerabilities

The Ukrainian energy system has four main vulnerabilities.

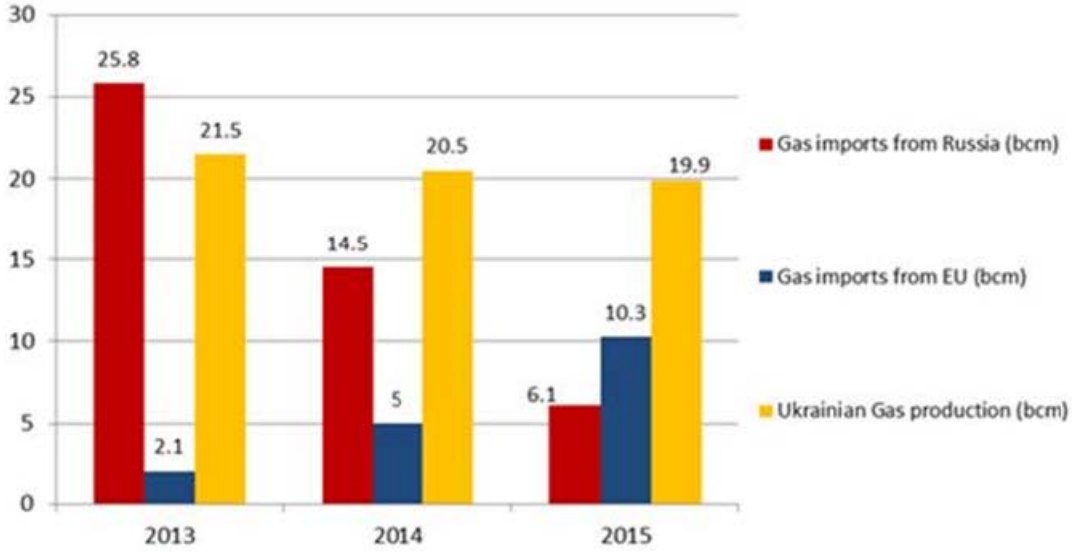
(A) Excessive dependence of energy import volume and route on a specific country

Before 2014, Ukraine imported more than half of its gas demand from Russia, the remainder being covered by domestic production. With the opening of reverse flow capacity from Europe in late 2014, Ukraine began a gradual diversification of supplies. In 2015, Ukraine imported 45% of natural gas supplies, of which EU accounted for 63%, the remainder from Russia.[2] It is important to note that the gas coming from the EU is largely still Russian-origin gas. This is a remarkable improvement from 2014 when Ukraine was still dependent on Russia for 74% of direct natural gas imports (Figure 1.1). Back in 2011, the share of imports in natural gas supplies was greater than 75%. Ukraine's import routes are overwhelmingly dependent on gas pipelines from Russia which were built in the Soviet era. Besides, Ukraine is dependent on Russia for almost all of steam coal and 100% of uranium imports.

[1] https://www.energy-community.org/portal/page/portal/ENC_HOME/AREAS_OF_WORK/Implementation

[2] In 2015 Ukraine imported 10.3 billion cubic meters (Bcm) of natural gas from the EU and 6.1 Bcm from Russia. Data from Naftogaz (http://www.naftogaz-europe.com/article/en/gasimport2015eng).

Figure 1.1 Natural Gas Imports per Source, Ukraine, 2013-15



Source: Naftogaz

(B) Inefficient energy market mechanism and the lack of modern infrastructure

Ukraine used to play an important role as an electricity supply base during the Soviet period. However, a lack of investment in the modernization of the country's generation and transmission capabilities has hurt the country's electricity output. Ukraine's energy intensity per real GDP based on purchasing-power-parity (PPP) is the highest among the IEA Europe members (Figure 1.2).

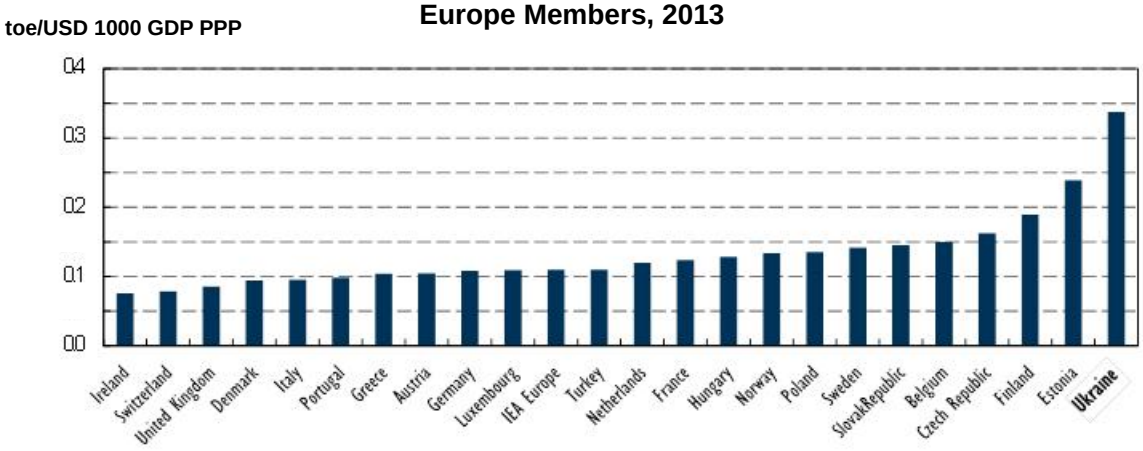
On the supply side, Ukraine's state-owned power and gas companies bear persistent deficits, causing delays in investment in modernization and/or replacement of old facilities. This is due in large part to tariffs which do not reflect cost recovery levels.

On the demand side, the excessively low tariffs for electricity and gas have discouraged incentives for energy saving. For example, as of 2013, the household electricity tariff was 2.4 Eurocent/KWh, far below the lowest value, 7.7 Eurocent/KWh in Romania, among the 28 EU nations[3]. In Ukraine, the electricity tariff for the industrial sector was also at a rather low level at 8.1 Eurocent/KWh. Likewise, gas prices were also low at 76.9USD/1000 m^3 for households and at 284.6USD/1000 m^3 for industry[4].

[3] Fuel and Energy Complex of Ukraine, Ministry of Energy and Coal Industry, Ukraine.
[4] Fuel and Energy Complex of Ukraine, Ministry of Energy and Coal Industry, Ukraine.

However, it should be noted that a substantial proportion of the recent energy demand declines are not due to energy efficiency improvements but have occurred because of a general decline in industrial output.

Figure 1.2 Energy Intensity Measured as TPES per real GDP PPP, Ukraine and IEA Europe Members, 2013



Note: TPES = total primary energy supply; GDP = gross domestic product; PPP = Purchasing Power Parity.

Source: IEA (2015), Energy Balances of Non-OECD Countries 2015, www.iea.org/statistics/.

(C) Insufficient use of domestic potential of energy resources

Ukraine has 0.6 trillion cubic meters of natural gas reserves[5], mainly lying in Ukraine's northeastern regions and around the Crimean Peninsula where resources in the Black sea offshore lie in the layer of the deep sea below 6,000-7,000 meters. Natural gas production in Ukraine has decreased since the 1980s with its declining trend worsening after the collapse of the former Soviet Union. Natural gas production in Ukraine decreased by one-third from 28 Bcm in 1990 to 19 Bcm in 2014[6]. The delayed development and reduction of natural gas can be attributed to the ineffective market mechanism and the unfavorable investment climate in Ukraine.

Unstable investment climate, including the state-owned gas company Naftogaz's funding shortfall due to very low domestic gas prices, the government's frequent changes of gas production tax, etc. has hindered participation of foreign capital to date, but improvement is a matter of some urgency.

Ukraine has 33.9 billion tons of coal reserves[7]. But about three-quarters of this lie in

[5] BP, Statistical Review of World Energy 2015.
[6] IEA, Natural gas information 2015.
[7] BP, Statistical Review of World Energy 2015.

Donetsk and Luhansk provinces, part of which are currently not under the full control of the Ukrainian government and affected by conflict with the separatist forces. Even before the conflict in the east, coal production more than halved from 85 million tons of oil equivalent (Mtoe) in 1990 to 41 Mtoe in 2013. Due to the reduction of domestic consumption from 81 Mtoe to 42 Mtoe during the same period, however, Ukraine's self-sufficiency of coal has remained flat at 98%[8]. The Ukrainian government continues to operate inefficient management of state coal mines while subsidies protected the domestic coal industry from closing unproductive coal mines. The government should consider a program to reduce subsidies to the coal industry.

(D) Political risks

Domestic political instability and conflict in Ukraine creates uncertainty with respect to the future procurement of natural gas and coal. In addition to Russia's temporary suspension of gas supplies in 2006 and 2009, the bilateral disputes over Russian gas export prices and the transit fees for gas deliveries to Europe via Ukraine are well-known.

It is noteworthy, however, that despite the far more serious overall context of the relationship with Russia, Ukraine has managed to separate this bilateral factor from the transits by complying with transit contract conditions and the relevant provisions of the Energy Charter treaty and did a credible effort to act as a reliable transit partner to Europe.

Naftogaz's joint projects with the Western oil majors regarding exploration and development of unconventional natural gas fields and deepwater areas in the Black Sea were forced to suspend or abandon against the backdrop of the seizure of the assets of its subsidiary company in Crimea and the escalation of the Ukrainian crisis.

Steam coal production and supplies from the main coal mines in Ukraine's eastern regions have decreased since the advent of the conflict in the east. There remain also long-term uncertainties over gas transit via Ukraine to Europe in the future, since Russia has indicated possible alternate routes around Ukraine after 2019, which would result in a significant shortfall in income to the Ukrainian energy system.

Nuclear power generation has supplied since the crisis of 2015 more than 50% of

[8] Calculated by production / total primary energy supply. IEA, Energy Balances of Non-OECD Countries 2015.

electricity. There are concerns that this level of production cannot be maintained indefinitely in view of the technical shut downs necessary to carry out regular inspections as well as overdue safety upgrades. There are no plans to build additional nuclear power plants for the time being, while the Ukrainian government cancelled the expansion projects for the Khmelnitsky 3-4 plants, for which Russia's state-owned nuclear company Rosatom had been selected as its contractor. Ukraine is meanwhile implementing a program of diversification of fuel supplies for its nuclear reactors, traditionally dependent on Russian fuel rods.

(2) Implementation of the Winter Action Plan 2015-2016

From 5 July to the 3 August 2015, a joint US, Canadian and EU team of energy experts supported the Ukrainian Government in drawing up a Winter Action Plan to address the energy challenges for the coming winter as well as drafted a medium term Ukrainian National Resilience plan exercise. The Winter Action Plan was adopted by the Cabinet of Minister on August 5, 2015, with a list of 41 concrete recommendations to prepare for the winter 2015. A number of measures were taken, including with regard to greater level of gas storages as well as some purchases of imported coal, while others, including the establishment of a national coal reserve, are still outstanding.

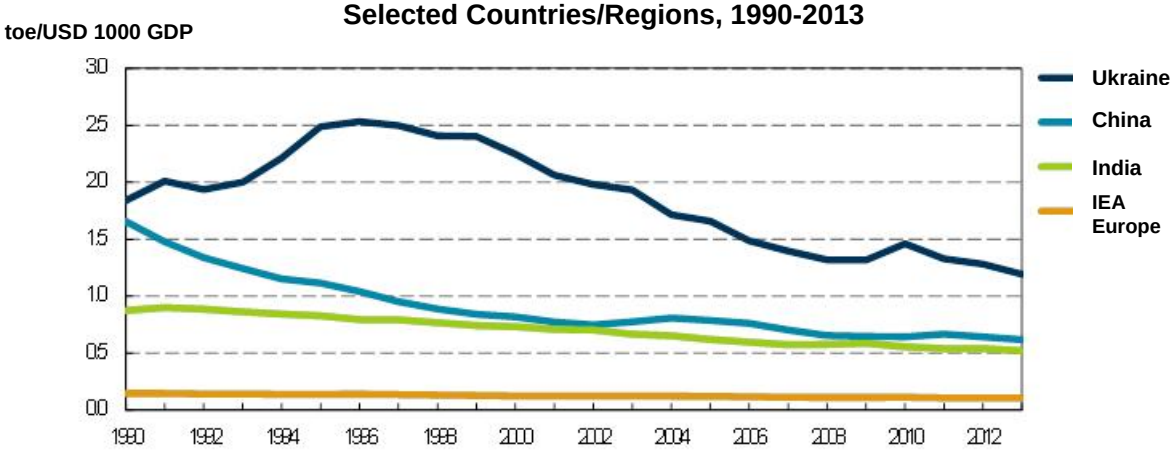
(3) Necessary measures: What is further needed?

Policy measures to overcome Ukraine's energy vulnerability can be approached from mainly six priority areas in supply or demand sides.

(A) Significant improvement of energy efficiency

According to the IEA, Ukraine's primary energy consumption per GDP (toe per 2005USD) kept worsening from 1.84 in 1990 and began to improve after hitting a bottom at 2.53 in 1996 (Figure 1.3). As of 2013, however, Ukraine's energy intensity is extremely high at 1.19, compared with China (0.62) and India (0.52) for instance, while its primary energy consumption per purchasing power parity (PPP) demonstrates the same trend.

Figure 1.3 Energy Intensity Measured as TPES per GDP (2005 prices), Ukraine and Selected Countries/Regions, 1990-2013



Source: IEA (2015), Energy Balances of Non-OECD Countries 2015, www.iea.org/statistics/.

Particularly at present, energy saving is of great importance as a means of increasing energy self-sufficiency from the demand side. Industrial energy efficiency in Ukraine needs to achieve a breakthrough in order to keep the industry competitive. In addition, gas and coal consumption can be largely reduced by introducing high-efficient technologies into thermal plants, including pollution control equipment.

To achieve greater efficiencies, Ukraine should steadily raise domestic energy prices, install and disseminate gas meters in its of district heating infrastructure as well as continue with renovation and replacement of old-fashioned district heating infrastructure. It is also critical for the government to initiate a public messaging and public awareness campaign about energy savings.

Although domestic energy prices have already been increased in Ukraine, there are two major challenges to be overcome for the full elimination of subsidies. Firstly, an extensive and well-designed social safety network introduced with the assistance from World Bank, should be implemented, given that even the current energy price increases are causing strain for most income classes. Secondly, substantial funds need to be channeled into energy efficiency from outside sources such as the European Bank for Reconstruction and Development (EBRD) and similar institutions in order to mobilize the energy efficiency potential unlocked by the price increases since even very high internal rate of return (IRR) efficiency projects do not get financed on a commercial basis against the backdrop of the crisis of the banking system.

(B) Improvement of self-sufficiency of energy

Given the large investment sums needed to expand domestic natural gas production and modernize domestic coal production, nuclear power generation will be needed as a base-load fuel for the immediate future. Increased introduction of renewables should also be encouraged. The short-term countermeasures should include more efficient use of the existing nuclear power plants and improvement of average heat-recovery efficiency at the existing coal thermal plants.

Improving infrastructure would also provide more energy security, for example, expanding and modernizing the ports in the Odessa region would enable Ukraine to take better advantage of the favorable coal supply situation in international markets, if and when necessary.

Meanwhile, in the middle and long run, it is not negligible for the strengthening of Ukraine’s energy security to have modernization and/or replacement of Ukraine’s old-fashioned coal thermal plants by higher-efficient ones with air pollution-proof equipment as well as with an adequately chosen portfolio of lower carbon sources. In this regard, appropriate guidelines include the EU Large Combustion Plant Directive upon which Ukraine established its National Emissions Reduction Plan. It is highly recommended that we should start discussing methods of financing relevant projects without ignoring the importance of utilizing the best practices to minimize environmental cost.

From the medium term, and long term, Ukraine should modernize and replace current generation assets and enhance self-sufficiency of energy by increasing the ratio of renewables based on economic assessment and recovery of exhaust heat from waste incinerators. Investment capital needs to be secured by clarifying investment priorities considering the time-span and effects of countermeasures.

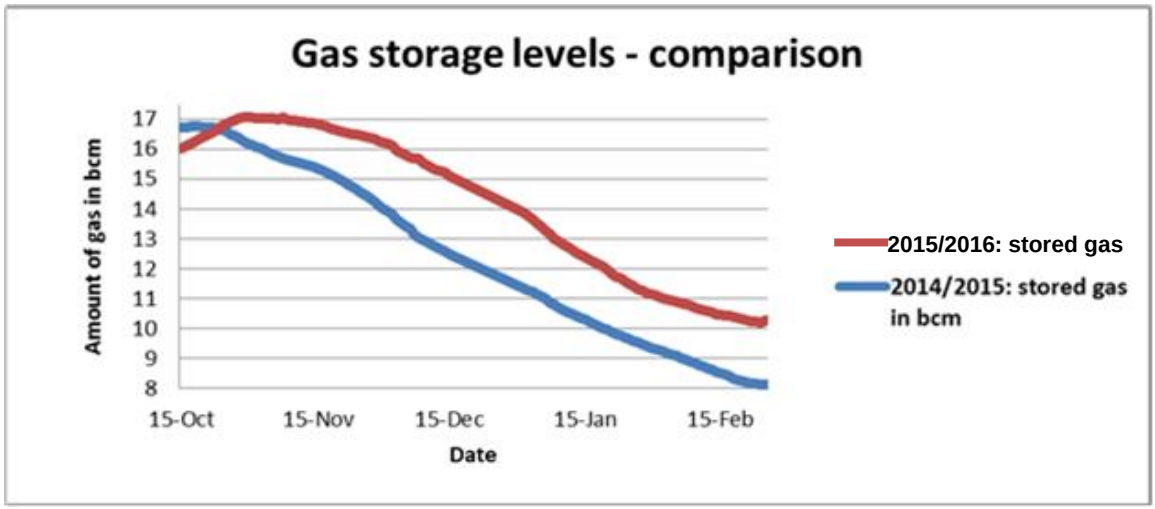
(C) Diversification of energy imports

Further reduction of Ukraine's gas imports directly from Russia is desirable. Ukraine’s energy direct dependence on Russia has been reduced by way of reverse gas supplies by pipeline from Europe via Slovakia, Hungary and Poland and diversification of uranium imports. While the EU’s share in Ukraine’s gas imports increase from 26% in 2014 to 63% in 2015, this new trend should be encouraged. It is important to steadily increase both the physical capacity of reverse gas supplies and implement virtual reverse flow as well as to

make effective use of underground gas storage in view of its commercial use in the future (Figure 1.4).

The utilization rate of domestic anthracite coal has declined due to the political uncertainty in the Donestk region. Domestic sources of steam coal in Ukraine are limited, and so the country should expand infrastructure to allow for future imports until greater reliance on renewable energy sources can be implemented.

Figure 1.4 Gas Storage Levels in 2015/2016 compared to 2014/5



Source: The European Commission

(D) Enhancement of energy market transparency

Ukraine needs to achieve greater transparency of the energy market as a part of the EU Third Energy Package. With respect to Naftogaz, a vertically integrated state-owned oil and gas company, for instance, the government is reviewing plans to institute greater transparency through implementation of an unbundling plan, introduction of external accounting auditing system, publication of annual reports, etc.

It is important to enact stable and appropriate energy-related laws and taxation systems, to increase transparency with regard to the use of public funds, to collect and consolidate energy statistics meeting international standards, and to establish an independent energy authority in view of ensuring consolidation of a competitive energy market.

Finally, increasing transparency in the country's energy market, including the use of subsidies, is a prerequisite in fighting corruption.

(E) Energy price reforms

Introducing market based energy price is an effective policy measure on both supply and demand sides. As regards the supply side, energy companies could secure financial resources for investment in new infrastructure if tariffs reach cost-recovery levels.

As for the demand side, consumers could be encouraged to save energy. As a matter of fact, both domestic and international experts have repeatedly noted the importance of raising Ukraine's domestic energy prices in accordance with market prices.

Substantial price increases did already take place in 2015, but with the collapse of the currency, these price increase have not entirely covered the import level price and further price increases in gas and electricity may therefore be necessary in 2016 and 2017, as planned under the ongoing IMF program.

(F) Renovation and replacement of energy infrastructure

Ukraine's energy infrastructure, including especially power generation plants, heat supply plants and gas pipelines, need renovation and replacement while prioritization of projects should be identified according to the estimated future demand of electricity and heat.

While it is an impending issue for operators to correctly understand the current state of energy facilities, energy price reforms are a prerequisite to achieve high efficiency and profitability as a result of renovation and replacement of the facilities. Improvement of the investment climate concerning the transparency and stability of related laws and regulations is required to attract foreign investment.

Central district heating currently accounts for approximately 40% of heat supply to the household sector. However, its infrastructure, mostly built during the Soviet period, has remained seriously deteriorated without relevant maintenance. For example, old plumbing equipment is causing water leakage and the huge loss of heat in transmission, entailing waste of fuels.

Renovation and replacement of district heating infrastructure would greatly contribute to improvement of Ukraine's energy efficiency. Installation of modern meter devices is required to collect and acknowledge the current state of energy consumption and the potential for energy saving.

The responsibilities as well as co-ordination between central and local governments should be clarified in order to overhaul and to realize effective investment in modernization of district heating.

The Ukrainian government also needs to increase heat tariffs according to cost-reflective and consumption-based calculation, while subsidies, discouraging incentives for energy saving, should be steadily reduced. Notwithstanding the huge amount of investment, however, modernization of infrastructure in the district heating sector is a pressing issue for Ukraine.

1.3 Ukraine's Energy Policy: What is achieved and is not?

(1) Major progresses

The National Reform Council (NRC) was established to forge political consensus on the procedures of reforms in each sector in Ukraine. The NRC has periodically published the current state of each sector's progress. It releases reform achievements by quantitatively assessing concrete tasks, including, for example, consolidation of electricity and gas markets' legislation and the establishment of an independent energy regulatory authority.

As of January 1, 2016, the NRC reported that 57% of Ukraine's energy sector' reforms were already achieved[9]. There remains however a significant gap between adoption of legal reforms and their effective implementation which will need to be addressed as a matter of urgency.

(A) Diversification of energy imports

Ukraine has striven for reduction of natural gas imports directly from Russia by procuring gas supplies via reverse flows from Central and East European countries. In 2010, all of Ukraine's gas imports (36Bcm) came from Russia. As late as 2015, however, Ukraine imported 16.4 Bcm of natural gas of which the EU and Russia accounted for 63% and 37%, respectively[10].

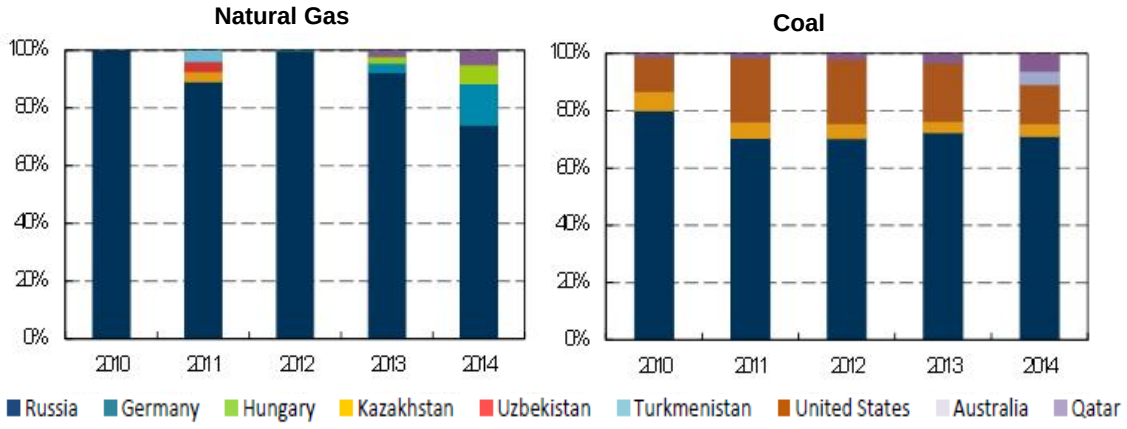
Likewise, Ukraine has reduced dependency of coal imports on Russia by diversifying the suppliers. In 2010, Ukraine imported 80%, 12% and 8% of coal (12 million tons) from Russia, the United States and Kazakhstan, respectively. As late as 2014, however, Ukraine's coal imports (15 million tons) are more diversified with 71% from Russia, 14%

[9] http://reforms.in.ua/en/reforms/energy-reform
[10] IEA, Natural Gas Information, 2015.

from the United States, 5% from Australia, 5% from Kazakhstan and 5% from the others[11].

In a similar manner, Ukraine has promoted diversification of nuclear fuel imports. Previously, Ukraine completely depended on Russia for uranium conversion, enrichment and nuclear fuel assembly. Energoatom and Westinghouse signed a fuel supply contract in March 2008. In 2016, Energoatom plans to purchase 40% of its uranium fuel form Westinghouse[12].

Figure 1.5 Natural Gas and Coal Imports per Source, Ukraine, 2010-14



Sources: IEA (2015), Natural Gas Information 2015 & IEA (2015), Coal Information 2015, www.iea.org/statistics/.

(B) Energy market reforms

Ukraine's domestic energy market reforms and formulation of the related laws are in progress in accordance with the EU Third Energy Package.

Structural reform of the gas market, including reorganization of Naftogaz, and its subsidiaries, is currently being implemented. In November 2015 the Ukrainian Government adopted a Corporate Governance Action Plan for Naftogaz and in April 2016, the Government appointed a new board for Naftogaz. The Law on the Natural Gas Market, approved by the Ukrainian government on April 9, 2015, came into force in October 2015. This law sets principles for gas market reform. As of January 2016, the secondary legislation, including Naftogaz's reform, is formulated, and transmission system operator (TSO), independent from gas supply and production sector has yet to be established.

The structural reform of the electricity market, addressing dismantling and reorganization

[11] IEA, Coal Information, 2015.
[12] "Nuclear Power in Ukraine" (updated 16 March 2016), the World Nuclear Association, http://www.world-nuclear.org/information-library/country-profiles/countries-t-z/ukraine.aspx

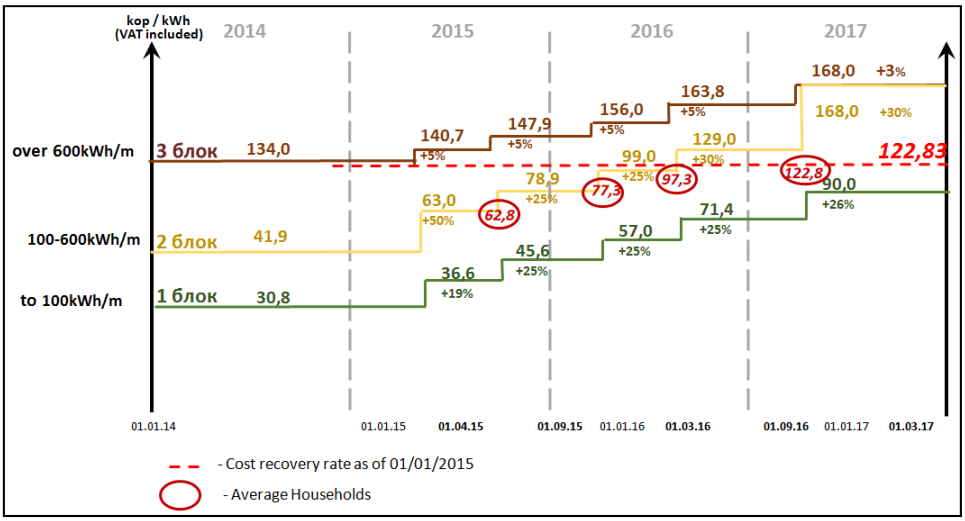
of the state-owned vertically integrated transmission company, Ukrenergo, was already initiated under the guidance of the World Bank but remains to be implemented. The electricity market does not today fulfill the conditions under the EU Third Energy Package and will therefore need further reforms. The power generation sector was largely privatized with the state-owned company retaining certain generation assets. The newly-established electricity wholesale market, *Energorynok*, is not in full operation against the background that the power generation sector remains oligopolistic characterized with one market player holding the majority of assets.

In addition to increasing electricity tariffs, transition to a competitive market is necessary. The draft Law on the Electricity Market, addressing electricity reform has been under deliberation in the Verkhovna Rada (parliament) of Ukraine since March 2016. The adoption of this specific law is of great importance in order to fully comply with the EU Third Energy Package.

(C) Energy Tariff System Reforms

The National Commission for State Regulation of Energy and Public Utilities (NKREKP) announced significant increases of electricity, heat and gas prices in the household sector in February-March 2015. The NKREKP plans step-by-step increases of those prices so that supply costs are recovered in three years from 2015 to 2017. Prices are planned to increase by 5 stages during the same period (Figure 1.6).

Figure 1.6 Planned Electricity Tariffs Increase in the Household Sector, 2015-2017



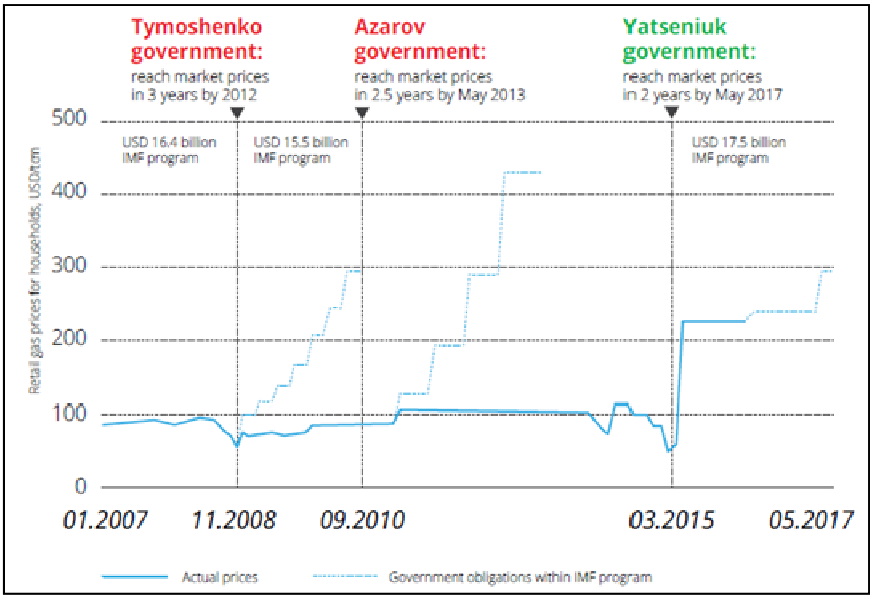
Source: Electricity tariffs Households Ukraine, NKREKP

The calculation of price increases in the household sector is based on the natural gas price for heat production (UAH 2,495.25/1000m^3)[13]. Yet, combined heat and power (CHP) system and heat supply from power generation plants, however, are exempt from the price increase.

Likewise, the NKREKP plans to increase gas tariffs by stages to recoverable levels of supply costs in three years from 2015 to 2017. Naftogaz intends to raise the recoverable level from 60% by April 2015, to 75% by April 2016 and 100% by April 2017 when the gas price increase is completed[14].

Figure 1.7 shows natural gas price increases in the household sector. According to the NKREKP, household and industrial gas prices are planned to converge in the future.

Figure 1.7 Planned Gas Tariffs Increase in the Household Sector, 2015-2017 (UAH/m^3)



Source: Naftogaz, Annual Report 2014

The Ukrainian government has promised to install building-level gas and heat meters on the side of all consumers by the end of 2016 as a condition for IMF's loans.

With respect to the abolition of subsidies, the MECI and the Ministry of Finance plans to limit the subsidies to coal industry to less than UAH 20 billion and to restrict the usage of the subsidies for draining and management of mines' water, while provision of subsidies

[13] 312 U.S. dollars per 1000 m^3 if calculated by the 2013 average price (USD 1=UAH 8).
[14] Naftogaz, Annual report, 2014

for a partial cost of coal production, modernization of coal mine and renovation of facilities is to be prohibited[15]. As of January 2016, the draft Law "On State Support for Coal Sector" is submitted to the Ukrainian government.

(D) Creation of independent energy regulatory authority

Previously, two regulatory authorities coexisted: The National Energy Regulatory Commission (NERC) was in charge of regulations with regard to natural monopolies in electricity, oil, gas and heat production; and the National Communal Services Regulatory Commission (NCSRC) was in charge of public services regarding water and sewage, heat and gas supplies.

On August 27, 2014, President Poroshenko abolished the NERC and the NCSRC and established the National Commission for State Regulation of Energy and Utilities (NKREKP) as a subordinate body under President and Supreme Rada (parliament) by integrating the authorities and functions of the NERC and the NCSRC[16].

The NKREKP regulates the energy sector, including electricity, heat, oil, gas and coal as well as public services, including water and sewerage, waste management, recycling, etc. As of March 2016, the Draft Law "On the National Commission for State Regulation of Energy and Utilities" is under deliberation in the Verkovna Rada.Adoption of this specific law is key to ensure the full independence of the NKREKP, a precondition for the compliance with the EU Third Energy Package.

Transition Plan for Ukrainian Energy Independence

Transition Plan for Ukrainian Energy Independence (Plan) is the result of a multi-national effort of subject matter experts from the United States, Canada, European Commission and Ukraine. The plan is currently being reviewed by the government of Ukraine.

The plan aims to reinforce Ukraine's energy security and reduce reliance on foreign energy fuels. The prioritized recommendations are derived from the evaluation of cross-cutting imperatives, government policy, energy fuels, generation and infrastructure.

[15] http://reforms.in.ua/en/reform/indicator/9427

[16] "Ukaz prezidenta Ukrayni, pro zatverdzhennya polozhennya pro natsional'nu komsiyu, scho zdiysnyue derzhavne regulyuvannya u sferakh energetiki ta komunal'nikh poslug", September 10, 2014, No.715/2014. <http://zakon3.rada.gov.ua/laws/show/715/2014?test=4/UMfPEGznhhxQ..ZiByh7BpHI46Is80msh8Ie6>

"Energy independence", addressed in TPUEI, refers to a combination of reliability (the ability of the energy system to operate within limits so that instability, uncontrolled events, or cascading failures do not result if there is a disturbance) and resilience (the ability of the energy system to adapt to changing conditions, withstand, and rapidly recover from disruptions). Resilience had additional four supporting characteristics:

- Robustness: the inherent strength or resistance in a system to withstand external demands without deregulation or loss of functionality
- Redundancy: system properties that allow for alternate options, choices, and substitutions under stress
- Resourcefulness: the capacity to mobilize needed resources and services in emergencies
- Rapidity: the speed with which disruption can be overcome and safety, services, and financial stability restored.

The recommendations included in TPUEI are all considered "elements of resilience" and will fall into one of the three primary categories:

- Required Elements (EU): Requirements set forth by the EU-Ukraine Association Agreement and the Energy Community Treaty;
- Recommended Elements (Non-EU): International requirements for mature national energy systems, but may not have been explicitly identified as an EU requirement; and
- Additional Elements: Any remaining strategies that could be accomplished within the timeframe of TPUEI for increasing Ukraine's energy resilience and, ultimately, its energy independence.

(2) Impending challenges

Ukraine already has basic laws with regard to gas and electricity reforms on the whole. It is expected that market reforms should be steadily implemented by the Ukrainian government by way of increasing gas, electricity and heat prices, installation of meters in buildings and at the household level, elimination of subsidies as planned, enactment of the secondary legislation to carry out liberalization of electricity and gas markets, while the NRC (National Reform Council), leading body to promote reforms, needs to consolidate domestic political consensus.

2 Support Actions by G7 Members and International Organizations

	Member	Project title	Project period
1	Canada	Energy Contingency Planning / Energy Preparedness Planning / Winter Action Plan (WAP): in collaboration with EU and US	From 2014 to 2016
2	Canada	Transition Plan for Ukrainian Energy Independence: in collaboration with EU and US	From 2015 -ongoing
3	Canada	Building National Geoscience Capacity in Ukraine: Energy Security and Growth through Geological Information Management Reform	From 2016 to 2017
4	Canada	Tabletop Exercise to Ensure Ukraine's Natural Gas Security	2016
5	France	Modernization of district heating facilities in Kyiv	From 2014
6	France	Support to energy efficiency in regional cities	From 2014
7	France	Capacity building on energy efficiency in waste management	From 2015
8	France	Energy efficiency and renewable energy	From October 2015 to end of 2016
9	Germany	Turning subsidies into investments	From 2014 to 2016
10	Germany	Promoting sustainable supply and use of bioenergy in agriculture and forestry in the Russian Federation and Ukraine	04/2013 till 03/2016
11	Germany	Rehabilitation of four electric power substations	Project implementation consultant started work end of November 2015, feasibility study planned for March 2016 with further information on project period
12	Germany	Modernization of Substations in Eastern Ukraine	From 2015/11/30 to 2019/12/31
13	Germany	Increasing Efficiency in Energy Transmission	From 2011/11/30 to 2018/06/30
14	Germany	Modernization Partnership Energy Efficiency	From early 2016 to early 2019
15	Germany	Energy efficiency in municipalities	From 2013/09/01 to 2017/04/30
16	Germany	Energy Efficiency Consulting for Companies	From early 2016 to early 2020

	Member	Project title	Project period
17	Germany	Support to energy efficiency in the building sector	1st stage: Oct. 2015 – April 2016, 2nd stage planned: May 2016 – April 2017
18	ITALY	Ukraine study tour visit	From 2015/01/27 to 2015/01/31
19	ITALY	Italy-Ukraine Joint Commission on Economic, Industrial and Financial cooperation	From 2015/10/26 to 2015/10/27
20	ITALY	Workshop on Geothermal Energy	From 2016/03/02 to 2016/03/04
21	JAPAN	Energy Master Plan Project	From April 2015 to February 2016
22	JAPAN	Clean Coal Technology Project for Tripulskaya Power Plant and Burstin Power Plant	From 2014 to 2015
23	JAPAN	Collecting Ukrainian Energy Data and Assessment	From Oct. 2015 to June 2016
24	JAPAN	Steam Turbine Efficiency Pilot Project	From Nov. 2015 -
25	UK	Strengthening energy security and sustainability through international cooperation and integration	From February to March 2016
26	UK	Support to the Parliament Fuel and Energy Sector Committee	From February to March 2016
27	UK	Support for the Energy Community Secretariat	From August 2015 to March 2016
28	UK	Reform of the coal industry: HR strategy	From Oct 2015 to March 2016
29	UK	Energy assets privatization: policy advice	From Nov 2015 to March 2016
30	UK	Energy information capacity building to support a “future energy vision for Ukraine”	From Nov 2015 to March 2016
31	UK	Good Governance Fund: Energy in Ukraine	From Nov 2015 to January 2016
32	UK	The Hidden Fuel – Tapping Energy Efficiency Potential in Ukraine	From Nov 2014 to June 2015

	Member	Project title	Project period
33	US	Naftogaz Corporate and Technical Reform	2015-2017
34	US	Naftogaz Corporate Governance	2014-2015
35	US	Regulatory Support	2013-2016
36	US	Gas Field Surface Facilities Engineering Assessment	2015-2016
37	US	Gas Rehabilitation	2015
38	US	PSA Implementation	2014-2015
39	US	Electricity Transmission System Planning and Operation	2004-2016
40	US	Electricity Regulatory Support	2013-2016
41	US	Improved Subsidy Calculation	2013-2016
42	US	Chernobyl Shelter Fund	1997-2017
43	US	Physical Security Upgrades to the South Ukraine Nuclear Power Plant	2015-2016
44	US	Ukraine Nuclear Power Plants Emergency Operating Procedures (EOPs) and Severe Accident Mitigation Guidelines (SAMGs)	2015-2016
45	US	Review of Used Nuclear Fuel Storage Facility	2016
46	US	Municipal Energy Reform Project (MERP)	2013-2016
47	US	Supporting Private Investment in Clean Energy (SPICE)	2015-2020
48	US	Bank Loan Guarantees through Development Credit Authority	2013-2023
49	US	Ukraine’s Bio-Energy Solutions and Technologies (U-BEST)	2016-2018
50	US	Local Alternative Energy Solutions in Myrhorod (LAESM)	2013-2015
51	US	Municipal Energy Reform Project	2013-2016
52	US	Supporting Private Investment in Clean Energy	2015-2020
53	US	Bank Loan Guarantees through Development Credit Authority (DCA)	2013-2023
54	US	Energy Efficiency Financing	2013-2019
55	US	Industrial Energy Efficiency	2015-2016

	Member	Project title	Project period
56	US	Energy Efficiency Auditor Training	2015
57	US	Local Environmental and Energy Action Plans	2014-2015
58	US	Electricity Contingency Planning	2015-2016
59	US	Winter Action Plan	2015-2016
60	US	National Resiliency Energy Plan	2015-2016
61	US	Anti-Crisis Cell Support	2015-2016
62	US	Humanitarian Assistance	2014-2015
63	US	Public Outreach Campaigns	2013-2016
64	US	Energy Sector Transparency Initiative	2015-2017
65	US	Transaction advisory support to Kyiv City on District Heating contract	2015-2017
66	US	Transaction Support for Centrenergo Privatization	2015-2017
67	US	Energy Working Group	2015
68	US	Energy Sector Transparency Initiative	2015-2017
69	US	Energy Efficiency and District Heating	2015/4/1
70	US	Nuclear Non-Proliferation Capacity Building	2009-2016
71	US	Nuclear Security Assistance	2014-2017
72	US	Guard/Response Force training	2015-2016
73	US	Nuclear Security Degree Program	2016
74	US	Radiological Security Assistance	2016
75	US	Nuclear Smuggling Detection and Deterrence	2005-2016
76	US	Nuclear Forensics Assistance	
77	US	HEU Minimization Assistance	2012-2015
78	US	Nuclear Incident Policy and Cooperation Assistance	2006-2010
79	US	Cybersecurity Initial Review	2015-2016
80	US	Cybersecurity Tabletop exercise	2016

	Member	Project title	Project period
81	EU	Continued support for the implementation of Ukraine's energy strategy	12/2013 – 05/2018
82	EU	Support to the Ministry of Energy and Coal Industry of Ukraine in the development of assistance in the energy sector	08/2013 – 03/2015
83	EU	Improving implementation of Ukraine's commitments within the Energy Community through enhancing impact of civil society	01/2014 – 01/2016
84	EU	Preparation of Twinning project and provision of assistance to National Commission for State Energy and Public Utilities Regulation (NEURC) of Ukraine in the area of electricity market regulation	08/2013 – 12/2014
85	EU	EBRD Technical Assistance Support for Ukrainian Municipalities	12/2008 – 12/2016
86	EU	EBRD Power Transmission Network Reinforcement	12/2009 – 10/2016
87	EU	EBRD Hydropower Rehabilitation Project	05/2010 – 05/2017
88	EU	EBRD Preparatory studies for the modernization of Ukraine's gas transit corridors and underground gas storage facilities	on-going
89	EU	KfW Power Transmission Efficiency Project	on-going
90	EU	Covenant of Mayors Capacity Building Model for Ukraine and Georgia	12/2011 – 12/2014
91	EU	Sustainable Energy Planning in Eastern Europe and South Caucasus - towards the Covenant of Mayors - Moldova, Ukraine and Azerbaijan	12/2011 – 12/2014
92	EU	Energy 4 Eastern Mayors	01/2012 – 12/2014
93	EU	Building local capacity for domestic solar heating, hot water and insulation for rural and remote areas in the EEC region	12/2010 – 12/2015
94	EU	Contribution to the multi-donor fund established in the framework of Eastern Europe Energy Efficiency and Environment Partnership (three Contribution Agreements: 1) Cris ref. 258219, AAP 2010; 2) Cris ref. 268938, AAP 2011; 3)	9 years, three contributions of the following duration: 1) 12/2010 – 09/2015 2) 12/2011 – 04/2018

	Member	Project title	Project period
		Cris ref. 306189, AAP 2012	3) 12/2012 – 12/2019
95	EU	Sustainable housing in Ukraine: Promoting local development and the role of non-state actors	12/2013 - 07/2016
96	EU	Technical Assistance project "Capacity Building of the State Agency for Energy Efficiency and Energy Conservation"	12/2011 – 12/2014
97	EU	Awareness raising campaign on energy efficiency for construction related stakeholders in Russia, Belarus, and Ukraine	11/2011 – 12/2014
98	EU	Joint European Commission-World Bank Facility to Support the Ministry of Energy and Coal Industry of Ukraine and NJSC “Naftogaz of Ukraine” for Modernization of Ukraine’s Gas Transit System	12/2012– 12/2016
99	EU	Independent monitoring of resource and finance flows from development of conventional and unconventional hydrocarbons in Ukraine within Production Sharing Agreement	12/2013- 5/2016
100	EU	Assistance to the Ministry of Energy and Coal Industry of Ukraine in the process of development of Emissions Reduction Plan for Ukraine (AAP 2010)	11/2014 – 05/2015

Annex: Support Actions by G7 members and International Organizations

Canada

Member	Canada in collaboration with the European Union and the United States
Project title	Energy Contingency Planning / Energy Preparedness Planning / Winter Action Plan (WAP)
Area of cooperation in the energy sector	Bolstering energy security and preparedness planning toward a more resilient Ukrainian energy sector
Stakeholder(s)	Public
Organization(country)	Natural Resources Canada, the European Commission and the United States Department of Energy
Counterpart	Prime Minister of Ukraine, Ukraine's Anti-Crisis Cell, Ministry of Energy and Coal Industry, a cross section of Ukrainian National Ministries as well as national and private companies, including Naftogaz of Ukraine, Energoatom, DTEK and Donbasenergo
Funding source and scheme	Natural Resources Canada (NRCan) for Canadian input
Project period	From 2014 to 2016
Brief overview	Following the intense Canada–U.S. assistance to the Government of Ukraine (GOU) resulting in the drafting of the Ukraine Energy Contingency Plan in the lead up to the 2014–2015 heating season, a follow-up scoping mission to Kyiv took place in January 2015. Natural Resources Canada (NRCan) and the U.S. Department of Energy (DOE) in collaboration with the European Commission (EC) identified specific areas for further assistance. As a result, a Canada-EC-U.S. team of experts worked in Kyiv with the GOU over a 5-week period in July-August 2015 to advise them in developing a Winter Action Plan (WAP), a series of preparedness and response measures for the 2015-16 heating season. U.S. DOE officials returned to Kyiv in September 2015 for a Tabletop Exercise of the WAP. The Canadian Ambassador to Ukraine observed the exercise, along with the Ambassadors from the U.S. and EC. A further WAP monitoring mission to Kyiv of the Canada-EC-U.S. team of experts occurred in November 2015.

	The U.S. and EU continue to be interested in Canadian support in Ukraine, specifically in the natural gas sector, as a way to provide continuity from the fall 2014 Energy Contingency Planning exercise and the July-August 2015 Winter Action Planning exercise. Due to this ongoing close collaboration on gas supply security and the trust established with Ukrainian officials, the national oil and gas company, Naftogaz of Ukraine, requested Canada's support in a gas supply focused table top exercise in January 2016. Canada led international participation in the exercise, also attended by experts from U.S. Federal Emergency Management Agency (FEMA) and the European Commission.

Member	Canada in collaboration with the European Union and the United States
Project title	Transition Plan for Ukrainian Energy Independence
Area of cooperation in the energy sector	Support for a stable course toward Ukrainian energy independence
Stakeholder(s)	Public
Organization(country)	Natural Resources Canada, the European Commission and the United States Department of Energy
Counterpart	Prime Minister of Ukraine, Ministry of Energy and Coal Industry, as well as a cross section of Ukrainian National Ministries
Funding source and scheme	Natural Resources Canada (NRCan) for Canadian input
Project period	From 2015 – ongoing
Brief overview	The Transition Plan for Ukrainian Energy Independence builds on the information developed during the 2015 Winter Action Plan (see earlier description of this area of joint support for Ukraine) and identifies recommendations and concrete actions that, if implemented, will result in the reduction in demand of energy fuels. The recommendations presented in the Transition Plan are the result of a multi-national effort of subject matter experts from the United States of America, Canada, European Union and Ukraine who have studied the current Ukrainian energy landscape and have developed a prioritized list of recommendations. These prioritized recommendations are derived from the evaluation

	of cross cutting imperatives, governmental policy, energy fuels, generation and infrastructure. Ukrainian energy independence means energy security and the reduction of reliance on foreign energy fuels. Energy independence is espoused by those who want to leave Ukraine unaffected by global energy supply disruptions, and to restrict a reliance upon politically unstable states for its energy purposes. Energy independence is highly concerned with natural gas and coal supplies, being the source of the Ukraine's principal electricity and heat generating fuels. Simply stated, energy independence can be achieved through the development of high efficiency systems that result in the reduction in energy demand. The recommendations included in the Transition Plan are intended to support the Government of Ukraine as it moves the country toward its long-term strategic energy sector outcomes of (1) market liberalization, (2) diversification, and (3) effective regulation and oversight.

Member	Canada
Project title	Building National Geoscience Capacity in Ukraine: Energy Security and Growth through Geological Information Management Reform
Area of cooperation in the energy sector	Encouraging transparent and open access to national geological data and map information to attract international investment interests within Ukraine’s natural resources sector
Stakeholder(s)	Ukrainian Ministry of Ecology and Natural Resources (MENR) and regional State Enterprises
Organization(country)	Natural Resources Canada (NRCan) with participation from the United States Geological Survey (USGS)
Counterpart	State Geological and Subsurface Survey of Ukraine (SGSSU)
Funding source and scheme	Global Affairs Canada (GAC)
Project period	From 2016 to 2017
Brief overview	Three Canada–U.S. scoping missions between the fall of 2014 and the spring of 2015 assessed Ukraine’s capacity for collection, management, access and distribution of geological data to support long term development of mineral and energy resources in Ukraine. In March 2016, GAC approved $352,000 for NRCan for a one year

	project proposal to assist Ukraine in implementing Open Data and geoscience reforms. A key project deliverable will be the development of an information infrastructure and web service for online (public) access to the State Geological Map of Ukraine. The goal of this activity will be to convert (digitize) available geological maps of Ukraine into a standardized, modern digital format (geo-PDF). Project outcomes are expected to lead to a longer term, second phase project, also funded by GAC, which would aim to assist Ukraine in enhancing its capacity for increased exploration, investment and development of natural resources including minerals and energy resources, as well as strengthen its ability to support environmental sustainability.

Member	Canada
Project title	Tabletop Exercise to Ensure Ukraine's Natural Gas Security
Area of cooperation in the energy sector	Energy Contingency Planning / Energy Preparedness Planning / Winter Action Plan (WAP)
Stakeholder(s)	Public
Organization(country)	Natural Resources Canada led international participation in this exercise in collaboration with the U.S. Federal Emergency Management Agency (FEMA) and the European Commission
Counterpart	Naftogaz of Ukraine, Ukrtransgaz, as well as Ukraine's Cabinet of Ministers, Anti-Crisis Cell and Ministry of Energy and Coal Industry
Funding source and scheme	Natural Resources Canada (NRCan) for Canadian input
Project period	2016
Brief overview	In January 2016, Canadian government and private sector gas supply and gas control experts led a Table Top Exercise (TTE) with Naftogaz, Ukraine's national oil and gas company. The TTE scenario was jointly developed by Natural Resources Canada and Naftogaz of Ukraine, with U.S. and European input. The TTE demonstrated the use of response measures contained in the Government of Ukraine's (GOU) 2015-16 Winter Action Plan, developed with Canadian, U.S. and European assistance over summer 2015. The international delegation that participated in the

	TTE included representatives from the European Commission's DG Energy and the U.S. Federal Emergency Management Agency (FEMA). The TTE scenario tested Ukraine's ability to withstand a total loss of Russian natural gas deliveries (both direct Ukrainian imports and transit gas deliveries via Ukraine to the EU) and a loss of gas import options from European Union neighbors. During the TTE, Naftogaz demonstrated a series of scenario response measures, including: • reversing the flow of the natural gas transmission system to allow use of Ukraine gas storage; • switching industrial enterprises to alternative fuels, such as coal; • encouraging the population and businesses to limit natural gas consumption; and, • shutting off large natural gas users such as gas-fired heat and power stations and chemical enterprises in the event of continued shortages. The TTE demonstrated that Naftogaz is well prepared to effectively respond to major natural gas supply disruptions for the remainder of the 2015/16 heating season. International technical team members observed the TTE and offered a number of recommendations. The TTE was attended by senior management of Naftogaz of Ukraine along with other senior Government of Ukraine and company officials. The TTE was also observed by Canadian and European Embassy representatives.

France

Member	France
Project title	Modernization of district heating facilities in Kyiv
Area of cooperation in the energy sector	Energy efficiency and renewable energy
Stakeholder(s)	Public
Organization(country)	Ministry of the Economy, Industry and the Digital Sector (France)
Counterpart	Kievenergo
Funding source	The program is financed by a grant issued from the Private Sector

and scheme	Study and Aid Fund (FASEP) designed to assist local contracting authorities to conduct studies preparing their infrastructure projects and their investment policies.
Project period	From 2014
Brief overview	The project supports the improvement of energy efficiency and the identification of biomass potential into the district heating system in Kyiv. The feasibility study addresses these two priorities: • Improvement of the energy efficiency of district heating system by : ✓ Reducing the heat consumption (automatic regulation of the consumption) ✓ Reducing the heat losses (targeted asset management, leak detection campaign) ✓ Implementing automatic regulation of the production and of the distribution(automation of the boilers, speed variable drives) ✓ Centralizing the existing district heating systems • Introduction of biomass as a fuel for the heat production

Member	France
Project title	Support to energy efficiency in regional cities
Area of cooperation in the energy sector	Energy efficiency
Stakeholder(s)	Public
Organization(country)	Ministry of Foreign Affairs and International Development (France)
Counterpart	Institute for Energy Efficiency for Ukraine
Funding source and scheme	Crisis Fund
Project period	From 2014
Brief overview	The project supports feasibility studies to improve energy efficiency in regional cities of Ukraine. The project targets several sectors with high social importance in Kharkiv (water purification systems), Rivne (isolation of the children's hospital), Berdichev (introduction of biomass boilers), Ladyzhin (heating system of school), Lviv (sewerage system water), Cherkasy (Energy policy of the city) and Kyiv (training seminar for municipal

	managers). The project will support the municipalities with the development of a strategic plan for sustainable action to develop its energy efficiency potential and good management. To achieve this goal, the project is based on a holistic approach aiming to: -optimize synergies among sectors of intervention (water, electricity, transport, waste, ...) and among projects; -prioritize measures on the basis of efficiency - cost to ensure the realization of the action plan; -support and train local stakeholders to ensure the sustainability of energy efficiency improvement.

Member	France
Project title	Capacity building on energy efficiency in waste management
Area of cooperation in the energy sector	Energy efficiency
Stakeholder(s)	Public
Organization(country)	Ministry of Environment, Energy and the Sea (France)
Counterpart	Ukrainian Parliament, ministry of ecology, environmental associations, city agencies , independent national commissions
Funding source and scheme	French Embassy in Ukraine and Ministry of Environment, Energy and the Sea
Project period	From 2015
Brief overview	The project includes several actions taking place according to the bilateral agreement signed in April 2015 by the French ministry of environment and his Ukrainian counterpart. In this framework, have already been organized: - a French-Ukrainian working group on environment in June 2015, attended by the French ministry of environment, the French environment and energy management agency (ADEME) and the international Office for water; - a study visit in France to share best practices on energy efficiency in waste management for an Ukrainian delegation composed of members of the Parliament, ministry of ecology and natural resources, environmental associations, city agencies and independent national commissions.

Member	France
Project title	Green city Cherkasy
Area of cooperation in the energy sector	Energy efficiency and renewable energy
Stakeholder(s)	Public
Organization(country)	French embassy in Ukraine, Ministry of Environment, Energy and the Sea, Caen and Ouistreham municipalities
Counterpart	Cherkasy municipality
Funding source and scheme	French embassy in Ukraine
Project period	October 2015 – End of 2016
Brief overview	This project aims at supporting Cherkasy municipality to reach its energy efficiency and sustainable management objectives, through the development and implementation of a strategic sustainable action plan. This project will be implemented in 3 steps: 1. Design a sustainable action plan for Cherkasy 2. Provide guidance during the first steps of implementation of this action plan (finance studies, implement internal reforms and planning documents) 3. Transfer of knowledge in order for the city to become able to self-implement the action plan. In this framework, a training week on sustainable cities, including energy efficiency aspects, was organized in France (Caen and Ouistreham) in January 2016 to train municipalities and showcase best practices.

Germany

Member	Germany
Project title	“Turning subsidies into investments”
Area of cooperation in the energy sector	Energy efficiency
Stakeholder(s)	Public
Organization(country)	Berlin Economics, EBRD, on-going selection process for one more implementing organization

Counterpart	Ukrainian Ministry of Regional Development
Funding source and scheme	International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety Grant
Project period	2014 - 2016
Brief overview	The potential for energy (and thus energy-related social subsidy) savings is particularly large in the natural gas-based residential and municipal heating sector. In cooperation with the European Bank for Reconstruction and Development (EBRD), the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) together with the Ministry of Regional Development of Ukraine has developed a concept, which shall unlock this potential and specifically reduce barriers for investments in energy efficiency, which will result in reductions of energy-related social subsidies. Preliminary calculations demonstrate significant economic benefits after the measures are completed, with substantial gross savings in natural gas consumption, the creation of new jobs and large CO2-emission reductions. At the heart of the concept “Turning Subsidies into Investments” (“S2I”) is the set-up of a revolving mechanism under Ukrainian law through which energy-related social subsidy savings, which have been accrued due to donor-supported energy efficiency investments under this concept, can flow back into the system in a revolving manner. Thus, new investments can be generated without further burdening the public budget. Donor funding will play an essential catalytic role in the initial phase of kick-starting the revolving mechanism and in creating reflows of energy-related social subsidies in the first cycle. The EBRD has declared to set up a single-purpose Multi-Donor Fund to allow for targeted funding of “S2I” by international donors, once a minimum of two contributors have pledged financial support to “S2I”. All in all, the project “S2I” consists of a number of sub-projects, which are implemented by different organizations (EBRD, Berlin Ecomics etc.). The legal and operational conditions for the implementation of “S2I” are supposed to be in place by the end of 2016.

Member	Germany
Project title	Promoting sustainable supply and use of bioenergy in agriculture and forestry in the Russian Federation and Ukraine
Area of cooperation in the energy sector	Renewable energies
Stakeholder(s)	Public and Private
Organization(country)	Agency for Renewable Resources (FNR)
Counterpart	In Ukraine: Ministry of Agricultural Policy
Funding source and scheme	International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety Grant
Project period	04/2013 till 03/2016
Brief overview	The project supports the identification of bioenergy potential as a decentralised energy source in Russia and the Ukraine. In this process, the sustainability of the bioenergy supply is of particular importance since the use of agricultural waste materials in a controlled manner produces bioenergy as well as reduces emissions into the air, ground and water. In both countries, the aim of the project is to enable project partners to independently recognize, develop and take advantage of opportunities for using renewable resources as an energy source. In the context of planning and implementing pilot projects, the partners receive advice and training that strengthen their project development capacity for initiating and encouraging future bioenergy projects. Sustainable financing models will help to shape the policy framework and to further develop concepts on bioenergy usage. So far, in Ukraine the project has supported the planning and implementation of three biogas pilot projects. Furthermore, the project implementer has organized a workshop on the reduction of greenhouse gas emissions in the biofuel sector in Kyiv in March 2015 and another workshop in cooperation with UNIDO on standards and calculations in the bioenergy sector in June 2014. In addition, FNR has prepared webinars to improve the knowledge on bioenergy for participants from Russia and Ukraine.

Member	Germany
Project title	Rehabilitation of four electric power substations
Area of cooperation in the energy sector	Power
Stakeholder(s)	Public.
Organization(country)	KfW
Counterpart	UKRENERGO and Ministry of Energy and Coal Industry of Ukraine
Funding source and scheme	KfW, Loan (untied financial loan)
Project period	Project implementation consultant started work end of November 2015, feasibility study planned for March 2016 with further information on project period
Brief overview	Rehabilitation of four electric power substations Saporishije, Dniprovska, Artema and Zalyutino.

Member	Germany
Project title	Modernization of Substations in Eastern Ukraine
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public
Organization(country)	Ukraine
Counterpart	State Enterprise Ukrenergo (National Power Company)
Funding source and scheme	KfW Loan
Project period	From 2015/11/30 to 2019/12/31
Brief overview	The project aims to rehabilitate urgently needed substations in the east of Ukraine. It is based on the project “Increasing Efficiency in Energy Transmission”, hence structure and objectives are similar to the first project with the partner Ukrenergo. The project helps to support the reliable connection of regional powerful consumers, to provide normalization of operation modes in case of emergency and repairs of regional grids and to transfer the additional power capacity to the bottleneck Eastern regions. The primary objectives of this project are to accommodate the peak

	demand and electricity consumption in the conditions of deteriorated power supply (as a consequence of damages and partial occupation of the East Ukraine), to secure a reliable operation of the power transmission system as a whole and Donbaska Regional Power System in particular, as well as to prepare the Ukrainian power system for the integration with the European Network of Transmission System Operators for Electricity ("ENTSO-E"). One key constraint is the technical condition of the high-voltage substations, most of which were constructed in the 1950s through 1970s. The deterioration of the part of high voltage facilities and their corresponding transmission lines, some of which have exceeded their technical lifetime, can result in a general decline in reliability and quality of electricity supply and transmission. The project comprises the modernization of four substations, namely the two 750 kV substation Zaporizka and Dniprovska plus the two 330 kV substations Artema and Zalyutino. Apart from the replacement of worn out equipment it includes as well accompanying consultancy services.

Member	Germany
Project title	Increasing Efficiency in Energy Transmission
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public
Organization(country)	Ukraine
Counterpart	State Enterprise Ukrenergo (National Power Company)
Funding source and scheme	KfW / EU Loan / Grant
Project period	From 2011/11/30 to 2018/06/30
Brief overview	The project comprises the rehabilitation of two substations in Ukraine. The primary objectives of this project are to prepare the Ukrainian Power System integration with the European Network of Transmission System Operators for Electricity ("ENTSO-E"), to accommodate projected growth in peak demand and electricity consumption and to secure reliable operation of the power transmission system. One key constraint is the technical condition of

	the high-voltage substations, most of which were constructed in the 1950s through 1970s. The deterioration of the part of high voltage facilities and their corresponding transmission lines, which have exceeded their technical lifetime, can result in a general decline in reliability and quality of electricity supply and transmission. In particular, redundancies ("n-1 criterion") which are essential for system performance are no longer ensured. The project will improve energy security and reliability and will contribute to the energy interconnection of Eastern Europe with the EU as the upgrading of the Ukrainian Power System is a precondition to link with the rest of Europe. By reducing transmission losses, the project will entail substantial energy savings, thus addressing also climate change threats. The project comprises the modernization of two 330 kV substations, namely Dnipro-Donbas and Kirovska of the Dniprovska Power Grid. The project will replace worn out equipment and includes accompanying consultancy services. The latter includes support to the partner throughout the entire project implementation, inter alia in the preparation of the detailed design, implementation of the tender and supervision of delivery and works.

Member	Germany
Project title	Modernization Partnership Energy Efficiency
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public
Organization(country)	GIZ
Counterpart	Ministry of Regional Development Construction, Housing and Municipal Economy of Ukraine
Funding source and scheme	BMZ Technical support
Project period	From early 2016 to early 2019
Brief overview	Context Having an adequate and reliable supply of energy is of huge importance to the population. Yet especially in severe Ukrainian

	winter months and due to heavy dependency from energy imports this cannot always be guaranteed. However, if the country can reduce its energy consumption and use locally available energy sources efficiently, this alone could lead to greater energy security and higher economic efficiency. Hospitals are one of the most energy-intensive building types in Ukraine. In addition to the high building energy demand for conditioning and lighting of the rooms, hospitals have a specific demand for the actual health care (e.g. technical medical devices, cooling of drugs, extra owner-operated hospital enterprises such as professional kitchens and laundries etc.). The given energy saving potential in this sector is very high. The thermal energy consumption for example (depending on size and constructional state) is up to 600 kilowatt hours per square meter and year (kWh/m²a) - in Germany the average energy demand of hospitals accounts for half. In addition to the high saving potential, the sector is a socially sensitive area with a special need for energy security. Objective of the project Energy-related modernization of hospitals in Ukraine is implemented on several examples. Approach In cooperation with model hospitals comprehensive energy management and energy efficiency concepts and measures will be developed and implemented. This also includes solutions for efficient energy production, distribution and use in hospitals. The experience of the identified modernization methods and saving concepts will be distributed nationwide (experience accessibility for other hospitals and other community facilities in Ukraine). Results The project activities have not started yet but are foreseen to be launched in spring 2016.

Member	Germany
Project title	Energy efficiency in municipalities
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public
Organization(country)	GIZ
Counterpart	Ministry of Regional Development Construction, Housing and Municipal Economy of Ukraine
Funding source and scheme	BMZ Technical support
Project period	From 2013/09/01 to 2017/04/30
Brief overview	Context Having an adequate and reliable supply of energy is of huge importance to the population. Yet especially in severe Ukrainian winter months and due to heavy dependency from energy imports this cannot always be guaranteed. However, if the country can reduce its energy consumption and use locally available energy sources efficiently, this alone could lead to greater energy security and higher economic efficiency. Municipal and regional administrations are in the forefront to assume a leading role in the implementation of energy efficiency measures and act as role models for the population. To improve their energy situation, the municipalities need adequate organizational structures, appropriately trained staff and adapted energy management systems. Objective The role of municipalities as a driving force for the implementation of energy efficiency (EE) measures is enhanced. Approach At both regional and local level, the project supports five consortia – local coalitions of several municipalities – across Ukraine: the Dnipropetrovsk regional council comprised of four municipalities; Chernivtsi with two municipalities; in Luhansk Oblast it is the city of Severodonetsk; the Poltava regional administration with four

	municipalities; and Zhytomyr with three municipalities. The consortia receive consulting by a pool of international experts on how to introduce professional energy management. This enables the municipalities to better regulate their energy consumption and to design and implement local measures to improve the energy efficiency of the municipal infrastructure. Training on the topic of energy efficiency is provided for employees of the municipalities and the international experts accompany and support the implementation of the energy efficiency measures. The acquired knowledge and the lessons learned are shared with regional, local and national decision-makers at municipal and national level and integrated into the nationwide policy dialogue on promoting energy efficiency. Results Nine partner municipalities signed the European Covenant of Mayors initiative for local sustainable energy and are developing and implementing action plans for sustainable energy use geared to achieving the European 20-20-20 targets. In addition, several municipalities have already developed plans for energy efficiency measures. The city of Myrgorod, for example, has switched its street lighting to energy-efficient light sources. Some cities have implemented comprehensive energy retrofit in their educational buildings and partly solar water heating facilities have been installed. Intensive training activities also in Germany and several study tours abroad provided professional training for 77 city employees in the field of energy efficiency, energy management and facilities management. Since the launch of the project, there have been nearly 100 dialogue events in a wide variety of formats, at which partners were invited to exchange experience and experts gave presentations on municipal energy issues.

Member	Germany
Project title	Energy Efficiency Consulting for Companies

Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public
Organization(country)	GIZ
Counterpart	Ministry of Economic Development and Trade of Ukraine
Funding source and scheme	BMZ Technical support
Project period	From early 2016 to early 2020
Brief overview	Context Having an adequate and reliable supply of energy is of huge importance to the population. Yet especially in severe Ukrainian winter months and due to heavy dependency from energy imports this cannot always be guaranteed. However, if the country can reduce its energy consumption and use locally available energy sources efficiently, this alone could lead to greater energy security and higher economic efficiency. Thus the efficient use of energy is inevitably connected to a healthy and durable economic development of Ukraine´s economy and its companies and products need to compete on international markets (e.g. EU-Ukraine Deep and Comprehensive Free Trade Area (DCFTA), which is part of Ukraine´s Association Agreement with the European Union). With this Association Agreement and the participation in the European Energy Community Ukraine is committed to implement EU directives, which have requirements on energy efficiency also for the private sector. For example Ukraine needs to introduce an Emissions Trading System until 2017. This is creating further pressure on energy-intensive businesses and it requires support and advice for companies to implement energy efficient measures. Objective The energy-related modernization of Ukrainian companies resulted in the reduction of green-house gas emissions as demonstrated in some examples. Approach To achieve the goal a multi-level approach is applied: On the macro

	level the relevant national bodies for developing incentive measures targeted at businesses to enhance the implementation of energy efficiency measures are advised. On the meso level in cooperation with relevant associations, energy agencies and educational institutions training modules are established and the creation of a market for energy services is supported. On the micro level pilot projects that are selected and supervised in order to have replicable models for further implementation. Results The project activities have not yet started but are foreseen to be launched in spring 2016.

Member	Germany
Project title	Support to energy efficiency in the building sector
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public.
Organization(country)	German Energy Agency (dena)
Counterpart	Ministry for Regional Development and Construction
Funding source and scheme	Budget funding, grant
Project period	1st stage: Oct. 2015 – April 2016, 2nd stage planned: May 2016 – April 2017
Brief overview	1st stage: Conceptual development of a state support scheme for the energy-efficient renovation of the Ukrainian residential building stock. Planned 2nd stage: pilot application of support scheme to renovation of a limited number of buildings.

Italy

Member	Italy
Project title	Ukraine study tour visit
Area of cooperation in the energy sector	Renewable energy, Energy Efficiency and Geothermal energy
Stakeholder(s)	Ministry of Economic Development, Italian trade Commission

Organization(country)	Italy
Counterpart	SAEE, KIEVESCO, NAFTOGAZ, KIEVESCO, ENERGORYNOK and NKREKP
Funding source and scheme	Italian Government
Project period	From 2015/01/27 to 2015/01/31
Brief overview	Italy organized and hosted a robust Ukrainian delegation study tour mission from the 27th to the 31st of January 2015. The study tour represented the result of the previous Italian assessment missions and the activities and topics were scheduled following the priorities that emerged in Kyiv. The study tour was composed of three different types of actions crossing all the topics that were analyzed: institutional dialogue, meetings with the sector companies and public entities, site visits. Energy efficiency and the power market reform was the first topic, with specific in-depth analysis of main Italian incentive schemes for energy efficiency (White Certificates, co-generation, “Conto termico”) and an exhaustive view on the Energy Saving Companies’ role in the implementation of efficiency projects. Secondly there was a session on renewable energy and power market, in which the Italian market liberalization process was illustrated and the activities carried out in order to be compliant with the various UE Energy Packages and the climate targets and, at lastly, the new Italian power market design and the relative organizational scheme. Finally there was a session dedicated to geothermal energy and the usage of depleted oil wells for various purposes. With regard to companies, it meetings and presentation with about 30 Italian firms and entities operating in the field of energy efficiency, renewables, geothermal and cogeneration have been organized.

Member	Italy
Project title	Italy-Ukraine Joint Commission on Economic, Industrial and Financial cooperation
Area of cooperation in the energy sector	Gas, Renewables, Energy Efficiency, Geothermal energy.

Stakeholder(s)	Ministry of Foreign Affairs and International Cooperation
Organization(country)	Italy
Counterpart	Ministry of Foreign Affairs of Ukraine, Ministry of Energy, SAEE.
Funding source and scheme	
Project period	From 2015/10/26 to 2015/10/27
Brief overview	The Parties agreed to further boost bilateral cooperation in the energy sector, specifically in the fields of energy efficiency, renewable energy, geothermal energy from depleted wells and alternative fuels as well as in the harmonization of electricity and gas markets with respect to the European Union legislation.

Member	Italy
Project title	Workshop on Geothermal Energy
Area of cooperation in the energy sector	Geothermal energy
Stakeholder(s)	Ministry of Economic Development, Italian trade Commission
Organization(country)	Italy
Counterpart	European Commission, Ministry of Energy and Coal Industry of Ukraine.
Funding source and scheme	TAIEX
Project period	From 2016/03/02 to 2016/03/04
Brief overview	Italy participated with two experts to the above workshop for the use of geothermal energy. The topics discussed were related to Italian experience on geothermal fields (figures and support schemes) and to geothermal energy from depleted oil and gas fields. The final purpose of the Italian participation on the above workshop is to establish a bilateral cooperation among the Ukrainian Ministry of Energy and Coal Industry and the Italian Ministry of Economic Development, on the `*re-use of depleted oil and gas well for geothermal purposes*`. An Ukrainian - Italian Joint Working Group of Experts shall be created, with the task to implement a feasibility study and experimental tests to develop pilot projects for re-use of depleted wells for geothermal purposes.

Japan

Member	JAPAN
Project title	Energy Master Plan Project
Area of cooperation in the Energy Sector	Oil / Gas / Coal / Power / Nuclear / Renewables
Stakeholder(s)	Public
Organization(country)	Ministry of Economy, Trade and Industry, Japan (METI) and the Institute of Energy Economics, Japan (IEEJ)
Counterpart (Ukraine)	Ukrainian Ministry of Energy and Coal Industry (MECI)
Funding source and scheme	
Project period	From April 2015 to February 2016
Brief overview	The Ministry of Economy, Trade and Industry, Japan (METI) and the Institute of Energy Economics, Japan (IEEJ) in collaboration with the Ukrainian Ministry of Energy and Coal Industry (MECI) developed a long-term Energy Master Plan toward 2030 as requested by Ukraine to revise its Energy Strategy toward 2030. The purpose of the master plan is to provide recommendations for the government of Ukraine from a long-term perspective. Japan and Ukraine held a joint energy seminar in Kyiv in February 2015, followed by the Japanese delegation's visit to Kyiv to have exchanges of views with the Ukrainian experts in March and July of the same year. Japan submitted the Energy Master Plan to the MECI at the joint energy seminar held in Kyiv in October 2015.

Member	JAPAN
Project title	Clean Coal Technology Project for Tripulskaya Power Plant and Burstin Power Plant
Area of cooperation in the Energy Sector	Power
Stakeholder(s)	Private
Organization(country)	Japan Coal Energy Center (JCOAL)
Counterpart (Ukraine)	DTEK (a largest power company in Ukraine)
Funding source and scheme	
Project period	From 2014 to 2015

Brief overview	Japan Coal Energy Center (JCOAL) and the MECI signed a MOU in August 2014; and JCOAL signed a MOU with DTEK, the largest power company in Ukraine, regarding inspection of Tripulskaya Power Plant of Centralenergo and Burstin Power Plant in October 2014. Japan and Ukraine held a joint energy seminar in Kyiv in February 2015. The Japanese experts and engineers finalized the inspection report with concrete technical proposals to upgrade those plants. Japan submitted the report to the MECI at the joint energy seminar in Kyiv in October 2015. Japan also invited Ukrainian experts to Japan for mainly capacity building purpose, in order to transfer not only technology but also know-how.

Member	JAPAN
Project title	Collecting Ukrainian Energy Data and Assessment
Area of cooperation in the Energy Sector	Oil / Gas / Coal / Power / Nuclear / Renewables
Stakeholder(s)	Public
Organization(country)	JICA
Counterpart (Ukraine)	TBD
Total project cost($)	
Funding source and scheme	
Project period	From September 2015 to May 2016
Brief overview	Energy consultants and experts commissioned by JICA visit Ukraine and collecting energy data and information, such as current primary energy supply, power, and district heating, Ukrainian government's mid-long term energy strategy, related energy law and regulation, etc. The purpose of the project is to find out concrete support needs of Ukrainian authorities and companies and suggest potential yen-loan-financed projects. JICA will complete a final report in May 2016.

Member	JAPAN
Project title	Steam Turbine Efficiency Pilot Project
Area of cooperation in the Energy Sector	Power

Stakeholder(s)	Private
Organization(country)	Japan Coal Energy Center (JCOAL), TOSHIBA
Counterpart (Ukraine)	TBD
Total project cost($)	
Funding source and scheme	
Project period	From 2015 to 2018
Brief overview	Japan Coal Energy Center (JCOAL) and TOSHIBA are commissioned by NEDO in November 2015, they will conduct a preliminary survey for a possible Steam Turbine Efficiency Pilot Project in Ukraine. They envision replacing steam turbines in aged coal power plant with latest one and contribute to improve energy efficiency in Ukraine.

United Kingdom

Member	UK
Project title	Strengthening energy security and sustainability through international cooperation and integration
Area of cooperation in the energy sector	Gas / Power / General Policy
Stakeholder(s)	Public
Organization(country)	FCO / DFID / MOD / Home Office (UK)
Counterpart	Kyiv Energy Research Institute (Ukraine)
Funding source and scheme	Conflict, Stability and Security Fund Grant
Project period	From April 2015 to March 2016
Brief overview	This project aims to deepen the dialogue between Ukraine and EU countries on the safety and reliability of the electricity and natural gas supply, diversifying energy sources, expanding the zone of market competition outside the EU through the international Conference “Ukrainian energy infrastructure and legislation: Challenges and opportunities for practical integration with energy systems of Central European Countries”. The dialogue facilitates integration of high voltage electrical grids for international electricity trade between Ukraine and EU countries, and it will help to increase

	capacity for gas flow from EU to Ukraine.

Member	UK
Project title	Support to Parliament Fuel and Energy Sector Committee
Area of cooperation in the energy sector	General Policy
Stakeholder(s)	Public
Organization(country)	FCO / DFID / MOD / Home Office (UK)
Counterpart	Parliament Fuel and Energy Sector Committee (Ukraine)
Funding source and scheme	Conflict, Stability and Security Fund Grant
Project period	From February to March 2016
Brief overview	The project aims to support active and reform oriented Members of the Parliament (MPs) working on legislation in areas including gas and electricity and coal markets, energy efficiency, renewable energy sources to bring it in compliance with the EU Directives and fulfill Ukraine's commitments under the Energy Community Treaty.

Member	UK
Project title	Support for the Energy Community Secretariat
Area of cooperation in the energy sector	Power / General Policy
Stakeholder(s)	Public
Organization(country)	FCO
Counterpart	Energy Security Secretariat (Austria)
Funding source and scheme	Prosperity Fund Grant
Project period	From August 2015 to March 2016
Brief overview	This project will support the Energy Community Secretariat in its work to adapt and transpose the Third Energy Package (TEP) in the area of electricity into Ukrainian law. It will provide legal assistance to the Ukrainian government bodies, responsible for regulation of energy, electricity and public utilities in development of legislation in compliance with TEP, including the one related to organization and monitoring of the electricity market in Ukraine.

Member	UK
Project title	Reform of the coal industry: HR strategy
Area of cooperation in the energy sector	Coal
Stakeholder(s)	Public / Private
Organization(country)	FCO / DFID / MOD / Home Office (UK)
Counterpart	Institute of Management Consultants (Ukraine)
Funding source and scheme	Conflict, Stability and Security Fund Grant
Project period	From October 2015 to March 2016
Brief overview	This project aims at ensuring the Ukrainian government's ability to solve the employment problem of redundant state coal employees by creating and running human capital restructuring mechanism accumulating labor market demand/supply options and identification of potential employment opportunities. It will undertake a social/HR strategy audit of the coal sector to accompany program of closures. It is initial part of the 5-year comprehensive program, aimed at attracting further funding by the Ukrainian government and international donors.

Member	UK
Project title	Energy assets privatization: policy advice
Area of cooperation in the energy sector	Power / General Policy / Privatization
Stakeholder(s)	Public / Private
Organization(country)	FCO / DFID / MOD / Home Office (UK)
Counterpart	State Property Fund of Ukraine (Ukraine)
Funding source and scheme	Conflict, Stability and Security Fund Grant
Project period	From November 2015 to March 2016
Brief overview	The project will provide expertise for the State Property Fund of Ukraine (SPFU) in preparation of 4 CHP plants (in Odesa, Mykolaiv, Kherson and Dniprodzerzhynsk) for sale in the framework of transparent and effective privatization program for 2015-2016.

Member	UK
Project title	Energy information capacity building to support a “future energy vision for Ukraine”
Area of cooperation in the energy sector	Gas / General Policy
Stakeholder(s)	Public / Private
Organization(country)	FCO (UK) / Shell
Counterpart	Shell (Ukraine)
Funding source and scheme	Shell and British Embassy Kyiv Grant
Project period	From November 2015 to March 2016
Brief overview	Facilitation of discussions between Ukrainian officials and civil society with UK experts and companies, such as Shell Gas Trading, to build knowledge of global energy issues; Promotion of market lead reforms and investor / business friendly regulatory regime; and in collaboration with Shell build energy reform knowledge with reform minded legislators to develop energy reform legislation in Ukraine, including legislation and regulatory regimes that facilitate development of hydrocarbon production.

Member	UK
Project title	Good Governance Fund: Energy in Ukraine
Area of cooperation in the energy sector	General Policy
Stakeholder(s)	Public
Organization(country)	DFID (UK)
Funding source and scheme	Good Governance Fund Grant
Project period	From November 2015 to January 2016
Brief overview	To identify a series of small, targeted possible support projects which the UK might take forward, which would: have clear impact on existing bottlenecks or barriers; make use of UK expertise, demonstrate UK commitment to Ukraine, and complement wider international support; either respond to existing demand e.g. from the Government of Ukraine, OR would provide a positive, supportive influence on key players in Ukraine towards reform they may not yet

	have identified.

Member	UK
Project title	The Hidden Fuel – Tapping Energy Efficiency Potential in Ukraine
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public
Organization(country)	FCO (UK)
Counterpart	International Energy Agency (France)
Funding source and scheme	Prosperity Fund Grant
Project period	From November 2014 to June 2015
Brief overview	The project successfully achieved its purpose by building the capacity and expertise of the Ukrainian government to develop effective energy efficiency governance, policies and programs. Tailored IEA training and policy recommendations informed the Ukrainian government on how to track energy efficiency progress and prioritize the implementation of necessary steps towards achieving significant energy savings and CO2 reductions.

United States

Member	US
Project title	Naftogaz Corporate and Technical Reform
Area of cooperation in the energy sector	Upstream Natural Gas
Stakeholder(s)	Public
Organization(country)	Department of State/Bureau of Energy Resources
Counterpart	Naftogaz of Ukraine
Funding source and scheme	U.S. government
Project period	2015-2017
Brief overview	Assistance that complements and builds on previous corporate governance work. Deloitte in-country advisor and advisory teams focused on assisting senior Naftogaz and Ukrgazvydobuvannya

	(UGV, Naftogaz's upstream gas production subsidiary) management as they improve UGV field and technical operations, restructure the company, and improve corporate governance, particularly related to supporting the creation of a competitive, transparent, and commercially viable upstream company.

Member	US
Project title	Naftogaz Corporate Governance
Area of cooperation in the energy sector	Upstream Natural Gas
Stakeholder(s)	Public
Organization(country)	Department of State/Bureau of Energy Resources
Counterpart	Naftogaz of Ukraine
Funding source and scheme	U.S. government
Project period	2014-2015
Brief overview	In response to PM request, Deloitte in-country advisor and advisory teams focused on development and implementation of an action plan on corporate governance; analysis of relevant international and EU corporate governance practices and implementation of steps for compliance; support to improve transparency and efficiency of procurement and revenue management; UGV reserves valuation assessment; and support for unbundling, privatizing and streamlining upstream operations.

Member	US
Project title	Regulatory Support
Area of cooperation in the energy sector	Conventional Natural Gas
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	
Funding source and scheme	U.S. government
Project period	2013-2016

Brief overview	Support the newly created Regulatory Commission to comply with the Energy Community's 3rd Energy Package related to the internal gas market. The exact areas of support have yet to be determined due to regulator staff changes, but working areas are expected to be defined in mid-2015 and to follow requests from the prior regulator, relating to gas tariff development, subsidy reform, and rules for managing gas storage. Support will be closely coordinated with World Bank Assistance to the Regulatory Commission.

Member	US
Project title	Gas Field Surface Facilities Engineering Assessment
Area of cooperation in the energy sector	Conventional Natural Gas
Stakeholder(s)	Public/Private
Organization(country)	Department of State/Bureau of Energy Resources
Counterpart	
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	Independent process engineering assessment of infrastructure at key gas fields and recommendations on debottlenecking, upgrades and operational improvements, and investment options for increasing gas production.

Member	US
Project title	Gas Rehabilitation
Area of cooperation in the energy sector	Conventional Natural Gas
Stakeholder(s)	Public
Organization(country)	US Department of State/Bureau of Energy Resources
Counterpart	PJSC Ukrgazvydobuvannya
Funding source and scheme	U.S. government
Project period	2015
Brief overview	TA to design a pilot project to increase domestic gas and gas

	condensates production by rehabilitating about 50 existing Soviet-era gas wells owned and operated by PJSC Ukrgazvydobuvannya, Naftogaz's gas production subsidiary.

Member	US
Project title	PSA Implementation
Area of cooperation in the energy sector	Unconventional Natural Gas
Stakeholder(s)	Public
Organization(country)	Department of State/Bureau of Energy Resources
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2014-2015
Brief overview	Support for the MENR, Ministry of Energy, and oblast and district-level governments to establish best practices on laws, regulations (including environmental) and public communication strategies, to develop a strategy for sustainable unconventional gas development. Advisor team in place in response to request from PM; visits by legal and petroleum engineering experts and workshops to discuss best practices and further implementation objectives.

Member	US
Project title	Electricity Transmission System Planning and Operation
Area of cooperation in the energy sector	Electricity
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	Ukrenergo
Funding source and scheme	U.S. government
Project period	2004-2016
Brief overview	Work with Ukrenergo to develop and apply cross-border static and dynamic transmission planning models. These models allow Ukrenergo to understand future system needs and limitations,

	assisting them in prioritizing infrastructure upgrades/investments and developing cross-border trading relationships.

Member	US
Project title	Electricity Regulatory Support
Area of cooperation in the energy sector	Electricity
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	
Funding source and scheme	U.S. government
Project period	2013-2016
Brief overview	Support the new regulatory commission to comply with the 3rd Energy Package related to electricity markets. The exact areas of support have yet to be determined due to regulator staff changes after the combination of the Communal Services and Energy Regulators into one body, but working areas are expected to be defined in mid-2015 and to follow requests from the prior regulator, relating to the development of a transparent regulatory framework for tariffs, licensing, energy services markets, incentives for private investments, and public hearings. Consultants may be placed in the Regulator. Support will be closely coordinated with World Bank Assistance to the new Regulator.

Member	US
Project title	Improved Subsidy Calculation
Area of cooperation in the energy sector	Electricity
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	Ministry of Social Protection
Funding source and scheme	U.S. government
Project period	2013-2016

Brief overview	Assist the Ministry of Social Protection to reform subsidy payments, train personnel, and present a PR campaign to encourage low income consumers to apply for assistance.

Member	US
Project title	Chernobyl Shelter Fund
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	
Funding source and scheme	U.S. government
Project period	1997-2017
Brief overview	Project oversight and expertise, management of U.S. contribution to Chernobyl Shelter Fund.

Member	US
Project title	Physical Security Upgrades to the South Ukraine Nuclear Power Plant
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	Upgrade video security, security alarms, security lighting, and access control methods to critical areas. This project will assist Ukraine in bringing the physical security of their nuclear plants to be more in line with IAEA and industry recognized standards. This is phase 2 of a 2-phase project, initiated in 2011, with a total cost of $5 million.

Member	US
Project title	Ukraine Nuclear Power Plants Emergency Operating Procedures (EOPs) and Severe Accident Mitigation Guidelines (SAMGs)
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	Update existing EOPs/SAMGs and develop capacity for Ukraine to write FLEX procedures to address long-term loss of offsite power.

Member	US
Project title	Review of Used Nuclear Fuel Storage Facility
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	
Funding source and scheme	U.S. government
Project period	2016
Brief overview	Provide expert technical review and guidance on the Nuclear Fuel Storage Facility

Member	US
Project title	Municipal Energy Reform Project (MERP)
Area of cooperation in the energy sector	Renewable Energy
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source	U.S. government

and scheme	
Project period	2013-2016
Brief overview	Support 17 municipalities to develop Sustainable Energy Action Plans, including utilization of renewable energy. Help municipalities examine the potential for locally available biomass and other renewable energy sources to substitute fossil fuels.

Member	US
Project title	Supporting Private Investment in Clean Energy (SPICE)
Area of cooperation in the energy sector	Renewable Energy
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2020
Brief overview	USAID is finalizing a new activity to develop bankable clean energy projects that are attractive to private investments and commercial lending.

Member	US
Project title	Bank Loan Guarantees through Development Credit Authority
Area of cooperation in the energy sector	Renewable Energy
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2013-2023
Brief overview	$10M guarantee to Bank Lviv with a second guarantee facility being developed this year with another bank. The USG cost for both of these guarantees is $1.5M (an additional $1M will be for agriculture lending). The guarantee facilitates local lending for clean energy and

	energy efficiency to SMEs, homeowners' associations and public entities to create a commercial market.

Member	US
Project title	Ukraine's Bio-Energy Solutions and Technologies (U-BEST)
Area of cooperation in the energy sector	Renewable Energy
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2016-2018
Brief overview	Improvement of the renewable energy legislative and regulatory enabling environment, capacity building of local stakeholders to implement renewable energy projects, and promotion of RE investment through improved support mechanisms and increased public awareness on RE best practices.

Member	US
Project title	Local Alternative Energy Solutions in Myrhorod (LAESM)
Area of cooperation in the energy sector	Renewable Energy
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2013-2015
Brief overview	The purpose of this Development Grants Program (DGP) funded activity is to develop sustainable solutions for increased utilization of locally available alternative energy sources (biomass) in Myrhorod rayon of Poltava oblast.

Member	US
Project title	Municipal Energy Reform Project
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2013-2016
Brief overview	Support regulatory and legislative environments to promote investments and improve municipal planning, through enhanced capacity in low emission development strategies. Develop enabling environments for energy efficiency by developing relevant legislation (e.g. Law on Energy efficiency, Law on ESCOs, Law on Home Owners' Associations). Regulatory components include incentives and tariff reforms to support energy conscious practices among households, local government, and companies.

Member	US
Project title	Supporting Private Investment in Clean Energy
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2020
Brief overview	Will work with U.S. businesses and other donors to transfer energy efficient innovations and technology by facilitating financing for bankable clean energy projects.

Member	US
Project title	Bank Loan Guarantees through Development Credit Authority

	(DCA)
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2013-2023
Brief overview	$10M guarantee to Bank Lviv with a second guarantee facility being developed this year with another bank. The USG cost for both of these guarantees is $1.5M (an additional $1M will be for agriculture lending). The guarantee facilitates local lending for clean energy and energy efficiency to SMEs, homeowners' associations and public entities to create a commercial market.

Member	US
Project title	Energy Efficiency Financing
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2013-2019
Brief overview	USAID contributes to EBRD's Eastern Europe Energy and Environment Partnership (E5P) to leverage over €90M for municipal heat, water, and energy efficiency projects through loans and grants. Projects involve replacement or upgrading municipal heating systems.

Member	US
Project title	Industrial Energy Efficiency
Area of cooperation in	Energy Efficiency

the energy sector	
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	Support efforts of GOU to improve energy efficiency by providing technical assistance to small and medium sized companies interested in improving energy management. National Lab experts will provide training on ISO 50001 which is a management framework that allows organizations to measure energy use and consumption, and deploy new equipment, processes and operational controls to improve efficiencies. Using DOE-designed tools and methodologies, the program would aim to assist commercial enterprises design a strategy for deploying energy management systems and attract critical investment. DOE will work with SABIT to find suitable candidates for the program and USAID's Development Credit Authority (DCA) may provide necessary financing to implement upgrades.

Member	US
Project title	Energy Efficiency Auditor Training
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	
Organization(country)	Department of Commerce/Special American Business Internship Training (SABIT)
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015
Brief overview	Train energy efficiency auditors.

Member	US
Project title	Local Environmental and Energy Action Plans
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public
Organization(country)	Department of State/Bureau of Oceans and International Environmental and Scientific Affairs
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2014-2015
Brief overview	Working with three pilot municipalities of Poltava, Cherkasy, and Ivano-Frankivsk to help civil society and municipal leaders collaborate to develop actionable plans for the sustainable provision of four top-priority energy and environmental services.

Member	US
Project title	Electricity Contingency Planning
Area of cooperation in the energy sector	Contingency Planning
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	Ukrenergo
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	USAID is supporting Ukrenergo in developing software models for evaluating power grid conditions and potential instability resulting from emergency events. Ukrenergo now uses these products to manage grid operation during power shortages. The first phase (a static model of the grind based on “worst case” moment in time) is complete. This work assisted Ukrenergo to mitigate the impact of power shortages during emergency situations. Work continues by developing a dynamic model which will enable Ukrenergo to understand the transient conditions that could cause grid instability

	and potentially create risk for operation of other generating plants.

Member	US
Project title	Winter Action Plan
Area of cooperation in the energy sector	Contingency Planning
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	DOE–led international team provided technical expertise to the GOU to create its own implementable contingency plan to address electricity, natural gas, district heating and humanitarian assistance for Winter 2015-2016. The contingency plan provided a step-by-step guide to responding to escalating crises that may occur during this winter heating season.

Member	US
Project title	National Resiliency Energy Plan
Area of cooperation in the energy sector	Contingency Planning
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	DOE led lead an international and interagency technical assistance team in July 2015 to work with the GOU to develop a National Energy Resiliency Plan. This will include working with the GOU on an implementation structure so that it can be approved by the Rada and implemented by the various ministries and various levels of government.

Member	US
Project title	Anti-Crisis Cell Support
Area of cooperation in the energy sector	Contingency Planning
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	DOE will provide technical assistance to help the GOU establish the ACEC at the cabinet level to coordinate government planning. The Prime Minister has requested this support so that the ACEC would not only manage the government's contingency planning efforts but would become a more permanent government entity responsible for supervising the energy sector, including the implementation of energy sector reform. In order to achieve this, the ACEC would need the support of a permanent independent analytical expert group, drawing upon broad involvement of U.S., Canadian and European experts. Pacific Northwest National Labs will be responsible for coordinating this effort, and for providing the expertise to train ACEC staff.

Member	US
Project title	Humanitarian Assistance
Area of cooperation in the energy sector	Humanitarian
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2014-2015
Brief overview	Provide cash, vouchers or in-kind assistance to displaced households to ensure access to winter-appropriate relief items; pay

	for rent and basic utilities.

Member	US
Project title	Public Outreach Campaigns
Area of cooperation in the energy sector	Public Messaging
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2013-2016
Brief overview	Public outreach campaigns to explain the energy situation, steps to save energy, and how low income families get access assistance with energy bills.

Member	US
Project title	Energy Sector Transparency Initiative
Area of cooperation in the energy sector	Public Messaging
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2017
Brief overview	Engage local organizations for public messaging to promote open information.

Member	US
Project title	Transaction advisory support to Kyiv City on District Heating contract
Area of cooperation in the energy sector	Industry Coordination
Stakeholder(s)	Public

Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2017
Brief overview	USAID will help the City of Kyiv in its preparation to restructure and re-bid the contract for a new concession to operate KyivEnergo in 2017. This assistance could result in more favorable conditions for the city, which could include increased revenue from the concession or more control over the quality of the services provided.

Member	US
Project title	Transaction Support for Centrenergo Privatization
Area of cooperation in the energy sector	Industry Coordination
Stakeholder(s)	Public
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2017
Brief overview	Provide technical assistance to the Government of Ukraine to prepare Centrenergo for privatization through an open and transparent process.

Member	US
Project title	Energy Working Group
Area of cooperation in the energy sector	Industry Coordination
Stakeholder(s)	Public/Private
Organization(country)	Department of Commerce
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015

Brief overview	Establish and support industry-led energy working group to bring business recommendations to the GOU in a concerted manner.

Member	US
Project title	Energy Sector Transparency Initiative
Area of cooperation in the energy sector	Anti-corruption
Stakeholder(s)	Public/Private
Organization(country)	United States Agency for International Development
Counterpart	Various
Funding source and scheme	U.S. government
Project period	2015-2017
Brief overview	Increase transparency in the energy sector. To achieve this USAD will support energy sector professionals, mass media and investigative journalists, professional associations and other civil society organizations in their efforts to combat corruption in the energy sector and ensure proper public disclosure and access to information.

Member	US
Project title	Energy Efficiency and District Heating
Area of cooperation in the energy sector	Energy Efficiency
Stakeholder(s)	Public/Private
Organization(country)	Department of Energy
Counterpart	Various public/private stakeholders
Funding source and scheme	U.S. government
Project period	Apr-15
Brief overview	In order to help integrate energy efficiency into Ukraine's energy strategy and planning, DOE brought together public and private stakeholders in a conference held in April 2015 in Kyiv. The conference, entitled "Energy Efficiency and District Heating: a

	Strategic Policy Approach to Improving Ukraine's Energy Security", included sessions on: 1) the role of energy efficiency in Ukraine's strategic energy policy; 2) applying a vision for energy efficiency in specific sectors at the national, regional and local level; 3) pricing, metering and district heating systems; and 4) next steps required to significantly improve Ukraine's energy efficiency. To complement this seminar, Pacific Northwest National Laboratories (PNNL) delivered a report to the Verkhovna Rada (Ukraine's Parliament), which contained written recommendations on actionable steps that could be taken to accelerate adoption of energy efficiency solutions in Ukraine. The GOU is currently working on several follow-on activities, including enhancing planning for energy efficiency, supporting pricing reform, developing a system for energy efficiency retrofits in public buildings, developing stronger standards for energy efficiency in buildings, implementing district heating reforms and other sectoral policies.

Member	US
Project title	Nuclear Non-Proliferation Capacity Building
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Ukrainian nuclear officials
Funding source and scheme	U.S. government
Project period	2009-2016
Brief overview	Since 2009, DOE/NNSA has cooperated with Ukraine to enhance the effectiveness and efficiency of nuclear safeguards. A key focus of engagement has been developing and implementing technical solutions for measuring nuclear materials at the Chernobyl Nuclear Power Plant and declaring these materials to the International Atomic Energy Agency (IAEA). In addition, DOE/NNSA has worked with Ukrainian nuclear officials to build their capacity for training domestic and regional staff on state systems of accounting for and control of nuclear materials (SSAC) and Additional Protocol

	implementation. DOE/NNSA partners with the Department of State's Office of Export Control Coordination to build Ukraine's capacity to: (1) conduct export license reviews; (2) engage in outreach efforts to WMD-related industry sectors; and (3) expand training to enforcement communities on identification of dual-use materials, equipment, and technologies.

Member	US
Project title	Nuclear Security Assistance
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public/Private
Organization(country)	Department of Energy
Counterpart	Ukrainian nuclear officials/operators
Funding source and scheme	U.S. government
Project period	2014-2017
Brief overview	In 2014, DOE/NNSA revived nuclear security cooperation on nuclear sites in Ukraine, including four nuclear power plants (NPPs) and three research reactors. The Department of State has been coordinating this cooperation under the Global Partnership, with assistance from Embassy Kyiv. Utilizing Department of State funds, DOE/NNSA's Office of Nuclear Energy initiated phase 1 of physical protection upgrades for Units 1 and 2 at South Ukraine Nuclear Power Plant (SUNNP). In 2016, DOE/NNSA continued physical protection upgrades for Units 1 and 2 of SUNPP by contracting for cabling to support the physical protection system. In addition, DOE/NNSA negotiated with the Department of Foreign Affairs, Trade and Development of Canada to fund physical protection closed-circuit television (CCTV) equipment. These activities are being conducted on a cost-share basis, with Ukraine paying for installation costs. The upgrades are scheduled to be completed in 2017.

Member	US
Project title	Guard/Response Force training

Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	National Guard of Ukraine
Funding source and scheme	U.S. government
Project period	2015-2016
Brief overview	DOE/NNSA is also providing guard/response force training to representatives of the National Guard of Ukraine to enhance their skills and procedures related to protecting nuclear facilities. Two such courses were held in late 2015, with a third on transportation security scheduled for July 2016.

Member	US
Project title	Nuclear Security Degree Program
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Nuclear industry personnel
Funding source and scheme	U.S. government
Project period	2016
Brief overview	With foreign assistance (including from the United States), Ukraine had developed a capacity to educate nuclear industry personnel in nuclear material protection, control, and accounting at Sevastopol National University of Nuclear Energy and Industry in Crimea. However, with the 2014 annexation of Crimea by Russia, Ukraine lost both the education program and the facility. There is an urgent need to develop a robust nuclear security degree program in order to satisfy the demand of the Ukrainian nuclear industry for educated specialists, as well as to attract new talent. In FY 2016, DOE/NNSA is supporting a four-week training program for a group of ten professors dedicated to the development of the nuclear security degree program

Member	US
Project title	Radiological Security Assistance
Area of cooperation in the energy sector	Radiological
Stakeholder(s)	Public/Private
Organization(country)	Department of Energy
Counterpart	Government of Ukraine/private institutions
Funding source and scheme	U.S. government
Project period	2016
Brief overview	DOE/NNSA cooperates with the State Nuclear Regulatory Inspectorate of Ukraine (SNRIU) and the State Agency for Management of the Exclusion Zone (SAMEZ) in Ukraine to provide physical security upgrades at facilities that use and store radioactive and nuclear material, including medical, storage, research, and industrial facilities. DOE/NNSA also works closely with SNRIU, SAMEZ, and other Ukrainian organizations to locate disused and orphaned radioactive sources and to consolidate those sources at secure storage facilities (RADONs) throughout the country. In FY 2016, DOE/NNSA conducted workshops on Security Regulations Development and Alarm Response Training in addition to providing physical protection upgrades at four medical facilities. DOE/NNSA is also working with SAMEZ to setup a centralized monitoring facility at the vector site in order to monitor alarms and video from the RADON facilities.

Member	US
Project title	Nuclear Smuggling Detection and Deterrence
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Government of Ukraine
Funding source and scheme	U.S. government

Project period	2005-2016
Brief overview	DOE/NNSA partnered with the Administration of the State Border Guard Service (SBGS) of Ukraine in 2005 to prevent illicit trafficking in nuclear and other radioactive materials. Since then, DOE/NNSA has installed radiation detection systems at 68 points of entry across Ukraine, with 4 additional sites scheduled for completion by the end of April 2016. An additional eight new sites will be completed in FY 2016, bringing the total to 80 points of entry equipped with radiation detection systems. DOE/NNSA has also delivered 12 mobile detection systems to SBGS for use along green borders and near the contested border regions. DOE/NNSA has recently expanded its efforts by establishing a new partnership with the State Security Service (SSU) of Ukraine and is providing two mobile detection systems along with associated training during the third quarter of FY 2016.

Member	US
Project title	Nuclear Forensics Assistance
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public/Private
Organization(country)	Department Energy/Department of State
Counterpart	Kiev Institute for Nuclear Research/Science and Technology Center of Ukraine
Funding source and scheme	U.S. government
Project period	
Brief overview	DOE/NNSA and the Department of State are jointly funding work with Ukraine to establish a nuclear forensics library at the Kiev Institute of Nuclear Research (KINR), drawing on that organization's long-term experience in characterizing radioisotopes from the Chernobyl exclusion zone. DOE/NNSA funds technical oversight by Lawrence Livermore National Laboratory, and the Department of State's International Security and Nonproliferation Bureau funds work by Ukrainian technical experts, under a contract through the multilateral Science and Technology Center in Ukraine (STCU).

	The project entails a three-year effort at KINR to create a forensics library of Ukrainian national nuclear holdings, with the associated computer database and on-site sample collection, along with protocols for system access, data queries, information confidentiality and material transport and security.

Member	US
Project title	HEU Minimization Assistance
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Government of Ukraine
Funding source and scheme	U.S. government
Project period	2012-2015
Brief overview	In exchange for the removal of all highly enriched uranium (HEU) from Ukraine just prior to the 2012 Nuclear Security Summit, DOE agreed to fund the construction of a state-of-the-art Neutron Source Facility (NSF) at the Kharkov Institute of Physics and Technology (KIPT). This experimental facility consists of an accelerator driven subcritical assembly using low enriched uranium (LEU) fuel and will allow for advanced research and medical isotope production when fully operational.

Member	US
Project title	Nuclear Incident Policy and Cooperation Assistance
Area of cooperation in the energy sector	Nuclear
Stakeholder(s)	Public
Organization(country)	Department of Energy
Counterpart	Government of Ukraine
Funding source and scheme	U.S. government
Project period	2006-2010

Brief overview	From 2006-2010, DOE/NNSA's Office of Counterterrorism and Counter-Proliferation managed the Nuclear Incident Policy and Cooperation program, formerly known as the International Emergency Management and Cooperation program. This effort was a collaborative initiative with emergency management authorities in Ukraine which was designed to augment preparedness and response capabilities for nuclear and radiological incidents and emergencies or terrorist acts which could endanger the welfare or safety of Ukraine's population.

Member	US
Project title	Cybersecurity Initial Review
Area of cooperation in the energy sector	Cybersecurity
Stakeholder(s)	Public/Private
Organization(country)	Various
Counterpart	Ukrainian government/private officials
Funding source and scheme	Various
Project period	2015-2016
Brief overview	On December 23, 2015 three utilities in western Ukraine experienced unauthorized access into their network systems. The intrusion impacted nearly 225,000 customers. This breach disabled call centers, corrupted equipment and threatened to degrade operating systems and interrupt transmission. At the request of the GOU, DOE led an interagency team (DHS, FBI) along with subject matter experts from the North American Reliability Corporation (NERC) and DOE national laboratories to provide technical assistance to the GOU to conduct an assessment of the incident. The team met with senior GOU officials as well as representatives of the affected companies and prepared an initial review for key stakeholders in Ukraine and the U.S. Among other findings, the team assessed that the intruders demonstrated significant cyber capabilities. There was a high level of coordination between attacks at the various utilities. However, the intruders also made several serious miscalculations, which served to blunt the overall

	impact of their attack. Moreover, the team assessed that the individual companies responded quickly to the attack, and by quick mitigation strategies were able, at least in the case of one target company, to prevent a complete outage.

Member	US
Project title	Cybersecurity Tabletop exercise
Area of cooperation in the energy sector	Cybersecurity
Stakeholder(s)	Public/Private
Organization(country)	Various
Counterpart	Government of Ukraine/utility companies
Funding source and scheme	Various
Project period	2016
Brief overview	In May 2016, DOE, in cooperation with NERC, will conduct a tabletop exercise with key GOU officials and representatives from the main utility companies. The tabletop will review various scenarios and mitigation strategies which could be taken in the short term.

EU

Member	EU
Project title	Continued support for the implementation of Ukraine's energy strategy
Project period	12/2013 – 05/2018
Brief overview	The program is designed to support the continuing implementation of the sector strategy, including the deepening of reforms in the key areas, facilitate the respect of Ukraine's commitments under the Energy Community Treaty, strengthen the financial sustainability in the energy sector and ensure greater transparency and environmental awareness in the energy sector.

Member	EU
Project title	Support to the Ministry of Energy and Coal Industry of Ukraine in the development of assistance in the energy sector
Project period	08/2013 – 03/2015
Brief overview	The project was launched to facilitate the development of assistance in energy sector. The project assisted in development of the list of indicators. Early 2014, the project focus was revised to assist mainly in coordination of Energy Community process in Ukraine (logistics, translation/interpretation) due to launched re-organization in Ukrainian institutions and revision of energy policy priorities.

Member	EU
Project title	Improving implementation of Ukraine's commitments within the Energy Community through enhancing impact of civil society
Project period	01/2014 – 01/2016
Brief overview	The purpose of the project is to monitor Ukraine's progress in realization of commitments in the Energy Community by the coalition of energy NGOs. Contract with NGO DiXi Group.

Member	EU
Project title	Preparation of Twinning project and provision of assistance to National Commission for State Energy and Public Utilities Regulation (NEURC) of Ukraine in the area of electricity market regulation
Project period	08/2013 – 12/2014
Brief overview	The objective of the Twinning Project is to foster the reform of electricity market of Ukraine to be implemented in line with the provisions of the Energy Community law. Given that in the EU there is significant experience and knowledge on electricity market regulation issues, NEURC could benefit from and exploit good practices and appropriate approaches through collaboration with EU regulatory authorities.

Member	EU
Project title	EBRD Technical Assistance Support for Ukrainian Municipalities
Project period	12/2008 – 12/2016

Brief overview	The EBRD has developed several investments in Ukraine in municipalities such as Zhytomyr, Lviv, Dnipropetrovsk, Lutsk, and Luhansk in the water, district heating and urban transport subsectors. Total project cost: €135M.

Member	EU
Project title	EBRD Power Transmission Network Reinforcement
Project period	12/2009 – 10/2016
Brief overview	The objective of the project is to target investments in high-voltage power network. Total cost: €1.110 billion Other FI: EIB.

Member	EU
Project title	EBRD Hydropower Rehabilitation Project
Project period	05/2010 – 05/2017
Brief overview	The project aims to increase UHE's fast-responding peaking capacity in Ukraine's power system by replacing the outdated hydraulic, electro-mechanical and hydro-mechanical equipment. Total cost: €398.6M Other FI: EIB

Member	EU
Project title	EBRD Preparatory studies for the modernization of Ukraine's gas transit corridors and underground gas storage facilities
Project period	on-going
Brief overview	The project will contribute to increased regional integration in the field of energy, including cross-border linkages with the EU. This will facilitate increased gas supply from the Eastern neighbors to the EU market thus improving the energy security of European countries. Total cost: € 2 billion Other FI: EIB.

Member	EU
Project title	KfW Power Transmission Efficiency Project
Project period	on-going
Brief overview	This project is aimed at preparing for the integration of Ukraine's power system into ENTSO-E. Total cost: €78.3M.

Member	EU
Project title	Covenant of Mayors Capacity Building Model for Ukraine and Georgia
Project period	12/2011 – 12/2014
Brief overview	Support to cities' sustainable energy action plans to reduce CO2 emissions. EU funds 80% of the total cost. Implemented by AEECU.

Member	EU
Project title	Sustainable Energy Planning in Eastern Europe and South Caucasus - towards the Covenant of Mayors - Moldova, Ukraine and Azerbaijan
Project period	12/2011 – 12/2014
Brief overview	Support to cities' sustainable energy action plans to reduce CO2 emissions. EU funds 73% of the total cost. Implemented by UNEP.

Member	EU
Project title	Energy 4 Eastern Mayors
Project period	01/2012 – 12/2014
Brief overview	Support to cities' sustainable energy action plans to reduce C02 emissions. EU funds 80% of the total cost. Implemented by University of Bologna.

Member	EU
Project title	Building local capacity for domestic solar heating, hot water and insulation for rural and remote areas in the EEC region
Project period	12/2010 – 12/2015
Brief overview	The project was implemented by Stitching Women in Europe for a Common Future. The aim is to increase energy security in rural communities and improve health and reduce poverty.

Member	EU
Project title	Contribution to the multi-donor fund established in the framework of Eastern Europe Energy Efficiency and Environment Partnership (three Contribution Agreements: 1) Cris ref. 258219, AAP 2010; 2) Cris ref. 268938, AAP 2011; 3) Cris ref. 306189, AAP 2012

Project period	9 years, three contributions of the following duration: 1) 12/2010 – 09/2015 2) 12/2011 – 04/2018 3) 12/2012 – 12/2019
Brief overview	The project focuses on pooling non-reimbursable contributions for support of energy efficiency and environmental projects (C02 reduction).

Member	EU
Project title	Sustainable housing in Ukraine: Promoting local development and the role of non-state actors
Project period	12/2013 - 07/2016
Brief overview	The project focus is on energy efficiency measures in housing. Lviv, Zaporizhzhia, Kherson and Odesa.

Member	EU
Project title	Technical Assistance project "Capacity Building of the State Agency for Energy Efficiency and Energy Conservation"
Project period	12/2011 – 12/2014
Brief overview	The objective of this project was to strengthen the overall capacity of SAESEE in order to foster EU-Ukraine cooperation in the area of energy efficiency.

Member	EU
Project title	Awareness raising campaign on energy efficiency for construction related stakeholders in Russia, Belarus, and Ukraine
Project period	11/2011 – 12/2014
Brief overview	A central target of the project was to increase the knowledge about measures to save energy or use it more efficiently. EU funded 80% of the total cost.

Member	EU
Project title	Joint European Commission-World Bank Facility to Support the Ministry of Energy and Coal Industry of Ukraine and NJSC “Naftogaz of Ukraine” for Modernization of Ukraine’s Gas Transit System

Project period	12/2012 - 12/2016
Brief overview	Project supports the Government of Ukraine to implement key components of the gas sector reform in line with the provisions of the 3rd Energy package and modernization of the gas transportation system of Ukraine.

Member	EU
Project title	Independent monitoring of resource and finance flows from development of conventional and unconventional hydrocarbons in Ukraine within Production Sharing Agreement
Project period	12/2013 - 5/2016
Brief overview	The project focuses on the actions that will address new developments in Ukrainian energy sector in terms of cooperation with international companies under production sharing agreements for unconventional and offshore hydrocarbon resources.

Member	EU
Project title	Assistance to the Ministry of Energy and Coal Industry of Ukraine in the process of development of Emissions Reduction Plan for Ukraine (AAP 2010)
Project period	11/2014 – 05/2015
Brief overview	The project assisted in drafting Ukraine`s emissions reduction plan required in the framework of implementation of Directives 2001/80 (LCP) and 2010/75 (IED) and continues to provide assistance in the process of technical discussions on this draft.