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Renewable Energy Policy in Ukraine

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Introduction

Ukraine is an increasingly industrialized nation in Eastern Europe, positioned between Russia and the European Union (EU). Ukraine's national economy relies heavily on production of and imports of conventional fuels such as coal, oil and natural gas to power it, and is currently provided energy through a system of outdated and inefficient infrastructure that contributes to the loss of energy during almost all kinds of use. While a very small portion of Ukraine's power comes from renewable energy sources such as solar water heating, photovoltaic, wind, and hydroelectric power, the national government, firms, regional governments, and international organizations are working to create a business environment in which more projects involving renewable and alternative energy can become competitive.

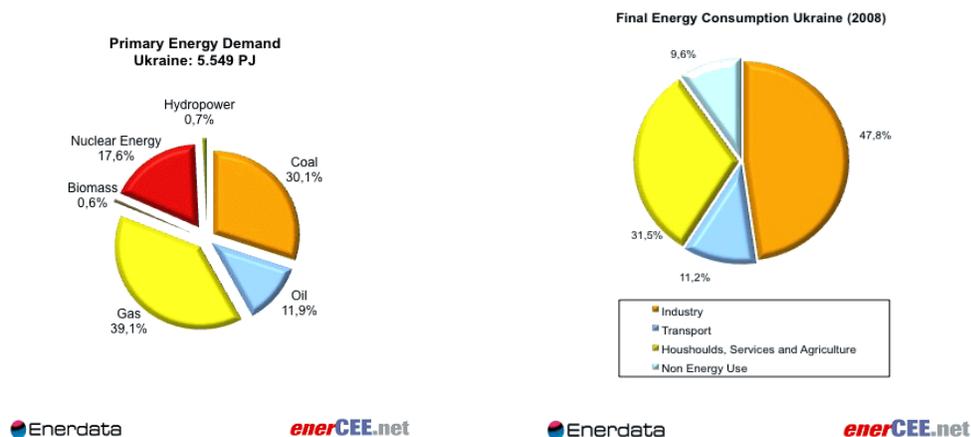
Ukraine's potential for growth in renewable energy lies within a complicated and dynamic context. Recently, events occurring in and around Ukraine have produced politically tenuous situations, such as the Gas War of 2009, which left tens of thousands of Europeans without heat during the winter. Events such as the Chernobyl disaster have had lingering negative effects on Ukraine's economy, as land rendered unusable has created an agricultural and industrial vacuum in both providing for the national populace and in contributing to the nation's competitiveness abroad.

External factors too, have had significant impact on Ukraine's capacity for energy growth – particularly large scale resource projects like the Nord Stream

and South Stream pipelines. As other nations race to develop better and cheaper ways of obtaining the energy needed to power their economies, Ukraine faces a herculean task in revitalizing its ageing national infrastructure, improving the efficiency of its fragile economy and modernizing its market.

Overview

Ukraine's electricity production potential far exceeds its demand, but because of ageing infrastructure and financial mismanagement of its energy sector, it remains highly dependent on imports of coal, gas and oil to maintain its level of economic activity¹.

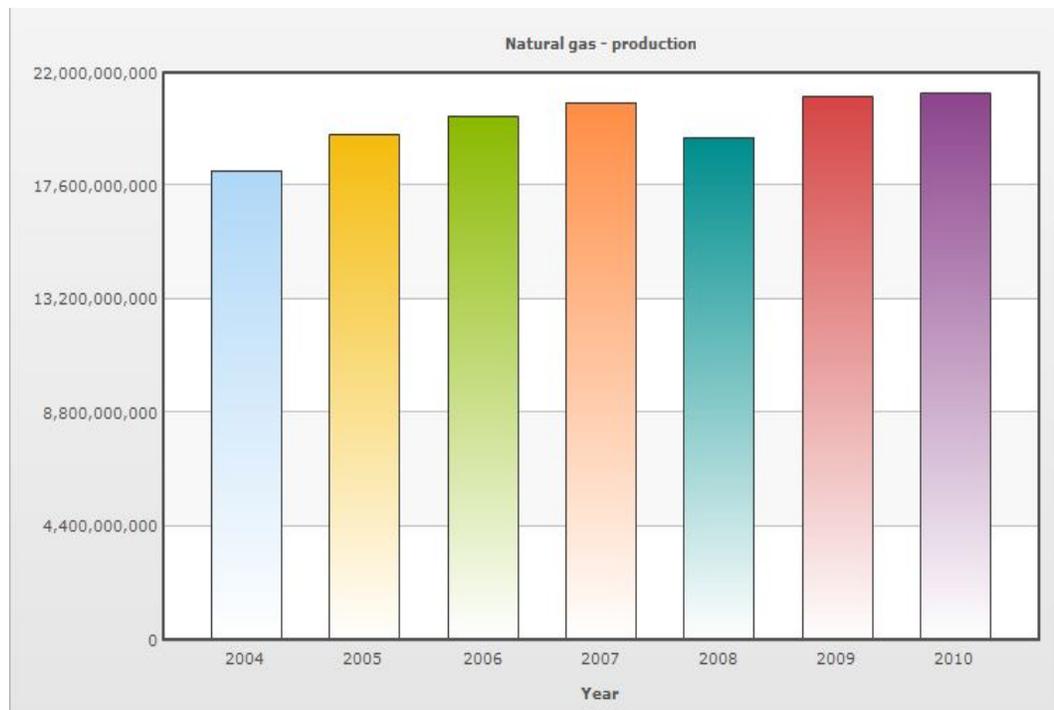


¹ <http://www.eia.doe.gov/countries/country-energy-data.cfm?fips=UP>

Energy Production and Consumption in Ukraine by Source

Natural Gas

Ukraine plays a critical role both in producing and transporting natural gas to the rest of Europe. While Ukraine itself is a large producer of natural gas, its primary involvement in energy politics within Europe is as a transport state between Western European nations and Russia's enormous supply of oil and



natural gas. Below is a chart of domestic production of natural gas (cubic meters)

that occurred within Ukraine.

Year	Natural gas - production	Rank	Percent Change	Date of Information
2004	18,200,000,000	27		2001 est.
2005	19,600,000,000	27	7.69 %	2003 est.
2006	20,300,000,000	27	3.57 %	2004
2007	20,850,000,000	27	2.71 %	2006
2008	19,500,000,000	29	-6.47 %	2007 est.
2009	21,050,000,000	29	7.95 %	2008 est.
2010	21,200,000,000	30	0.71 %	2009 est.

The decline in natural gas production in 2008 can be attributed both to the Global financial crisis and to the Gas War of 2009 that resulted in emergency negotiations with Russia to restart gas flows through Ukraine to Western Europe (explained in a later section). Since the economic recession, natural gas production has increased and is expected to increase nearly 5 fold by 2030 to keep up with consumption and demand both domestically and abroad.²

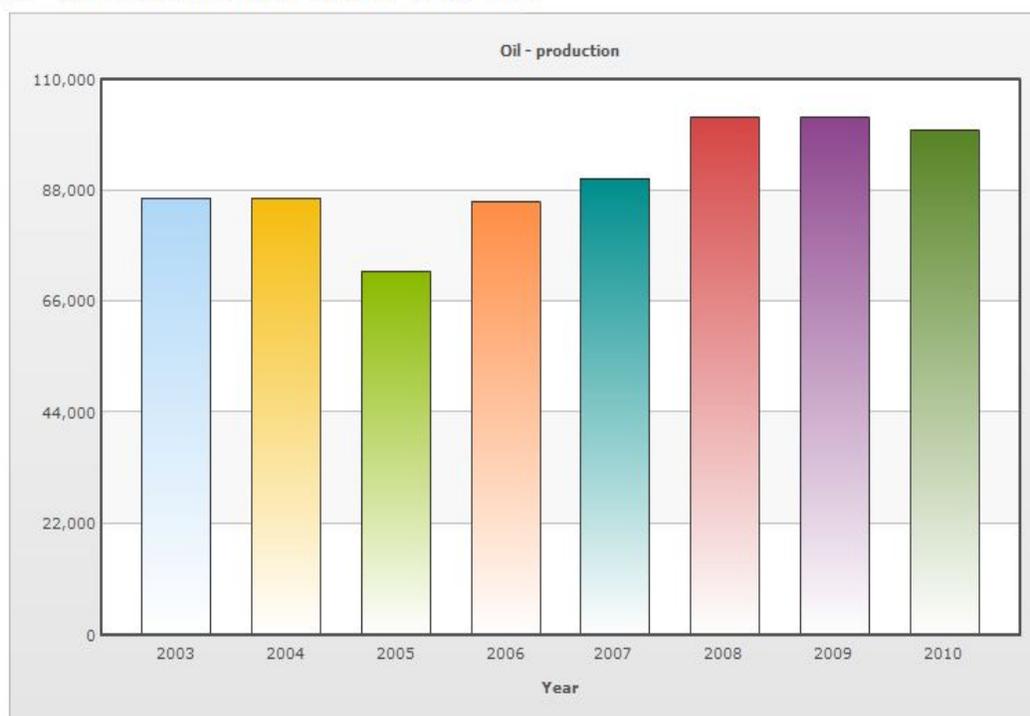
Natural gas currently provides the largest share of Ukraine's total energy, and is its second largest source of power for generating electricity behind nuclear power. Historically, Ukraine has been able to purchase large quantities of natural gas from Russia at a reduced price. This has occurred largely because of negotiations centered around Ukraine's role as a transit state for Russian resources to the EU – as subsidies such as gas discounts have been incorporated into agreements between Ukraine and Russia. As Russian gas prices are expected to increase, it is unlikely that natural gas will become much larger of a contributor to total energy consumption within Ukraine.

² http://www.qclub.org.ua/en/energy_issues/energy_resources/gas/production/

Oil

Oil has been a large portion of Ukraine's energy production since before the collapse of the Soviet Union. Although Ukraine is not particularly rich in oil reserves when compared to other countries like Russia or Iran, its production and consumption of oil and oil condensate products plays a large role in keeping the national economy afloat. Recently, Ukraine's oil production has decreased, a partly resulting from the global recession, Ukraine's stagnant economy, repercussions of the Gas War of 2009 and dwindling national resources.

Oil - production: 99,930 bbl/day (2009 est.)



Year	Oil - production	Rank	Percent Change	Date of Information
2003	86,490	47		2001 est.
2004	86,490	47	0.00 %	2001 est.
2005	72,000	53	-16.75 %	2003 est.
2006	85,660	53	18.97 %	2004
2007	90,400	53	5.53 %	2006
2008	102,400	50	13.27 %	2007 est.
2009	102,400	50	0.00 %	2007 est.
2010	99,930	51	-2.41 %	2009 est.

³

Ukraine's rank among oil producing countries has also dropped, as it hasn't been able to keep pace with other oil producing countries. Ukraine's oil production has also decreased because of dwindling prospects and uncertainty

³ http://www.indexmundi.com/ukraine/oil_production.html

related to the infrastructure upkeep associated with its massive and complex system of pipelines.

Ukraine uses oil in a similar fashion to many countries – through automotive transport and limited thermal energy production. In 2010, Ukraine consumed an estimated 340,000 barrels of oil daily.⁴ This meant that most of its oil came from imports, sourced almost entirely from Russia. The declining production from national facilities of Ukraine coupled with economically competitive Russian oil prices have led to an increased dependence on Russian oil for economic activity.

Coal

Ukraine boasts one of the highest largest coal reserves world wide – the estimate totaling approximately 57,320,000 short tons.⁵ Recently, coal production in Ukraine increased by 4.1% from 2009 to 2010.⁶ Despite sizeable resources and production capacity, Ukraine is a net importer of coal, importing roughly 3.8 million short tons of coal in 2009.

Nuclear Power

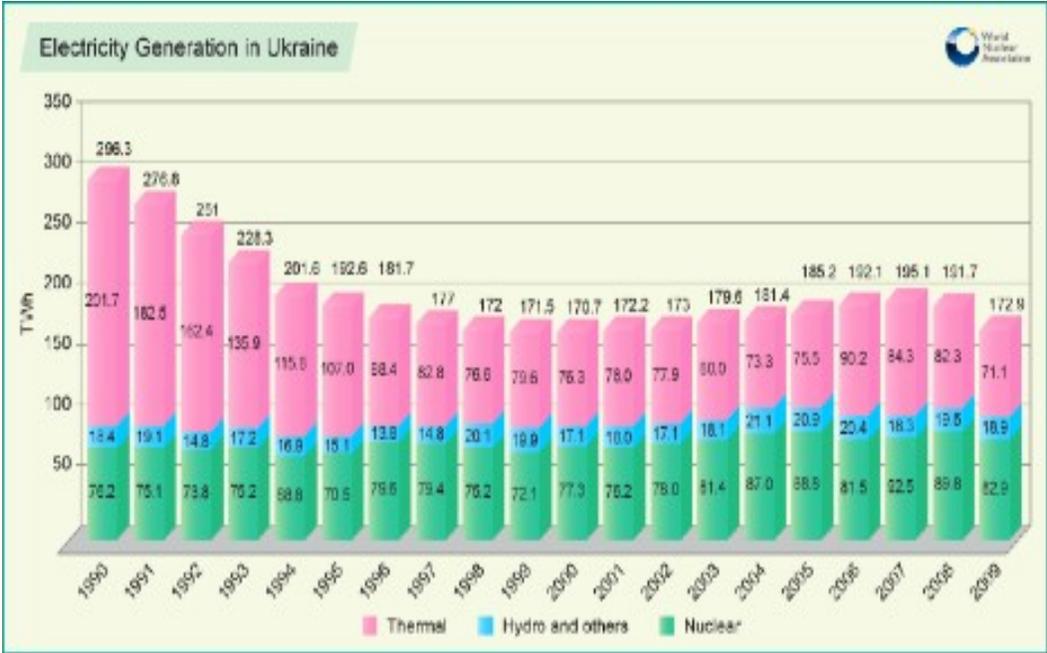
Nuclear power has played a large role in Ukraine's energy policy since 1977, when its first unit of the Chernobyl power plant was commissioned. Today, Ukraine's 15 functioning reactors supply 48-52% of Ukraine's electricity needs

⁴ http://www.indexmundi.com/ukraine/oil_consumption.html

⁵ <http://www.euracoal.org/pages/layout1sp.php?idpage=269>

⁶ <http://www.eia.doe.gov/countries/country-data.cfm?fips=UP>

alongside of coal, natural gas, and renewable energy sources like hydropower and photovoltaic. Ukraine currently has fifteen operating reactors producing a combined 13.8 GWe. The reactors are distributed among four main facilities within Ukraine and are run by Energoatom, the Ukrainian Nuclear Power Utility.



Nuclear power, particularly after the Gas War of 2009, has become regarded as highly necessary for stable economic functioning and energy security. As a result, Energoatom aims to maintain its share of the energy market through the addition of new reactors in the near future.

Ukraine power reactors operating

Reactor	Type V=PWR	MWe net	Commercial operation	Scheduled close, likely close
Khmelnitski-1	V-320	950	Aug 1988	2018, 2032
Khmelnitski-2	V-320	950	Aug 2005	2035, 2050
Rovno-1	V-213	402	Sep 1981	2030
Rovno-2	V-213	416	Jul 1982	2031
Rovno-3	V-320	950	May 1987	2017, 2032
Rovno-4	V-320	950	late 2005	2035, 2050
South Ukraine-1	V-302	950	Oct 1983	2012, 2027
South Ukraine-2	V-338	950	Apr 1985	2015, 2030
South Ukraine-3	V-320	950	Dec 1989	2019, 2034
Zaporozhe-1	V-320	950	Dec 1985	2015, 2030
Zaporozhe-2	V-320	950	Feb 1986	2016, 2031
Zaporozhe-3	V-320	950	Mar 1987	2017, 2032
Zaporozhe-4	V-320	950	Apr 1988	2018, 2033
Zaporozhe-5	V-320	950	Oct 1989	2019, 2034
Zaporozhe-6	V-320	950	Sep 1996	2026, 2041
Total (15)		13,168 MWe net (13,835 MWe gross - Energoatom May 2010)		

Energy demand by 2030 is expected to rise to 420 billion kilowatt-hours. Current government policy is to maintain 50-52% of the nation's electricity production from nuclear power. To meet this increase in demand, 29.5 GWe of nuclear power capacity will be needed by 2030, constituting roughly doubling nuclear capacity. This increase in nuclear capacity is planned through the construction of 22 new and replacement reactors by 2030.

Energoatom, the national nuclear power utility has set up "Atomproektengineering to handle new nuclear power projects, including investment, design, and construction."⁷ The establishment of this new entity, while still part of Energoatom, is highly indicative of the seriousness to expand nuclear power production in a large and lasting way.

⁷ <http://www.world-nuclear.org/info/inf46.html>

Recently, Ukraine's nuclear expansion has attracted attention from Russia's state-owned nuclear holding firm Rosatom. Last year, Prime Minister Vladimir Putin directly reached out with an offer that would merge many aspects of Russia and Ukraine's nuclear generation capabilities. Said Prime Minister Putin, "We are offering to establish a major holding, which would unite our generation, nuclear engineering and nuclear fuel cycles."⁸ Russia's President Medvedev suggested "full-scale cooperation of our nuclear industries," further outlining prospects of Russia and Ukraine establishing a large holding company that would include power generation, heavy engineering and fuel cycle facilities.⁹

These statements from Russian leadership come coupled with official offers from Rosatom including discounts of up to \$1 billion should Ukraine commit to a 25 year contract to using Russian fuel supplies.

This shouldering for Ukraine's nuclear power production comes slightly before the announcement of Rosatom to purchase Australian based Mantra Resources Ltd. for roughly \$1.15 billion, opening up access for the Russian based Rosatom to Tanzanian uranium resources.¹⁰

Wind Power in Ukraine

As of 2008, wind energy in Ukraine amounted to a little more than .2% (89 MW) of the nation's energy needs. The Complex Wind Programme planned

⁸ <http://blogs.ft.com/energy-source/2010/04/27/ukraine-hooking-up-on-russian-nuclear-energy-too/>

⁹ <http://www.world-nuclear.org/info/inf46.html>

¹⁰ <http://www.businessweek.com/news/2010-12-21/russia-s-rosatom-to-buy-mantra-for-a-1-16-billion.html>

to build nearly 2000 MW of additional wind turbines by 2010, but was stunted in reaching that goal as a result of economic pressures and from receiving only approximately 20% of their promised funding.¹¹

There are currently 2 main types of turbines built and used locally in Ukraine: the first being USW 56-100 turbine (107.5 kW output) with a design of U.S. origin, and the second being a Belgian model Turbowinds (600 kW output).

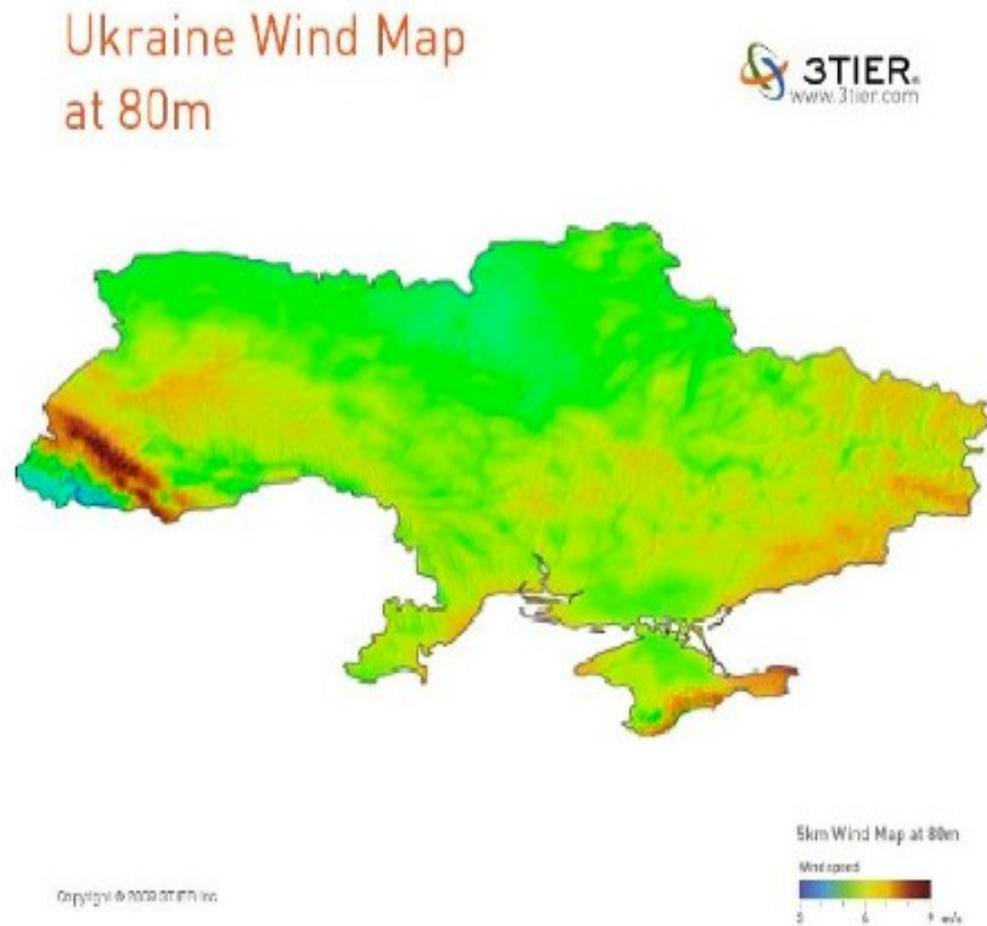
In February, 2011, Anatoly Bliznyuk, the head of the State Administration of Donetsk region announced a new pilot program designed to build, maintain and use 57.5 MW of wind power within Donestsk. The project has already begun to produce power and will be expanded to its full potential of 57.5 MW through 2015.¹²

According to the World Wind Energy Association, wind power potential equates to approximately an annual 70 million Megawatt hours. This estimate dwarfs current output, and would require massive amounts of construction and financing to realize. Potential wind energy is also a contested fact, as varying views are still held by different agencies and organizations.

¹¹ http://www.uwea.com.ua/ukraine_wind.php

¹² <http://gotpowered.com/2011/ukraine-is-moving-down-the-wind/>

The map below represents the average recorded wind velocity at a height of 80 meters in Ukraine. As is visible, the regions that possess the most potential for wind energy are in the southeastern and southwestern areas of the nation.¹³



There is also additional potential for offshore wind off of Crimea and the southern coast of the country, using wind resources above the Black Sea.

There is a great deal of international involvement in wind energy projects within Ukraine. Whether through the provision of technical expertise, environmental information or financial investment, numerous projects are being

¹³ <http://ws2-23.myloadspring.com/sites/renew/countries/ukraine/profile.aspx#Overview>

given support to progress and expand in the years ahead. While projects vary dramatically in level of preparation and scale, the EBRD is currently managing wind power projects in Ukraine that amount to over 3150 MW in output¹⁴. Below is a synopsis of current wind energy projects active in Ukraine under the oversight of the EBRD.

Project Title	Technology	Capacity MW	Status	Sponsor
Donetsk 2011 Wind PP	Wind	57.5	under construction	Novoazovsky Wind Base
Sovetsky Wind Farm	Wind	250	planned	New Energy of Ukraine Alliance
Pervomaiska station	Wind	400	planned	Krym-Eol Ltd.
Kholmohorska station	Wind	200	planned	Krym-Eol Ltd.
Turhenevska Wind PP	Wind	200	planned	Krym-Eol Ltd.
Bakhchysaray Wind PP	Wind	200	planned	
Soniachna Dolyna (Sudak) Wind PP	Wind	100	planned	Krym-Eol Ltd
Tylyhulska Wind PP	Wind	500	planned	Krym-Eol Ltd.
Kazantip Wind Farm	Wind	100	under construction	Concorde Group Ltd.
Donetsk Regional Wind Plants	Wind	700	planned	Wind Power DTEK
Crimea 500 MW Wind Power Station	Wind	500	financed	Ukraine Based Wind Energy Project - Knight Investments
Nikolaev	Wind	0.6	Operating	

¹⁴ <http://ws2-23.myloadspring.com/sites/renew/energyTech.aspx>

Novoazovsk	Wind	15.6	Operating	
Saki	Wind	11.7	Operating	
Tarkhankut	Wind	7.1	Operating	
Truskavets	Wind	0.75	Operating	
Yzhnoe Crimea	Wind	0.8	Operating	
Donuzlav	Wind	12.1	Operating	
Donuzlav Sudak	Wind	22	Operating	

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Solar Power in Ukraine

During 2008, approximately 10,000 square meters of area were dedicated to radiation capture in the southern regions of Ukraine.¹⁶ There are currently no incentives for buying, installing or selling solar power within Ukraine. Companies that produce “green energy” are, however, exempt from paying income tax until 2020, as well as value added taxes (VAT) on imported equipment. While there aren’t presently solar projects utilizing the ‘green tariff’ program available for alternative energy projects, other forms of renewable energy have successfully acquired ‘green tariffs’ for their projects, using economically enticing forces to promote purchase of renewable energy from regional municipalities¹⁷.

Although relatively little solar Power production currently exists in Ukraine, the more southern regions – particularly in the regions of Crimea, Kherson, Odessa, and Mykolaiv enjoy an annual radiation potential of over 1350

¹⁵ <http://www.ebrdrenewables.com/sites/renew/countries/Ukraine/default.aspx>

¹⁶ <http://www.solarthermalworld.org/node/1001>

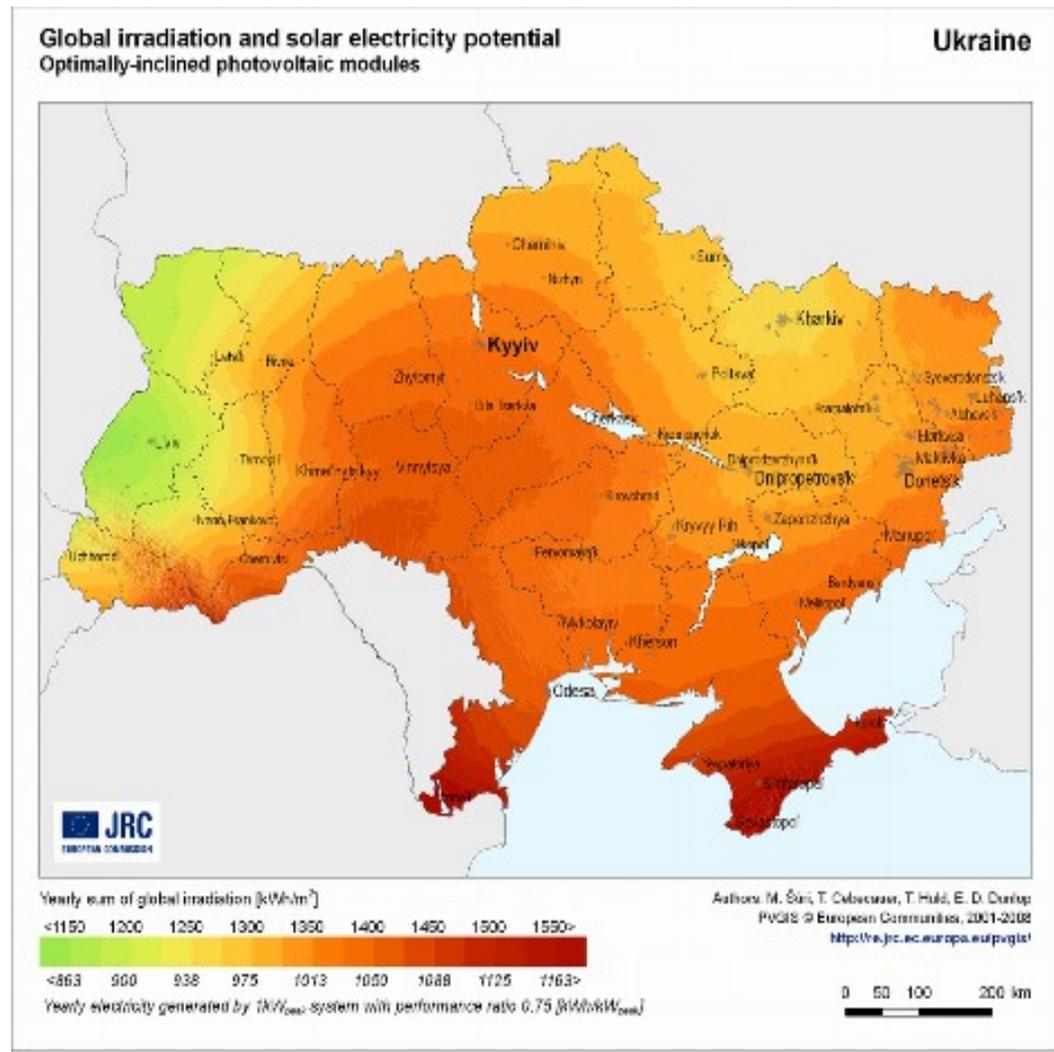
¹⁷ <http://www.ref-ua.com/en/press-service/press-releases/press-release2.html>

kW / square meter¹⁸ - making them particularly promising locations for solar projects. In some regions along the coast of the Black Sea, radiation potential exceeds 1650 kWh/m² a year.¹⁹ By comparison, the average annual radiation potentials for New York City and Miami, Florida are 1288 kWh/m² and 1920 kWh/m² respectively²⁰. The map below illustrates the dispersion of solar radiation across Ukraine as a nation – indicating that solar projects would be more competitive and profitable were they to be established in the south of the country – particularly along the coast of the Black Sea.

¹⁸ <http://www.solartermalworld.org/node/1001>

¹⁹ http://www.inforse.org/europe/success/SU_S_UKR.htm

²⁰ <http://www.solarpanelsplus.com/solar-insolation-levels/>



While international development of solar projects are occurring in Ukraine, other projects in wind energy and hydro-electric power far surpass international involvement in solar projects. The European Bank for Reconstruction and Development (EBRD) is currently managing five projects totaling 320 MW in output.²¹

²¹ <http://ws2-23.myloadspring.com/sites/renew/energyTech.aspx>

The United States Agency for International Development (USAID) is also involved in supporting solar power projects in Ukraine – most notably solar water heating, rather than electricity produced via Photovoltaic panels. Most of this development has taken place in the southern region of Crimea, one on of Ukraine’s regions most naturally favorable to the development of solar energy projects.²²

Hydro Power in Ukraine

Hydropower, both large-scale and small-scale operations currently counts for 10.2% of installed energy creation capacity in Ukraine. As of early 2010, hydropower accounted for 5,414,000 kW with plans from The Ukrainian Fuel and Energy Ministry to construct 58 small electric power stations.²³

“The estimated total potential of the Ukrainian hydropower generation is close to 20 billion kWh of electricity per year. For small hydropower alone, the estimated potential is about 2,500 million kWh of which only 170 million kWh is currently being utilized (Winkler, 2009).”²⁴

Hydropower is a recognized source of renewable energy and is subject to support under the green tariff program, much like solar and wind power. This

²² http://www.usaid.gov/press/frontlines/fl_jun10/p03_ukraine100605.html

²³ <http://en.for-ua.com/news/2010/11/12/162002.html>

²⁴

http://www.inogate.org/index.php?option=com_inogate&view=countrysector&id=92&Itemid=63&lang=en

program will last for 10 years and is expected to increase the amount of electricity from renewable sources used within Ukraine.²⁵

There are currently several major hydroelectric power projects being tracked by the European Bank for Recovery and Development. Projects consist not only of new construction of facilities and power generators, but of expansion of previous plants that have existing sites.

Combined, the current planned projects account for more than 8,276 MW of generation power and would more than double Ukraine's hydroelectric power production. This realization should come with the recognition of the risk and uncertainty involved in the construction of large hydropower projects, as the securing of finances, land rights and capital needed for project completion can be difficult for those supervising and producing the projects.²⁶

Biomass / Digesters

While not traditionally a major source of either economic activity or energy use, biofuels and biomass have recently become a growing industry in Ukraine. From 2009 to 2010, the export of solid biofuels has increased by 63%, totaling over 570,000 tons²⁷. Apart from helping local producers with economic development, the growth in the biomass/biogas industry provides research into a possible alternative energy source for use within the country.

²⁶ <http://ws2-23.myloadspring.com/sites/renew/energyTech.aspx>

²⁷ <http://www.blackseagrain.net/about-ukragroconsult/news-bsg/ukraine-exports-573-400-tons-of-solid-biofuel-in-2010-increasing-sales-by-63>

There are currently a number of biogas and biofuel projects active within Ukraine being monitored by the EBRD. Of the six operations planned, designed or operational, government, national industry and private international interests are represented as investors, advisers and stakeholders of the projects²⁸. Apart from these internationally assisted projects, private growth of biodigester plants has increased in Ukraine

To incentivize the growth and production of biofuels and biogas in Ukraine, the Ukrainian Cabinet of Ministers temporarily exempted producers from profit taxation between January 2008 and January of 2017²⁹. This ruling came alongside of a decision to plan and create at least 20 biodiesel producing plants in Ukraine by 2010. While this goal went unmet, significant developments in the use of agricultural bi-products have recently surfaced in Ukraine, such as the waste-to-energy 625 KW cogeneration plant owned and supplied by the Ukrainian Milk Company³⁰.

Projects such as this and others could help not only to increase domestic energy output in Ukraine, but could serve to diversify the nation's energy supply and create economic development for the local populace, and encourage investment and economic activity of international companies such as General Electric.

²⁸ <http://ws2-23.myloadspring.com/sites/renew/countries/Ukraine/default.aspx>

²⁹ <http://www.kyivpost.com/news/nation/detail/41860/>

³⁰ <http://www.businessgreen.com/bg/news/1802947/-ukrainian-cows-power-countrys-biogas-plant>

Energy Intensity

While gross production and consumption of natural resources provide valuable insight into Ukraine's energy situation, perhaps the best indicator of the problems regarding outdated infrastructure and poor use of energy can be explained through Ukraine's disproportionately high energy intensity.

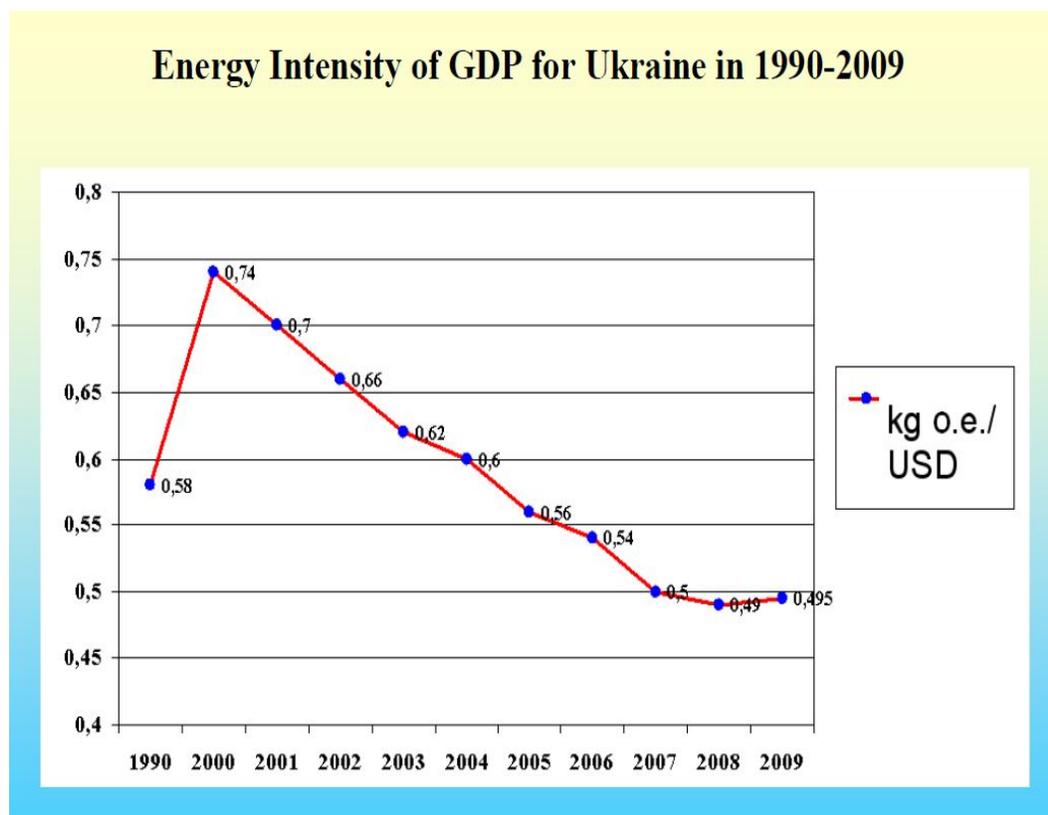
"Energy intensity" is roughly translated to – How much energy it takes to produce one unit of GDP or, "Total Primary Energy Consumption per Dollar of GDP," with energy measured in British Thermal Units (BTUs)³¹.

As of 2008, Ukraine was ranked as having the fourth highest energy intensity in the world, falling behind only Uzbekistan, Tajikistan and the Virgin Islands. Ukraine's energy intensity is roughly eight times that of the U.S. and nearly twice that of Russia – a country which produces far more of its GDP through fossil fuels like oil and natural gas.

Ukraine's energy intensity has decreased dramatically over the past decade, but continues to remain above almost every other country worldwide. Ukraine has the potential to lower its energy intensity dramatically by both upgrading its energy infrastructure to increase its energy efficiency and by encouraging the awareness and use of energy efficient appliances within its population. In addition, the EBRD is contributing several loans to Ukrainian

³¹ <http://www.eia.doe.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=92&pid=46&aid=2>

industries in order to encourage the development of energy efficient practices from large-scale firms ³².



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Conventional Energy Firms

Much like in the United States, oil and gas firms hold considerable sway over national and international politics in Ukraine. This influence is largely amplified by the fact that many, large energy firms are fully or partially state-owned, state run or serve as the single largest source of tax revenue for an entire country. In Russia and Ukraine, conventional energy firms not only behave as national players, but have power enough to broker international deals, direct

³² <http://www.ebrd.com/downloads/research/factsheets/eeukr.pdf>

³³ http://www.unec.org/energy/se/pp/adhoc/EE21_16_AHGE_Oct10/19_Ukraine_Dudkin_e.pdf

industrial policy, and rely on national political support to obtain profit goals. The vast power of these firms, coupled with a largely beneficial energy inefficiency has made crafting effective energy policy into a convoluted discussion with both public and private interests.

Naftogaz is the largest natural gas and oil producing company in Ukraine and is state owned and directed. Naftogaz's subsidiary companies account for 91% of all natural gas produced within Ukraine and are a major contributor of tax-revenue to the national government's budget.

Natural gas production in Ukraine, which has been increasing from 2004 to 2008 amounted to 21 billion cubic meters, 19.2 billion cubic meters of which was produced by Naftogaz's subsidiary companies.³⁴

Naftogaz has had recent financial problems, particularly as a result of the global recession coupled with the Ukraine-Russia Gas War of 2009. A technically outdated infrastructure, compounded with poor financial management have also contributed to recently declining output and dimmer prospects for the State-owned company.³⁵

Naftogaz oil production remains relatively stable, but is becoming difficult to keep up – as domestic reserves have become increasingly tapped-out, forcing the company to rely on newer and more diverse well and operations to maintain its annual output of approximately 3.9 million tons of oil-based output.

³⁴ http://www.oilvoice.com/Production-Reserves/Naftogaz_Ukrainy/5f080c85.aspx

³⁵ <http://www.energydelta.org/mainmenu/edi-intelligence/latest-energy-news/naftogaz-of-ukraine-production-drops>

Recently, there have been official propositions both from Gazprom's CEO, Alexi Miller and representatives of the Russian government, to merge the two state-owned resource companies. Doing so would effectively put Russia and Ukraine's energy situation into the hands of a single power and would dramatically alter the tensions that exist between the two governments in terms of energy security and economic needs.³⁶

Gazprom is one of the largest conventional energy firms in the world. It accounts for 20% of global natural gas production and is currently developing oil production capability that would increase its current output (more than 35 million tons annually) to 80 Million tons annually by 2020.³⁷ Gazprom currently controls 60% of Russia's enormous gas reserves (the largest on the planet – estimated at roughly 1,576 trillion proven cubic feet)³⁹ and is responsible for 90% of natural gas production in Russia.⁴⁰ Gazprom's oil branch – Gazprom Neft is also progressing to one of the most formidable sources of oil production in the world – netting more than \$727 million dollars in profit during the first quarter of 2010 alone.⁴¹ Gazprom is an enormous company with massive amounts of resources, influences and investments in nations other than Russia. To polarize matters, Gazprom is also a State-owned company, with 51% of its shares being held by the Russian Government. This makes the interests of Gazprom directly

³⁶ <http://www.platts.com/RSSFeedDetailedNews/RSSFeed/NaturalGas/8570315>

³⁷ <http://www.gazprom.com/production/energetics/>

³⁸ <http://www.nord-stream.com/our-company/shareholders/gazprom.html>

³⁹ <http://www.eia.doe.gov/international/reserves.html>

⁴⁰ <http://www.nord-stream.com/our-company/shareholders/gazprom.html>

⁴¹ <http://rt.com/business/news/gazprom-neft-profit-result/>

linked with Russia's interests – as the national economy is closely linked to the success of the company. As a result, Russia will use its bargaining power to ensure that the interests and needs of Gazprom are met.

The Ukraine – Russia Gas War of 2009

Often, national crises serve to present just how weak or vulnerable a nation is to some kind of disaster. In Ukraine, this came in the form of an energy conflict that dramatically reduced economic output, worsened the effects of the economic recession and illustrated unquestionable reliance on foreign energy sources for the functioning of Ukraine's internal economy and way of life.

On January 1st, 2009, oil and natural gas resources from Russia ceased flowing to Ukraine. While the exact trigger of the stoppage remains contested, the ostensible reasons provided by Gazprom CEO, Aleksei Miller, was that Ukraine had failed to accept a planned price increase in gas prices from Gazprom and that Ukrainian nationals were siphoning gas resources out of transit pipes without repercussions from the Ukrainian Government. In addition to these provided reasons, December of 2008 had seen some of the fiercest negotiations and political altercations concerning Ukraine's level of debt to Russia. While Ukraine did owe Russia a significant amount of money, disputes between delinquencies of payments as well as amount owed caused tensions between heads of state – perhaps contributing obliquely to the decision to shut off gas supplies. One indication of the debt's influence in causing the decision to shut off gas flow comes in the form of a threatening message given by Russian President

Medvedev, promising that Russia would use its “entire arsenal of possibilities” in order to coerce Ukraine into paying its large debt.

One week after Russia stopped sending gas and oil to Ukraine, the flow of natural gas to other European nations stopped. Media from both countries blamed each other for the stoppage of flow, though the actual cause is still uncertain or unreleased today.

On January 11th, Ukraine and Russia signed an agreement that allowed the auditing of the pipeline system by international teams, rather than agents of a particular nation. Even with this agreement, Russia found that it couldn't reinstate the flow of gas to Europe. It was only after another round of agreements that ended in 20% discount on gas price for Ukraine that flow could be restored to the rest of Europe. This 20% discount disappeared in 2010, and is beginning to affect Ukraine's ability to provide reliable resources to its population – resulting in the price increases for electricity set to begin in the beginning of February 2011.⁴² The second set of talks also gained a legal agreement that Ukraine would not increase transit fees for Russian Energy Resources.⁴³

The economies of both nations suffered enormously from economic freezes caused by the Gas War, and are still burdened with penalty fees from European nations seeking to gain reimbursement for lack of services. This event symbolizes if not epitomizes the tensions between Russia and Ukraine that

⁴² <http://www.globalresearch.ca/index.php?context=va&aid=11911>

⁴³ <http://www.worldpress.org/Europe/3307.cfm>

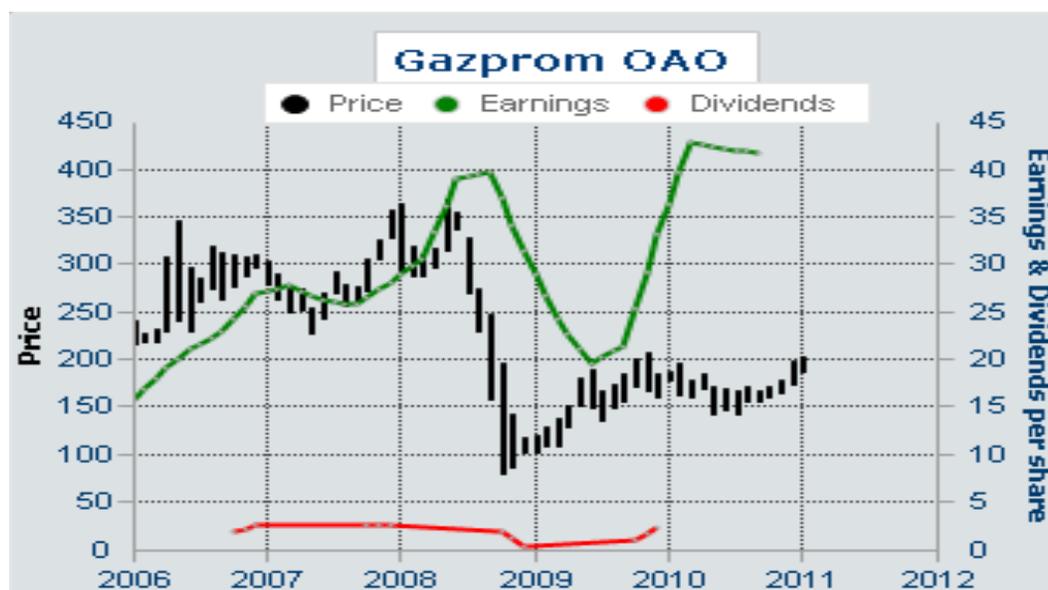
originate between geographic interdependence for transporting gas and oil resources to Western Europe. It also illustrates, perhaps, the logic behind Russia's aims to circumvent Ukraine as a necessary step in the selling of gas and oil resources to the wealthier nations of Western Europe.

Important to note about the gas war is the effect the loss of energy resources had on surrounding countries – particularly eastern and central European countries such as Slovakia, Romania, Bulgaria and Croatia.⁴⁴ Citizens of these experienced a dramatic pause in daily life without energy, suffered from the cold, and in some cases, froze to death.

In terms of Ukraine and Russia's international neighbors, the Gas War provided a renewed sense of vulnerability to the political and economic whims of large, state owned companies and rivaling political interests. In demonstrating the region's desperate need for conventional energy, Gazprom may have sown the seeds for a movement towards greater energy diversity as well as less dependence on fossil fuels like oil and natural gas.⁴⁵

⁴⁴ <http://www.globalresearch.ca/index.php?context=va&aid=11911>

⁴⁵ <http://www.guardian.co.uk/world/2009/jan/12/russia-ukraigas-gazpromne->



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In addition to long-term effects caused by the 2009 Gas War, Russia's state-owned gas company, Gazprom, suffered immediate effects because of the inability to deliver resources. This immediate loss is compounded by the aforementioned payments, which amount to close to \$4 million per day without fuel. This comes as a particularly hard blow to Russia – as Gazprom is the nation's single largest source of tax revenue.⁴⁷

Circumventing Projects: Nord Stream and South Stream and Nabucco

The world and Russia in particular, is racing to develop the most efficient, profitable and reliable ways to transport needed energy to a rapidly growing world. Presently, Ukraine holds considerable sway over the resources Russia sends to the rest of Europe, as its strategic location grants it a 'gate keeper' status

⁴⁶ <http://www.corporateinformation.com/Company-Snapshot.aspx?cusip=C64393710>

⁴⁷ <http://www.guardian.co.uk/world/2009/jan/12/russia-ukraine-gas-gazprom>

in ferrying resources from one player to the next. Should this situation be undone, Ukraine would lose not only large sources of transit revenue, but leverage in brokering deals with its resource rich neighbor. To this extent, the completion of projects aimed to diversify transportation of gas and oil to the EU will radically alter Ukraine's role in Europe's energy situation from one with moderate sway over a reluctantly complacent energy giant to potentially beholden to a powerful, self-interested energy producer.

In an effort to secure routes for natural gas and oil resources that bypass Ukraine as a transport country, Russia's state-owned gas company, Gazprom, has begun construction of two major pipeline networks that would travel through bodies of water and eventually reach markets in Western and Southern Europe. With the completion of these projects, Ukraine will lose significant leverage in brokering negotiations and discounts with Russian energy firms, as it will no longer be the primary medium through which natural resources pass through to the rest of Europe.

Nord Stream

Being built along the floor of the Baltic Sea, the Nord Stream Pipeline will transport oil and natural gas from Russia to northern Germany. The pipeline has an estimated capacity of 55 billion cubic meters of natural gas a year, or roughly the equivalent of the energy needs of 26 million average European households⁴⁸.

⁴⁸ <http://www.nord-stream.com/the-pipeline/gas-for-europe/gas-supply.html>

The Nord Stream pipeline currently under construction, and is planned to become partially operational by 2011. The second phase of the pipeline is planned for completion by 2012. Although actual construction of the pipeline has proven thus far successful, the entire budget has increased by almost four billion euro from its original price tag in 2005. The total cost of the Nordstream pipeline, as of March 2010 is roughly 8.8 billion euro⁴⁹.



South Stream

The South Stream Pipeline Project originates at Russia's coast on the eastern shore of the Black Sea and travels along the floor of the Black Sea to Bulgaria, where it is diverted into a branch leading north to central Europe and a branch leading west to Italy. The estimated capacity of the pipeline is 63 billion cubic meters a year, the pipeline is expected to become operational in December

⁴⁹ <http://www.neftegaz.ru/en/news/view/93646>

of 2015, but may be put online prior to the announced date because of rapid development in partner nations like Bulgaria and Romania⁵⁰.

While the political obstacles of the pipeline fall away more easily than expected, its budget dwarfs that of the Nord Stream Pipeline, totaling close to 15.5 billion euro for the entire project. Gazprom is currently completing feasibility studies in conjunction with nations like Bulgaria and Romania, and intends to make the final decision on the project by April 2011⁵¹.

The success or failure of the Nabucco Pipeline holds significant influence on the South Stream pipeline, as the two are expected to be in direct competition with each other over the long term.

⁵⁰ <http://www.neftegaz.ru/en/news/view/97528>

⁵¹ <http://www.businessweek.com/news/2010-11-30/gazprom-says-south-stream-pipeline-may-cost-15-5-billion-euros.html>



The successful construction of the Nord Stream Pipeline will not only help to meet Europe's increasing demand for energy, but will restructure Ukraine's significance in the region as a transit nation for resources from Russia to the EU. While Russian President Medvedev claims that neither the construction of the Nord Stream Pipeline nor the South Stream pipeline is driven by political influences⁵², the posturing of Russian energy firms in the debate of natural gas access has left an impression with many that Russia is bent on using its heightened influence demand more concessions from the EU, as its largest receiver of resources⁵³.

⁵² <http://www.neftegaz.ru/en/news/view/97833>

⁵³ <http://news.bbc.co.uk/2/hi/8090104.stm>

Nabucco

The Nabucco pipeline is currently a multi-billion dollar mega-project designed to diversify Europe's gas and oil supply by accessing natural resource suppliers in the Caspian region as well as Middle Eastern states. Although not publicized as being a direct reaction to Russian energy dependence, the goal of the project is largely seen as a way to wean Europe off of Natural gas and oil imports from Russia – often viewed as an unstable or pernicious power looking to establish undisputed dominance in the European energy market.⁵⁴ There are presently six sovereign nations acting as the projects main investors: Germany, Austria, Hungary, Romania, Bulgaria and Turkey.



Recently, however, the outlook for the Nabucco project has looked rather grim. Apart from the setbacks in investment posed by the global recession, the investor nations are finding it difficult to secure enough natural gas for the project's successful operation. To be profitable, the Nabucco pipeline project

⁵⁴ <http://www.nabucco-pipeline.com/portal/page/portal/en/pipeline/overview>

would require roughly 30 Billion cubic meters of natural gas to flow through it at today's prices. At present, this supply simply isn't there.⁵⁵ Even if the project does go through and successfully diversify the energy resource mix available to European nations, it is unlikely that the pipeline will be able to compete with lower gas prices from Russia – particularly if the South Stream pipeline through the Black Sea is completed. Currently, consortium of six countries is looking to have definite commitments from a variety of gas and oil producing states in order to ensure that the minimum supply level can readily be met. The deadline for these commitments is tentatively March, 2011.⁵⁶

Chernobyl

Apart from modern problems such as strained relations with international neighbors, low energy efficiency and a sluggish economy, Ukraine faces a legacy of chronic problems that weigh heavily on its chances for dramatic change. Chief among Ukraine's setbacks is the lasting impact of the Chernobyl reactor explosion. Twenty five years after the fact, large portions of the nation are still crippled from the fallout and stigma, making 'moving forward' even more difficult. Chernobyl's lasting legacy, and its effect on a nation seeking both aid from the international community and partnerships with willing investors, has drained the pockets of the national government, left a permanent mark on the memory of the population and immobilized large portions of the nation's recovering economy.

⁵⁵ <http://www.euronews.net/2010/01/30/questions-about-viability-of-nabucco-pipeline/>

⁵⁶ <http://www.ft.com/cms/s/0/fd97d6ba-32ec-11e0-9a61-00144feabdc0.html#axzz1FJk3zzC3>

In the early hours (~1:23 am) of April 26, 1986, a failed cooling experiment conducted by technicians at the Chernobyl nuclear power plant resulted in an explosion of reactor # 4 of the functioning reactors. This explosion caused immediate deaths of plant workers, and later of firemen and ‘liquidators’ who attempted to extinguish the flames. The longer lasting effects of the explosion however, took the form of radiation more than 100 times the amount released from both atomic bombs being spread over dozens of European countries – Belarus, Ukraine and Russia being the main sites of radiation fallout (70% of the fallout being deposited here)⁵⁷ The cloud that resulted in the 10 days of burning nuclear material dispersed iodine and cesium nucleotides over much of Europe.

Initially, the explosion was kept a secret by Soviet news sources, but after Forsmark nuclear power plant in Sweden detected and mapped abnormally high amounts of radiation in respect to wind direction, multiple nuclear facilities within Europe began to arrive at the same conclusion – there had been a nuclear accident of notable proportions in the Soviet Union. This led Soviet authorities announced the disaster, almost three days after the initial explosion.⁵⁸

The Chernobyl reactor was a RBMK – 1000 model, a Soviet design that originated in the 1970s.⁵⁹ This model contained a number of design errors including a flaw that caused a sudden increase in reactor power when control rods

⁵⁷ <http://chernobyl.info/index.php?userhash=898871&navID=2&IID=2>

⁵⁸ <http://www.un.org/ha/chernobyl/history.html>

⁵⁹ <http://www.world-nuclear.org/info/inf31.html>

were inserted to lower the power. This flaw is what caused the explosion of Reactor 4 during the test.

Today, there are multiple thousands of people suffering relocation, their identities and their livelihoods lost as a result of the Chernobyl disaster. While the true number of accident related cancer deaths is difficult to assess, the UN sponsored Chernobyl Forum estimates that Chernobyl-related cancer deaths will exceed 9,000.⁶⁰

Economically, Chernobyl crippled the effected regions in large, somewhat permanent ways. Because of the nature of radionuclide contamination, industries like agriculture and lumber, which are tied to the natural resources of the affected land, can no longer function safely. Despite reclamation efforts to grow ‘clean food’ from these areas, the demand has virtually disappeared from the region because of the lasting stigma associated with the Chernobyl accident. In total, the governments of Belarus, Ukraine and Russia place the cost of the accident at hundreds of billions of dollars.⁶¹

International Involvement

International organizations play a vital role in shaping the makeup of energy firms in Ukraine – particularly in financing the construction and development of projects that would otherwise struggle to find the necessary investment and expertise. Many international organizations are dedicated not only

⁶⁰ <http://www.time.com/time/photoessays/2006/chernobyl/>

⁶¹ <http://www.iaea.org/Publications/Booklets/Chernobyl/chernobyl.pdf>

to encouraging development, but also in investing in sustainable or renewable energy development. Because of the nature of Ukrainian based projects and firms receiving funding and assistance from international organizations like USAID, The World Bank, and the EBRD, many interests of renewable energy firms and the organizations are shared – both for financial and value-based reasons.

USAID

USAID, the U.S. Agency for International Development, is a national organization that aims to extend assistance to individuals in need while at the same time encouraging effective democracy and free market practices in the regions it serves⁶². USAID had a foreign affairs operating budget of over \$34 billion in 2009 and is looking to expand to nearly 40 billion in 2011⁶³. Of the 779 million allocated to Europe and Eurasia during 2009, nearly \$100 was given to projects in Ukraine – ranking second behind only contributions to Kosovo (\$123 million).

Located in Kyiv, USAID Ukraine has contributed over \$1.7 billion in humanitarian aid and technical assistance within Ukraine since 1992. These contributions come in many forms, but are focused around the areas of “Economic Growth, Democracy and Governance, Health and Social sector.”⁶⁴

Although many of these projects are oriented on providing a variety of services to individuals that need them, some important projects include

⁶² http://www.usaid.gov/about_usaid/

⁶³ http://www.usaid.gov/policy/budget/cbj2011/2011_CBJ_SummaryTables.pdf

⁶⁴ <http://ukraine.usaid.gov/about.shtml>

encouraging the development of renewable energy projects. While the efforts of USAID do help to foster growth of renewable energy, the focuses of its programs are primarily to reduce the country's heavy dependence on imported energy sources and to improve energy efficiency throughout the country⁶⁵.

USAID is directing its efforts towards identifying sources of wasted energy, and towards developing strategies to assist local municipalities in lowering the amount of energy wasted, thereby reducing the demand for conventional fuel sources like gas and oil – contributing to large amounts of emissions of CO₂ and other greenhouse gases.

Some of the most prominent projects undertaken by USAID include:

1. Cooperation in Research and Education in Science and Technology (CREST). Through supporting the CREST center, USAID is looking to improve the Ivano-Frankivsk University's capacity to discover renewable energy alternatives as well as energy efficiency solutions and energy conservation techniques.

2. USAID is providing legal and technical assistance to the Dnipropetrovsk Oblast in developing a 5-year strategy to reduce Carbon Dioxide emissions and reduce energy consumption in the industrial, agricultural and housing sectors. This project is also meant to attract investment of projects geared towards energy efficiency development and well as clean-energy technologies.

⁶⁵ http://ukraine.usaid.gov/lib/Fact_sheets/2011/energy.pdf

3. USAID has also managed to completion ten energy efficiency projects in six cities that are expected to reduce natural gas consumption by 46 million cubic meters by 2016.

World Bank

The World Bank is a multilateral organization that provides low-interest loans to developing nations in the hope of improving health quality, infrastructure, environmental quality and other areas.

The World Bank is currently operating under the Country Partnership Strategy established in 2007, which outlines the lending of \$2-6 billion dollars to Ukraine over the course of 2008, 2009, 2010 and 2011. This does not include resources invested in Ukraine's private sector through the International Finance Corporation⁶⁶.

The World Bank is currently financing and assisting to main projects including the Hydropower Rehabilitation Project⁶⁷ and the Power Transmission Project in Support of the Energy Sector Reform & Development Program⁶⁸

1. The Power Transmission Project aims enhance the security, reliability and efficiency of Ukraine's energy by improving the "institutional capacity and technical capabilities of transmission system operator, Ukrenergo." These

⁶⁶<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/ECAEXT/UKRAINEEXTN/0,,contentMDK:21961950~menuPK:5536404~pagePK:141137~piPK:141127~theSitePK:328533,00.html>

⁶⁷<http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=328533&menuPK=328566&Projectid=P083702>

⁶⁸<http://web.worldbank.org/external/projects/main?pagePK=64312881&piPK=64302848&theSitePK=40941&Projectid=P096207>

improvements will take place through the rehabilitations of substations, increased institutional development of Ukrenergo, stabilization of the Crimea Electric Power Grid, strengthening of the transmission network through the construction of additional transmission lines and expansion of substations, and by implementing the 'Grid Code' – providing for increased technical assistance.

2. The goal of the Hydropower Rehabilitation Project is to improve the stability and reliability of power supply by increasing capacity, safety and efficiency of hydroelectric stations within Ukraine. With this, the World Bank is hoping to remove technical barriers that exist in generating competitive electricity through the use of hydropower.

EU involvement

Approximately 20% of the natural gas consumed by countries within the EU travels through pipelines on Ukrainian soil⁶⁹. Because of this dependence, the EU has become actively involved in the security and stability of the energy resource routes that travel through Ukraine. During the 2009 gas war, the EU facilitated negotiations between Russia and Ukraine, largely because of the urgent need for gas and oil in EU countries.

In an effort to effectively establish efficient connections to and within Europe, the European Commission manages the establishment of Trans-European Networks. The nature or focus of these networks can range from establishing secure systems of information sharing to providing for infrastructure for the

⁶⁹ http://ec.europa.eu/energy/international/bilateral_cooperation/ukraine_en.htm

transport of goods and people. Although the governing bodies within the EU direct and implement these networks, the projects themselves are involved with countries outside of the EU and Council of Europe.

One type of Trans European Network currently being developed is that concerning flow of energy into and out of Europe. To determine which European projects are eligible and considered highest priority for community assistance, guidelines have been established in order to meet the objectives of the TEN-E. These objectives include the effective operation of the internal energy market, security and diversification of energy supply, improved terrestrial cohesion⁷⁰ within Europe, and the promotion of sustainable development within Europe⁷¹.

The annual budget allocated to TEN-Es is approximately 20 million euro, most of which is used for conducting and sharing feasibility studies for proposed projects dealing with the transport of energy or energy resources.

European Bank for Reconstruction and Development

Established in 1991, the European Bank for Reconstruction and Development, or EBRD, is owned by the EU, the European Investment Bank and 61 European countries within and outside of the EU⁷². The EBRD provides large amounts of investment to projects, new ventures and industries, and to the work of existing private and public companies. The investment goal for each project is approximately 35% of the required financing, and usually results in between 5

⁷⁰ Reducing the isolation of less-favoured, island, landlocked or remote regions

⁷¹ http://europa.eu/legislation_summaries/energy/internal_energy_market/127066_en.htm

⁷² <http://www.ebrd.com/pages/about.shtml>

million euro and 230 million euro being lent⁷³. Investment from the EBRD is distinct from other investment, as the institution targets projects that normally would be unable to obtain funding from other sources.

The EBRD also has a charitable aspect, as its donor program, funded through participating governments and institutional organizations, helps to provide access to consultant experts to local businesses.

Investment given through the EBRD adheres to its environmental policy, which aims to “to promote in the full range of its activities, environmentally sound and sustainable development.”⁷⁴ Before a project is financed through the EBRD, it undergoes an environmental and social appraisal to determine if investing in the program adheres to the EBRD environmental standards and if so, how to best address environmental and social issues in financing, planning and implementation of the project. When conducting this assessment, the EBRD scrutinizes three main aspects: The environmental and social impacts of the project, “the capacity and commitment of the client to address these impacts and issues in accordance with this policy,” and “the role of third parties in achieving compliance with this policy.”⁷⁵

The EBRD is currently working very closely with Ukraine and has invested over 4.4 billion euro in 226 cumulative projects, 65% of which exist

⁷³ <http://www.ebrd.com/pages/about/what.shtml>

⁷⁴ <http://www.ebrd.com/downloads/research/policies/2008policy.pdf>

⁷⁵ <http://www.ebrd.com/downloads/research/policies/2008policy.pdf> - p.5

within the private sector⁷⁶. While the nature of these projects varies widely, the EBRD's areas of focus for investment in Ukraine are stabilization of the financial sector, improvement of the business environment and competition, liberalization and privatization of the market – particularly in opposition to protectionist tendencies, and the restructuring and modernizing of the nation's infrastructure⁷⁷.

The EBRD is currently working with the Ukrainian Government to modernize the roughly 37,500 kilometers of pipelines in Ukraine designated for the transport of energy resources. The EBRD is helping not only to finance this modernization (estimated to cost between 15-20 billion euro) but to provide technical assistance in devising an efficient and cost effective strategy to develop a new system that would improve stability, and in particular, the energy efficiency of the pipeline network⁷⁸.

Summary and Implications for Simulation

Ukraine's system of energy networks, though technologically and economically dragging behind many present in other European countries, is a dynamic one. The recent investment in Ukraine's energy sector, both in the area of improving existing infrastructure for conventional fuels and for improving market based support for renewable energy, indicates that the nation's government and private sector are taking serious strides toward developing energy alternative sources for current and future use.

⁷⁶ <http://www.ebrd.com/downloads/research/factsheets/ukraine.pdf>

⁷⁷ <http://www.ebrd.com/pages/country/ukraine/focus.shtml>

⁷⁸ <http://en.rian.ru/world/20100401/158400964.html>

To complement the financial reinvestment in Ukraine's infrastructure, recent promising political action has resulted in the creation of a number of policies encouraging the growth of the renewable energy use. Perhaps most commonly known is the "Green Tariff." Implemented in 2008, the Green Tariff program financially encourages energy retailers to purchase electricity generated by renewable energy sources. This program will last for 10 years and is expected to increase the amount of electricity from renewable sources used within Ukraine.⁷⁹ This, coupled with consideration of greenhouse gas emissions shows a political willingness to engage inefficiency and dependence problems present in Ukraine's energy sector.

This progress, coupled with a wealth of renewable energy potential spanning solar, wind, biomaterial, and hydro-electric resources provides a bright future for a nation currently struggling with crippling energy and economic dependence on an increasingly competitive and politically active Russia. Though the fate of Ukraine's energy situation has yet to be decided, it will most certainly hinge on policies crafted to encourage development of more modern, efficient and renewable resources, as well as the financial and technical resources invested by national and international players, individuals and organizations alike.

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http://www.wwindea.org/home/index.php?option=com_content&task=view&id=211&Itemid=40

Simulations – The Rationale

A simulation, simply put, is a representation of reality that aims to recreate or forecast an experience with the goal of training, explaining or teaching the participants involved. Simulations are useful teaching tools that can use the replication of a scenario with shifted emphasis on different facets in order to explore potential outcomes that might not have been originally envisioned in a conventional, objective setting.⁸⁰ In most contexts, a simulation is a “confluence of systemic knowledge, practice, emotional involvement, and social embeddedness that creates the potential to achieve results that no other methods can match.”⁸¹ Essentially, simulations assist in learning not because they provide a flawlessly accurate representation of a scenario– indeed such an effort to do so would prove futile – but because they expose participants to situations requiring problem solving skills in the context of subjective attachment to the outcomes of the process. This allows not only for an expanded perspective on behalf of the participant, but an interesting window into potentially unseen aspects of the situation for the observers or facilitator.

The Advantages of Using Simulations

Simulations involving human interaction and structured decision-making play a large role in both informing influential policy makers and providing for a forum to discover new aspects and viewpoints of particular scenarios. Whether

⁸⁰ Instructional Strategies Online – Simulations, 2009.

⁸¹ Simulations, Games, and Experience-Based Learning, 1999.

used within military settings such as war gaming or in emergency management testing, simulations provide a venue for involved stakeholders and players to act on virtual situations without the actual generation of disturbances, such as a missile crisis or wild land fire.

This construction and facilitation of a type of event, whether it be an accident needing emergency responders or an imagined war scenario to a routine doctor's appointment allows for practicum in the fields of policy, as well as observation and information collection on the part of the simulation creators.

Policy simulations also provide social sciences students "an opportunity to learn from first-hand experience in much the same way that laboratory experiments allow students of the physical sciences to observe actual physical processes." Political simulations, which are a form of experiential learning, often "increase students' understanding of the subtleties of theories or concepts and draw in student who can be alienated by traditional teaching approaches."⁸²

In addition to helping students learn what can be difficult-to-access material, "by putting students in role-playing situations where they need to make defensible decisions and often have to convince others to work with them, simulations also provide students with the opportunity to develop their communication, negotiation, and critical thinking skills, and in many cases, improve teamwork skills."⁸³

⁸² Asal, Blake, 2006, p. 1

⁸³ Asal, Blake, 2006, pp. 1 - 2

This opportunity to develop skills simultaneously with comprehension of new material was a valuable aspect I sought to include in my own simulation. Interested in why this occurred, I consulted an example of using simulation to teach Agricultural policy that explained “by directly involving the student, he understands because of his own experience...is able to move from abstraction to reality after interpreting his behavior and analyzing the results.”⁸⁴

Characteristics of Effective Simulations

Having never created a simulation before, I wanted to identify which characteristics of simulations produced effective learning results, and what aspects of creating a simulation could lead to an incoherent learning experience for the students. Although literature I discovered varied somewhat on advice to other facilitators, I discovered a number of useful underlying themes present in particularly successful simulations.

One of the most important steps outlined by previous examples was to indicate “a clear statement of purpose.”⁸⁵ This helps the students, or participants, to place their involvement within a useful context, rather than working without a defined framework. Secondly, an introduction to both the scenario and game mechanics of the simulation helps to establish rules of engagement and the general principals of participation.

⁸⁴ White, 1977, p. 225

⁸⁵ Asal, 2006, p. 3

Another theme that presented itself in existing examples was the use of reference materials and “role sheets” for the participants of the simulation to use throughout the encounter. Though simulations can include both scenarios in which participants do their own, independent research, I was interested primarily in an approach that used prepared material, as it “can save a great deal of time and allows maximum time to be devoted by the participants to developing strategies.”⁸⁶

In the literature I reviewed and the interviews I conducted, there were several themes about not only the usefulness of simulations, but in how to positively impact the learning of the participants by attending to the sense of reality present in the simulation. This sense of ‘reality’ can be achieved through attention to the rules of engagement, verbal atmosphere or in the reference materials used during the simulation.

An aspect of effective simulations I discovered was the ability to incorporate real-world strategy and negotiation into a fictional setting. A fictional setting assists the facilitator not only in calibrating the scenario to meet the learning objectives, but can help “avoid pre-existing bias or perceptions, as well as heated emotions.”⁸⁷ While my simulation would be based on real information and background content, the scenario would involve a maintained, but fictional setting in which participants were treated as their roles, rather than as themselves.

⁸⁶ Asal, 2006, p.3-4

⁸⁷ Asal, 2006, p. 6

Perhaps the main piece of advice I sought from previous examples was how to manage the actual results the participants developed in response to the challenges posed to them by the scenario. While, I did want to encourage creativity in the development of solutions, I was drawn to a more structured set of solutions because of my intention to focus on the negotiation aspect of the scenario. “Non structured outcome possibilities allow for creativity on the part of the participants, but provide fewer constraints and may allow them to come up with solutions that are too easy or unrealistic to the detriment of what you are trying to teach.”⁸⁸

In addressing the expected difficulty of the simulation, I looked to see if there were ways of moderating the level of challenge associated with each content section, and with the simulation as a whole. I encountered an interesting concept of putting constraints on roles that would “determine to a large degree how challenging the simulation will be for the participants.”⁸⁹

Integrating Suggestions from Examples

In making my own simulation, I chose to follow a combined format of three distinct stages: Preparation, Interaction and Debriefing. The very first action I took when introducing the simulation to any test groups was to make a very clear statement of purpose. After thanking them for their attendance and dedication, I established what they would be working to do, that total consensus

⁸⁸ Asal, 2006, p. 9

⁸⁹ Asal, 2006, p. 10

was needed for a final decision and the simulation would end unsuccessfully after a given time period. During the introduction stage, I released material explaining the content to the participants and explained background information to the extent that it established an environment of understanding in which negotiations could take place.

I also decided to establish structured possibilities, as it would allow the simulation to focus more primarily on the challenges facing energy policy creation, rather than the weaknesses of existing suggestions and propositions. This combined with a verbal and written explanation to the participants, of the need for adherence to the 'reality' of the simulation would provide for the mental and emotional investment needed to have participants experience the roles subjectively, rather than as observers.

Thinking back to successful examples of simulations like the Iron Triangle Simulation involving congress, I was certain that, after introducing the premise and purpose of the simulation, I explained the rules in an understandable and simple format. In this way, I hoped to save time for actual negotiation by clearing up mechanical details and by preventing mental burnout by avoiding needlessly complex rules or procedure.

During the interaction phase of the simulation, I acted as an observer and an arbiter when there was a dispute on any of the subject matter. Because one of the constraints I chose to incorporate into the simulation was a set time limit, I also served as a timekeeper throughout the simulation.

After each group had reached a conclusion and the posttest had been taken, I explained both the importance and relevance of the content as well as the learning objectives of the simulation. I was sure to tell students the intended value of the simulation after the posttest results were recorded to avoid directing answers in a way that would reflect my goals for the exercise, rather than what the students felt they actually learned.

Personal

Although I personally have no certifications or official credentials in the creation and administration of policy simulations, I have had manifold experiences in creating, facilitating and evaluating them, both in the academic and professional worlds.

From 2007 to present I've worked as a 'cog' in the machine of State University of New York Upstate Medical clinical skills practicum, playing the role of a 'standardized patient' for medical and education students alike. As a standardized patient, my role is to be on the inside of the simulation and to portray the role of an individual targeted with the clinical skills of those being taught and tested by the simulation. As a patient, I have full knowledge of each aspect of the simulation, and have been trained to react according to a standardized conduct when participants proffer various reactions and suggestions by the student to various problems posed to them by the simulation. In short, I have been 'diagnosed' with a condition, and must react to the medical students actions in a way that upholds the scenario in which I am a sick person visiting their doctor in

hopes of obtaining answers from them. My role as a patient translates into non-medical fields, as I've been asked to play the roles of problem students, unruly children and even depressed medical students. To the extent of contributing to a simulation, my direct role in this has been educationally purposed acting rather than mechanism development or evaluation of the actual simulation.

I have also played the role of administrator of a simulation, as I am currently a Teaching assistant for the class 'Congress – Legislative Processes' which places students in the roles of interest group members, legislators and members of the media in roleplaying the 112th U.S. Congress. I've served not only as a developer of the simulation's mechanics such as money balancing, voting procedure and student logistics, but have been a resource for content – related questions concerning the actual operations of the real U.S. Congress.

My experience as a TA has proven not only valuable for my own understanding of the complexities of developing legislation, but has alerted me to the large amount of work and preparation needed for the facilitation of a successful simulation.

In addition to fulfilling the role of a part of a simulation and administering one, I had the unique opportunity to develop curriculum based on a simulation exercise when I was the teaching assistant for a class known as Local Government. I worked with the professor to develop a sales-tax restructuring debate that pitted three groups of stakeholders against one another to establish a

new paradigm of tax revenue distribution. The preparation for this exercise, while fairly specific in content and material, was extensive.

I pulled together reports of paradigm shifts for the past decades and found information concerning allocations, spending, community indicators and area trends. Although the preparation was time consuming, the simulation project provided the students with a hands-on approach to determining a generated tax make-up that ultimately led to an enhanced understanding of both the make-up of the tax system and the negotiation process used to determine the characteristics of that tax-code.

Examples of Simulations as Policy Teaching Tools

“For almost a decade, agricultural economists have been interested in using simulation to teach university students.”⁹⁰ By using simulations to instruct agricultural policy and economics, students are introduced to varying viewpoints and a range of options, strategies and outcomes. Simulations assist not only in placing students within a subjective role – allowing for more personalized decision-making, but help students access viewpoints that are substantially different or opposing to their own. This replacing of objectivity is also amplified by the function of the simulation, which allows students to more readily decide strategies that have immediate results. This aspect of simulations allows not only for multiple trials, but also for an examination on known outcomes either individually or in a group forum.

⁹⁰ White, 1977, p. 2

A more common example of a simulation structured for the purpose of teaching policy and political process is that of mock congress, or legislative body. At the University of Missouri-Columbia, a group of 130 students were given roles of congressional representatives and interest groups with the intention of simulating a semester-long session of congress in order to learn the challenges, shortfalls and intricacies of legislative processes. After the semester had concluded, evaluations indicated that a large majority of the involved students found the simulation aspect of the class to be a valuable tool for learning the content of the class. The simulation was also evaluated as enjoyable and engaging.⁹¹

Another example of an accepted and commonly utilized form of human-involved simulations is war games designed to prepare decision makers and to discover additional aspects of a crisis situation not readily obvious from an objective standpoint. Many national governments include war games in their strategy of preparation, and rely on both paper-based scenarios as well as physical practice runs to test effectiveness of tactics, technology and personnel.⁹²

Simulations, whether used for emergency response, medical practicum or tactics training, have become an integral part in the way institutions and individuals prepare for scenarios that are identified as important and meaningful. Along with increased use and recognition, simulations have become part of certification processes in a variety of fields, such as medicine or automotive

⁹¹ Endersby, 1995, pp. 520-523

⁹² Department of Defense, 2001

manufacturing⁹³. Perhaps most importantly, successful simulations allow for multi-directional learning, in which insights from participants can act as lessons to developers, as well as providing practice scenarios for participants. In this regard, simulations rely not only on what is normally considered relevant information that is incorporated into the content, but on the more general human experience which pits human adaptability and resourcefulness against challenges or situations that require creative thought, critical thinking and understanding of a specific set of concepts. While this complicated balance of making effective simulations presents a series of challenges for those who attempt to develop them, it is exactly this complexity and adaptability that make them dynamic and valuable learning tools.

⁹³ Suling, 2007, Ulgen

Findings

Answering the overarching research question

In examining the effectiveness of the simulation as a teaching tool, I used a pretest and posttest given to each participant in order to register their perception of knowledge prior to and after their experiencing the simulation.

Introduction, methods, what the questions mean

In order to assess what and how much a participant learned as a result of the simulation exercise, I conducted two distinct surveys: one prior to introducing any of the content at the beginning the simulation and one immediately after a solution had been reached or time ran out at the end of the exercise. In all, there were ten questions present on both the Pretest and Posttest concerning how participants assessed their understanding of the content presented in the simulation exercise. The ten identical questions on the Pre and Post tests used a ten point Likert scale to assess how comfortable participants felt with concepts and skills present in the simulation exercise.

While using this method of assessing knowledge is somewhat subjective, it allows for an understanding of personal aptitude over knowledge of supposedly correct, one option answers. This fulfills my aim of focusing on student learning progress rather than knowledge of what could be prove to be oversimplified information that fails to be of practical use to the participants involved. I also was able to record the three trials with a concession to the participants that the files

would not be publicly available or incorporated directly into the presentation of my findings. In taking video, however, I was able to observe qualitative trends that provided insight onto the behavior and tendencies found within each group's exercise.

The value of using T-tests

Paired T-tests are used to determine if the unknown means, or averages, of two populations are significantly different enough to rule out chance or fate as the reason they appear different when aggregated. Simply put, T-tests help to statistically check if the difference in averages is great enough to mean something, rather than being slightly off for reasons unrelated to any independent variables. While there are other kinds of T-tests, paired T-tests are “used to compare two population means using samples that are paired in some way.”⁹⁴

The data collected from the three trials qualifies for analysis by a paired T-test because it represents two groups of data with equal numbers of values that have undergone a hypothetical change (ie, the simulation). The ten questions on the pretest and the first ten questions on the posttest ask the same question, before and after the participants have completed the simulation. In effect, the T-test will examine whether or not the average response for each question has changed enough to indicate significant difference.

One tailed and two tailed T-tests both test for significant difference, but in slightly different ways. In a two-tailed T-test, the means of the two populations

⁹⁴ Elliot, 2006, p. 54

are examined to see if they are equal to one another. In a one-tailed T-test, the two populations are checked to see if the average of one population is greater than the other⁹⁵. In my findings, I have conducted both a two-tailed and one-tailed T-test to test both for equal means and for the mean of one population being greater than the other.

Basic findings

To begin assessing the data I obtained from the three simulation trials, I calculated the Average, Median, Total, Minimum, Maximum and Standard Deviation of not only every participant's scores for the Pretest and Posttest, but for each question on each test as well. I also developed the total Average, Median, Total, Minimum, Maximum and Standard Deviation for the combined scores of the questions and participants, so as to have the information as it portrayed to the aggregate data. This information will allow me to see not only the general trends associated with questions before and after the simulation, but the distribution of answers, including any participants who might have had a tendency to rate their abilities higher or lower than others, contributing to the natural variability with conducting personal surveys in order to gather information.

I then used Microsoft Excel to develop a 'difference chart' in which I subtracted the values for the Pretest from the Posttest to obtain a change in self-assessed proficiency, or as I generally termed it, the 'learning' value. This

⁹⁵ Elliot, 2006

variable represented the transformation that took place of the participant's perceived understanding of a skill explained in the questions.

Significant differences between pretest and posttest results

The main question I had in quantifying the questions asked by the Pretest and Posttest was "did the participants learn from the simulation in a noticeable way, or were the results too ambiguous to arrive at a conclusion about the significance of the exercise?" This question basically applies a statistical tool of verifying significance to answer the broader question: "was the simulation helpful to the participants' learning processes?"

To investigate this, I calculated the difference ratings of knowledge that the students provided both before and after the exercise. I then performed a T-test to determine what the likelihood that the difference present between the Pretest and Post test scores was due to fate, chance or confounding variables rather than as a direct result of the simulation. I used both a 2-tailed T-test and a 1-tailed T-test in order to test for a bi-directional difference between the samples and an increased average and median of the Posttest sample

Learning of the main group versus learning by assigned role

One potential concern I had in examining the results was the possibility that some roles were more conducive to learning than others, meaning that an participant's learning experience could be impacted simply by which role they were randomly assigned. Were this correlation to exist, it would mean that there

would be an identifiable pattern between how much an individual learned and what their role was during the simulation. It also meant that if the overall experience were to have an equal value of learning for each participant, then it would need to be modified in a way that removed or ameliorated the learning advantage present in some roles. While I did not have an expectation for this particular finding, I hoped that there emerged no significant pattern between average learning and role, as this would mean that students benefited highly unevenly based on the factor of arbitration used to determine role.

To determine if there was a link between how much a participant learned and what role he or she was assigned during the Simulation, I tested for significant difference between the average and median rates of change of the larger groups and the rate of change when organized by role.

Although the average learning of some groups was higher than that of others, it did not differentiate significantly from the larger sample, nor did any role's learning exceed the overall average in a significant way. In short, while there was variance among the roles, there was not a significant difference between the six roles nor between any given role and the larger group.

This finding is helpful in determining whether or not the simulation is balanced in a way that allows for similar learning opportunities for participants regardless of the role they are randomly assigned. While I take the lack of a learning pattern linked to role to be a positive sign, it is possible that the data remained insignificant because of the relatively small sample size of eighteen

participants. Perhaps if the simulation were run a few dozen times, a pattern might emerge revealing a learning disadvantage associated with one or more of the roles.

No significant difference between main sample and groups

One practical answer I attempted to find in the collected data was whether one of the three groups indicated a higher or different degree of learning than the overall sample. To do this, I conducted T-Tests between the average and median learning of individual groups with the overall average and median learning of all three groups with aggregate data.

The results of both a 1-tailed T-test and 2-Tailed T-test were that there was no significant difference between the average and median learning of individual groups as compared to the overall sample. As a result, I failed to reject the null hypothesis, being that: there was no statistically significant difference between any of the three groups and the aggregated data.

Simulation responses

In addition to the Posttest's ten questions matching those on the Pretest, I included eight questions inquiring as to how the participants assessed the impact of the simulation on their learning experience. These questions were designed to include feedback from the participants as to how the simulation impacted the speed, quality and enjoyment of their learning, and weren't matched with other sets of questions concerning the simulation.

Out of the eighteen responses, the two prompts that were answered the highest on average were

12: “I felt that the simulation aspect made the overall experience more enjoyable than attending a lecture of similar length and intention” with an average of 9.83 out of 10 and a standard deviation of .51, and

14: “I felt that the simulation allowed me to learn in different ways than I would have been able to if I was learning by reading a textbook or watching a presentation” with an average response of 9.72 out and a standard deviation of .69.

The two prompts that were on average rated the lowest were:

11: “ I feel that the simulation exercise helped me to gain useful perspectives on hoe energy policy is negotiation, developed and decided” with an average response of 8.78 out of ten and a standard deviation of 1.56, and

15: “I would prefer learning material in the form of a structured simulation than a more common teaching method, such as a lecture or a test-based course” with an average response of 9.22 and a standard deviation of 1.35.

As is clear, the ratings for all of the questions were relatively high (all averaging close to or above 9 out of 10 on the Likert scale). Furthermore, on the lower ranking responses, the standard deviation was greatest among all eight

simulation questions, indicating that there was less agreement on the lowest two than any of the others, potentially signaling that one participant's preferences might have shaped the average in a way uncharacteristic of the rest of the group.

The responses for the simulation, though based solely on opinion and personal assessment, help me to understand the impact of using a simulation as a teaching tool beyond what normal evaluation methods such as tests or learning ratings might provide.

Qualitative Findings

Not all of the findings of the simulations can be identified or verified through the collected data. As I observed and facilitated the three trials of the simulation, I noticed trends that stood out as potentially important aspects of the group's learning.

Ten-Minute Shift

Perhaps one of the most prominent trends present in the simulation exercise was the dramatic change in negotiation tactic that occurred directly after the participants were told they had only ten minutes remaining in the simulation before the end of the exercise. In all three trials, the negotiation tactics as well as the learning environment shifted dramatically.

Students who, moments prior to the ten minute warning had been secretively guarding, or even lying about their priorities and stances, quickly shifted to a much more open debate involving more direct communication, an

abandonment of pre-established procedure and somewhat of a greater willingness to compromise and concede on behalf of almost all of the participants.

Another shift that occurred in the group was that of cohesive decision. Each group, which had been progressively reaching an eventual agreement, changed each of the four decisions within the last ten minutes every time, sometimes to a consensus that didn't begin to resemble what the group had on the table before the ten-minute warning.

Although I am uncertain of what caused the various shifts associated with the ten-minute warning in each of the groups, my hypothesis is that the abandonment of previously discussed or established procedure, tentative arrangement, and calm or collected atmosphere stemmed from a greater connection to the objective and premise of the simulation – which was to reach some sort of agreement than the connection associated with the mechanics of the simulation such as identification with the roles, acknowledgement of past agreements and decisions and past decorum. This imbalance between the attachment to premise and attachment to workings may hold valuable lessons on the art of negotiations and discussions yet unexplored in this particular study.

Mental fatigue and abandonment of simulated reality

In each of the trials, there were periods of the exercise in which roadblocks that prevented an agreement switched the participants into a mode of behavior that invested less attention in the pretense governing the simulated

reality, and more towards securing an agreement on a particular issue or concept present within the mechanics of the simulation. Often, participants became almost entirely removed from the roles, overtly stating what preferences they claimed and what they would be willing to compromise given a particular adjustment to the consensus.

These temporary deteriorations of the simulated reality were fairly minor, and didn't result in the entire unraveling of the simulation. What they did do, however, was provide a momentary lapse in the agreed upon scenario that might have given the participants time to regroup or refocus a perspective other than that provided by the material outlined in their roles. While I'm not certain of the exact effects, it's likely that constraints dealing with the upholding of the scenario would greatly reduce the propensity to devolve into temporary lapses of role recognition such as those experienced in the trials. If grade deductions, chastising, or even reminders were put in place to enforce and maintain the artificial reality of the simulation, the participants would be forced to invest more attention and energy into maintaining their particular part of the reality.

While my simulation did not include any mechanism to enforce the reality of the simulation, I was present in the room of the simulation, which perhaps encouraged the participants to fulfill their roles in a manner they felt would meet expectations I had of their demeanor during discussion. Removing my presence from the room after the beginning of the negotiations may have resulted in a

greater propensity to suspend the mechanisms of the simulated reality and approach an end consensus more readily.

Varying possible approaches

Each group reached a different solution by the end of the allotted time. While the fact that a consensus was consistently reached for each trial is itself a finding, the fact that each final decision was different speaks to the ability of the simulation to be solved in a variety of ways, rather than one particular combination of answers that consistently appears as the easiest and best solution for the six participants involved.

In the version of the simulation that was tested, there was a possibility of reaching 36 successful consensuses out of a 144 possible combinations of decisions included in each of the four sections. Were the number of successful consensus options to be decreased, I predict that participants would reach a similar consensus more often because of mathematical elimination and because of an increased sense of difficulty associated with the challenges, perhaps provoking an atmosphere in which participants act less selfishly because of the heightened difficulty in reaching any agreement by the end of the allotted time.

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Appendix I – Interview Transcripts

Mark Monmonier 2/15/2011

1. Do you consider simulations to be valuable teaching tools?
2. Why or why not?

They can be, you can get a graphic model. If you capture something, it allows you to basically compress time. A. described simulation model, but B. offered an indication of fire spread. As a teaching tool, it's a matter of experimentation and compressing time – can be run with different parameters.

3. Do you have any experience in using either data driven or role-playing simulations?

Tabletop exercises are useful in the classroom. They're also good as training tool and promoting awareness. Emergency responders use this kind of simulation as training exercises: how readily they can get ambulances out? There is certain artificially there, they don't have the stress. Don't have simulations that truly disrupt life.

4. Can you think of any simulations that have been particularly useful or surprising in their effectiveness?

General purpose systems simulator – developed by IBM.

The idea was to try out working on managing a restaurant. The simulator had facilities that could be occupied. There was timing involved, arrival time of patrons involved. One could experiment with seeing the effect of service under hypothetical systems, the capacity of kitchen, putting on more wait staff, putting in more tables.

Putting in more events that could result in large influx.

5. Have you ever made a simulation?

6. What was it about?

I Simulated ink spread during printing of dot screens. Idea was to look for stability of certain kinds of dot screens.

7. Have you ever used a simulation?

I have broken class up into smaller groups – modified Delphi technique of trying to discern priorities or certain hierarchy of things.

8. Any that stand out as being terrific? As horrible?

When you look at atmospheric simulation, looking out about 48 hours, most are very good. The thing there, it's fairly common these day to sort of run ensemble modeling where you have a suite of models that do things differently or that use different parameters for models. How much consistency do you get in the results varies. The term is ensemble forecasting – which uses a suite of methods to obtain accurate forecasts. You have to have very good initial conditions in phenomena, it becomes trickier when you try to simulate climate. This happens with some models when they try to run them forward a year – 11, 12 ,13 months hence, the results reported in fairly vague sense, generally do this, temperature, precipitation –above and below normal. The results are inherently vague, intriguing. It helps if they can plug into the model any sort of trend like El Niño.

You can say that a map is a simulation of reality. One could have a 'view shed' simulation – simulate effect on appearance of landscape of new structures or change on a landscape – useful in landscape and traditional architecture.

Estimating snow load is a form of simulation. This can be used to come up with more accurate structural design standards.

9. Any advice on how to avoid making a horrible simulation or how to ensure making a good one?

10. How did you discover simulations, and have there been any changes in how they are perceived, used or seen as useful predictive and educational tools?

Principally, tabletop simulations have become a useful tool in the emergency management area, Emergency management institute – Particularly at the University of Maryland.

There was an old catholic college that closed, FEMA bought it.

There was training for state and local EM people in conjunction with U.S. fire academy. In that context, tabletop simulation would be part of curriculum, used to test strategies.

Simulations I don't like: Fire drills. I see no point in fire drills on a college campus. Students are generally not in same place, they tend to move around, I think college fire drills are useless.

Military training exercises are good examples

Computational efficiency has improved enormously – atmospheric circulation models, storm surge models, Models can accommodate higher resolution data – allows for more experimentation, when you have multiple runs you can see how reliable the results are.

Simulations like yours can make people aware of the different sorts of stakeholders – aware of the planning process that at some levels become adversarial. This kind of simulations make you aware of the range of

possibilities, physical and socio-political, could be used to promote fuller understanding of a certain incident.

About simulations – groundwater modeling is a whole intriguing aspect of simulations from the standpoint of assessing potential problems as well as remediation.

Paul Hirsh 2/16/2011

1. Do you consider simulations to be valuable teaching tools?

Yes

2. Why or why not?

Because a lot of grappling happens as if the participants were those roles. A lot of problems when you objectively analyses them, you don't really appreciate them. People interacting from multiple different perspectives

Things that don't come out in algorithms like pride come out

3. Do you have any experience in using either data driven or role-playing simulations?

Yes

4. Can you think of any simulations that have been particularly useful or surprising in their effectiveness?

2 things

1. I've Done multi criteria decision analysis

You lay out different values and goals and then lay out different options and then rank options with how they will meet their goals and prioritize those goals

- 2. Mathematic side of the spectrum for seeing how things come out- this is dangerous as something that you put variables into and it spits out the right answer. When you get to a certain level of complexity no model can give you the right answer. Discourse is important because it helps you realize there is no answer but also it demonstrates the process. A good process yields a more legitimate answer. I myself have been involved in developing ways to have conversations that get over a lot of the communication difficulties when you have different scientists and researchers that come together vs. stakeholders. Each analyst has their own theory and perspective – everyone has their own lens and they don't appreciate the views of others. Helping structure workshops so that one person coming from on analytical perspectives can appreciate complexity in different perspectives that wouldn't normally be apparent.**

One danger to avoid– cognitive burnout, if you ask people to do something too hard – if something is too hard. They do things half way. Very important. On the other hand, the more you simplify it, the less information you get.

5. Have you ever made a simulation?

6. What was it about?

No, but I've worked with the real people who ARE the roles and working with them to have a productive conversation. I've done it in 5 different continents. I haven't done them as simulations, but as multi-stakeholder workshops.

7. Have you ever used a simulation?

Yes, at Emery in the Environmental Studies department. Water planning in Georgia. This was used to teach high school. There was a simulation about spotted owls and loggers.

Had a couple simulations when I was a student – I remember one as being tremendously helpful, I still remember it really well. I was the environmental Activist; it had something to do with the Kyoto Protocol. It was a Semester long thing. That was awesome, that was a really good learning experience. I used to have a high school teacher – some of the most important learning experiences in my learning career. I can still remember what I learned from the Simulation. I still remember the lessons.

8. Any that stand out as being terrific? As horrible?

A shogun simulation in teaching feudal system in Japan. Then a climate change simulation with professor Douglas Allchin. Both were terrific.

9. Any advice on how to avoid making a horrible simulation or how to ensure making a good one?

Keep it simple. Trust.

Think far ahead, but then back up in order to double check that you've met your thought-ahead goals.

Make sure that it's a simulation and not predetermined – so it can unfold in multiple ways. A little math is fine, but not too much math.

Then the nerds win.

It's good to limit it to 6 people.

Prepare, have people read over the content. Do it more than once so that you can learn, have a dry run.

10. How did you discover simulations, and has there been any changes in how they are perceived, used or seen as useful predictive and educational tools?

When I was a Masters student, I created a simulation, got to run class for two weeks – created a huge mural that represented an island and then used it to determine issues for encroachment, environment. It was sort of a culmination of a political art project.

Simulations are a small part of my education, probably could have been more. I think they take a lot of work and confidence and trial and error to prepare. They take a lot of skills that many teachers may not have – they take video game designer skills. Another professor is working with students to make a fundraising program for a real non-profit, almost like service learning. Sort of a simulation in taking on a role and doing that role.

It might be interesting to come up with a typology for simulation – highly controlled one day classroom thing, or overall semester long thing.

I don't see any trends because I only have my own snapshot experiences. Except to say they're not used as much as they could be. They make you want to go to class a little bit more. Even for young kids, if you get people to step into other roles they can think in ways that they couldn't think otherwise because you've challenged them to step outside the box. They help gain understandings from different perspectives.

It would be cool to see a simulation that's designed to fail and then think about why it failed.

Carol Dwyer 2/18/2011

1. Do you consider simulations to be valuable teaching tools?

Yes

2. Why or why not?

I think when I am developing a course, I often think about my own learning style, and while I understand some people are visual and auditory learners, there are different styles of learning. Most people learn the best when they are doing it rather than reading about it. When I look at a simulation, if I were going to learn to play the piano, I wouldn't learn a textbook to find out about the technique, I would read about it well, in order to play it well, I really have to do it. I think that translates into any kind of learning. I'll ask people something and I'll forget it, but if I had actually physically obtained the information, chances are I wouldn't be asking it repetitively. I think a simulation particularly, if you do a case study (also an interesting teaching tool) They'll throw in curve balls, you have to think about the other side rather than your own tendencies or leanings, but when you read about something in a book – and congressional simulation is good example, and while they're all interesting, I came to the conclusion to not use any textbooks. Even the students who read it, very few students retain what they read about in the book. Some students come into the class with some level of knowledge of congress, some come with none. Even those who have knowledge, they still don't always recognize all the things that can go wrong. It's not a pure scenario- different personalities, different levels of intelligence, different willingness to study what you need to know – So it's very real, and it was proven last year, after spending a semester, they only passed one bill- very representative of what really happens in congress. Would they have really understood the difficulties in passing a bill in congress if they had just read about it? No – but they are a lot work, and lots of logistic issues.

3. Do you have any experience in using either data driven or role-playing simulations?

Sort of – I took a class some time ago in what is called “PARK” – Conflict Management. In the class you're given a scenario, you role-play as different individuals. There are certain rules you need to play by and have certain restraints. You are sometimes the role-player and in some instances you are observing – both scenarios are very informing, took away a lot more through the simulation than the writing and reading involved in the class. Role-playing is THE most beneficial in the learning.

4. Can you think of any simulations that have been particularly useful or surprising in their effectiveness?

PARK

5. Have you ever made a simulation?

6. What was it about?

7. Have you ever used a simulation?

Yes, the Congress class

8. Any that stand out as being terrific? As horrible?

I changed the class every semester, very major. Eliminated textbooks but let the TAs be part of the simulation creation. One of the things when you use TAs like I have, you give up control, not complete control – for a teacher, that’s a challenge. It’s worth the sacrifice, because it provides a positive experience for TAs who have risen to the challenge and students who have been challenged.

None of the classes have failed, but last year was the worst year and I think it was because of the quality of the TAs. I blame myself in picking the TAs and not being more on top of them. That’s why this semester I am more rigid about things. It made it clear to me how important it is to pick the right TAs.

I don’t feel like any of the simulations were a failure.

9. Any advice on how to avoid making a horrible simulation or how to ensure making a good one?

I don't know how to avoid badness, but the semester before it was offered, that TAs and I spent the entire summer reading at least 10 different books on congress, on the content. Understanding how congress operates. To try and reduce the chance of a failure, you have to know the content. The first year, I had terrific TAs. The Simulation needs to energize the students. It needs to give them enough information but not bore them. They don't want to listen to people lecture for 3 hours. Short snippets are good. Humor helps a lot where possible. The assignments have to be geared towards helping the students learn. Writing the profile is super helpful, force them to learn about whom they are representing and give them as many tools as you can to get that.

Run throughs are very helpful for simulation. Almost a simulation of the simulations. Once they recognize they can learn by doing, it's a good thing. Allow them the freedom of making mistakes.

10. How did you discover simulations, and have there been any changes in how they are perceived, used or seen as useful predictive and educational tools?

It depends on the class. It's hard to do simulation in a statistics class. I couldn't even tell you who uses it. I haven't heard a lot of them. A Simulation is a lot of work, so a lot of people don't use it. A lot of work for the TAs. It's a lot more work than standing up front and sending students home to do assignments.

Added workload it demands makes it not too used. That said, I love the energy from the class. For me, it's worth the extra effort because I think the extra energy because you can visually see them learning. You can feel their excitement and it's fun. Again, it has to be the appropriate class, but when it does, it's great.

Jeremy Schreifels 2/23/2011

1. Do you consider simulations to be valuable teaching tools?

Yes.

2. Why or why not?

Simulations are a nice complement to lectures/reading because they provide a safe, low-consequence environment for the students to put theory into practice. Simulations can also illustrate complex and/or abstract ideas that students may find difficult to comprehend from lectures/readings along.

In addition to their educational value, simulations can be a good tool to encourage team work/collaboration and 'break the ice'.

3. Do you have any experience in using either data driven or role-playing simulations?

Yes. I have used several data driven simulations in which the participants play the role of a power plant/company manager responsible for complying with environmental regulations.

4. Can you think of any simulations that have been particularly useful or surprising in their effectiveness?

Climate Change, Wildlife, and Wildlands Toolkit:
<http://epa.gov/climatechange/wycd/CCWKit.html>

Chevron Energyville: <http://www.willyoujoinus.com/energyville/>

SimCity

5. Have you ever made a simulation?

Yes.

6. What was it about?

There are three. All three are simulations about air pollution control policy; specifically, cap and trade programs. The participants take on the role of a power plant/company environmental manager and must make strategic decisions about how to meet consumers' demand for electricity while complying with government-established limits on pollution.

7. Have you ever participated in a simulation someone else had made?

Yes.

8. Are there any simulations you've been exposed to, participated in or created that stand out as particularly brilliant or terrible?

I would point back to the simulations I mentioned in Q4.

On the 'terrible' side, I have participated in many. I would say that those simulations have the following in common:

- **Inappropriate use of technology**
- **More flash than substance**
- **Technology problems (e.g., networking computers)**
- **Lack of feedback**
- **Missing the 'teachable moments' by either failing to build them in or passing over them**

9. Any advice on how to avoid making a horrible simulation or how to ensure making a good one?

Consider the objective, audience, and key lessons the audience should understand after playing the simulation. Then build the simulation around those lessons.

10. How did you discover simulations?

Graduate school.

11. In your opinion, has there been any change in how they are perceived, used or seen as useful predictive and educational tools?

No. I think simulations are viewed as a valuable learning tool. Harvard Business School has built an entire teaching model around case studies, which, on many levels, are a form of simulation.

Steve Harris 3/11/2011

1. Do you consider simulations to be valuable teaching tools?

Yes, I believe that simulations are valuable teaching tools.

2. Why or why not?

Simulation offers opportunities to provide realistic learning experiences with the ability to tailor the experiences to the learner and to control various factors to make for a focused learning experience. Human simulations, in particular, also allow learners to experience realistic interactions in a safe and controlled environment. The learner can learn by making mistakes without causing any harm. Human Simulations allow for feedback to the learner that is often not possible in “real life” situations.

3. Do you have any experience in using either data driven or role-playing simulations?

I have had many opportunities to learn using various types of simulations, both data driven and human driven. I have much more experience with live human simulations.

4. Can you think of any simulations that have been particularly useful in their effectiveness as teaching tools?

The simulations that I have engaged in (particularly the human simulations) have been among the most valuable learning experiences that I have had. It is particularly useful when simulations can be video recorder to allow the learner to observe him/her self.

5. Have you ever made a simulation?

I am the director of an education program which provides a wide variety of live human simulations to a number of different types of learners. I have spent the last 15 years creating and implementing human simulations.

6. What was it about?

The majority of the simulations that I create are with medical students and Residents using Standardized Patients. Most of these are simulations of patient/doctor interactions. I also create simulations for pre-service teachers and school leaders involving interactions between teachers and/or school leaders with simulated students, parents and colleagues. I also create simulations involving Chaplains interacting with patients and their families.

7. Have you ever participated in a simulation someone else had made? What was it about?

As part of my training and professional development I have participated in many simulations for the purpose of developing my skills in create realistic simulations of the type described above.

8. Are there any simulations you've been exposed to, participated in or created that stand out as particularly brilliant or terrible?

Simulations that do not seem realistic are always unproductive. I have had the opportunity to participate in many very successful and meaningful

simulations and feeling real is always a key component of a successful simulation.

One recent example that stands is a simulation I helped to create in which pediatric Residents had the opportunity to first interact with the parent of an injured child for the purpose of obtaining a history of the child's injury and then, after debriefing with faculty, interact with the same parent again to inform the parent that a child abuse investigation was being initiated due to the nature of the injuries. The learners were also required to make a simulated "hot line" call to report the suspected child abuse.

This simulation was complex and very realistic. It simulated very real interactions in a safe learning environment. The learners were provided with a great deal of feedback from their faculty, the participants in the simulations and themselves as they watch videos of their encounters.

9. Do you have any advice on how to avoid making a horrible simulation or how to ensure making a good one?

When creating a simulation I think that the most important thing is to ground the simulation in reality. In my experience with live simulations, I always try to develop scenarios that are based on actual "real life" experiences that I or others have had. By doing so it is much easier to create a simulation that will feel real to the learner thus making it a much more valuable learning tool. I also find it very important to pay very close attention to details. It can be the simplest little detail that can cause a simulation to fall apart because it loses its immediacy and "reality".

10. How did you discover simulations?

I have been exposed to simulations as a learner starting as an undergraduate student. I participated in many simulations as part of my graduate school program in counseling. I learned about the type of human simulations that I currently create attending a variety of workshops at conferences.

11. In your opinion, have there been any changes in how they are perceived, used or seen as useful predictive and educational tools?

In the field of Medical Education human simulations have become a major part of teaching and evaluating learners over the past 10-15 years. When I started doing this type of work, there was a lot of misunderstanding and mistrust of the value of simulations. Now Clinical Skills Exams involving standardized patients doing simulations with students are a requirement for graduation at many medical schools and for licensing for all physicians in the US.

James Snyder 4/5/2011

1. Do you consider simulations to be valuable teaching tools?

Yes – no question about it. Teaching can go far: they are great tools for developing individuals, testing procedures, and changing institutions.

2. Why or why not?

Simulations are for organizations what training and conditioning are for military units or sports teams. Simulations do two things primarily: they prepare individuals for their own reactions to a crisis scenario, and they allow organizations to experiment or change crisis procedures without the risk of an actual crisis. Without the preparation of a simulation, in a real crisis people focus too much on their reaction (usually a negative one). In a crisis, organizations tend to simply ignore procedures. Adverse reactions and procedures can badly affect responses to a real crisis. Simulations help hone individuals and organizations so they're the best prepared for when the real thing happens.

3. Do you have any experience in using either data driven or role-playing simulations?

Other than a Model United Nations conference more than 20 years ago and faking the media during a NATO simulations (see below and article attached), I don't think so.

4. Can you think of any simulations that have been particularly useful or surprising in their effectiveness?

I've worked on NATO's week-long Crisis Management Exercise (CMX) and observed a "workshop" for the North Atlantic Council, which takes a few hours. Both are well thought-out and reasonably realistic, but the CMX is far more elaborate – involving a dozen major scenarios, a major crisis, and dozens of minor events. I much prefer the CMX because the multiplicity of events gives it a verisimilitude, unpredictability and game play – the choice available to players – most matching reality.

5. Have you ever made a simulation?

I have played three simulations and helped build three simulations for a total of four planning cycles of the NATO CMX.

6. What was it about?

Two CMX scenarios involved a primary narrative of a United Nations peacekeeping mission under threat from an insurgent organization and the decision by NATO to support or relieve the UN mission. One CMX scenario involved an ongoing NATO peacekeeping operation also under insurgent attack. A third CMX involved a NATO Article V collective defense scenario. All of these scenarios involved many smaller "crises" to simulate and respond to – plane crashes, earthquakes, floods, riots, chemical spills and fires, terrorist attacks, and the like.

7. Have you ever participated in a simulation someone else had made?

I “played” in one CMX, observed one North Atlantic Council “workshop” involving a WMD scenario.

8. Are there any simulations you’ve been exposed to, participated in or created that stand out as particularly brilliant or terrible?

My first CMX was not particularly bad, but I worked with like-minded colleagues on the following scenario to improve its verisimilitude: a realistic media, terrorists that couldn’t see through walls and mount a dozen simultaneous attacks, etc. I find the media simulations in many simulations to be pedantic, when they need to mimic how the media will react given the circumstances of the crisis. This is a lot harder than it looks.

9. Any advice on how to avoid making a horrible simulation or how to ensure making a good one?

Verisimilitude above all. The simulation should look and feel as close to the real thing as possible. All material used in the simulation should mirror what is used in reality. That is especially true when scenarios are completely made up – fake target islands, fake terrorist organizations, etc – they should look, act and sound as close to what is familiar as possible, otherwise game players won’t suspend their disbelief long enough to take the game seriously. Also, they won’t be able to apply historical lessons to the simulation, which is a legitimate pedagogical goal of a simulation.

10. How did you discover simulations?

I represented Yemen in a Model United Nations crisis simulation more than 20 years ago (resolving the Iran-Iraq war, which really dates me), but professionally I was assigned to “play” in the 2006 NATO Crisis Management Exercise. I was of course aware of field exercises and table-top exercises and simulations but I had never participated. After playing, which I found interesting but slow-paced and unrealistic training, I volunteered to be part of the next cycle’s planning team.

11. In your opinion, have there been any changes in how they are perceived, used or seen as useful predictive and educational tools?

In the NATO universe there hasn’t been much change, only the split between the civilian and military sides that hasn’t been bridged. The military mindset is ingrained with the importance and utility of training and exercising, from tactical maneuvers and weapons skills to major maneuvers and table-top strategic simulations. They understand this, budget for it, and do it with enthusiasm. Civilians find exercising to be distractions from the “real” crises of their everyday. It’s a difficult mindset to crack – that simulations and exercising can help them train, improve their performance, and do their work better. In that way, perception hasn’t change much although only during my last CMX training cycle did I work with a colleague to come up with an “internal communications” plan to drum up support for and explain the purpose of the exercise. Hopefully the next person will pick up that idea and run with it next time.

Appendix II – Pretest

Please quantify your answers on a scale from 1 to 10. Circle 1 choice per question. (1 being totally incorrect and 10 being very correct).

1. I feel like I understand the long-term implications of developing energy policy in relation to conflicting interests of players and stakeholders.

1 2 3 4 5 6 7 8 9 10

2. I understand why difficulties and challenges exist when developing renewable energy policy.

1 2 3 4 5 6 7 8 9 10

3. I feel like I understand the challenges Ukraine faces when it comes to developing a national strategy for fulfilling its energy needs.

1 2 3 4 5 6 7 8 9 10

4. I can draw similarities between some of the challenges Ukraine faces in securing reliable energy with the challenges the United States faces.

1 2 3 4 5 6 7 8 9 10

5. I feel like I could have a fairly informed conversation with someone about Ukrainian Energy Policy.

1 2 3 4 5 6 7 8 9 10

6. I know the role of international organizations in determining the energy make-up of nations like Ukraine.

1 2 3 4 5 6 7 8 9 10

7. I understand why it is difficult for nations like Ukraine to transition their economies from conventional fuels to renewable or alternative forms of energy.

1 2 3 4 5 6 7 8 9 10

8. I understand the role of compromise and negotiation in shaping energy policy.

1 2 3 4 5 6 7 8 9 10

9. I understand the impacts of energy policy on the environment of a region.

1 2 3 4 5 6 7 8 9 10

10. I understand the social implications of energy policy on a region and within nations.

1 2 3 4 5 6 7 8 9 10

Appendix III - Postest

Please quantify your answers on a scale from 1 to 10. Circle 1 choice per question. (1 being totally incorrect and 10 being very correct).

1. I feel like I understand the long-term implications of developing energy policy in relation to conflicting interests of players and stakeholders.

1 2 3 4 5 6 7 8 9 10

2. I understand why difficulties and challenges exist when developing renewable energy policy.

1 2 3 4 5 6 7 8 9 10

3. I feel like I understand the challenges Ukraine faces when it comes to developing a national strategy for fulfilling its energy needs.

1 2 3 4 5 6 7 8 9 10

4. I can draw similarities between some of the challenges Ukraine faces in securing reliable energy with the challenges the United States faces.

1 2 3 4 5 6 7 8 9 10

5. I feel like I could have a fairly informed conversation with someone about Ukrainian Energy Policy.

1 2 3 4 5 6 7 8 9 10

6. I know the role of international organizations in determining the energy make-up of nations like Ukraine.

1 2 3 4 5 6 7 8 9 10

7. I understand why it is difficult for nations like Ukraine to transition their economies from conventional fuels to renewable or alternative forms of energy.

1 2 3 4 5 6 7 8 9 10

8. I understand the role of compromise and negotiation in shaping energy policy.

1 2 3 4 5 6 7 8 9 10

9. I understand the impacts of energy policy on the surrounding environment of a region.

1 2 3 4 5 6 7 8 9 10

10. I understand the social implications of energy policy on a region and within nations.

1 2 3 4 5 6 7 8 9 10

11. I feel that the simulation exercise helped me to gain useful perspectives on how energy policy is negotiated, developed and decided.

1 2 3 4 5 6 7 8 9 10

12. I felt that the simulation aspect made the overall experience more enjoyable than attending a lecture of similar length and intention.

1 2 3 4 5 6 7 8 9 10

13. I felt though the simulation was well developed.

1 2 3 4 5 6 7 8 9 10

14. I felt that the simulation allowed me to learn in different ways than I would have been able to if I was learning by reading a textbook or watching a presentation.

1 2 3 4 5 6 7 8 9 10

15. I would prefer learning material in the form of a structured simulation than a more common teaching method, such as a lecture or a test-based course.

1 2 3 4 5 6 7 8 9 10

16. I felt my participation in the simulation helped me to learn the material more rapidly.

1 2 3 4 5 6 7 8 9 10

17. I felt my participation in the simulation helped me to learn the material more thoroughly.

1 2 3 4 5 6 7 8 9 10

18. I actively participated in the simulation and was able to voice my interests.

1 2 3 4 5 6 7 8 9 10

Appendix IV – Simulation Materials – Roles

Conventional Energy Firms

The 2011 Ukrainian National Convention on Energy Policy (UNCE 2011)

Welcome to the 2011 Ukrainian National Convention on Energy Policy! You and 5 other representatives will take place in a negotiation to determine the future of energy policy in Ukraine. The results of this negotiation will be integrated into Ukrainian national policy and will affect the future of energy practices in Ukraine.

Your Role: Conventional Energy Firms

Conventional Energy Firms play a vital role in supplying Ukraine with the oil and natural gas it needs for its economy to function. A large network of pipelines runs through Ukraine – ferrying resources not only to domestic centers for refining and use, but to other countries in central and western Europe.⁹⁶ Ukraine is by far the most important country in transporting conventional resources from their source in Russia to the buyers in Western Europe, as 80% of Russia’s natural gas is transported through Ukraine¹.

Some of the firms or associations you are representing are:

-Naftogaz

-Gazprom

-Concern Galnaftogaz

-UkrTransNafta

You have been chosen by a coalition of Conventional Energy Firms. Your mission is to ensure that the outcomes of the negotiations do not severely damage your industry by placing unneeded regulations on energy production, providing unfair preference to certain industries such as renewable energy or by allowing non-market forces such as input from abroad to shape the market in a way that disadvantages you and your business.

Scoring

These negotiations will focus on four main topics that will be discussed by all six representatives. While these topics all involve Energy Policy in Ukraine, they will focus on different, specific issues. You have been assigned points values for each potential outcome of the discussions of each section. In these negotiations, there

⁹⁶ <http://www.thedeanegroup.com/Ogintro.html>

will be a limited number of choices to pick from – meaning that resolutions must entail only the choices provided. It is your job to make sure that the resolution favors the interests of the coalition of Conventional Energy Firmss who appointed you to represent them. Your goal is to get as high a score as possible. You also are not allowed to reveal your designated scores to any of the other members of the negotiation – though you can voice your preference of options at will.

Section 1 – Adherence to certain priorities in National programs and initiatives.

The government of Ukraine often contributes significantly to Domestic Energy projects and is responsible for negotiating international deals, agreements and practices with other foreign powers, such as Russia. In the coming decades, the Ukrainian national government will approach projects looking for approving, funding, loopholes or other incentives in a manner that reflects the agreed upon priorities put forward by the resolution of these negotiations. The following are options for groups of priorities (listed from most important to least).

Critically Important	Moderately Important	Mildly Important	Points Awarded
1. Affordability	Security	Sustainability	15 Points
2. Security	Affordability	Sustainability	10 Points
3. Sustainability	Security	Affordability	0 Points

Conventional Fuels like oil and natural gas are currently the economically cheapest solution to Ukraine’s energy needs. With expanding prospects both in the fields of national natural resource capabilities and output from foreign powers like Russia, it’s likely that conventional energy sources will continue to become more competitive as operations expand to accommodate growing demand and improvements in technology used to locate and access oil and natural gas. These prospects coupled with growing political unrest in other oil and gas producing regions could dramatically improve the profitability of conventional fuels as this region remains stable and open for business. Persuading the government to choose ‘Affordability’ as the main priority would be conducive to the continued use of cheap fossil fuels, thereby ensuring Ukraine’s continued dependence on your resources for economic activity.⁹⁷

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Section 2 – Establishment of a Renewable Energy Consumption Goal

The Ukrainian government is very goal oriented when it comes to making Energy policy. Large amounts of resources are used to ensure that expectations and needed output are met for both nuclear and conventional fuel sources.

Establishing a goal for renewable energy resources would allow the government to pursue an active approach to including, subsidizing and encouraging renewable energy's share of the national consumption in its energy plan. Benefits associated with this include mapping locations for new plants, tax allowances to qualified firms and grants and loans designed to encourage growth in compliance with government regulations. The following choices are based on the year 2030 for goals.

- | | |
|---|--------------------|
| <u>1. Establish no goal for Renewable Energy</u> | <u>(25 points)</u> |
| <u>2. Establish a 20% goal for Renewable Energy</u> | <u>(10 points)</u> |
| <u>3. Establish a 30% goal for Renewable Energy</u> | <u>(5 points)</u> |
| <u>4. Establish a 50% goal for Renewable Energy</u> | <u>(0 points)</u> |

Establishing a goal for renewable energy's share in Ukraine's energy market goes directly against your interests, which are to secure as much of the market for the firms you represent as possible. Your preference is that no renewable energy goal be established, with higher goals being more adverse to your overall preferences.
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Section 3 – International Projects and Development

International organizations, agencies and institutions play a large role in fostering development of energy growth and stability in Ukraine. These institutions lend not only money, but expertise and precedent to the economy and energy make-up of Ukraine, often making their impacts long lasting and meaningful. Some of these institutions are globally based, such as UNDP while others are more regionally specific, like institutions involving the EU (TEN-E) or the US (USAID). Providing an environment friendly to outside projects and input helps encourage more international projects, while placing national regulations on projects makes it more difficult for international institutions to influence or support national projects.

⁹⁸ <http://www.gazprom.com/press/news/2011/march/article110398/>

1. Plan no changes to current system (10 points)

2. Remove existing Barriers (5 points)

3. Establish new regulations to international projects and development (20 points)

Many projects from international organizations are directed at forms of non-conventional energy. These projects have the potential to encourage firms that compete with you for market share. Your supervisors find this unfair, as the preference of support and assistance has been directed away from you by the international community. Your preference lies with establishing reasonable regulations that would prevent international organizations from adding unfair resources into Ukraine's energy market, which in your mind, violate the market's ability to function properly.

Section 4 – Ratification of the Rio Protocol

Last month, an international conference involving high-ranking representatives and heads of state was held in Rio de Janeiro, Brazil. The conference was held to determine a multi-lateral solution to anthropogenic climate change forces. The result of this conference was an establishment of the Rio Protocol – which calls for: “A proportional reduction in identified greenhouse gases and other anthropogenic factors contributing to global climate change”. In this sense of the word, ‘proportional’ refers to the amount of input each nation-state has to the climate system. Effectively, the protocol is an agreement to take steps in reducing greenhouse gas emissions and that wealthier nations that have contributed to more to the net greenhouse gas budget will do more to reduce their own emissions and the emissions of developing countries.

The choices for ratifying, or putting into effect, this protocol are:

1. Introduce protocol for ratification next year (0 points)

2. Introduce protocol for ratification in 3-5 years (10 points)

3. Introduce protocol for ratification in 6-10 years (25 points)

4. Delaying ratification of the protocol for 11+ years. (40 points)

Your preference is that any protocol requiring a reduction in greenhouse gas emissions never be passed. As such, you would like to delay the introduction of the Rio Protocol for as long as possible. Even though ratifying the protocol is bad regardless of the timescale, your colleagues have placed a very high priority on this particular decision, as it will affect your industry enormously should it come to pass. Your assets and investments lie in resources that produce greenhouse

gases as a by-product of energy generation. Were this protocol ratified, it might mean a forced reduction in your economic activity, which could potentially force you to downscale or go out of business.

Score Sheet

Section 1 – National Investment Priorities __15__

Choices – Priorities of Investment

1. Affordability, Security, Sustainability __15__

2. Security, Affordability, Sustainability __10__

3. Sustainability, Security, Affordability __0__

Section 2 – National Renewable Energy Goal for 2030 Total Possible __25__

Choices – Percentage of Total Energy Use

1. No National Goal __25__

2. Goal of 20% by 2030 __10__

3. Goal of 30% by 2030 __5__

4. Goal of 50% by 2030 __0__

Section 3 – International Initiatives and Projects Total Possible __20__

Choices –incentives or restrictions on International Renewable Energy Projects

1. Plan for no change in the current system __10__

2. Remove or Lessen Barriers for International Projects __5__

3. Establish Regulations to protect existing Domestic Interest __20__

Section 4 – Ratification of the Rio Protocol Total Possible: __40__

Choices – Timeline for ratification of the Rio Protocol

1. Move to ratify Rio Protocol next year __0__

2. Ratify Rio Protocol within 3-5 years __10__

3. Ratify Rio Protocol within 6-10 years __25__

4. Delay Ratification for 11+ years __40__

Total Points Earned: _____

Total Needed for Agreement: __50__

Energoatom

The 2011 Ukrainian National Convention on Energy Policy (UNCE 2011)
Welcome to the 2011 Ukrainian Convention on Energy Policy! You and 5 other representatives will take place in a negotiation to determine the future of energy policy in Ukraine. The results of this negotiation will be integrated into Ukrainian national policy and will affect the future of energy practices in Ukraine.

Your Role: Energoatom

Energoatom, the Ukrainian National Nuclear Power Utility, supplies nearly half of all of Ukraine's electricity and is the 2nd highest contributor in total energy supply. This is largely because of an organized and concerted effort on behalf of the Ukrainian government to support and fund large-scale nuclear projects in Ukraine in order to achieve the nation's energy needs.

You have been chosen by the leadership of Energoatom to represent the utility and its interests in the UNCE 2011. Your goal is to ensure that the direction for energy policy established through the negotiations ensure a continued commitment to Energoatom and the Nuclear power industry within Ukraine. There are 22 new and replacement reactors planned to maintain nuclear power's share in Ukraine's energy market and dramatic shifts in the national energy strategy could prove devastating for the vital and successful nuclear industry.⁹⁹

Scoring

These negotiations will focus on four main topics that will be discussed by all six representatives. While these topics all involve Energy Policy in Ukraine, they will focus on different, specific issues. You have been assigned points values for each potential outcome of the discussions of each section. In these negotiations, there will be a limited number of choices to pick from – meaning that resolutions must entail only the choices provided. It is your job to make sure that the resolution favors the interests of the nuclear power industry within Ukraine. Your goal is to get as high a score as possible. You also are not allowed to reveal your designated

⁹⁹ http://www.energoatom.kiev.ua/en/index_eng.htm

scores to any of the other members of the negotiation – though you can voice your preference of options at will.

Section 1 – Adherence to certain priorities in National programs and initiatives.

The government of Ukraine often contributes significantly to Domestic Energy projects and is responsible for negotiating international deals, agreements and practices with other foreign powers, such as Russia. In the coming decades, the Ukrainian national government will approach projects looking for approving, funding, loopholes or other incentives in a manner that reflects the agreed upon priorities put forward by the resolution of these negotiations. The following are options for groups of priorities (listed from most important to least).

Critically Important Awarded	Moderately Important	Mildly Important	Points
<u>1. Affordability</u>	<u>Security</u>	<u>Sustainability</u>	<u>20 Points</u>
<u>2. Security</u>	<u>Affordability</u>	<u>Sustainability</u>	<u>25 Points</u>
<u>3. Sustainability</u>	<u>Security</u>	<u>Affordability</u>	<u>10 Points</u>

Since the numerous reforms in the nuclear industry after the explosion at the Chernobyl Nuclear facility, nuclear power has proven to be a cost-effective, innovative and safe way of producing a massive amount of energy for industrial and commercial purposes. The Nuclear industry has benefited not only from long term planning to ensure the economic sensibility of infrastructure improvements, but from a desire for secure energy which would be controlled and produced in-country, rather than in a foreign power. Nuclear power has proven to be an affordable and reliable way to meet the energy needs of the country. To this end, priorities involving security and affordability are more preferred than those placing sustainability as the primary concern.

Section 2 – Establishment of a Renewable Energy Consumption Goal

The Ukrainian government is very goal oriented when it comes to making Energy policy. Large amounts of resources are used to ensure that expectations and needed output are met for both nuclear and conventional fuel sources.

Establishing a goal for renewable energy resources would allow the government to pursue an active approach to including, subsidizing and encouraging renewable energy's share of the national consumption in its energy plan. Benefits associated with this include mapping locations for new plants, tax allowances to qualified firms and grants and loans designed to encourage growth in compliance with government regulations. The following choices are based on the year 2030 for goals.

- | | |
|---|--------------------|
| <u>1. Establish no goal for Renewable Energy</u> | <u>(30 points)</u> |
| <u>2. Establish a 20% goal for Renewable Energy</u> | <u>(20 points)</u> |

3. Establish a 30% goal for Renewable Energy (8 points)
4. Establish a 50% goal for Renewable Energy (5 points)

Establishing a renewable energy goal directly conflicts with your interests, as your share of the energy market is due largely in part to decisions and investment on behalf of the government to ensure a meaningful role of your industry in powering the nation's economy. That said, the percent share gained by the renewable energy industry could come from conventional energy resources – as recent gas-related events have largely soured public opinion towards importing large amounts of conventional fuel from sources subject to economic or political unreliability.¹⁰⁰

Section 3 – International Projects and Development

International organizations, agencies and institutions play a large role in fostering development of energy growth and stability in Ukraine. These institutions lend not only money, but expertise and precedent to the economy and energy make-up of Ukraine, often making their impacts long lasting and meaningful. Some of these institutions are globally based, such as UNDP while others are more regionally specific, like institutions involving the EU (TEN-E) or the US (USAID). Providing an environment friendly to outside projects and input helps encourage more international projects, while placing national regulations on projects makes it more difficult for international institutions to influence or support national projects.

1. Plan no changes to current system (25 points)
2. Remove existing Barriers (5 points)
3. Establish new regulations to international projects and development (30 points)

The current system of regulating domestic and internationally based projects is working in the favor of the nuclear power industry. You receive improved technology and assistance from the IAEA and have helped reduce greenhouse gas emissions by using a relatively carbon-free resource. That said, an increase in renewable energy based projects could lead to competition with your share of market. Your preference is that the system remain as it is, or better yet, be reformed to prevent unneeded influx of resources into energy sources other than your own.

Section 4 – Ratification of the Rio Protocol

Last month, an international conference involving high-ranking representatives and heads of state was held in Rio de Janeiro, Brazil. The conference was held to determine a multi-lateral solution to anthropogenic climate change forces. The

¹⁰⁰ <http://www.world-nuclear.org/info/inf46.html>

result of this conference was an establishment of the Rio Protocol – which calls for: “A proportional reduction in identified greenhouse gases and other anthropogenic factors contributing to global climate change”. In this sense of the word, ‘proportional’ refers to the amount of input each nation-state has to the climate system. Effectively, the protocol is an agreement to take steps in reducing greenhouse gas emissions and that wealthier nations that have contributed to more to the net greenhouse gas budget will do more to reduce their own emissions and the emissions of developing countries.

The choices for ratifying, or putting into effect, this protocol are:

- | | |
|--|--------------------|
| <u>1. Introduce protocol for ratification next year</u> | <u>(0 points)</u> |
| <u>2. Introduce protocol for ratification in 3-5 years</u> | <u>(5 points)</u> |
| <u>3. Introduce protocol for ratification in 6-10 years</u> | <u>(10 points)</u> |
| <u>4. Delaying ratification of the protocol for 11+ years.</u> | <u>(15 points)</u> |

Although nuclear power is an available option for producing relatively carbon-light energy, it has not traditionally been seen as the primary solution for reducing emissions. Additionally, your superiors feel that the ratification of an international agreement to reduce emissions could lead to, among other things, new environmental agreements that could potentially threaten the use of nuclear power as a long-term, competitive source of energy.

Score Sheet

Section 1 – National Investment Priorities	<u>25</u>
Choices – Priorities of Investment	
1. Affordability, Security, Sustainability	<u>20</u>
2. Security, Affordability, Sustainability	<u>25</u>
3. Sustainability, Security, Affordability	<u>10</u>
Section 2 – National Renewable Energy Goal for 2030	Total Possible <u>30</u>
Choices – Percentage of Total Energy Use	
1. No National Goal	<u>30</u>
2. Goal of 20% by 2030	<u>20</u>
3. Goal of 30% by 2030	<u>8</u>
4. Goal of 50% by 2030	<u>5</u>
Section 3 – International Initiatives and Projects	Total Possible <u>30</u>
Choices –incentives or restrictions on International Renewable Energy Projects	
1. Plan for no change in the current system	<u>25</u>

- | | |
|---|------|
| 2. Remove or Lessen Barriers for International Projects | _5_ |
| 3. Establish Regulations to protect existing Domestic Interests | _30_ |

Section 4 – Ratification of the Rio Protocol Total Possible: 15
 Choices – Timeline for ratification of the Rio Protocol

- | | |
|--|------|
| 1. Move to ratify Rio Protocol next year | _0_ |
| 2. Ratify Rio Protocol within 3-5 years | _5_ |
| 3. Ratify Rio Protocol within 6-10 years | _10_ |
| 4. Delay Ratification for 11+ years | _15_ |

Total Points Earned: _____

Total Needed for Agreement: 35

Non-Governmental Organizations

The 2011 Ukrainian National Convention on Energy Policy (UNCE 2011)

Welcome to the 2011 Ukrainian National Convention on Energy Policy! You and 5 other representatives will take place in a negotiation to determine the future of energy policy in Ukraine. The results of this negotiation will be integrated into Ukrainian national policy and will affect the future of energy practices in Ukraine.

Your Role: National NGOs

Non-governmental organizations (NGOs) play a vital role in developing solutions to societal problems, representing the ideals and opinions of their members and contributing ideas, expertise and resources to strategies that will push their own goals in both government and in practices of the private sector. Ukraine has a number of influential and dedicated NGOs – some of which are primarily concerned with the protection of the Environment within Ukraine.¹⁰¹

Some examples of Ukrainian Environmental NGOs are:

- MAMA-86 – A Ukrainian NGO that has numerous of local offices and projects within Ukraine
- The “All-Ukrainian Environmental League”
- Ukrainian Society for Environment Protection
- International Charitable Organization “Environment-People-Law”
- Ukrainian Environmental Association "Zelenyi Svit" (Green World),
- All-Ukrainian NGO "Chysta Khvylya" (Clean Wave) and

¹⁰¹ http://rac.org.ua/fileadmin/user_upload/publications/Espoo_Guide_ENG_web.pdf

-The National Environmental Center of Ukraine

You have been chosen by a coalition of Ukrainian Environmental NGOs to represent the interests of improving Ukrainian national policy in the vein of enhancing environmental protection, national sovereignty and public participation in policy-making domestically and abroad. With this representation comes the responsibility of representing the members of these NGOs which, generally, are interested in improving governmental involvement in environmental protection and supporting initiatives that will improve Ukraine's economy and environment.^{102 103}

Scoring

These negotiations will focus on four main topics that will be discussed by all six representatives. While these topics all involve Energy Policy in Ukraine, they will focus on different, specific issues. You have been assigned points values for each potential outcome of the discussions of each section. In these negotiations, there will be a limited number of choices to pick from – meaning that resolutions must entail only the choices provided. It is your job to make sure that the resolution favors the interests of the coalition of NGOs who appointed you to represent them. Your goal is to get as high a score as possible. You also are not allowed to reveal your designated scores to any of the other members of the negotiation – though you can voice your preference of options at will.

Section 1 – Adherence to certain priorities in National programs and initiatives.

The government of Ukraine often contributes significantly to Domestic Energy projects and is responsible for negotiating international deals, agreements and practices with other foreign powers, such as Russia. In the coming decades, the Ukrainian national government will approach projects looking for approving, funding, loopholes or other incentives in a manner that reflects the agreed upon priorities put forward by the resolution of these negotiations. The following are options for groups of priorities (listed from most important to least).

Critically Important	Moderately Important	Mildly Important	Points Awarded
1. Affordability	Security	Sustainability	8 Points

¹⁰² http://www.mama-86.org.ua/archive/main/about_e.htm

¹⁰³

http://www.irf.ua/index.php?option=com_content&view=article&id=29622:ukraines-environmental-ngos-expressed-their-concern-regarding-the-process-of-elaboration-of-the-national-environmental-policy-strategy&catid=82:news-euro-en&Itemid=57

2. Security	Affordability	Sustainability	8 Points
3. Sustainability	Security	Affordability	10 Points

Although you would like the Ukrainian Government to adhere support policy that adheres to sustainability guidelines, you are less concerned with internal decision-making functions of the government than you are with allowing the voice of the public to be heard and translated into specific environmental decisions. As a result, you favor choice three, but don't have a high priority in this section.

Section 2 – Establishment of a Renewable Energy Consumption Goal

The Ukrainian government is very goal oriented when it comes to making Energy policy. Large amounts of resources are used to ensure that expectations and needed output are met for both nuclear and conventional fuel sources.

Establishing a goal for renewable energy resources would allow the government to pursue an active approach to including, subsidizing and encouraging renewable energy's share of the national consumption in its energy plan. Benefits associated with this include mapping locations for new plants, tax allowances to qualified firms and grants and loans designed to encourage growth in compliance with government regulations. The following choices are based on the year 2030 for goals.

- | | |
|--|-------------|
| 1. Establish no goal for Renewable Energy | (0 points) |
| 2. Establish a 20% goal for Renewable Energy | (15 points) |
| 3. Establish a 30% goal for Renewable Energy | (30 points) |
| 4. Establish a 50% goal for Renewable Energy | (10 points) |

While the establishment of an ambitious renewable energy goal is good for the promotion of environmentally friendly practices, a goal of 50% would be not only too ambitious and likely to fail, but might cause a good deal of environmental degradation because of the amount of rapid development that would need to take place in order to meet it. To avoid failure of meeting an unlikely goal and causing environmental or market failure, 30% is the ideal choice for a goal.¹⁰⁴¹⁰⁵

Section 3 – International Projects and Development

International organizations, agencies and institutions play a large role in fostering development of energy growth and stability in Ukraine. These institutions lend not only money, but expertise and precedent to the economy and energy make-up of Ukraine, often making their impacts long lasting and meaningful. Some of these institutions are globally based, such as UNDP while others are more regionally specific, like institutions involving the EU (TEN-E) or the US

¹⁰⁴ <http://www.rea.org.ua/pdf/vis50e.pdf>

¹⁰⁵ http://www.inforse.org/europe/pdfs/VisionUA_ppt.pdf

(USAID). Providing an environment friendly to outside projects and input helps encourage more international projects, while placing national regulations on projects makes it more difficult for international institutions to influence or support national projects.

The regulation process for international projects currently provides for environmental consideration under the direction of the European Bank for Reconstruction and Development. These environmental regulations, when applied to international investment in domestic energy projects, protect the health of the environment, but also encourage a steady amount of investment in energy – with an emphasis on renewable energy. Currently, the system is helping both oversee investment projects and safeguard the environment. A dramatic increase in restrictions might lead to less investment in renewable energy projects, while a dramatic decrease might lead to more projects, but with fewer environmental considerations.¹⁰⁶

1. Plan no changes to current system (15 points)
2. Remove existing Barriers (10 points)
3. Establish new regulations to international projects and development(5 points)

As a representative of Ukrainian NGOs, you favor international projects in the sense that they have the potential to help to both projects favorable to environmental protection and social progress, but they can also act as sources economic competition for existing business and economic activity. As a result, you favor maintaining the current system, but don't want to remove barriers as it may lead to an influx of non-regulated.

Section 4 – Ratification of the Rio Protocol

Last month, an international conference involving high-ranking representatives and heads of state was held in Rio de Janeiro, Brazil. The conference was held to determine a multi-lateral solution to anthropogenic climate change forces. The result of this conference was an establishment of the Rio Protocol – which calls for: “A proportional reduction in identified greenhouse gases and other anthropogenic factors contributing to global climate change”. In this sense of the word, ‘proportional’ refers to the amount of input each nation-state has to the climate system. Effectively, the protocol is an agreement to take steps in reducing greenhouse gas emissions and that wealthier nations that have contributed to more to the net greenhouse gas budget will do more to reduce their own emissions and the emissions of developing countries.

The choices for ratifying, or putting into effect, this protocol are:

1. Introduce protocol for ratification next year (30 points)
2. Introduce protocol for ratification in 3-5 years (20 points)

¹⁰⁶ <http://helsinki.org.ua/en/index.php?id=1274199871>

3. Introduce protocol for ratification in 6-10 years (5 points)
 4. Delaying ratification of the protocol for 11+ years. (0 points)

Your top choice is to have the Rio Protocol ratified as soon as possible, as it will mandate government action in lowering climate-warming gases, and will introduce Ukraine as a pioneer of global environmental protection. The sooner the Rio Protocol is ratified, the better, as fluctuations in governmental agenda and priorities might cause the ratification to fall off of the national agenda.

Score Sheet

Section 1 – National Investment Priorities Total Possible: 10
 Choices – Priorities of Investment

1. Affordability, Security, Sustainability 8
 2. Security, Affordability, Sustainability 8
 3. Sustainability, Security, Affordability 10

Section 2 – National Renewable Energy Goal for 2030 Total Possible: 10
 Choices – Percentage of Total Energy Use

1. No National Goal 0
 2. Goal of 20% by 2030 15
 3. Goal of 30% by 2030 30
 4. Goal of 50% by 2030 10

Section 3 – International Initiatives and Projects Total Possible: 15
 Choices –incentives or restrictions on International Renewable Energy Projects

1. Plan for no change in the current system 15
 2. Remove or Lessen Barriers for International Projects 10
 3. Establish Regulations to protect existing Domestic Interests 5

Section 4 – Ratification of the Rio Protocol Total Possible: 30
 Choices – Timeline for ratification of the Rio Protocol

1. Move to ratify Rio Protocol next year 30
 2. Ratify Rio Protocol within 3-5 years 20
 3. Ratify Rio Protocol within 6-10 years 5
 4. Delay Ratification for 11+ years 0

Subtotal of Points Earned: _____

Points gained for Agreement (+20)

Total Points Earned: _____

Total Needed for Agreement: 30

Renewable Energy Firms

The 2011 Ukrainian National Convention on Energy Policy (UNCE 2011)

Welcome to the 2011 Ukrainian Convention on Energy Policy! You and 5 other representatives will take place in a negotiation to determine the future of energy policy in Ukraine. The results of this negotiation will be integrated into Ukrainian national policy and will affect the future of energy practices in Ukraine.

Your Role: Renewable Energy Firms

Renewable energy firms are looking to use UNCE 2011 as a way to help access an energy market that has been traditionally reserved for nuclear energy and conventional fuel sources such as oil and natural gas. Because of the seemingly unbreakable holds that conventional energy firms have over the Ukrainian market, it has been difficult for companies marketing wind, solar, or geothermal power to capture enough business to remain competitive. This difficulty is partly due to governmental preference and attention to conventional energy sources as a way to feed the nation's demand for cheap, reliable energy.

Recently, however, events like the 'Gas war' of 2008-09 have shown the external risks of relying on foreign nations to supply the lifeblood of your nation's industries. Indeed, the people and economy of your nation suffered tremendous losses when their access to gas was shut off because of political conflicts with Russia. You are looking to use events like these and an increasing global trend towards renewable energy to your advantage as you attempt to secure a healthy amount of the Ukrainian energy market.

You have been chosen by an assembly of renewable energy firms to be the spokesperson of the fledgling industry. The objectives entrusted to you by your colleagues are to secure commitments from the government to assist in the growth of renewable energy and to help negotiate aspects of a national strategy that will directly or indirectly shape Ukraine's energy market into one that will be conducive to supply and demand of large quantities of energy supplied by domestic renewable energy firms.¹⁰⁷

Some Major Firms or Industry Groups you are representing are:

- Ukrainian Wind Energy Association

¹⁰⁷ http://www.posharp.com/renewable-energy-product-companies-in-ukraine_renewable.aspx?gtype=country_UA

- SintSolar Odessa
- Technotrade
- JSC Kvazar
- UkrWindEnergo

Scoring

These negotiations will focus on four main topics that will be discussed by all six representatives. While these topics all involve Energy Policy in Ukraine, they will focus on different, specific issues. You have been assigned points values for each potential outcome of the discussions of each section. In these negotiations, there will be a limited number of choices to pick from – meaning that resolutions must entail only the choices provided. It is your job to make sure that the resolution favors the interests of the assembly of renewable energy firms who elected you to represent them. Your goal is to get as high a score as possible. You also are not allowed to reveal your designated scores to any of the other members of the negotiation – though you can voice your preference of options at will.

Section 1 – Adherence to certain priorities in National programs and initiatives.

The government of Ukraine often contributes significantly to Domestic Energy projects and is responsible for negotiating international deals, agreements and practices with other foreign powers, such as Russia. In the coming decades, the Ukrainian national government will approach projects looking for approving, funding, loopholes or other incentives in a manner that reflects the agreed upon priorities put forward by the resolution of these negotiations. The following are options for groups of priorities (listed from most important to least).¹⁰⁸

Critically Important	Moderately Important	Mildly Important	Points Awarded
1. Affordability	Security	Sustainability	5 Points
2. Security	Affordability	Sustainability	10 Points
3. Sustainability	Security	Affordability	15 Points

In your view, the Ukrainian Government has been giving preferential treatment to both conventional energy firms and the nuclear energy utility since the dissolution of the Soviet Union. As a result, these sectors have a practical grip on the energy market, making it very difficult for yet-unestablished firms to enter it competitively. Your goal is to encourage a switch from treating energy policy with a narrow focus on the financial bottom line to a longer-term interest in promoting sustainable growth. Such a switch would result in more attention and resources directed towards renewable energy firms like the ones you represent. One reason you feel that incorporating sustainability into the national energy priorities is the inherent security that comes from having nationally based sources

¹⁰⁸ http://www.uwea.com.ua/ukraine_wind.php

of energy rather than relying on foreign powers to supply the energy your national economy requires to function.

Section 2 – Establishment of a Renewable Energy Consumption Goal(30 points)

The Ukrainian government is very goal oriented when it comes to making Energy policy. Large amounts of resources are used to ensure that expectations and needed output are met for both nuclear and conventional fuel sources.

Establishing a goal for renewable energy resources would allow the government to pursue an active approach to including, subsidizing and encouraging renewable energy's share of the national consumption in its energy plan. Benefits associated with this include mapping locations for new plants, tax allowances to qualified firms and grants and loans designed to encourage growth in compliance with government regulations. The following choices are based on the year 2030 for goals.

- | | |
|--|-------------|
| 1. Establish no goal for Renewable Energy | (0 points) |
| 2. Establish a 20% goal for Renewable Energy | (10 points) |
| 3. Establish a 30% goal for Renewable Energy | (15 points) |
| 4. Establish a 50% goal for Renewable Energy | (30 points) |

If the Ukrainian Government were to make a pledge to meet a certain %-goal of renewable energy, it is likely that a great deal of support and resources would be directed towards renewable energy firms. Simply put, you'd like for renewable energy to be as large a piece of Ukrainian Energy policy as possible.

Section 3 – International Projects and Development

International organizations, agencies and institutions play a large role in fostering development of energy growth and stability in Ukraine. These institutions lend not only money, but expertise and technical assistance to the economy and energy make-up of Ukraine, often making their impacts long lasting and meaningful. Some of these institutions are globally based, such as UNDP while others are more regionally specific, like institutions involving the EU (TEN-E) or the US (USAID). Providing an environment friendly to outside projects and input helps encourage more international projects, while placing national regulations on projects makes it more difficult for international institutions to influence or support national projects.

- | | |
|--|-------------|
| 1. Plan no changes to current system | (15 points) |
| 2. Remove existing Barriers | (20 points) |
| 3. Establish new regulations to international projects and development | (5 points) |

International bodies often assist in providing technical assistance, advice and funding to upcoming projects or firms. As you have a good chance of being the recipient of environmentally motivated programs, you would like international

groups such as UNEP, The World Bank and USAID to have as much freedom to contribute to your success as possible. An added bonus of increased involvement of international institutions is that some of the programs would compete directly with established national industries –perhaps allowing you an opportunity to become competitive as a result of this assistance.

Section 4 – Ratification of the Rio Protocol

Last month, an international conference involving high-ranking representatives and heads of state was held in Rio de Janeiro, Brazil. The conference was held to determine a multi-lateral solution to anthropogenic climate change forces. The result of this conference was an establishment of the Rio Protocol – which calls for: “A proportional reduction in identified greenhouse gases and other anthropogenic factors contributing to global climate change”. In this sense of the word, ‘proportional’ refers to the amount of input each nation-state has to the climate system. Effectively, the protocol is an agreement to take steps in reducing greenhouse gas emissions and that wealthier nations that have contributed to more to the net greenhouse gas budget will do more to reduce their own emissions and the emissions of developing countries.

The choices for ratifying, or putting into effect, this protocol are:

- | | |
|---|-------------|
| 1. Introduce protocol for ratification next year | (35 points) |
| 2. Introduce protocol for ratification in 3-5 years | (30 points) |
| 3. Introduce protocol for ratification in 6-10 years | (10 points) |
| 4. Delaying ratification of the protocol for 11+ years. | (5 points) |

The more emphasis that the nation and its government puts on reducing greenhouse gas emissions, the more renewable / clean energy it is likely to need. As such, you would like to have the Rio Protocol introduced for ratification as soon as possible.

Score Sheet

Section 1 – National Investment Priorities __15__

Choices – Priorities of Investment

- | | |
|--|--------------|
| 1. Affordability, Security, Sustainability | <u> 5 </u> |
| 2. Security, Affordability, Sustainability | <u> 10 </u> |
| 3. Sustainability, Security, Affordability | <u> 15 </u> |

Section 2 – National Renewable Energy Goal for 2030 Total Possible __30__

Choices – Percentage of Total Energy Use

- | | |
|------------------------|--------------|
| 1. No National Goal | <u> 0 </u> |
| 2. Goal of 20% by 2030 | <u> 10 </u> |
| 3. Goal of 30% by 2030 | <u> 15 </u> |

4. Goal of 50% by 2030 __30__

Section 3 – International Initiatives and Projects Total Possible __20__
 Choices –incentives or restrictions on International Renewable Energy Projects

- | | |
|---|--------|
| 1. Plan for no change in the current system | __15__ |
| 2. Remove or Lessen Barriers for International Projects | __20__ |
| 3. Establish Regulations to protect existing Domestic Interests | __5__ |

Section 4 – Ratification of the Rio Protocol Total Possible: __35__
 Choices – Timeline for ratification of the Rio Protocol

- | | |
|--|--------|
| 1. Move to ratify Rio Protocol next year | __35__ |
| 2. Ratify Rio Protocol within 3-5 years | __30__ |
| 3. Ratify Rio Protocol within 6-10 years | __10__ |
| 4. Delay Ratification for 11+ years | __5__ |

Total Points Earned: _____

Total Needed for Agreement: ____45____

Ukrainian Government

The 2011 Ukrainian National Convention on Energy Policy (UNCE 2011)

Welcome to the 2011 Ukrainian National Convention on Energy Policy! You and 5 other representatives will take place in a negotiation to determine the future of energy policy in Ukraine. The results of this negotiation will be integrated into Ukrainian national policy and will affect the future of energy practices in Ukraine.

Your Role: Ukrainian Government

The Ukrainian Government takes an active stance in ensuring the energy needs of its population is met. As many projects involving oil and gas pipelines, nuclear power, hydro power and other forms of renewable energy require cooperation between nations, the Ukrainian government is well situated to outline its strategies for meeting energy needs. Defining the stance of the national government will better help to set a national energy agenda and establish guidelines of cooperation between the government and the private industries that are looking to establish themselves in Ukraine.¹⁰⁹

¹⁰⁹

You have been chosen by a Governmental Panel including the President of Ukraine (Viktor Yanukovich) and the Ukrainian Prime Minister (Yulia Tymoshenko) to represent the national government in negotiations for UNCE 2011.

Scoring

These negotiations will focus on four main topics that will be discussed by all six representatives. While these topics all involve Energy Policy in Ukraine, they will focus on different, specific issues. You have been assigned points values for each potential outcome of the discussions of each section. In these negotiations, there will be a limited number of choices to pick from – meaning that resolutions must entail only the choices provided.

It is your job to make sure that the resolution outlines reasonable strategies towards ensuring the meeting your nation's energy needs as well as to ensure the practicality of the solutions discussed. One important outcome of the negotiations is that the measures decided on not be outside of the realm of possibility – as your superiors would like the nation to be able to meet decided-upon goals in an attempt to reassure credibility within the Ukrainian people. This aspect of your consideration will be represented in the scores your superiors have assigned to each outcome.

Although you do have established preferences for outcomes of the negotiations, your primary concern is that the negotiations conclude in having reached a successful outcome – rather than with sections that have not been addressed or agreed upon. You are very concerned with reaching some sort of agreement by the end of the negotiations. As such, you may want to fill the role of a supportive facilitator in order to reach agreements between opposing parties.

Section 1 – Adherence to certain priorities in National programs and initiatives.

The government of Ukraine often contributes significantly to Domestic Energy projects and is responsible for negotiating international deals, agreements and practices with other foreign powers, such as Russia. In the coming decades, the Ukrainian national government will approach projects looking for approving, funding, loopholes or other incentives in a manner that reflects the agreed upon priorities put forward by the resolution of these negotiations. The following are options for groups of priorities (listed from most important to least).

Critically Important	Moderately Important	Mildly Important	Points Awarded
1. Affordability	Security	Sustainability	10 Points
2. Security	Affordability	Sustainability	10 Points
3. Sustainability	Security	Affordability	8 Points

While each of the three listed values is important to the national government, the consideration of available resources trumps your desire to be seen as environmentally conscious. This is particularly true given the recent background of slow economic growth both domestically and around the world. With respect to your populace, stability and security are also very highly valued and demanded, and as such, outrank sustainability in your choice of preferences.

Section 2 – Establishment of a Renewable Energy Consumption Goal (30 points)

The Ukrainian government is very goal oriented when it comes to making Energy policy. Large amounts of resources are used to ensure that expectations and needed output are met for both nuclear and conventional fuel sources.

Establishing a goal for renewable energy resources would allow the government to pursue an active approach to including, subsidizing and encouraging renewable energy's share of the national consumption in its energy plan. Benefits associated with this include mapping locations for new plants, tax allowances to qualified firms and grants and loans designed to encourage growth in compliance with government regulations. The following choices are based on the year 2030 for goals.

- | | |
|--|-------------|
| 1. Establish no goal for Renewable Energy | (5 points) |
| 2. Establish a 20% goal for Renewable Energy | (10 points) |
| 3. Establish a 30% goal for Renewable Energy | (8 points) |
| 4. Establish a 50% goal for Renewable Energy | (5 points) |

Because you are looking to establish an image of the current administration as one that is forward thinking and willing to react to input from the populace, you prefer establishing some sort of renewable energy goal over failing to establish one at all in the face of domestic and international attention. That said, it would be disastrous if a goal were set above what is reasonable for the nation to attain. To avoid this 'failure' situation, you prefer establishing a more moderate goal that both appears meaningful and is possible to accomplish. Because funding is scarce, you prefer a goal of 20% to 30% because of your expected involvement in encouraging the growth in renewable energy.

Section 3 – International Projects and Development

International organizations, agencies and institutions play a large role in fostering development of energy growth and stability in Ukraine. These institutions lend not only money, but expertise and technical assistance to the economy and energy make-up of Ukraine, often making their impacts long lasting and meaningful. Some of these institutions are globally based, such as UNDP while others are more regionally specific, like institutions involving the EU (TEN-E) or the US (USAID). Providing an environment friendly to outside projects and input helps encourage more international projects, while placing national regulations on

projects makes it more difficult for international institutions to influence or support national projects.

1. Plan no changes to current system (20 points)
2. Remove existing Barriers (10 points)
3. Establish new regulations to international projects and development(10 points)

As a representative of the Ukrainian Government, you prefer no changes be made in the regulations and incentives offered for international projects. The nation benefits from the added attention and investment and the populous enjoys the benefits associated with work done by USAID, The World Bank, UNDP etc.... That said, you very much value the sovereignty you have over what kind of projects are allowed within your borders and would hesitate to relinquish any kind of control over which of your industries are impacted through international or jointly based projects. To this end, keeping with the current system is your favored choice.

Section 4 – Ratification of the Rio Protocol

Last month, an international conference involving high-ranking representatives and heads of state was held in Rio de Janeiro, Brazil. The conference was held to determine a multi-lateral solution to anthropogenic climate change forces. The result of this conference was an establishment of the Rio Protocol – which calls for: “A proportional reduction in identified greenhouse gases and other anthropogenic factors contributing to global climate change”. In this sense of the word, ‘proportional’ refers to the amount of input each nation-state has to the climate system. Effectively, the protocol is an agreement to take steps in reducing greenhouse gas emissions and that wealthier nations that have contributed to more to the net greenhouse gas budget will do more to reduce their own emissions and the emissions of developing countries.

The choices for ratifying, or putting into effect, this protocol are:

1. Introduce protocol for ratification next year (20 points)
2. Introduce protocol for ratification in 3-5 years (15 points)
3. Introduce protocol for ratification in 6-10 years (10 points)
4. Delaying ratification of the protocol for 11+ years. (5 points)

As a nation of emerging influence, you would like to appear well attuned to global trends, including those that shape your industry and infrastructure in a modern style. It’s possible that you might receive funding or assistance from other nations or international organizations looking to establish projects within your borders. It is also possible that your industries will benefit as a whole because of your proactive stance on reducing emissions and limiting other damaging behaviors. To this end, the sooner that the ratification of the Rio Protocol is brought to the table, the better.

Score Sheet

Section 1 – National Investment Priorities __10__
 Choices – Priorities of Investment

- | | |
|--|--------|
| 1. Affordability, Security, Sustainability | __10__ |
| 2. Security, Affordability, Sustainability | __10__ |
| 3. Sustainability, Security, Affordability | __8__ |

Section 2 – National Renewable Energy Goal for 2030 Total Possible __10__
 Choices – Percentage of Total Energy Use

- | | |
|------------------------|--------|
| 1. No National Goal | __5__ |
| 2. Goal of 20% by 2030 | __10__ |
| 3. Goal of 30% by 2030 | __8__ |
| 4. Goal of 50% by 2030 | __5__ |

Section 3 – International Initiatives and Projects Total Possible __20__
 Choices –incentives or restrictions on International Renewable Energy Projects

- | | |
|---|--------|
| 1. Plan for no change in the current system | __20__ |
| 2. Remove or Lessen Barriers for International Projects | __10__ |
| 3. Establish Regulations to protect existing Domestic Interests | __10__ |

Section 4 – Ratification of the Rio Protocol Total Possible: __20__
 Choices – Timeline for ratification of the Rio Protocol

- | | |
|--|--------|
| 1. Move to ratify Rio Protocol next year | __20__ |
| 2. Ratify Rio Protocol within 3-5 years | __15__ |
| 3. Ratify Rio Protocol within 6-10 years | __10__ |
| 4. Delay Ratification for 11+ years | __5__ |

Subtotal of Points Earned: _____

Points for Agreement: (+40)

Total Points Earned: _____

Total Needed for Agreement: __30__

International Organizations

The 2011 Ukrainian National Convention on Energy Policy (UNCE 2011)

Welcome to the 2011 Ukrainian National Convention on Energy Policy! You and 5 other representatives will take place in a negotiation to determine the future of energy policy in Ukraine. The results of this negotiation will be integrated into Ukrainian national policy and will affect the future of energy practices in Ukraine.

Your Role: International Organizations

International Agencies and Organizations play a large role in developing, supporting and financing programs and projects in Ukraine. Some of these international organizations are interested in promoting energy sources that are compatible with environmental protection while others are more heavily invested in encouraging energy security or development for the region as a whole.

Some examples of International Organizations involved in shaping Ukraine's energy sector are:

- The European Bank for Reconstruction and Development (EBRD)
- The Trans-European Network (Energy Branch)
- USAID
- United Nations
 - Environmental Programme (UNEP)
 - Development Programme (UNDP)
- The World Bank
- International Atomic Energy Agency (IAEA)

You have been chosen by a coalition of International Organizations to represent the interests of improving Ukrainian national policy in the vein of enhancing access and freedom of international organizations to promote and support programs and projects within Ukraine. Broadly speaking, your superiors who sent you are also interested in making sure that Ukraine's regulations don't favor one kind of organization or energy source unfairly as market freedom, cooperative development and fairness in national strategy are important to the organizations that you represent.

Scoring

These negotiations will focus on four main topics that will be discussed by all six representatives. While these topics all involve Energy Policy in Ukraine, they will focus on different, specific issues. You have been assigned points values for each potential outcome of the discussions of each section. In these negotiations, there will be a limited number of choices to pick from – meaning that resolutions must entail only the choices provided. Your goal is to get as high a score as possible. You also are not allowed to reveal your designated scores to any of the other

members of the negotiation – though you can voice your preference of options at will.

Section 1 – Adherence to certain priorities in National programs and initiatives.

The government of Ukraine often contributes significantly to Domestic Energy projects and is responsible for negotiating international deals, agreements and practices with other foreign powers, such as Russia. In the coming decades, the Ukrainian national government will approach projects looking for approving, funding, loopholes or other incentives in a manner that reflects the agreed upon priorities put forward by the resolution of these negotiations. The following are options for groups of priorities (listed from most important to least).

Critically Important	Moderately Important	Mildly Important	Points Awarded
1. Affordability	Security	Sustainability	10 Points
2. Security	Affordability	Sustainability	10 Points
3. Sustainability	Security	Affordability	15 Points

Often, national priority that involves only an examination of immediate resource costs results in a lack of proactive planning or arranging of infrastructure that can adapt to changing needs and trends within the nation. Additionally, a national priority plan that places security above other interests runs the risk of being protectionist, therefore limiting the capability of international organizations to contribute meaningfully to the development of the region. Your preference for this section is that sustainability be considered a top priority so that internationally supported programs can continue to find national support in Ukraine.

Section 2 – Establishment of a Renewable Energy Consumption Goal

The Ukrainian government is very goal oriented when it comes to making Energy policy. Large amounts of resources are used to ensure that expectations and needed output are met for both nuclear and conventional fuel sources.

Establishing a goal for renewable energy resources would allow the government to pursue an active approach to including, subsidizing and encouraging renewable energy's share of the national consumption in its energy plan. Benefits associated with this include mapping locations for new plants, tax allowances to qualified firms and grants and loans designed to encourage growth in compliance with government regulations. The following choices are based on the year 2030 for goals.

- | | |
|--|-------------|
| 1. Establish no goal for Renewable Energy | (5 points) |
| 2. Establish a 20% goal for Renewable Energy | (10 points) |
| 3. Establish a 30% goal for Renewable Energy | (10 points) |
| 4. Establish a 50% goal for Renewable Energy | (10 points) |

While a national plan for renewable energy may prove to be a motivating factor in fostering innovative and collaborative projects, the actual goals of the plan may not match up with the missions of the international organizations you represent. Therefore, your preference is not particularly influenced by the share of renewable energy desired by 2030 because it may prove incompatible with the motivation of international organizations to support projects in Ukraine.

Section 3 – International Projects and Development

International organizations, agencies and institutions play a large role in fostering development of energy growth and stability in Ukraine. These institutions lend not only money, but expertise and technical assistance to the economy and energy make-up of Ukraine, often making their impacts long lasting and meaningful. Some of these institutions are globally based, such as UNDP while others are more regionally specific, like institutions involving the EU (TEN-E) or the US (USAID). Providing an environment friendly to outside projects and input helps encourage more international projects, while placing national regulations on projects makes it more difficult for international institutions to influence or support national projects.¹¹⁰

1. Plan no changes to current system (20 points)
2. Remove existing Barriers (50 points)
3. Establish new regulations to international projects and development(0 points)

Your clear preference is to remove the barriers that exist in supporting programs within Ukraine. This step would provide for more ease in establishing projects that would prove economically feasible and beneficial to the missions and goals of involved international organizations.

Section 4 – Ratification of the Rio Protocol

Last month, an international conference involving high-ranking representatives and heads of state was held in Rio de Janeiro, Brazil. The conference was held to determine a multi-lateral solution to anthropogenic climate change forces. The result of this conference was an establishment of the Rio Protocol – which calls for: “A proportional reduction in identified greenhouse gases and other anthropogenic factors contributing to global climate change”. In this sense of the word, ‘proportional’ refers to the amount of input each nation-state has to the climate system. Effectively, the protocol is an agreement to take steps in reducing greenhouse gas emissions and that wealthier nations that have contributed to more to the net greenhouse gas budget will do more to reduce their own emissions and the emissions of developing countries.

The choices for ratifying, or putting into effect, this protocol are:

1. Introduce protocol for ratification next year (25 points)
2. Introduce protocol for ratification in 3-5 years (15 points)

¹¹⁰ <http://www.ebrd.com/downloads/research/policies/2008policy.pdf>

3. Introduce protocol for ratification in 6-10 years (10 points)
 4. Delaying ratification of the protocol for 11+ years. (0 points)

Your top choice is for the Ukrainian government to ratify the Rio Protocol as soon as possible, as it will better help to provide a clear indication of the political agenda and climate within Ukraine. This will help to eliminate uncertainty of interest on behalf on international organizations and will also give a good representation of how Ukraine stands on moving forward with greenhouse gas reduction measures – which is the category for a number of possible projects in the near future.

Score Sheet

<u>Section 1 – National Investment Priorities</u>	__15__
Choices – Priorities of Investment	
1. Affordability, Security, Sustainability	__10__
2. Security, Affordability, Sustainability	__10__
3. Sustainability, Security, Affordability	__15__
<u>Section 2 – National Renewable Energy Goal for 2030</u>	Total Possible __10__
Choices – Percentage of Total Energy Use	
1. No National Goal	__5__
2. Goal of 20% by 2030	__10__
3. Goal of 30% by 2030	__10__
4. Goal of 50% by 2030	__10__
<u>Section 3 – International Initiatives and Projects</u>	Total Possible __50__
Choices –incentives or restrictions on International Renewable Energy Projects	
1. Plan for no change in the current system	__20__
2. Remove or Lessen Barriers for International Projects	__50__
3. Establish Regulations to protect existing Domestic Interests	__0__
<u>Section 4 – Ratification of the Rio Protocol</u>	Total Possible: __25__
Choices – Timeline for ratification of the Rio Protocol	
1. Move to ratify Rio Protocol next year	__25__
2. Ratify Rio Protocol within 3-5 years	__15__
3. Ratify Rio Protocol within 6-10 years	__10__
4. Delay Ratification for 11+ years	__0__

Total Points Earned: _____

Total Needed for Agreement: _____30_____

Appendix V – Excel Data

Pretest Responses

ID	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Question 7	Question 8	Question 9	Question 10	Average	Median
1	3	6	1	1	1	1	6	5	4	7	3.5	3.5
2	5	9	1	4	1	1	5	7	7	5	4.5	5
3	8	9	1	5	1	3	3	7	7	6	5	5.5
4	3	7	1	1	1	5	5	7	7	7	4.4	5
5	7	8	3	2	2	1	5	5	6	4	4.3	4.5
6	2	3	1	1	1	1	1	6	6	6	2.8	1.5
7	1	9	2	1	1	1	3	8	9	8	4.3	2.5
8	6	7	2	1	1	2	2	3	8	7	3.9	2.5
9	7	9	4	4	2	3	9	9	9	9	6.5	8
10	8	8	2	1	1	4	6	9	10	10	5.9	7
11	2	6	8	3	2	2	8	2	2	4	3.9	2.5
12	3	8	1	2	1	3	2	4	5	4	3.3	3
13	3	5	1	2	2	1	3	2	2	2	2.3	2
14	4	6	1	1	1	3	4	5	5	5	3.5	4
15	3	7	1	1	1	1	3	3	4	5	3.1	2
16	4	8	2	2	2	1	3	3	9	6	4	3
17	4	7	1	1	1	2	5	6	7	6	4	4.5
18	5	8	1	1	1	2	5	8	9	6	4.6	5

Posttest Responses

ID	PostQ1	PostQ2	PostQ3	PostQ4	PostQ5	PostQ6	PostQ7	PostQ8	PostQ9	PostQ10	Average	Median
1	9	10	9	8	9	7	10	10	8	9	8.9	9
2	8	9	9	8	7	7	9	8	9	9	8.3	8.5
3	9	10	8	10	9	9	9	9	9	9	9.1	9
4	7	9	8	8	6	6	8	7	6	6	7.1	7
5	8	10	9	10	8	6	9	10	5	8	8.3	8.5
6	7	10	9	8	5	6	5	10	9	10	7.9	8.5
7	9	10	10	9	9	9	9	10	10	10	9.5	9.5
8	7	8	6	6	6	5	8	7	8	8	6.9	7
9	10	10	10	8	7	9	9	10	9	10	9.2	9.5
10	10	10	10	8	8	9	8	10	8	10	9.1	9.5
11	7	10	8	6	6	5	7	9	6	8	7.2	7
12	8	8	9	10	7	7	7	6	9	9	8.2	8
13	5	7	4	4	4	5	3	6	3	5	4.8	5
14	6	10	7	7	4	5	5	6	6	5	6.1	6
15	7	10	8	5	5	6	8	10	8	5	7.2	7.5
16	7	9	7	5	7	6	8	9	9	9	7.6	7.5
17	7	8	7	5	7	4	5	8	5	6	6.2	6.5
18	9	10	7	7	6	6	8	9	9	9	8	8.5

Change in Responses

ID	Change in Q1	Change in Q2	Change in Q3	Change in Q4	Change in Q5	Change in Q6	Change in Q7	Change in Q8	Change in Q9	Change in Q10
1	6	4	8	7	8	6	4	5	4	2
2	3	0	8	4	6	6	4	1	2	4
3	1	1	7	5	8	6	6	2	2	3
4	4	2	7	7	5	1	3	0	-1	-1
5	1	2	6	8	6	5	4	5	-1	4
6	5	7	8	7	4	5	4	4	3	4
7	8	1	8	8	8	8	6	2	1	2
8	1	1	4	5	5	3	6	4	0	1
9	3	1	6	4	5	6	0	1	0	1
10	5	2	4	4	5	3	6	2	3	1
11	5	4	0	3	4	3	-1	7	4	4
12	5	0	8	8	6	4	5	4	4	5
13	2	2	3	2	3	2	3	4	1	3
14	2	4	6	6	3	2	1	1	1	0
15	4	3	7	4	4	5	7	3	4	0
16	3	1	5	3	5	5	5	6	0	3
17	3	1	6	4	6	2	0	2	-2	0
18	4	2	6	6	5	4	3	1	0	3
Total Change in Q	62	38	111	98	98	78	62	53	20	38
Maximum Change in Q	8	7	8	8	8	8	7	7	4	5
Minimum Change in Q	1	0	0	2	3	1	-1	0	-2	-1
Average Q Change	3.44	2.11	6.17	5.44	5.44	4.33	3.44	2.94	1.11	2.11
Median Q Change	3	2	6.5	5.5	5	5	4	2.5	1	2.5
Standard Deviation	1.89	1.75	2.12	1.92	1.58	1.85	2.31	2.01	2.05	1.81
Average Total change in Q	3.44	2.11	6.17	5.44	5.44	4.33	3.44	2.94	1.11	2.11

Simulation Question Responses

ID	S1	S2	S3	S4	S5	S6	S7	S8	Average	Median
1	9	10	10	10	10	10	10	10	9.875	10
2	9	10	10	10	10	10	10	10	9.875	10
3	9	10	10	10	10	10	10	10	9.875	10
4	10	10	10	10	10	10	10	10	10	10
5	10	10	10	10	10	9	9	10	9.75	10
6	10	10	10	10	10	10	10	10	10	10
7	10	10	10	10	10	10	10	10	10	10
8	9	10	10	10	10	9	10	10	9.75	10
9	10	10	9	10	10	10	10	10	9.875	10
10	10	10	10	10	10	10	10	10	10	10
11	10	10	10	10	10	7	8	10	9.375	10
12	10	10	10	10	10	9	9	9	9.625	10
13	8	9	10	8	10	9	7	8	8.625	8.5
14	5	8	8	8	8	8	7	6	7.25	8
15	7	10	8	10	9	10	9	10	9.125	9.5
16	9	10	10	10	10	10	10	9	9.75	10
17										
18	7	10	10	10	10	10	9	9	9	9.5
S Average	8.94	9.82	9.71	9.76	9.47	9.53	9.47	9.41	9.51	9.74
S Median	9	10	10	10	10	10	10	10	9.75	10
S Total	152	167	165	166	161	162	161	160	161.75	165.5
S Max	10	10	10	10	10	10	10	10	10	10
S Min	5	8	8	8	7	8	7	6	7.25	8
S Standard Dev.	1.43	0.53	0.69	0.66	0.87	0.72	1.01	1.23	0.71	0.59

Ukrainian Energy Policy Simulation - A Summary

Problem:

During a time of serious transition in the energy regime of the United States, there are many proponents of ‘switching away’ from conventional energy sources like coal, oil and natural gas. In my experience, individuals who feel strongly about using more alternative or renewable sources of energy often demand questions like “why haven’t we switched?” “why don’t we just ...” Questions like these show that while individuals may understand certain parts of energy policy, the connection between available resources and technology, and the challenge of developing a coherent energy strategy often goes unaddressed in learning environments that otherwise provide useful information about both renewable and conventional energy sources.

For my Capstone project, I wanted to create a tool that would illustrate the difficulty in reaching a comprehensive and effective energy strategy, despite a wealth of options for alternative energy use. To do this, I turned towards using an interactive simulation to allow students to learn and subjectively experience the obstacles that lie in the way of applying knowledge of renewable energy resources to an overall national policy.

While my target audience for the simulation was American four-year University Students, I chose to place the simulation in Ukraine to: 1. Avoid a high level of conflicting understandings associated with American energy politics, 2.

Take advantage of Ukraine's energy policy structure, 3. Use Ukraine's need for comprehensive energy policy reform as a basis for a negotiation scenario, 4. Illustrate a manageable picture of international cooperation and competition associated with energy policy and, 5. Depict a nation on the verge of an energy shift more clearly than the situation in the United States.

Project Components

For my project I chose to design, create, and administer an interactive simulation in which participants could learn and experience the difficulties associated with establishing national policy on the use of renewable energy. The project includes a background section on the state of energy use, consumption, international involvement, and government influences within Ukraine. This background provided me a way to conceptualize key points to include in the simulation. Included in the background are trends, figures and information concerning Ukraine's energy production, consumption, and potential as well as important events that influence the goals and policies within Ukraine.

In addition to background information that discusses the content associated with the project, I have written a brief piece on why I chose to use a simulation as a policy – teaching tool. This piece includes my interviews with experts, my own experience with using simulations as learning devices and research I've conducted on similar simulations that indicate interactive learning methods to be effective teaching tools.

The Simulation aspect of the program is administered by one person who facilitates the negotiations between the six participants who do not have pre-existing knowledge of anything pertaining to the simulation. Before the participants interact with one another, the facilitator presents a brief background information packet, which is a synopsis of the larger background information section. After the administrator is finished, the participants are each given a distinct part to play in the negotiations. Each part indicates a certain preferences, priorities and strategies in determining the outcome of the negotiations by solving 4 sections of challenges. Although the roles are different and conflicting in what they're looking to accomplish, they are similar in their power to influence the final outcome, meaning that no one role has more structural authority than another.

During the simulation, the participants negotiate which outcomes will be integrated into a new energy policy for Ukraine. In order for a successful outcome to be reached, each player must consent to the outcomes of all four sections, meaning that the group must reach consensus before the allotted time runs out. Each participant is constrained by instructions and minimum accomplishment levels given to them by hypothetical superiors written into their roles. If a participant fails to achieve a certain level of victory for his or her role, they are not allowed to agree to the overall solution to the negotiation.

Methods

In order to develop a working simulation, I researched existing examples for clues on how to blend the structure of a negotiation-form simulation with the content I wanted to include. In addition to using aspects of simulations I had researched, I interviewed several experts on the use of simulations in an educational context for ideas on how to create a simulation that had both meaningful educational value and that functioned well as a group exercise.

After choosing four aspects of Ukrainian energy policy to focus the simulation around, I developed strategy choices for each, and assigned preference and priority to each choice for each role based on research I had done in developing background information on each role. After I had assigned values to preference and priority to each choice for each player, I tested the simulation to ensure that it could be completed and that the use of compromise was integral to reaching an agreement on all four aspects was possible, realistic and feasible within the time frame I had allotted for the simulation.

During my development of the matrix governing the preference values for each role, I discovered an interesting aspect of the simulation. I found that by adjusting the minimum values for each role, that I could increase or decrease the difficulty of the simulation by eliminating possible combinations of solutions to each aspect of energy policy included in the negotiations. While I did not change the mechanics of the simulation for the different groups tested, it occurred to me that the ease of reaching an agreement could be calibrated based on what group of individuals was involved, as well as how long of a time period the simulation was taking place over. Essentially, it is possible to change the difficulty of the

simulation by manipulating the number of possible outcomes.

Significance

The significance of my project lies in its ability to serve as a policy-teaching tool for students who would not normally be able to understand or experience the challenges associated with attempting to craft successful energy policy. Students that participate in the hands-on simulation are put into subjective roles in which they feel they have a stake. As a result, each participant is viewing the outcome of the negotiations from a selfish standpoint, and is more able to explore strategies, avenues and styles of negotiation that best fit their preferences. This allows students to experience and explore the various interests presented in the roles, rather than reading and memorizing them, as they would in a traditional learning context.

While there are a multitude of classes and techniques that teach the content associated with energy policy, resources and associated politics, this information is sometimes left as information without a purpose, as the tensions and strategies involved in national policy setting can be left out of the lesson plans. This project is an attempt to remedy this omission.

Drawbacks / Issues

While the simulation offers students an exciting opportunity to learn certain aspects of Ukraine's energy policy, teaching with a simulation does have its drawbacks. Firstly, because my simulation takes place over the course of one session, it is impossible to present and explain every facet of Ukraine's energy situation and national policies – as this would take at least several weeks if done

thoroughly. Because of practical considerations, the presentation given by the facilitator is one that covers key areas of Ukraine's energy situation and establishes the basic context needed for the negotiations to take place. Were the simulation to be held over a longer period than three hours, it would be possible to expand the background briefing, thus including more relevant information into the learning experience as a whole.

Another drawback of the simulation is the pre-determined options and sections of challenges. In order to develop a matrix of possible scenarios that I could forecast and adjust, I wrote pre-determined choices for agreement in negotiations. This is not wholly unrealistic in the context of policy negotiations, but it does detract from the students' ability to invent new options with which to reach an agreement. The creation or speculative suggestion of new ideas, though frequently present in an informal context during the simulation, is not inherently something I was looking to foster with the simulation tool. That said, the invention of new solutions, particularly in the field of energy policy is an important part of developing effective strategies and should be recognized as an important step in solving energy problems within our own society today.
