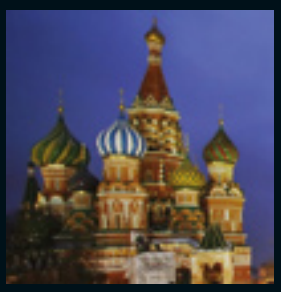
2012 Eastern Europe Energy Handbook

Delayed promise, renewed risk



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Slovakia, yes, Slovakia, took center stage in the global debt crisis theatre back in mid-October 2011 becoming the final member of 17-nation consortium to approve the Eurozone bailout fund. The country with 5.5 million inhabitants, or 1.6% of the Eurozone population, became its most crucial member, if only for a few days, having absolute power to make or break the bailout. This parliamentary vote did not come without consequences, monetary (of course) and political. The contentious debate to open up its coffers to bail out the likes of Greece eventually led to approval of the funds but also a vote of no-confidence in the coalition government, resulting in its collapse.

In terms of energy, Slovakia also found itself in the middle of a natural gas crisis in winter 2009. Its transport infrastructure is vital for delivery of Russian natural gas to its Western neighbors. Just a few weeks after acceptance into the Eurozone, a conflict between Russia and Ukraine halted the flow of natural gas through the country for ten days resulting in losses in excess of $1.3 billion, highlighting its own vulnerabilities, those of the Eurozone in relying on Russian gas, and their need to seek viable alternatives to ensure economic and energy security.

The volatile nature of global financial markets today and for the foreseeable future place dearer risks on almost all monies lent to governments and private entities. For example, Russia's transparency issues are not going to improve anytime soon as Prime Minister Vladimir Putin and his protégé, President Dmitry Medvedev, essentially agreed to switch positions for the next six years. On a more optimistic note, Poland's fiscal diligence and political stability is making 10-year Zloty bonds some of the most desirable emerging market debt to own.

Allow energy expert Tom Armistead to guide you through the political temperature, energy resources, electricity market, and investment opportunities for Russia, Poland, Turkey, Romania, and Slovakia. The basis for unearthing potential growth prospects lies in dependable and poignant data and analysis. The takeaway from the 2012 Eastern Europe Energy Handbook is an understanding of these fundamentals in relation to our energy and electricity sectors.

Overview of policy, trends, and projections

The electricity grid will require enhancements to transmit power generated by intermittent sources such as wind and solar energy. New lines must be built to load centers in many cases from remote areas where wind and solar energy are available

The EU Perspective

In Central and Eastern Europe's energy sector, there are essentially two players: The European Union and Russia. That is so because of the six-decade-long development of the EU to unite the Continent's fractious national groups, on one hand, and, on the other, because Russia's immense energy resources and its historic political mass simply overwhelm the smaller countries to its west. Without the EU, they would be entirely at the mercy of whatever Russia chose to do with its energy resources and the political power that comes with them.

This handbook focuses closely on five countries in Central and Eastern Europe (CEE): Poland, Romania, Slovakia, Russia, and Turkey. The first three are EU members and Turkey is eager to become one. Whether that will happen is very much an open question, but the country in any case will play a key role in Europe's energy supply as a transit country for oil and gas from the Caspian region. Slovakia alone in this group has acceded to the "euro zone," the group of 17 EU member states that have adopted the euro as their currency.

The overview that follows focuses mainly upon the policies, trends, and projections of the European Union because these provide the context within which the three EU members and, to an extent, Turkey make and execute their respective energy policies. The policies, trends, and forecasts for the EU and Russia together form a whole picture of the environment within which energy investment must operate in CEE.

Introduction

Europe's energy sector looks like the political map of the Continent minus the will to continental unity that has produced the European Union. Electrical grids, oil and gas infrastructure, and the companies that build, maintain and operate them continue to function as poorly interconnected islands while EU policy strives to reduce the economic obstacle posed by national borders and to promote the free movement of energy, talent, trade, and financing necessary for a single European market. Hindrances to greater integration include simple inertia, differences in market design, a latter-day erosion of political and social support because of economic hard times, economic nationalism, and lobbying by entrenched interests.

But the crisis in the euro zone that has required bailouts for Greece and Ireland has thrown a harsh light on what can happen when sovereign entities are unified without coordinating their national policies and practices. Since 2005, the European Commission has been develop-

1. Best Countries for Business 2011

Ranks from 134 countries

Overall	Investor protection	Tax burden	Name	2010 GDP growth %	GDP/ capita ($)	Trade balance as % of GDP	Population (mil.)	Public debt as % of GDP
33	92	87	Slovakia	4.0	22,000	-3.6	5.5	41.0
38	35	86	Poland	3.8	18,800	-3.4	38.4	52.8
52	35	111	Romania	-1.3	11,600	-4.4	21.9	30.8
54	46	55	Turkey	8.2	12,300	-6.5	78.8	42.8
102	76	73	Russia	4.0	15,900	4.9	138.7	9.0

Source: Forbes

ing a strategy to push the EU's member states toward greater integration of their energy sectors. If successful, it could forestall an energy-sector replay of the euro's tragedy.

Energy 2020

In November 2010, the European Commission (EC) presented "a strategy for competitive, sustainable and secure energy" under the name Energy 2020, defining the Union's energy priorities for the next 10 years. The commission developed the proposed strategy in response to a 2007 directive of the European Council, but the January 2009 gas crisis lent extra urgency to the task.

In that month, Russia's Gazprom monopoly stopped shipping natural gas via Ukraine to Europe because of a payment dispute with Ukraine. The incident laid bare the insecurity of Europe's energy supply, which depends heavily on Russian gas transiting Ukraine and Belarus. It drove home the pressing need to diversify the sources of supply and to interconnect the EU's nation-based islands of energy infrastructure to create an integrated European energy system.

In Energy 2020, the EC estimates that energy investments on the order of $1.35 trillion will be required in the coming decade to diversify energy sources, replace equipment and "to cater for challenging and changing energy requirements." A 2010 World Bank study said the total projected energy-sector investment requirements for Eastern Europe and the former Soviet Union countries in the next quarter-century would amount to $3.3 trillion in 2008 dollars.

The power sector alone would require $1.5 trillion of that and district heating $500 billion. In accordance with the energy policy defined in the Lisbon Treaty on the functioning of the European Union, the central goals of Energy 2020 are security of supply, competitiveness and sustainability.

To Become Truly European

Since its 1950 origin in the founding of the European Coal and Steel Community, the European Union has trudged slowly and haltingly toward increased integration of its many nation-states. It now comprises 27 member states flying the EU flag in addition to their own, ceding authority and power for some policy decisions to a Brussels-based bureaucracy, and with its own seat as an observer at the United Nations. Seventeen of its members have adopted the euro as their currency.

2. Corruption Index

Poland	5.5
Turkey	4.2
Slovakia	4.0
Romania	3.6
Russia	2.4

Source: Transparency International
9.0-10 = Very clean
0-0.9 = Highly corrupt

But serious gaps persist in delivery of the energy policy aims, the EC notes. The EU, with a population exceeding 500 million, accounts for one-fifth of the world's energy use and is the world's largest energy importer, but its internal energy market is still fragmented, with the security of internal energy supplies undermined by delays in investments and technological progress. The European electricity transmission system operators' organization, ENTSO-E, for example, estimates that the EU needs to build or renew 30,000 km of network cables by 2020.

The diversity of national rules and practices hampers the development of companies that are trying to operate on the Europe-wide scale. The aging of the power-generation plant stock will open opportunities for replacement with renewable-energy stations, but the move in that direction is too slow, and the transmission grid is not being adapted to the requirements of intermittent energy resources. "The time has come for energy policy to become truly European," the EC concludes.

Apart from some reserves in the North Sea, which are being rapidly depleted, the EU has relatively little in the way of indigenous oil and gas resources. Hence Energy 2020's focus on those fuels is largely on policy, such as the importance of establishing a common approach toward partner, supplier and transit countries; securing new, diversified and safe supply routes; reducing dependence on oil; and, with an eye on the 2010 Deepwater Horizon oil blowout in the Gulf of Mexico, ensuring the highest level of protection in offshore oil development.

Significantly, Energy 2020 does not mention coal or lignite at all. Several EU member states have abundant resources of both fuels and use them extensively for electricity generation, but the Union is a signatory of the Kyoto Protocol and has made serious efforts to reduce carbon dioxide emissions, although achievements have fallen short.

In Energy 2020, the European Commission envisions an energy sector in which buildings and transportation both will be


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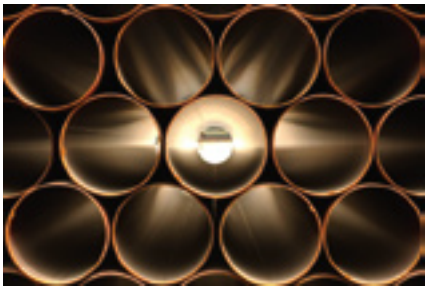
Gazprom

The total length of South Stream, a joint project of ENI, Gazprom, and EDF, is estimated at roughly 2,500 km, including 900 km under the Black Sea, at a cost of more than $20 billion (above)

Nabucco is the EU's preferred channel for gas from the Caspian and Middle East. Detailed engineering is under way, and Nabucco is expecting to begin construction in 2012, starting operation by the end of 2015 (left)

Viborg.dk

To reduce conversion losses and conserve natural resources now used to heat and cool individual buildings, the EC calls for development and modernization of district heating and cooling networks

more energy-efficient than currently; investments in power generation will produce a powerplant fleet of which nearly two-thirds will be fueled by low-carbon sources (up from the current 45 percent), and much of that will be renewable energy; and carbon-free nuclear energy will be "assessed openly and objectively" for its potential to contribute more than its current one-third share to the Union's power supply.

In brief, it will be the energy sector defined in 2007 by the European Council's objectives: greenhouse-gas emissions reduced by 20 percent below 1990's level, renewable energy providing 20 percent of the union's supply and energy efficiency improved by 20 percent. The popular name is 20-20-20.

Opportunities Beckon

The need to develop and integrate the power markets of the newer EU members presents a variety of investment opportunities. Here are two.

- In November 2010, the European Bank for Reconstruction and Development announced that it would provide an equity investment of up to $30 million to Central Europe Oil Company – CEOC Limited to redevelop both mature and underdeveloped hydrocarbon reservoirs in central Europe.
- Power markets in the "transition countries" of Eastern Europe, which are making the transition from planned economies to market economies, require investment and expertise to create mature power markets, with power exchanges, regulatory agencies, and physical infrastructure equivalent to those in Western Europe. Some have proposed creating a regional exchange to serve a number of national markets.

Efficiency

Energy 2020 is formulated on the premise that the cheapest powerplant is the one you don't have to build. It calls for rebalancing energy actions "in favor of a demand-driven policy, empowering consumers and decoupling economic growth from energy use." In pursuit of that policy, the strategy calls for higher energy savings and more low-carbon investments in both centralized and distributed renewable energy, energy storage technologies, and electrification of both private vehicles and public transport.

Enhancing energy efficiency "should be concentrated on the whole energy chain, from energy production, via transmission and distribution to final consumption," says the strategy document. Its call for "effective compliance monitoring, adequate market surveillance, widespread usage of energy services and audits, as well as material efficiency and recycling" clearly points to a range of opportunities for investment in power electronics and smart-grid technology, among other things. The strategy specifically includes cogeneration, district heating and cooling, and third-party energy services among the recommended approaches.

"Efficiency, including in electricity use, must become a profitable business in itself, leading to a robust internal market for energy-saving techniques and practices and commercial opportunities internationally." The strategy also calls for special attention to existing building stock and the transport fleets as sectors having "the largest potential to make energy efficiency gains." The EC presented its energy efficiency plan in early 2011 followed by concrete regulatory proposals to support it, including incentives to induce energy-efficiency investments.

Monti Report—A Path to the Single Market

In May 2010, the publication of the eagerly anticipated Monti Report pushed the European "single market" back to center stage. European Commission President José Manuel Barroso commissioned the report in October 2009, asking Professor Mario Monti, president of Luigi Bocconi Commercial University in Milan, Italy, to consult with officials and stakeholders throughout the EU and report to the Commission on options and recommendations "to relaunch the Single Market as a key strategic objective" of the Commission.

Over the previous two decades, the single market had become just one of several of the Commission's objectives as it focused on establishing the euro, expanding with new member states from Central and Eastern Europe and other urgent matters. The global financial crisis had tempted some EU members "to roll back the Single Market and seek refuge in forms of economic nationalism," Barroso wrote to Monti.

The report builds a case for the single market as a means not only to increase economic efficiency but also to drive the political changes that are needed to strengthen and deepen the unity of the EU, calling the single market "the very foundation of the integration project." It emphasizes the role of infrastructure in unifying the market's members, saying, "It is impossible to imagine a single market without the physical infrastructure connecting its parts: roads and other transport connections, electricity grids, electronic communications and water networks. Infrastructures are vital for ensuring the mobility that underpins a functioning integrated market and for promoting growth and sustainable development. They are key to ensuring territorial cohesion."

Noting that "the cross-border infrastructure gap is becoming more acute in Europe" while the economic crisis has

reduced the ability of both the public and the private sectors to obtain financing, the report recommends a variety of approaches. One would be to facilitate the combination of public-private partnerships with the use of structural funds. The report also urges creation of an ad-hoc European regulatory framework to encourage long term investors' focus on infrastructure projects. A third recommendation is to develop a European liquid bond market for very long maturities to finance major cross-border infrastructure projects.

The March 2011 launch of the Agency for the Cooperation of Energy Regulators may represent a toe in the water of a European regulatory framework, but its current mandate precludes its functioning as a super-regulator. The European Commission sees it as an advisory and monitoring body with decision-making powers limited to specific cross-border issues, and then only at the request of the national regulators involved. Still, it could become the foundation for a more robust European regulatory system tending toward the kind of role played in the United States by the Federal Energy Regulatory Commission.

Flagpedia.net

In Energy 2020, the EC estimates that energy investments on the order of $1.35 trillion will be required in the coming decade to diversify energy sources, replace equipment and "to cater for challenging and changing energy requirements"

The report's analysis and recommendations have met with a largely positive reception. In October 2010, the European Commission announced the Single Market Act, a comprehensive set of 50 proposals to be put into place by 2012 to improve the functioning of the single market. Among its key priorities are several aimed at improving the business climate for small and medium-sized business enterprises, known as SMEs, including simplifying accounting rules, improving access to public procurement contracts and introducing a common tax base for those operating cross-border.

Infrastructure

"We need to make frontiers irrelevant for pipelines or power cables," President Barroso told the European Parliament in a September 2010 State of the Union address. The Energy 2020 plan elaborates: "As the Monti Report outlined, the new challenge to 2020 is to provide the backbone for electricity and gas to flow where it is needed. Further efforts need to be made to upgrade energy infrastructure particularly in member states that joined as of 2004…." Slovakia, Poland, and Romania, the subjects of study in this handbook, are all in that category.

In November, as a supporting piece to Energy 2020, the European Commission issued "A Blueprint for an integrated European energy network." This communication details the infrastructure that will be needed to achieve the required integration.

The electricity grid will require enhancements to transmit power generated by intermittent sources such as wind and solar energy. New lines must be built to load centers in many cases from remote areas where wind and solar energy are available. It will also require smart meters and smart grids, operating to common standards, to ensure interoperability across the network and to improve efficiency.

The Blueprint anticipates that network operators, particularly the distribution companies, and private companies under regulation by national authorities will fund the bulk of the investment required for smart-grid deployment. But where the market-funded investment falls short, "public finances must have the opportunity to step in." To make that possible, the Commission will encourage member states to set up funds to support smart-grid deployment. The Blueprint also sees large-scale energy storage as a necessary adjunct to the smart grid, helping to smooth out the erratic flow of renewable power. Slovakia, Poland and Romania all will require substantial investment in smart-grid infrastructure; none of them currently has a smart-grid project.

The 2009 gas crisis revealed the lack of reverse-flow options and inadequate interconnection and storage infrastructure, helping to raise the priority of improving gas interconnections among EU member states. The Blueprint emphasizes the need for development of "a diversified portfolio of physical gas sources and routes and a fully interconnected and bidirectional gas network" by 2020. The European Parliament has already acted on this goal, passing legislation to require gas suppliers within four years to have enough gas to met residential demand for defined periods of exceptionally high demand. Achieving that goal will require construction of storage, cross-border interconnecting pipelines and retrofits to permit bidirectional flow.

To reduce conversion losses and conserve natural resources now used to heat and cool individual buildings, the Blueprint calls for development and modernization of district heating and cooling networks "as a matter of priority in all larger agglomerations where local or regional conditions can justify it."

The Blueprint estimates the required

Nuclear Energy Limbo

Nuclear energy has had a rough ride in Europe, with Sweden and Germany planning at one time to completely phase it out. But as concern about climate change grew and nuclear came to be seen as a carbon-free power-generation technology, it enjoyed a return to favor. But in the wake of the Fukushima Dai-ichi nuclear disaster in Japan, many nations are now forced to rethink their nuclear future.

Germany has plans to completely phase out all 17 existing nuclear plants by 2022. In France, it has long been the mainstay of the generation system and will continue to be as substantial investment in nuclear power continues. But permanent disposal of the high-level waste stream (HLW) from the industry remains an unresolved issue.

In May 2010, EU Energy Commissioner Günther Oettinger expressed frustration that no HLW disposal repository has been built despite decades of work on the issue and called for "concrete steps" to build repositories in the EU. In November 2010, the European Commission released a proposed directive on nuclear waste. It emphasizes that deep geological disposal is the preferred method for high-level waste, but leaves ultimate responsibility for managing spent fuel and nuclear wastes to the member states. If approved by the EU Council of Ministers and the European Parliament, the directive would require each member state to draw up its own program detailing how it will construct and manage its disposal facility.

South Stream

South Stream, a joint project of ENI, Gazprom, and lately joined by EDF, would ultimately deliver 63 billion cubic meters of gas per year from Russia to Bulgaria, from where one branch would run to Austria through Serbia and Hungary, while another would run through Greece to Italy. The total length is estimated at roughly 2,500 km, including 900 km under the Black Sea, at a cost of more than $20 billion. A feasibility study was completed early in 2011, resulting in a final investment decision by all parties this September. Startup will be in late 2015.

investment to 2020 in energy transmission networks alone at $270 billion. The market is expected to provide only about half of that unless the EU succeeds in further developing the internal energy market. To focus attention and facilitate permitting and the flow of investment capital, the EU has identified seven "priority corridors" for electricity, gas and oil. Three of them overlap in Central and Southeastern Europe, where the Blueprint says the electrical grid is sparse compared with the rest of the continent.

Thus, the Central and South Eastern Electricity Connections Corridor will aim to bolster the grids between Germany and Romania and Bulgaria, including the intervening countries. The North-South Gas Interconnections and Oil Supply Corridor extends from Poland in the north to Albania and Macedonia in the south, reaching out to embrace Romania and Bulgaria as well.

Rosneft

Apart from some reserves in the North Sea, which are being rapidly depleted, the EU has relatively little in the way of indigenous oil and gas resources, relying heavily on Russia for supply

The Southern Gas Corridor includes Turkey, Austria, Hungary, Romania, Bulgaria and the former Yugoslav republics. This last corridor is a critical transit route for natural gas from the Caspian region, which the EU is hoping to tap as an alternative to Russian gas supplies. Several gas pipeline projects are being developed overland via Turkey or under the Black Sea. Among these, we will look more closely at the Nabucco and South Stream pipelines.

Seeking Energy Security

Much of the energy infrastructure in the new EU member states of Central and Southeastern Europe is a legacy of Cold War politics. The countries served by it are tethered to Russia via pipelines built decades ago to enhance the economic ties of the Soviet Bloc. When Russia's Gazprom shut off gas to Ukraine briefly in 2006 and again for two weeks in winter 2009, the legacy pipeline system transmitted the pain to Europe, and especially to the EU's newer eastern members. The crisis spurred efforts to develop secure supply lines for natural gas.

An April 2010 client briefing by Clifford Chance, a London-based global law firm, notes that new natural-gas transmission lines will be "a prerequisite to a diversified and stable European gas market." Interconnections between national energy grids are another essential piece in the region's energy-security puzzle, according to the European Regulators' Group for Electricity and Gas (now replaced by the Agency for the Cooperation of Energy Regulators). New and enhanced cross-border transmission pipelines will be a key to meeting the need for interconnections.

Retrofitting pipelines for reverse-flow capability will make the transmission system more flexible, while increasing gas-storage capacity will improve the stability of supply, smoothing out the fluctuations. All these measures are necessary especially in CEE because the Soviet-built gas-supply system was designed to flow from east to west and envisioned no disruptions based on either payments or politics.

Liquefied-natural-gas (LNG) terminals being planned for the Baltic and Adriatic seas will further diversify supply and reduce the region's vulnerability to disruptions. Public funds for gas projects of all kinds in CEE from institutions such as the European Investment Bank, the European Bank for Reconstruction and Development and the EU itself amount to more than $1 billion. Adding funds from private investors might raise that figure to more than $1.35 billion, the Clifford Chance briefing said.

Pipelines also are being built or planned to bypass the potentially troublesome transit countries Belarus and Ukraine. The Nord Stream gas pipeline from Russia to Germany under the Baltic Sea and the South Stream pipeline under the Black Sea, will bypass Ukraine while maintaining the EU's partial dependence on Russian supply.

In the Southern Energy Corridor, the Nabucco Pipeline crossing Turkey with gas from the Caspian and Middle East, will bypass both Russia and Ukraine. Russia's proposed rival to the Nabucco Pipeline, called South Stream, would allow it to retain some control over gas supply to Europe.

Nabucco

Nabucco is the EU's preferred channel for gas from the Caspian and Middle East, having won full political support from the EU at a summit in January 2009, just a week after the gas crisis, which Russia calls the Ukrainian transit crisis. Between 3,300 and 4,000 km long, it would run entirely overland through Turkey, Bulgaria, Romania and Hungary to Austria, delivering 31 billion cubic meters per year. Its initial estimated cost of $7.7 billion in 2006 has risen to more than $10 billion and its completion date has slipped from 2012. Participants are OMV of Austria, Transgas of Romania, Bulgargaz of Bulgaria, Botas of Turkey, and Germany's RWE.

Many analysts question Nabucco's viability, observing that it must be commercially successful, while state-owned Gazprom could choose to operate South Stream at a loss to secure market share and to gain political leverage for Russia. And Gazprom has said that it would buy all the gas that Azerbaijan wants to sell, positioning itself as a potent Nabucco rival. But in its fourth quarter 2010 status report, Nabucco Gas Pipeline International GmbH, Vienna, trumpeted a number of recent accomplishments, including obtaining EU funding of $274 million; starting a prequalification tender for $4.5 billion worth of long-lead items; and signing a mandate letter with the European Bank for Reconstruction and Development, the European Investment Bank, and IFC, a member of the World Bank Group, to start the appraisal process for $5.2 billion of financing. Detailed engineering is under way, and Nabucco is expecting to begin construction in 2012, starting operation by the end of 2015.

Creating an Energy Supply Triangle

A summit meeting of Central and Eastern European countries in February 2010 produced a declaration to collaborate on improving the region's energy security. The gathering, led by the Visegrad Four (Hungary, Poland, the Czech Republic, and Slovakia), determined to create a new "energy supply triangle" via new investments in natural-gas infrastructure that would deliver supply from sources other than Russia, which now supplies up to 100 percent of the gas demand in some of the countries.

The points on the triangle would be the Nabucco Pipeline entering the eastern Balkan peninsula, the Krk LNG terminal planned in Croatia in the southwest and the LNG terminal being planned on Poland's coast in the north. Pipelines from the LNG terminals would be built to deliver the gas to the interior, creating alternative supply lines that could soften the impact of possible future disruptions of gas supply from Russia.

North-south connections between the region's gas and electricity grids also were envisaged in the declaration. The key investments to achieve the declaration's goals will be aimed at completion of the infrastructure by the 2014-15 timeframe. Besides the Visegrad Four, participants joining the declaration included Austria, Bosnia, Bulgaria, Croatia, Romania, Serbia, and Slovenia.

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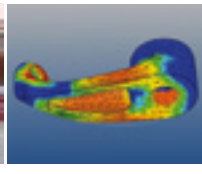

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THE INDEPENDENT VOICE OF THE GAS-TURBINE-BASED GENERATION SECTOR

The elephant in the EU's living room

Mikie11

The public-sector corruption that allowed the Soviet economy to work has persisted in the Russian Federation, earning the country a rank of 154 out of 178 in the world from Transparency International

Russia's unimaginable vastness is only suggested by the fact that the country sprawls across nine time zones and 40 degrees of latitude, from the temperate zone to the Arctic. Its endowment of natural resources is similarly vast. In 2009 Russia for the first time dethroned Saudi Arabia as the world's largest petroleum producer, and its natural-gas production was the world's second-largest, after the US. Russia's coal reserves are second only to the United States', and its hydroelectric potential is the second-largest after China's. Its industrial base and educated population support a vigorous nuclear-power industry that is building power plants at home as well as exporting them at a time when the industry elsewhere is struggling back to its feet after decades on the defensive, and may yet be knocked down again in the wake of Japan's nuclear tragedy.

But Russia's allure for investors is tempered by some sobering facts. The country's tradition of absolute rule, first by princes, then by czars and the Soviet dictatorship, is expressed today in "extensive" state control in the Russian economy "via both direct state ownership and control over economic activity," says the Organization for Economic Cooperation and Development (OECD). "State-owned enterprises are found across a wide range of sectors and often occupy a dominant position in their industry. Furthermore, there is a pervasive blurring of the line between the public and private sectors, arising not only from the extensive role of state-owned enterprises but also by close ties between government (at all levels) and major private firms. One reflection of this phenomenon is the unusually important role of current or former politicians and senior bureaucrats in business, which gives rise to multiple, distorting and costly conflicts of interest."

Combined with a lack of transparency, these conditions leave outsiders with the impression that Russia's energy industry appears to be a puppet show cynically staged by the Kremlin for its own benefit. "Recent initiatives to strengthen the obligations for politicians and senior bureaucrats to publicize their incomes and financial assets are welcome," OECD notes, but much remains to be done to complete the freeing of the market. The public-sector corruption that allowed the Soviet economy to work has persisted in the Russian Federation, earning the country a rank of 154 out of 178 in the world from Transparency International.

Responding to the negative spin in Western media reports on its business practices, Russia's government says it is simply seeking fair compensation for its commodities and a fair return for its people on foreign investments in its economy. To its credit, Russia has made real progress in the transition from state socialism to a market economy after a chaotic start. The privatization of state-owned companies in the oil and gas industry in the 1990s devolved in a tumultuous scramble of insider cowboy capitalism to produce today's business-scape of energy behemoths with near-monopolistic sway, controlled by hyperwealthy, politically connected oligarchs. In 2008, by contrast, RAO Unified Energy Services, the sole, state-owned electric utility, was broken up in a more orderly fashion into 23 separate companies, in part to make private investment easier.

The Central Intelligence Agency Fact Book describes Russia as "a centralized semi-authoritarian state whose legitimacy is buttressed, in part, by carefully managed national elections, former President [Vladimir] Putin's genuine popularity, and the prudent management of Russia's windfall energy wealth."

Whatever the shortcomings of Russia's energy industry today, it is at least somewhat open to foreign direct investment, something that could not be said of the Soviet Union. In the European Bank for Reconstruction and Development's (EBRD) Transition Report for 2010, which measures the progress of former command economies moving toward market economies, the Russian Sustainable-Energy sector and the Natural-Resources sector each earned a transition indicator of 2 on a scale of 4; the

Gazprom

At an estimated cost of $10 billion, Nord Stream runs 1200 km from Vyborg, Russia, under the Baltic Sea, to Greifswald, Germany, and is vital to EU energy security

Electric Power sector's indicator was 3.25, tied with Telecommunications and second only to Capital Markets.

And the Russian government continues to seek a place in the sun commensurate with the country's potential. In 2006, the ruble was made a fully convertible currency, raising its international status and opening the currency to foreign investment. Two years later, President Dmitry Medvedev announced that Moscow was to become an international financial center. Lucio Vinhas de Souza, a World Bank economist, throws cold water on that boast, insisting that Russia's attractiveness to investors is not improving in spite of all its striving. But Medvedev and Prime Minister Vladimir Putin, nothing daunted, keep presenting the case for Russia to investors and the world business community.

The Country

After the 1991 dissolution of the Soviet Union, the 2330-percent inflation of 1992, and the chaotic scramble kicked off by the privatization of state assets, the financial crisis of 1998 seemed to deal the coup de grâce to Russia's economy and pride, producing 85-percent inflation and bank failures that vaporized millions of people's life savings. But the 10 years that followed saw the strongest decade of growth in Russia's history, with real GDP nearly doubling, says the OECD. Inflation was on a trend decline to single digits by mid-2007, and the middle class swelled to comprise a quarter of the population.

The global financial crisis of 2008 hurt Russia worse than many countries because commodities make up nearly 90% of its exports, and commodity prices plummeted as the world economy reeled. Growth, which had averaged 6-7% for most of the decade, slowed to 5.2% in 2008 and the economy shrank 7.9% in 2009. It is recovering, with growth in 2010 estimated by the World Bank at 4.2%, and the bank is forecasting moderate annual growth for the near term: 4.5% in 2011 and 3.5% in 2012 "as domestic demand expands in line with gradual improvements in the labor and credit markets."

Russia's population statistics paint a troubling picture, with likely consequences for the labor force. The Russian Ministry of Public Health estimated the population at 141.9 million in January 2009, which was a decrease from the previous year. The Russian government has launched a program to encourage births and improve life expectancy, but in 2008, the US Census Bureau reported, "Russia's population is expected to shrink by 24 million people between 2008 and 2040, a drop of 21%." Life expectancy is one of the lowest among developed countries, averaging 59.3 years for men and 73.1 years for women, reports the US State Department. Major causes of death among working-age men include cardiovascular diseases, cancer, traffic accidents, and violence, and excessive alcohol consumption and smoking are considered major factors.

Unemployment, about 5.5% in mid-2008, shot up to 9.4% in February 2009. It remained over 7.6% until falling to 6.6% in September 2010. In November 2010, the World Bank forecast an improvement in unemployment "later in 2011." Inflation also spiked in 2008 to 15.1% in the second quarter of 2008 before declining to 5.5% in July 2010. It is rebounding now and reached 9.6% in January 2011, but the Economist Intelligence Unit of the British news magazine The Economist forecasts a gradual decline to less than 6% by 2015.

Opportunity Knocking

In June 2010, Russia began a new run at privatization. After a decade during which the Kremlin focused on gaining control of the country's strategically

Energy Industry Players: Russia

Bashneft	9th-largest oil producer
Enel OGK-5	Territorial genco
Federal Grid Co	Transmission monopoly
FTS	Federal Tariff Service
Gazprom	Gas company
Inter RAO UES	Genco
Irkutskenergo	Power supplier to UC Rusal
Krasnoyarskaya GES	Power supplier to UC Rusal
Kuzbassenergo	Genco
Lukoil	Independent oil major, 2nd largest producer, including refineries (975,860 bpd)
Mosenergo	Genco
Novatek producer	Largest independent gas
Novosibirskenergo	Wholesale Genco
OGK-1	Wholesale Genco
OGK-2	Wholesale Genco
OGK-3	Wholesale Genco
OGK-4	Wholesale Genco
OGK-5	Wholesale Genco
OGK-6	Wholesale Genco
Quadra Power Generation	Territorial Genco
Rosneft	Biggest oil producer and biggest refinery operator (1.3M bpd), independent
RusHydro	Russia's largest power generating company
Russneft	8th-largest oil producer
Surgutneftegaz	Independent gas producer
Tatneft	Oil producer
TGK-1	Territorial Genco
TGK-2	Territorial Genco
TGK-5	Territorial Genco
TGK-6	Territorial Genco
TGK-7	Territorial Genco
TGK-9	Territorial Genco
TGK-10	Territorial Genco
TGK-11	Territorial Genco
TGK-13 (Yeniseyskaya TGK)	Territorial Genco
TGK-14	Territorial Genco
Volzhskaya TGK	Genco
Zarubezhneft	State-owned oil producer authorized for offshore E&P

OAO Boguchanskaya GES

The 3000-MW Boguchanskaya hydro plant is obtaining financing from external investors and is scheduled for completion in 2013

important companies and assets and reorganizing them, the government now intends to raise an estimated $50 billion to modernize them by selling stakes, ranging from minority to controlling, via private negotiations with foreign investors. The "strategy for modernization and privatization has created an incredibly ambitious, intricate and fragile plan," says a report by Stratfor, an Austin, Texas, US-based analytical service. "The plan depends on many variables and could fall apart before Moscow realizes its goal of securing strength for the state and economy for years to come."

Stratfor explains the Russian government's actions in the first decade of this century as the result of Vladimir Putin's deliberate efforts, first as prime minister, then as president, and again as prime minister, to reorganize, rebuild and strengthen Russia, overcoming the embarrassment and correcting the mistakes of the chaotic 1990s. "These goals affected every sector in Russia," says Stratfor. "Economically, Putin began consolidating the main assets that were strategically important to the government by taking them away from the Russian oligarchs or foreign entities that controlled them. After getting them under state control, Putin ordered a reorganization of those firms and assets, eliminating inefficiencies and creating large monopolies that became national champions in the energy, banking, transportation, military industrial, agricultural, telecommunications, and other sectors."

If correct, this reading of events would help to explain why Yukos was destroyed on the dubious pretext of tax claims but Rosneft was allowed to feast on the remains, or why Royal Dutch Shell, Mitsui, and Mitsubishi in 2007 were forced to sell Gazprom a controlling half of their $20-billion stake in the Sakhalin II natural-gas development, violating earlier guarantees. Such incidents seriously compromised Russia's reputation as a reliable business partner and a safe destination for investment, but they served goals that the Kremlin must have considered to be overriding.

The shock of the 2008 global financial panic "shook the Russian economy to its core," says Stratfor. In its aftermath, the government realized that controlling the economy was only a first step; the next would require the modernization of the national champions to ensure their ability to compete globally. For that, they needed technology and cash.

President Medvedev has been securing the technology through deals in western Europe and the US in recent years. For the cash, the Kremlin will raise an estimated $30 billion between 2011 and 2013 by selling minority stakes in a dozen or so large companies as well as controlling stakes in thousands of smaller, strategically less important ones. Rosneft, Transneft, Federal Grid Company, and RusHydro are among the strategic prizes on the block. In January 2011, it appeared that the oil company already had struck gold when Rosneft and BP agreed on a joint offshore exploration and production program in 125,000 km^2 of the South Kara Sea accompanied by a $16-billion stock swap. The companies touted the agreement as the first cross-shareholding in the global oil industry between a major national oil company and an international oil company, but the deal fell apart when BP's Russian partners in TNK-BP successfully opposed it before an arbitration panel. When it was announced, analysts had called the deal an encouraging signal to investors that Russia's resources are opening up to foreign investors, according to Platts energy newsletters. The effect of its failure remains to be seen.

Possibly taking the cue, French oil company Total and Russian independent gas producer Novatek in March 2011 agreed that Total will take a 12-percent shareholding for about $4 billion in Novatek, possibly rising to 19.4% within 36 months. The deal also will make Total the main international partner on the Yamal LNG project, with 20%. Other recent major oil and gas announcements have included plans by Chevron and Exxon Mobil separately to collaborate with Rosneft for offshore exploration and production in the Black Sea. And Stratfor's analysis of the privatization plan notes that "Italian energy firm Eni is interested in buying a stake in Rosneft as a way to give Eni more freedom to work in Russia and possibly secure other oil deals previously off-limits to the foreign firm."

As if to emphasize that the Kremlin has changed its ways, Prime Minister Putin in December 2010 said that Russian officials "understand that we need foreign investment." At the World Economic Forum in Davos, Switzerland, in January 2011, President Medvedev's theme was Russia's welcome to foreign investment.

Russia Energy Stats

Oil Proved Reserves 2010 (bbl)	60 billion
Oil Production 2009 (bbl/day)	9.495 million
Crude Oil Pipelines 2009 (km)	74,285
Refined Products Pipelines 2009 (km)	13,658
Refinery Capacity 2010 (bbl/day)	5.4 million
Gas Proved Reserves 2010 (m^3)	47.57 trillion
Gas Production 2009 (m^3)	583.6 billion
Gas Pipelines 2009 (km)	159,552
Hard Coal Recoverable Reserves 2005 (tonnes)	49,088 million
Hard Coal Production 2009 (tonnes)	228.6 million
Lignite Recoverable Reserves 2005 (tonnes)	107,922 million
Lignite Production 2009 (tonnes)	68.2 million
Installed Generation Capacity 2008 (MW)	224,240
Electricity Production 2008 (kWh)	925.9 billion
Transmission Lines (km)	118,000
Generation: Coal/Peat 2008 (%)	19
Generation: Gas (%)	48
Generation: Nuclear 2008 (%)	16
Generation: Hydropower 2008 (%), including pumped storage	16
Generation: Non-hydro Renewables 2008 (%)	1

Sources: CIA Fact Book, Energy Information Administration, Wikipedia

"An Attractive Investment Destination," with Caveat

The wise investor will look closely and think twice before leaping into Russia, which UK Prime Minister Winston Churchill famously described as "a riddle wrapped in a mystery inside an enigma." The CIA Fact Book seems to depict Russia as attractive to investors, ranking it 19th in the world as a recipient of foreign direct investment, with an estimate of $256.8 billion in 2009, up from $219.7 billion in 2008. But how one reads the country's investment climate depends on where one stands.

The 2010 Energy Report from the Economist Intelligence Unit writes, "The overall investment environment [in Russia] remains problematic, since the legislative framework is inadequate; in particular, there is an absence of a functioning framework for production-sharing agreements (PSAs). In addition, the government is reluctant to allow foreign majority control in the energy sector. Significant exceptions have included the Sakhalin offshore projects, although here too the government has reasserted state control."

A special advertising section in Oil & Gas Financial Journal, however, describes Russia as "an energy superpower grappling with the challenge of redefining itself for the 21st century. Part of the problem is that old stereotypes prevail where they should not. Russia is keen today to show itself as a country bursting with potential, as open and transparent as any other market across the globe. Although a lot still needs to happen before the world begins to view Russia in this way, the current situation means that for those who are not risk-averse, the market holds much potential. It is clear that Russia's key oil and gas decision makers, although focused in different areas and on different challenges and opportunities, are all working towards one common goal: making Russia a strong energy player for the sake of the economy, for business and for its citizens."

If that is Russia's goal, hard-eyed analysts, surveying the countries of the world and comparing statistics among them, conclude that this work-in-progress is far from finished. Forbes Magazine's 2011 list of Best Countries for Business ranks Russia number 102, behind Armenia and ahead of Ukraine. That rank places Russia significantly below Poland (38), Slovakia (33), Romania (52) and Turkey (54).

While citing Russia's progress toward a market-based, globally integrated economy, the CIA Fact Book notes that "protection of property rights is still weak and the private sector remains subject to heavy state interference." Forbes ranks Russia's market performance 8th in the world, but some other ranks—investor protection (74), red tape (79), and technology and tax burden (69 each)—place it in the middle of the pack, while still others—corruption (115), trade freedom (108), and monetary freedom (118)—place it much lower.

Rosatom plans to commission three new reactors per year from 2016 to 2020, shrugging off concerns raised by the tsunami-damaged Fukushima Dai-ichi disaster in Japan

The World Bank's report, Doing Business 2011: Making a Difference for Entrepreneurs, which compares business regulations in 183 economies, ranks Russia even lower: 123rd overall for ease of doing business, behind Slovakia (41), Romania (56), Turkey (65), and Poland (70). For investor protection, Russia earns a rank of 93; for dealing with construction permits, 182; and for cross-border trading, 162. Its one bright spot in this report appears to be a rank of 18 in enforcing contracts. "There does not yet seem to be a well-established legal-political framework for third-party investments in Russia," writes the French Institute for International Relations (IFRI), an independent think tank.

To its credit, Russia is taking steps to harmonize its national accounting standards with the International Financial Reporting Standards. The effort was launched in 1998 and is due to be complete in 2011. But Russia's integration in the world economy remains incomplete. Its accession to the World Trade Organization is still pending after more than 15 years of negotiation. "WTO membership would…exercise some leverage for making more progress with competition-enhancing reforms," says the OECD. "As to foreign direct investment (FDI), inflows have until recently, been robust, but barriers to foreign ownership are estimated to be high in Russia compared to OECD countries. In part, this reflects the enactment in May 2008 of the law on strategic industries, which defines 42 sectors in which control by foreign investors requires prior authorization from a government commission… The emergence of large state-controlled conglomerates with dominant market positions also acts as a barrier to FDI inflows… Beyond explicit barriers to FDI, the overall regulatory environment in Russia is perhaps the most significant impediment to greater inflows of FDI."

But the UK-based risk-analysis firm Maplecroft most concisely sums up the ambivalence toward investment in Russia in its Political Risk Atlas 2011, published in January 2011. The atlas analyzes 196 countries and categorizes 11 of them as an "extreme risk." Russia is one of them, in the company of Somalia, Zimbabwe and North Korea, among others. Contributing factors include terrorist attacks and the business environment, including corporate governance and corruption, compounded by "an ineffective legal and regulatory system, which includes a lack of judicial independence," says Maplecroft. Contradicting the World Bank, the firm also warns of "the increasing risk of poor contract enforcement and expropriation. Irrespective of these risks," Maplecroft continues, "Russia remains an attractive investment destination" because of its "resource security, infrastructure readiness and education." In addition, it notes, the country enjoys political stability, with a popular prime minister in Putin and a trusted president in Medvedev.

Natural Gas

In 2009, Russia published its energy strategy for the period up to 2030. It envisages investment of $565-590 billion to increase its gas production by 33%. Russia has the world's largest reserves of natural gas, 44.38 trillion m^3, or 23.7%

of the world's total, according to the BP Statistical Review of World Energy 2010. The next-largest reserves, in Iran and Qatar, together make up 29.3% of the world's total, putting more than half of the world's gas reserves within Europe's reach. But they are less accessible for Europe than are Russia's, which can deliver its production via pipeline. Iran was to have been a source for the Nabucco Pipeline, but the sanctions on the Islamic Republic have precluded that plan, and Qatar's gas is being delivered primarily via ships in liquid form. That is a principal reason for Europe's dependence on Russian gas and for the EU's anxiety over the various pipeline options—Nord Stream, South Stream, and Nabucco, among others—that are being promoted to deliver gas.

Accounting for nearly 85% of Russia's gas production and owning the gas pipeline network, Gazprom is the dominant force in its industry. As such, it has figured prominently in disputes over gas transmission via transit countries like Ukraine that have led to disruptions of supply to the EU in the dead of winter. Gazprom insists the cutoffs were the result of payment disputes alone, but many Western analysts consider the crises at least partially induced as an exercise in foreign-policy leverage by the government that owns Gazprom.

Gazprom's two main strategic projects today are the Yamal Peninsula and the Shtokman field in the Barents Sea. Gas reserves totaling 10.4 trillion m^3 have been discovered in the Yamal Peninsula, and the Russian energy strategy estimates that capital investments in the range of $166-198 billion will be required to develop them.

Gazprom began drilling at the largest Yamal field, Bovanenkovo, in 2008, 11 years late, aiming for production in 2011 at an estimated cost of $10 billion. Favored as a strategic company under the 2008 law on strategic industries, Gazprom has been able to secure licenses on gasfields in Yamal without public auction, and until recently the company intended to develop Bovanenkovo without foreign participation. Facing complications both technical and economic, Gazprom has reduced its investment 22%, delaying production until 2012. The apparent change in policy that produced the BP-Rosneft stock swap, however, has also softened resistance to foreign investment in Yamal, opening the door to Total's purchase of the stake in Novatek, which is developing the Yamal LNG project.

Gazprom announced in 2006 that it would develop the huge Shtokman gasfield in the Barents Sea alone, but in 2007, Total and StatoilHydro were invited to take stakes of 25% and 24%, respectively in Shtokman Development, the company that will design, finance, and build the infrastructure. Gazprom will retain full ownership of the Shtokman license, however. The rapid development of shale-gas deposits in the US has altered plans for an LNG plant in the Shtokman project. The US was considered to be a primary market for Shtokman production, but the country no longer requires natural-gas imports at their former level. The partners decided in early 2010 to defer a final investment decision on the LNG plant until December 2011, pending completion of a US EPA study on the environmental impact of hydraulic fracturing, the method used to unlock the gas deposits in shale. The shale-gas development has affected gas prices worldwide because it has removed a large part of US demand from the world gas market. In September 2010, Russia and Norway agreed on a maritime border in the Barents after 40 years of negotiation, opening the area to oil and gas development that had been stalled by the dispute.


Gazprom

The Northern Sea Route, if proved commercially viable, will open an entirely new shipping channel for production from the Shtokman field as well as from the proposed Yamal LNG plant

"The Russian government seems keen to explore the possibility of opening the [Arctic] shelf to private companies," says the O&GFJ Russian ad section, because Rosneft and Gazprom, the only Russian companies allowed to explore and produce there under current law, can't invest the $207 billion required to do the job in a timely fashion. "We're looking to expand the list of companies allowed to get licenses for development of the offshore fields," said Sergey Donskoy, deputy minister of Natural Resources and Ecology.

Moving the gas to market remains a challenge. Russia's gasfields are mostly in remote locations and pipelines of extraordinary length are required to deliver the production. Complicating the problem are the transit countries—Ukraine, Belarus, and the Baltic Countries—that lie between Russia and the European market. Europe receives 25% of its gas from Russia, with 90% of that transiting Ukraine. Gazprom's solution consists of two pipelines, Nord Stream and South Stream, that bypass all transit countries.

At an estimated cost of $10 billion, Nord Stream runs 1200 km from Vyborg, Russia, under the Baltic Sea, to Greifswald, Germany. The pipe was inaugurated in November of 2011 and is now fully operational. A second pipe will follow a year later. For roughly the same cost, South Stream will cross the Black Sea from Beregovaya, Russia, to Varna, Bulgaria, whence it will split, with one branch running through Greece and Albania to Italy and the other via Serbia and Hungary to the Baumgarten Hub in Austria. South Stream is still in development, aiming for completion by 2015. Eni of Italy is participating and Électricité de France is negotiating to join the project as a strategic partner with Gazprom, which hinted in February 2011 that other partners might soon be added. Gazprom has proposed expanding its Yamal-Europe gas pipeline with a second line doubling the total capacity to 28.3 billion m^3, but disagreement over its route is holding up the project.

An intriguing possibility for a route to the East Asian market is being explored. In August 2010, Russian shipping company Sovcomflot sent a 100,000-deadweight-ton Aframax ship laden with gas condensate, escorted by two of the world's biggest nuclear-powered icebreakers, from Murmansk to Ningbo, China, via the Northern Sea Route, i.e., around the north and eastern tip of Siberia and then south to China. The trip took 22 days and cut the traditional route via the Suez Canal nearly in half, from 12,000 nautical miles to 6600 miles. Sovcomflot has announced a program of commercial voyages via the Northern Sea Route for later in 2011 to further test the route's commercial viability. If successful, it will open an entirely new

shipping channel for production from the Shtokman field as well as from the proposed Yamal LNG plant.

Oil

The 2030 energy strategy envisages increasing Russia's oil production about 10% with $609-625 billion of capital investments. The modest goal for expansion reflects the reality that Russia already produces close to its top capacity; the investment will be required just for exploration and production from new fields and to enhance output of fields that are being depleted.

"Russian oil majors have not been investing enough in the exploration of new fields, many of which are found in remote Arctic regions of eastern Siberia, where exploration and exploitation will be considerably more expensive and technically challenging," says the Economist Intelligence Unit. Exploration and production will be even more challenging and expensive in the Arctic offshore, where vast reserves are suspected to lie. Given the Russian companies' limited offshore experience, these areas probably will be more open to foreign investment, as the Rosneft deals with Chevron and Exxon Mobil in the Black Sea and with BP in the South Mara Sea suggest. In January 2010, Natural Resources Minister Yuri Trutnev called for opening Russia's offshore oil and gas reserves to international oil companies, saying that developing those reserves would take 160 years at the current rate of investment by Gazprom and Rosneft.

ConocoPhillips and BP have long been among the most prominent foreign investors in the Russian oil industry. Conoco acquired a 7.6% shareholding in Lukoil for $2 billion in 2004 and later increased its holding to 20%. The US firm reduced that by half in spring 2010 to improve its balance sheet. The 2003 merger of Tyumen Oil Company (TNK) with BP's Russian oil assets produced TNK-BP, Russia's third-largest oil producer, of which BP owns 50%. However, that merger has suffered a series of trials that give would-be investors in Russian energy good reason to be cautious. Whether its fortunes will turn under the presumed new policy described by Stratfor remains to be seen.

Russian oil has flowed to Eastern Europe since 1964 via the Druzhba (Friendship) pipeline, which supplied oil to several of the Soviet Union's Warsaw Pact allies. It is a network that extends from deep in European Russia to eastern Germany, Hungary, and the Czech Republic, with extensions now continuing into other parts of the EU. Several proposed additions are under study, but nothing yet has gone very far beyond planning.

The state pipeline monopoly, Transneft, also has been active in developing new routes for its oil exports, building Primorsk as a Baltic oil export terminal and now adding construction of Ust-Luga nearby as a companion port. The first part of the Baltic Pipeline System became operational in 2001 with the Primorsk terminal. A second trunk line now being added will supply Ust-Luga by 2012.

Looking eastward as well, Transneft began exporting oil in 2009 via the Eastern Siberia-Pacific Ocean Pipeline (ESPO). The line then was just 2694 km long, from Taishet to Skovorodino, from where the oil is being trucked to Kozmino on the Pacific coast near Vladivostok. Construction of the pipeline is continuing now to Kozmino and is scheduled for completion in 2014, but a spur from Skovorodino to Daqing, China, was completed in 2010, and crude-oil shipments commenced January 1, 2011.

But Prime Minister Putin, seeking shelter from the volatility of commodity prices, is urging the industry to produce more petroleum products, and the Kremlin has crafted the tax laws to support that goal. Export taxes on refiners are lower than those on crude suppliers, and the state is preparing to discourage construction of boutique refineries by prohibiting refineries with a depth of less than 70% from using Transneft's pipelines. Refining depth refers to the quality and range of a plant's products. The country has 40 large refineries with a total crude processing capacity of 5.4 million bbl/day, according to the Oil & Gas Journal.

Russia's energy strategy for the period to 2030 envisages the establishment of large complexes for production and refining of oil, gas and petrochemicals in new oil-producing regions. The plan calls for refineries with depth up to 72% in the first phase, ending between 2013 and 2015, with increases to 83% and later 90% in subsequent phases. Expansions are planned for refineries at Tuapse and Kirishinetteorgsintez, and new oil chemical complexes will be constructed in the Republic of Tatarstan and in Primorsk.

Electricity

The reform of Russia's nominal 200-GW electricity system was accomplished with much less turmoil than the privatization in the 1990s. Between 2004 and 2008, generation, transmission and distribution were unbundled and Unified Energy System, the federation-wide electricity utility, was broken up. Most of the thermal powerplants and combined heat-and-powerplants were grouped, respectively, into six wholesale generating companies, called OGKs, and 14 territorial generating companies, called TGKs, all privatized. Hydroelectric plants, nuclear plants, the transmission grid, distribution companies and system operator also were grouped in separate companies, but remain state-owned, either fully or with majority state control.

The restructuring was intended to attract investment to the competitive parts of the system. The Russian energy strategy forecasts that $577-888 billion of capital investments will be required in the period to 2030 to expand and modernize the system, almost all of which dates from Soviet times, is heavily dependent on coal, and is already at or near the end of its design life.

Rosneft

Exploration and production will be even more challenging and expensive in the Arctic offshore, where vast reserves are suspected to lie. Given the Russian companies' limited offshore experience, these areas probably will be more open to foreign investment

Rosneft

Moving gas to market remains a challenge for Russia as its gasfields are mostly in remote locations and pipelines of extraordinary length are required to deliver the production

Buyers of the OGKs and TGKs during the reform undertook an obligation in the purchase to introduce new power facilities within the next 10 years, including 40,900 MW between 2006 and 2010. They are legally bound to begin investing in expansion of the powerplant stock soon, although several have failed to meet their investment obligations, blaming the poor economy. The government had promised to stop capping electricity prices by 2011, thus adding to the attraction for investment capital. The government also is pilot-testing a new system of tariff regulation for grid companies using the regulatory asset base methodology to replace the cost-plus system. If adopted, the RAB tariff is expected to attract investment for the upgrade of the 3.2-million-km transmission system, of which 118,000 km are cables over 220 kV.

The transmission grid's inadequate condition has caused congestion and is partially responsible for the low capacity factors in the generation system. The Federal Grid Company plans to invest $14.5 billion by 2013 to modernize the high-voltage grid. Siemens has a cooperation agreement for this with FGC, using its high-voltage DC transmission technology.

The dilapidated state of the generation system was glaringly evident when a turbine at the Sayano-Shushenskaya hydropower plant broke apart in 2009, flooding the turbine hall and engine room and claiming 75 lives. Another red flag is the fact that about half of the 31 nuclear reactors in Russia's 23,200-MW generating fleet use the same RBMK design that was used at the ill-fated Chernobyl plant, and the nuclear fleet operates with a suboptimal 80% capacity factor, although that has been rapidly improving in recent years.

Ten nuclear units now are under construction and probably will replace at least some of the older stock, and an extensive uprating program is under way. One plant, the 2300-MW, two-unit Baltic Nuclear Powerplant in Kaliningrad is the first nuclear plant to be authorized for construction in Russia with private-sector investment and joint ownership, said Maxim Kozlov, head of the project team for the Russian reactor project at utility Inter RAO UES in an interview with Platts energy newsletters. Rosenergoatom, the nuclear power station operator, will hold 51% of the $6.1-billion plant, but the rest is available for foreign investment. A Rosatom official added that the utility plans to build more plants in partnerships in the future. In March 2010, Rosatom said it would commission three new reactors per year from 2016 to 2020, and the Russian nuclear power program appears to be shrugging off concerns raised by the tsunami-damaged Fukushima Dai-ichi disaster in Japan.

But these plans took a bit of a hit when Rosatom's pending joint venture with Siemens was canceled when Siemens announced it would be exiting the atomic energy market. In response, Rosatom signed a deal with Rolls-Royce in late-September to collaborate in the civil nuclear maket and is seeking further partnership with Italian utility Enel to fill the void. Rosatom and Italian utility Enel are cooperating on development of nuclear powerplants in Central and Eastern Europe as well. Enel has developed extensive investments in the Russian power sector since 2004, including 54% of electricity wholesaler OGK-5. Germany-based E.ON controls another wholesaler, OGK-4, with a 71% stake.

About half of the 31 nuclear reactors in Russia's 23,200-MW generating fleet use the same RBMK design that was used at the ill-fated Chernobyl plant, and the nuclear fleet operates with a suboptimal 80% capacity factor

The 2030 energy strategy projects that "non-fuel" energy (nuclear and hydro) will double by 2030, raising the combined share of these sectors, now 32%, to at least 38% of the nation's power supply. As noted, these two sectors remain under state control, but in October 2010, First Deputy Prime Minister Igor Shuvalov said Russia might sell nearly 8% of RusHydro as well as 4.1% of the Federal Grid Company.

Russia has built two of the largest hydroelectric powerplants in the world, but still only 45,000 MW, 20% of the country's vast hydroelectric potential, has been developed. RusHydro has 6367 MW of large powerplants under construction; one project, the 3000-MW Boguchanskaya plant on the lower Angara River in Krasnoyarsk Territory, is obtaining financing from external investors, as are a number of small hydro projects in the Caucasus.

One reason so little hydropower has been developed is the remoteness of the resources from potential load centers. Most of the hydro potential is in Siberia and the Russian Far East, while the population is concentrated largely in European Russia. The Boguchanskaya plant is being developed to serve a greenfield aluminum smelter also now in construction. Future hydropower development may require similar arrangements or the construction of long high-voltage DC lines to deliver the power to distant load centers.

Renewable energy, other than hydropower, has gotten short shrift in Russia, but the 2030 energy strategy sets a goal to increase non-hydro renewable energy production from 0.5% to 4.5% of the total by 2020. The goal for wind alone is 5000 MW, and several EU-based energy companies have already made their moves. Netherlands-based Windlife Energy in 2008 received approval from regional authorities to build the first 200 MW of up to 2000 MW of wind capacity in the Kola Peninsula. The developer, Windlife Arctic Power, is a 51/49 joint venture with local shareholders. Construction was scheduled to start in 2011. In June 2010, Siemens, RusHydro and Rostechnologii agreed to form a joint venture to install at least 1250 MW of wind capacity in Russia by 2015. The next month, Genoa-based ERG Renew and Lukoil agreed to cooperate in developing joint business opportunities in Eastern Europe and Russia, specifically focusing on wind energy.

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PKN Orlen

Slated for privatization, the 373,000-bpd Plock refinery, operated by PKN Orlen, has plans to increase efficiency in its operations to meet the growing competitive challenge of the liberalized European market

Poland's power sector needs "substantial investment," and "foreign investors could make an important contribution" in meeting the need, says the European Bank for Reconstruction and Development (EBRD) in its 2010 Transition Report.

"Poland has made significant progress in the transition to a modern market economy," and has been one of the most successful of the countries making the transition, the EBRD adds. "A 'shock therapy' program during the early 1990s enabled the country to transform its economy into one of the most robust in Central Europe," explains the CIA World Factbook.

The economy performed well in the mid-2000s, but privatization largely halted. "The authorities did not use the exceptional 2003-08 expansion to improve the fiscal position in a sustainable way, resulting in the need to use privatization receipts in the recent period of lower stock prices so as to meet fiscal targets," says the EBRD.

Noting that Poland's 2009 real GDP growth rate of 1.7% made the country the only one in Central Europe and the Baltic States to avoid recession, the EBRD adds, "Poland is one of the European Union economies where the involvement of the state is most pervasive, notably in the power, natural resources and banking sectors." Its report cites "an inefficient power sector" for hindering both growth and Poland's ability to meet European Union environmental standards. "Additional investment is necessary to proceed with the restructuring and full privatization of the larger power groups."

The CIA Factbook cites "lingering challenges of high unemployment, underdeveloped and dilapidated infrastructure, and a poor rural underclass," while the EBRD report concludes, "Reducing the influence of the state is an overriding priority, for which perseverance with implementing the privatization program is essential."

The Economy

Poland has survived the financial turmoil of recent years through a paradoxical luck that turned weaknesses and threats into opportunities. In September 2008, the country was riding the wave of a five-year economic boom, and Prime Minister Donald Tusk announced the goal of joining the euro zone by 2012. A few days later, US investment bank Lehman Brothers collapsed and by winter the Polish zloty had lost nearly 50% of its value against the dollar and 35% against the euro, according to the US State Department. Yet the ability to trim its foreign-exchange sails in the economic storm saved Poland from foundering on the shoals of the contraction that caused shrinkage in every other EU country's GDP. Currency depreciation improved the competitiveness of Poland's domestic producers, leading to improvement in the country's real balance of trade. Euro adoption now has been indefinitely postponed.

The relatively limited development of Poland's banking system also worked in the country's favor because the banks were not burdened with the sophisticated financial products that have been blamed for creating the bubble, according to the Organization for Economic Cooperation and Development (OECD). Prompt action by the National Bank of Poland helped to calm the turbulent waters by cutting official rates and taking other measures to ensure liquidity in the domestic interbank market. The OECD also credits "fortunate pre-crisis cuts in taxes and social contributions, and infrastructure investments related to EU funds and the 2012 European football championships" with supporting domestic demand.

Those EU funds actually are funds made available through the EU's cohesion policy, under which resources from affluent parts of the Union are transferred to poorer areas to be spent on modernization that will help them to achieve GDP parity with the EU average. "Poland has become the largest beneficiary of EU cohesion policy in absolute terms," says the OECD, which forecasts the transfers will average 3.3% of Poland's GDP annually between 2009 and 2015 and will raise real growth by an average of 0.5-1.5% per year. Thus, even the underdevelopment of Poland's infrastructure was a perverse advantage, making the country a magnet for the

cash infusions that buoyed the economy through the recession.

"Despite the setback, Poland has weathered the global crisis as well as any country in Europe," says the US State Department. "It was the only country in the European Union whose economy grew in 2009…Fiscal moderation of recent years meant that the government's accounts looked fitter than those of, for example, crisis-stricken Hungary or Latvia." But Poland is still suffering from declining exports and investment. "Unemployment appears to have peaked at 9.9% in December 2010," but the government is "struggling to contain unexpectedly large public finance deficits in 2009 and 2010, as well as the government debt, largely by cutting spending, speeding up privatization, modifications of the pension system, and extracting dividend payments from state-owned companies." The sale of state-owned assets "accelerated considerably in 2010," the State Department says.

Poland's work force of 17 million is well educated: the literacy rate is 99.8%, men average 15 years of schooling and women 16 years, but wages are low. Industries employ 29.2% and services 53.4%, with the rest in agriculture. Per-capita GDP in purchasing power standards in 2009 was 61% of the average of the EU's 27 member countries. "Strong economic growth potential, a large domestic market, tariff-free access to the EU, and political stability are the top reasons US and other foreign companies do business in Poland," says the State Department. Unemployment, 9.9% at the end of 2010, is close to the EU average, but the OECD forecasts that it will fall to 8.9% in 2011 and 7.8% in 2012.

The population is estimated by the CIA Factbook to be 38.4 million in mid-2011. A generally low incidence of HIV/AIDS and other infectious diseases contributes to a life expectancy at birth of 76 years, but behind that average is a wide gap between men's and women's life expectancies: 72.1 years for men and 81.25 for women. The fertility rate of 1.3 children per woman ranks Poland 209th in the world, according to the CIA, and the population growth rate is negative, estimated at -0.062% in 2011.

Energy Industry Players: Poland

Enea S.A.	Vertically integrated power company, 3d largest, state-owned
Energa	Power utility
Energetyka	Energy arm of copper mining company KGHM
EuRoPol Gaz	Owner-operator of gas pipeline from Russia to Germany via Poland
Gas Trading	Gas trading company
Gaz System	Gas TSO, state-owned
Grupa Lotos	2nd largest refiner
Kompania Weglowa (KW)	Largest hard coal mining company
KWB Adamow	Lignite miner
Lubelski Wegiel Bogdanka	Hard coal mining company
Petrobaltic	Oil producer, part of Lotos
PGNiG	State-owned gas company
PGNiG Energia	Electricity
PKN Orlen	Largest refiner
Polish Energy Partners (PEP)	Wind farm developer
Polish Power Exchange	PX
Polska Energia – Pierwsza Kompania Handlowa (PEPKH	Tauron-owned
Polska Grupa Energetyczna (PGE)	Country's largest power company
Polskie LNG	State-owned company in charge of new LNG terminal
Poludniowy Koncern Energetyczny (PKE)	Second-largest power generator (part of Tauron Group)
PSE-Operator	State-owned TSO
Tauron Polska Energia S.A	2nd largest power company, state-owned
URE	Energy regulator
Wojewodzkie Przedsiebiorstwo Energetyki Cieplnej w Legnicy (WPEC Legnica)	District heating company in SW Poland
Zespol Elektrowni Patnow-Adamow-Konin (ZE PAK)	Operator of three power plants in central Poland

In global management consultant AT Kearney's 2010 FDI Confidence Index, senior executives at the world's largest companies ranked Poland 6th as a destination for investment, vaulting from 22nd in the 2007 Index. That move positions Poland with Germany as "one of Europe's new leaders where investors see large, relatively stable economies," says the report.

A glance at some measuring sticks dulls the lustre, however. The World Bank's report, Doing Business 2011, ranks Poland at 70th of 183 countries for "Ease of doing business," 164th for "Dealing with construction permits," 121st for "Paying taxes," 77th for "Enforcing contracts," and 44th for "Protecting investors." Only its rank of 15th for "Getting credit" lifts Poland out of the crowded middle of the pack.

Forbes magazine's list of Best Countries for Business is a bit more favorable, ranking Poland 38th in the world. The tax burden's rank of 106th is the harshest measurement, but a red-tape rank of 87th hints at the potential for difficulty. "Starting a company is still too costly and takes too long," says the OECD. "Formalities to start up a business, get construction permits and register properties are excessive, risking corruption to get around them." Corruption, while not a stellar rank, is better than most, at 40th, says Forbes, closely tracking Transparency International's rank of 41st in the world, with a Corruption Perception Index of 5.5 on a scale where 0-0.9 is "Very Corrupt" and 9.0-10 is "Very Clean." Rankings for Trade Freedom (12th) and Personal Freedom (1st), however, point to Poland's promising potential.

Energy

Coal and lignite together are Poland's only significant indigenous conventional energy resource. Poland's obligations, under the Kyoto Protocol and the regulations of the European Union, to achieve significant reductions in its carbon-dioxide emissions present a major challenge. Coal and lignite fuel 87% of the country's powerplants and produce 92% of its electricity, and the paucity of other energy resources means that there are few inexpensive alternatives.

Poland now is following a three-year action program that was defined in a policy titled Poland's Energy Policy until 2030, adopted in 2009. The policy consists of the action program, which ran until 2012, and a long-term development strategy. With the overall goal of enhancing the country's energy security by reducing dependence on imported energy resources, the strategy's priority directions are:

1 Improve energy efficiency
2 Security of fuel and energy supplies
3 Introduce nuclear power
4 Develop renewable energy sources
5 Develop competitive fuel and energy markets
6 Limit environmental impact.

In pursuing the first priority, energy efficiency, the Ministry of Economy will focus on the entire chain from generation through transmission and distribution to energy use. Powerplant efficiency throughout Poland is 36%, and energy loss by powerplants is estimated at 24 terawatt-hours per year, according to the

GYI NSEA

Coal and lignite fuel 87% of the country's powerplants and produce 92% of its electricity, and the paucity of other energy resources means that there are few inexpensive alternatives

Austrian Energy Agency. Transmission and distribution losses, at 9.36%, are among the highest in Europe. Altogether, generation and line losses constitute 25% of the country's total energy production, says the agency.

To achieve security of fuel and energy supplies, the second goal, "support will be given to develop technologies whereby it will be possible to acquire liquid and gaseous fuels from domestic resources," says the government's Trade and Investment Website. The technology to derive synthesis gas and liquid fuel from coal is nearly a century old and well proved, but researchers differ on the CO_2 emissions associated with it, and its competitiveness depends upon the prices of petroleum and natural gas.

Oil prices are high enough in late spring 2011, but their volatility is such that the picture could change before a plant could be built to convert coal to liquid fuel. Thanks to vast shale-gas development in the US recently, gas prices are low and expected to remain so for a long time. Poland currently has no plants using the coal-conversion technology, but an estimated 3 trillion m3 of shale gas has been discovered. Hydraulic fracturing began in 2010, but analysts are not yet ready to call the project a success. If this resource could be developed, it might make a substantial contribution to Poland's energy security as well.

Poland has planned since 2005 to build a nuclear powerplant because of its potential to generate a large quantity of power with minimal fuel imports and no CO_2 emissions, and the government fast-tracked the plan after the 2009 gas cutoff by Russia over a price dispute with Ukraine. The Fukushima Dai-ichi nuclear disaster in Japan has not shaken that resolve. Plans are drawn up for two plants of 3000 MW each, and a site is to be selected for the first by 2013. In February 2011, tenders with a total value of $477 million were issued for early engineering services. A tender for technology is scheduled for July 2011.

Poland Energy Stats

Oil Proved Reserves 2010 (bbl)	96.38 million
Oil Production 2009 (bbl/day)	34,140
Oil Pipelines 2009 (km)	1384
Refinery Capacity 2010 (bbl/day)	462,578
Gas Proved Reserves 2010 (m^3)	164.8 billion
Gas Production 2009 (m^3)	5.86 billion
Gas Pipelines 2009 (km)	13,631
Hard Coal Recoverable Reserves 2009 (tonnes)	.6012 million
Hard Coal Production 2009 (tonnes)	77.4 million
Lignite Recoverable Reserves 2009 (tonnes)	1490 million
Lignite Production 2009 (tonnes)	57.1 million
Installed Generation Capacity 2009 (MW)	32,999
Electricity Production 2009 (kWh)	141.8 billion
Transmission Lines 2009 (km)	13,294
Generation: Coal/Lignite 2007 (MW)	29,992
Generation: Gas 2009 (MW)	0
Generation: Nuclear 2011 (MW)	0
Generation: Hydropower 2009 (MW), including pumped storage	2348
Generation: Oil/Diesel 2009 (MW)	0
Generation: Non-hydro Renewables 2008 (MW)	522
Goal for Renewables Gross Final Energy Consumption by 2020	15.5%

Sources: CIA Fact Book, Euracoal, Austrian Energy Agency, Energy Information Administration, Polish Ministry of Economy, PSE Operator SA

Renewable-energy sources are a tiny part of the energy picture in Poland today, composing 10% of installed capacity but providing only 3% of the system's supply, but they offer opportunities for growth. Poland's goal is for renewable energy to compose 15.5% of the country's generating capacity by 2020 and 20% by 2030. London-based Frost & Sullivan says Poland will have to add 863-1002 MW annually to achieve those goals. Wind and biomass are the most promising types. Geothermal energy resources are available in 80% of the country, but they are characterized by low enthalpy and used mainly for space heating, therapeutic purposes and industrial applications, according to a 2009 report by Black & Veatch for the EBRD. Hydropower is the second-largest renewable energy source and is likely to remain there because of limited possibilities for further growth, says the Black & Veatch report. Poland's solar-energy potential also is limited, but little-studied. "It is obvious that a country-wide extensive research on the technical and economical feasibility of solar energy is needed," the report says.

Electricity

Poland's power-generation sector is the largest in Central and Eastern Europe, according to the Energy Report of the Economist Intelligence Unit of the British news magazine The Economist. As noted above, 87% of the country's 33,000 MW of installed capacity is fueled by coal or lignite, leaving only scraps for hydropower, non-hydro renewables and natural gas generation. Such dependence on a single fuel is undesirable in most countries because it exposes the system to large risks if problems arise with fuel supply. Poland doesn't lack fuel supply, but the CO_2 emissions profile is unacceptable, given the obligations of the various climate-change treaties and regulations. Yet even with the energy policy announced in 2009, the EIU Energy Report forecasts that 77% of the generation fleet in 2020 will still use "combustible fuels."

Poland has followed a winding path to privatization. The program was launched in the early 1990s with the goal of privatizing all generation and distribution companies, leaving only grid operation in state control. A number of generation and distribution companies were formed, and privatization of individual powerplants be-

imagedepotpro

Transmission and distribution losses, at 9.36%, are among the highest in Europe. Altogether, generation and line losses constitute 25% of the country's total energy production

Jon Mullen

Poland may also have a gas ace up its sleeve, one that is entirely its own. The country is home to two of the five largest shale-gas plays in Europe outside Russia, according to the Oil & Gas Financial Journal

gan in 1999, but it went slowly because of the obligations of long-term supply contracts.

When the center-right Law and Justice party won the national election in 2005, the new government reversed some of the fragmentation of the power sector and reorganized it into four independent parts: generation, transmission, distribution, and trade. The unbundled system was then reconsolidated into four large, integrated electricity groups—Polska Grupa Energetyczna (PGE), Enea, Energa, and Tauron, says a report by Raffeisen Centrobank, Vienna.

These companies now combine generation and regional distribution with ownership of some coal mines, while the transmission grid is owned and operated exclusively by state-owned PSE Operator SA.

The Polish Power Exchange, POEE Platform and brokerage platforms are the markets for wholesale power trading, with the contract market handling some short- and mid-term bilateral contracts and PSE Operator managing the balancing market.

Government plans call for the four integrated utilities to be eventually privatized through sales of stock, and in 2009 PGE and in 2010 Tauron were successfully listed on the Warsaw Stock Exchange, raising a total of $2.68 billion. Swedish energy company Vattenfall acquired 19% of Enea in a 2008 IPO. Privatization of Enea was expected to have been completed in 2011. The antimonopoly regulator UOKiK has blocked PGE's bid to take over Energa despite the government's backing it. The government still owns both companies.

Poland can't afford much more delay. "Most of the power generation capacities operated in Poland were constructed in the '60s and '70s, so their remaining economic useful life is about to end," says Raffeisen. Of the capacity in place, 23% is more than 40 years old and 48% more is 31-40 years old, Raffeisen says. "With planned decommission of 15 GW and the anticipated increase in peak load demand by 11 GW, up to 30 GW of capacity will have to be built over the next 20 years." Reserve capacity margin has declined to 3% at peak demand, while 5% is generally considered the safe margin, Raffeisen says. Poland thus is facing four to five years of potential power shortages until the expansion can catch up with demand growth.

"Plans to construct around 10,000 MW of new capacity by 2015 have been announced," says the EIU, "but it is estimated that around 12,000 MW will be required. At the same time, there will be continuing efforts to modernize the existing generating plants in order to make them more fuel-efficient and less environmentally damaging. There is likely to be significant investment in clean coal technology and coal gasification."

The good news is that the expansion is beginning. "New projects are underway," says Raffeisen, "and already a construction of 21 GW has been started." Bloomberg Businessweek in April 2011 reported that PBG SA, Poland's largest constructor by market value, now is bidding to build six powerplants in a country that built three new units in the last 10 years. These include the country's largest powerplant project, an 1800-MW coal-fired plant for PGE; a 1000-MW coal plant for Enea, 900 MW for Tauron, and a 460-MW unit for PGE. Also on its target list are a 400-MW gas-turbine plant and a 500-MW plant for oil refiner PKN Orlen SA. PBG is bidding jointly with Alstom SA for all but one of the projects. The company is pursuing $1-2.6 billion of contracts with an astonishing gross margin of 20%. "Poland hasn't yet seen an energy boom like this," CEO Jerzy Wisniewski told Businessweek.

Poland's dependence on coal is scaring off some investment, however. In October 2010, Vattenfall canceled plans to build up to 3000 MW of new coal-fired generation capacity in Poland in favor of concentrating on its core markets in Germany, the Netherlands, and Sweden, and said it may sell

Polskie LNG S.A.

Plans to build an LNG terminal at Swinoujscie in northwest Poland have progressed to construction, aiming for operation by mid-2014. This terminal will supply 5 billion m^3 per year, about a third of the country's gas demand

its Polish holdings in three years. The announcement followed actions by RWE and CEZ to freeze investment plans. Analysts attribute the hesitancy at least in part to uncertainty over how many free CO_2 emission allowances Poland will receive up to 2020.

As noted earlier, Poland has persisted with plans to build two nuclear powerplants. PGE will build and operate the plants, the first of which is to be commissioned in 2022 and the second in 2030. Marcin Cieplinski, CEO of PGE's nuclear power subsidiary, has estimated the cost of the first plant at $14 billion, but PGE plans to hold just 51%, with the rest owned by a foreign partner in the consortium. The site has not yet been confirmed, but most sources say it will be in Zarnowiec, on the Baltic coast 40 km west of Gdansk. Locating the plant there could complicate the project. Construction of a nuclear plant in Zarnowiec was halted in 1990 after nearly 10 years of work because of protests from the local people.

A July 2010 report titled Investment Opportunities in the Wind Energy Sector in Europe, by Frost & Sullivan, London, named Poland as the largest wind energy market in Central and Eastern Europe. "Although there are many challenges to surmount within the market, the country has seen the most expansion in the region, due to great wind potential and government support," Frost & Sullivan reported. Several Polish companies also manufacture wind turbines, notes a 2009 report by Black & Veatch for the EBRD. Foreign investors already are developing wind farms. Germany-based RWE has built a portfolio of 108 MW in three wind farms, and in October 2010, E.ON opened a $1.3-billion, 52.5-MW wind farm near Poznan, and both companies intend to invest more. "Poland is a particularly attractive market for us when it comes to operating onshore wind power plants," explains Paul Coffey, Chief Operating Officer at RWE Innogy. "This is because of the remarkable wind resources, the large growth potential and the cooperation opportunities with our sister company RWE Polska. This is why we intend to go ahead with the development of additional Polish wind farms in the next few years."

"Biomass is the most promising source of renewable energy in Poland," says the Black & Veatch report. Most biomass plants burn fuel wood, forestry residues, and agricultural residues and surpluses for individual and industrial heating, district heating and combined heat and power. Biogas from landfills and municipal waste also contributes a share. Plants generally are small. There were 30 landfill-gas power stations with a total capacity of 11 MW in 2009 and 40 sewage digester stations totaling 40 MW capacity. But GDF Suez is constructing a 190-MW biomass powerplant, the world's largest, at a cost of $321 million in southeastern Poland. It is scheduled to begin commercial operation in 2012.

Most of Poland's large-scale hydroelectric potential has been developed, and much of it is in pumped-storage powerplants. The main opportunity for investment in this sector would be modernization, which could increase power output by 20-30%, according to Black & Veatch's report.

Powerplants are only as productive as the transmission grid that connects them to the load centers, and "The grid network in Poland is quite aged and in bad technical condition," says Raffeisen Centrobank. "Most of its 220-kV lines were built in the years 1952-1972 leading to substantial network losses and inefficiencies…It is estimated that around 20% of medium voltage and 50% of low voltage require modernization," at a cost of more than $22 billion, the bank estimates. In October 2010, PSE Operator announced plans to invest $2.95 billion by 2015 to expand and modernize the transmission system, but complained that existing laws made permitting too difficult to meet that deadline. The company called for legislative reform to clarify the process.

In addition to modernizing Poland's own grid, interconnections with its neighbors, especially those that are in the EU, must be expanded. "Poland is quite an isolated place on the electricity transmission map in Europe," says Raffeisen. "The available transfer capacities for market participants are forecast to stand only at 200 MW for export and 700 MW for import." Poland has exported power for many years, mostly to the Czech Republic, but analysts expect the country to require imports for several years now until its new powerplants can be built. The energy policy adopted in 2009 set the goal of building interconnections that will allow Poland to import 25% of its power needs by 2030.

Emerson

Poland's goal is for renewable energy to compose 15.5% of the country's generation by 2020 and 20% by 2030. Wind and biomass are the most promising types

Oil and Gas

Poland's petroleum endowment is negligible, and its gas production meets only about a quarter of Polish demand. Pipelines built during the Cold War deliver oil and natural gas from Russia to Poland and beyond to Germany, but they served an economic and political order that has been upended by the collapse of the Soviet Union and the expansion of the European Union to include Poland as well as its neighbors in the old East Bloc.

Poland's relations with Russia have been strained since the country was reconstituted in 1918, nearly 125 years after it was partitioned among Russia, Germany and Austria. The Poles, occupying the North European Plain and lacking natural defenses on east and west, remain wary of their neighbors on both sides, and thus are eager for alternatives to Russian gas and oil.

The bulk of oil imports—400,000 barrels per day—for Poland's two refineries comes via the 4,000-km-long Druzhba (Friendship) North Pipeline was built between 1960 and 1962 to deliver oil from deep within Russia to Poland and East

Germany. But Russia has built the Baltic Pipeline System to ship oil from Primorsk and soon Ust-Luga on the Gulf of Finland, thus avoiding potential difficulties transiting Ukraine and Belarus to the EU market. Poland is concerned that Russia's new export route threatens its own oil supplies, so is considering construction of a pipeline to connect its premier refinery at Plock to Brody in Ukraine, where it can connect to oil being shipped from the Caspian region. Poland also hopes to develop Naftoport at Gdansk to increase its capacity to import oil via the sea.

PKN Orlen operates the 373,000-bpd Plock refinery and Lotos Group the 120,000-bpd refinery in Gdansk. Both are slated for privatization, and the state now owns only 28% of PKN, but 90% of Lotos. PKN has plans to increase efficiency in its operations to meet the growing competitive challenge of the liberalized European market. At present, foreign companies operate mostly in the downstream market, in distribution of fuels, liquefied petroleum gas and lubricants.

Poland imports 70-75% of its natural gas supply, and, as with oil, almost all of it comes from Russia, via the Yamal pipeline to Europe. Russia is developing export routes for gas that bypass Ukraine and Belarus as well, and Poles are sensitive to the fact that the Nord Stream gas pipeline, which runs under the Baltic from St. Petersburg to Greifswald, Germany, also bypasses Poland. Now, plans to build a liquefied natural gas terminal at Swinoujscie in northwest Poland have progressed to construction, aiming for operation by mid-2014. This terminal will supply 5 billion m^3 per year, about a third of the country's gas demand. International and domestic investors already are getting involved in plans to build the pipelines, pumping stations and storage required by this huge new influx. Gaz-System, Poland's state-owned gas transmission operator, intends to build more than 1000 km of pipelines by 2014.

These LNG terminals constitute the northern tip of the EU-designated North-South Gas Interconnections and Oil Supply Corridor. "The strategic concept of the North-South natural gas interconnection is to link the Baltic Sea area (including Poland) to the Adriatic and Aegean Seas and further to the Black Sea…to create a robust, well-functioning internal market and promote competition," says the European Commission's Energy 2020 plan. At the southern end of the Corridor, Croatia plans to build an LNG terminal on the island of Krk in the northern Adriatic Sea. Together, these terminals will add a north-south axis to the east-west direction that now characterizes natural-gas flow in Central and Eastern Europe, reducing the region's dependence on Russia for its supplies and increasing its ability to respond to any future gas-supply disruptions.

A pipeline linking Szeged, Hungary, and Arad, Romania, half-funded by the EU and inaugurated in October 2010, is the first of several that are planned to create the Corridor. Others, partially funded by the EU, will include connections between Hungary and Slovakia, Hungary and Slovenia, Romania and Bulgaria, and Bulgaria and Greece. In March 2011, Jan Chadam, president of Gaz-System, told the European Parliament that an interconnector between Poland and the Czech Republic and another between Poland and Germany would be completed by the end of the year. And in January 2011, Gaz-System and Eustream, Slovakia's gas transmission operator, agreed on a feasibility study for a gas interconnector between their countries. The decision on whether to proceed with the project is scheduled for 2012.

Poland may also have a gas ace up its sleeve, one that is entirely its own. The country is home to two of the five largest shale-gas plays in Europe outside Russia, according to the Oil & Gas Financial Journal. Many foreign oil and gas companies have obtained some of the 58 exploration permits Poland has issued for the resource. Exploration began in 2010, but some analysts fear that European regulations may make the development so onerous that operators will abandon the effort, says O&GFJ. Even the Polish environment ministry foresees a decade of labor before production takes off.

Bridging the energy supply chain and demand center

Olga TEZCAN

In September 2010, Alstom entered the Turkish wind-energy market, contracting with Turkey's Eolos Wind Energy Generation for construction of a new 24-MW wind farm in southern Turkey

Turkey's strategic location guarantees the country a role in commerce between East and West. Its modest endowment of hydrocarbons and coal, however, means that its role in energy will be that of a middleman, not a producer.

The country lies between the vast proven reserves of energy resources (72% of the world's oil and 73% of its gas) that are found in the Middle East, Russia, and the Caspian Basin and the thirsty energy markets of Western Europe. The Turkish Straits—the Bosporus and the Dardanelles—are the only link between the Black and Mediterranean seas and are fully within its territory. Turkey thus is an energy crossroads, a major "transit country" for oil and gas on its way to market.

The republic is not entirely energy-poor; domestic resources meet about 26% of total energy demand, the government says. Within its borders are deposits of oil, gas, and coal, and its mountainous interior harbors an estimated 36,000 MW of hydropower potential, about 1.2% of the world's total, according to a Black & Veatch report for the European Bank for Reconstruction and Development (EBRD). Turkey's non-hydro renewable-energy potential is extensive and largely undeveloped. Still, Turkey requires imports to supply every category of its energy needs.

About 69% of Turkey's 77.8 million population is found in urban areas, according to the CIA World Factbook. Its median age of 28.1 and life expectancy of 72.23 place the country 126th in the world, but its population growth rate of 1.272% is 97th, suggesting that the median age will be falling for some time.

Geography has been kinder to Turkey than its geology. The country is subject to severe earthquakes, especially in northern Turkey, along an arc from the Sea of Marmara to Lake Van. Among the most recent was a Richter 7.6-magnitude temblor in August 1999 near Izmit in western Turkey, which claimed more than 17,000 lives. It was followed three months later by a 7.2-magnitude earthquake in Bolu province, 100 km east of Izmit, causing 894 more fatalities. These were the last ones measuring over 7 on the Richter scale, but three

Doga Demegi

Completion of Ilisu is scheduled for 2016, but the contractors have accelerated the work in response to a call from Turkey's Prime Minister Recep Tayyip Erdogan to complete it in the first half of 2014

others ranging from 5.1 to 6.4 have occurred in eastern Turkey since then.

The Business Environment

Turkey is no stranger to economic crisis, and its experience in the banking crisis of 2001 increased the country's resilience in the recent Great Recession, according to a report by the Organization for Economic Cooperation and Development (OECD). In the decade that followed the earlier crisis, Turkey strengthened its macroeconomic policy framework, breaking the pattern, OECD says. "Now, with the recovery under way, a golden opportunity for structural reforms arises from the sharp drop in real interest rates in the wake of the acknowledgement of Turkey's solid fundamentals by international investors."

Turkey's GDP plummeted from 4.7% growth in 2007 to minus-4.7% in 2009, one of the most serious setbacks in the OECD area. But the country's recovery has been the strongest in the OECD area, with a cumulative GDP increase of more than 10% from the trough to the first quarter of 2010. In March 2011, the republic's statistics authority, TurkStat, reported the economy grew 8.9% in 2010. OECD further projects growth above 5% in 2011 and 2012, adding that the authorities have announced that both fiscal and monetary policy will be gradually tightened.

Important as solid fundamentals are, they must be matched by good policies, and analysts agree that Turkey's labor market regulations remain a serious weakness. The OECD calls the republic's legal and regulatory framework "unsupportive," and says, "Turkey has one of the OECD's most protective, but also most costly, labor legislation environments." Regulations make termination of formal-sector employees costly and difficult and circumscribe the use of temporary employees, discouraging the growth of that sector while providing incentives for growth in the informal sector.

"Between 24 and 44% of the labor force works either independently or in informal arrangements," said a 2009 World Bank report. "The share of self-employed in the workforce has remained roughly constant at around 25% over the last ten years…about three times the level of European countries like Spain." The OECD adds, "Informal firms have less access to finance, cannot efficiently participate in innovation networks and invest less in human capital. Their productivity is therefore much lower than in fully formal, rule-abiding firms." The productivity of informal workers is estimated to be as much as 80% below that of formal-sector workers, on par with agricultural productivity, according to the OECD's report.

Regulation of product markets is another hindrance to economic advancement, with too much pricing power still in the hands of network monopolies, says the OECD. The organization prescribes measures to make starting a business easier, elimination of price controls, completing planned privatizations in network industries, and continuing to ease conditions for foreign direct investment. With respect to the last, the report approvingly notes the measures Turkey already has taken to establish regional Development Agencies and to support private research and development, technology-transfer centers, and cooperation between universities and the private sector.

Finally, "The fiscal policy framework was successful in bringing down public debt after the 2001 crisis, but became pro-cyclical in the run-up to the *recent* crisis and fiscal accounts are not yet fully transparent," OECD says. "Monetary policy succeeded in bringing inflation to single-digit levels but still faces challenges in reaching a lower inflation environment on a sustainable basis." Turkey has struggled with inflation the way some people struggle with their weight. After it peaked at 130% in 1995, the rate lingered at 80% for several years before falling, over seven years, below 10%. There it has stubbornly stalled, with surges during the latest economic crisis. The Central Bank of Turkey aimed to reduce inflation to 5.5% by 2012 but failed as inflation came in nearly 5 points higher at 10.4%.

Turkey's unemployment rate spiked to 16.1% in February 2009, then fell back to 11.4% in December 2010. But the large size of Turkey's informal sector makes accurate description of unemployment problematic, since the informal sector by definition is invisible to the government. OECD's report describes the "employment rate" as 40%, the lowest in the OECD area, presumably describing only the portion of the workforce in the formal sector. That sector is not growing fast enough to absorb the growing working-age population or the people migrating to the cities. And even at 11.4%, Turkey's official unemployment rate was two to three points higher than it has historically been in December. Forbes Magazine says Turkey's GDP per capita was $12,300 in 2011, but given the size of the informal labor sector, it's hard to have confidence in that figure.

As a place friendly to business, Turkey is not a standout on Forbes' list of Best Countries for Business 2011, but it's not bad either. Turkey ranks number 54 out of 134 countries profiled. For property rights, it ranks at 57; for red tape, 42; for investor protection, 46; and for monetary freedom, 88. Forbes ranks Turkey's corruption at 49, while Transparency international ranks it at 56. TI's Corruption Perception Index for Turkey is 4.2 on a scale in which 0-0.9 is "Very Corrupt" and 9.0-10 is "Very Clean."

On the World Bank's Doing Business 2011 report of 183 countries, Turkey's rank for ease of doing business is 65. Dealing with construction

Energy Industry Players: Turkey

AES-Cictas insaat	Foreign-Turkish venture
Akenerji Elektrik Uturim	Akkok-CEZ JV
Baskent Dogalgaz	Gas distributor
BOTAS	Gas importer, mem consortium Nabucco p.l.
EMRA	Independent energy regulator
EnBW-Borusan	Foreign-Turkish venture
Enerco	Gas company
Enerjisa	Sabanci-Verbund JV
EPDK	Energy regulator
EUAS	State-owned generation utility
Garanti Bank	Turkey's second-largest bank
Gazprom-Aksa	Foreign-Turkish venture
GEAS	Foreign-Turkish venture
Global Yatirim Holding	Power and holding company
IGDAS	Gas distributor
MENR	Defines targets and policies related to energy and natural resources
OIB	Privatization administration
Petrol Ofisi	Largest fuel retailer
RWE-Turcas	Foreign-Turkish venture
Sabanci	Conglomerate
Suez-Baymina	Foreign-Turkish venture
TEDAS	State distribution umbrella organization
TEIAS	Transmission system and market operator
TEK	Unbundled in 1993
TETAS	State-owned electricity wholesaler, importer and exporter
TPAO	Turkish Petroleum Corp
Tupras	Main oil refiner
Turcas	Petroleum distributor

EMRA	Energy Market Regulatory Authority
EUAS	Electricity Generation Corp
GEAS	Gama Energy/GE Energy Financial Services JV
MENR	Ministry of Energy and Natural Resources
TEDAS	State distribution umbrella organization
TEIAS	Turkish Electricity Transmission Corp
TEK	Turkish Electricity Authority
TETAS	Turkish Electricity Trading and Contracting Corp
Tupras	Turkish Petroleum Refineries Co

permits is the most onerous chore, ranked 137, while Turkey ranks at 72 in getting credit, 59 in protecting investors, and 76 in trading across borders. Enforcing contracts, 26, is its best rank.

Investing in Turkey

In 2011, Turkey had 24 M&A transactions and 2012 will see more of the same as Deloitte and Touche LLP predicts energy will lead the way in an optimistic year. "The Turkish energy sector is widely seen as the most promising and attractive field of investment in the Turkish economy," says an August 2010 report by Deloitte for the Turkish Prime Ministry Investment Support and Promotion Agency. "The market experiences a transition into a competitive market structure in order to attract private sector investments. The energy market is witnessing rapid growth and liberalization process with the recent privatizations, licensing tenders and strategic partnerships. The sector has been remarkably active recently and offers major opportunities to investors." The report can be found at http://www.invest.gov.tr/en-US/Sectors/Pages/Energy.aspx.

Gazprom

Russia and Turkey have discussed the possibility of extending the pipeline from Ankara to Israel via the Mediterranean Sea, a scheme dubbed Blue Stream-2

Turkey has an active privatization program, and in 2009, it completed 106 privatization deals. They included 52 small hydroelectric powerplants and electricity distribution companies in 13 regions, and tenders for eight more were announced or completed, says the 2010 Transition Report of the European Bank for Reconstruction and Development (EBRD), which tracks the transition of planned economies to free-market operation. Foreign direct investment inflows in 2009 contracted by more than half compared with the previous year, mainly directed at the electricity, gas and water-supply sectors. That was in line with the government's privatization program for the period.

Enerjisa illustrates how privatization with foreign direct investment is playing out in the power sector. The 50-50 joint venture of Turkish conglomerate Sabanci Group and Austrian utility Verband is on track to acquire generation and distribution assets up to the 20% market share maximum allowed by law, including gas plants, hydro plants, a handful of other renewable-energy plants, and the distribution company for Ankara, the national capital. Enerjisa Chairman Selahattin Hakman told Platts energy news service that the JV would have to invest $200-300 million per year for five years to upgrade the distribution lines because of the high level of losses. "The infrastructure to measure losses accurately didn't exist, so we have had to create that before we can estimate how much we need to invest," he said.

Turkey now is courting FDI for other energy facilities. One of the largest, estimated at $20 billion, is a Russian-built and -owned nuclear powerplant. Others include natural-gas pipelines from the Caspian region and Iran through Turkey to markets in Europe. All three subsectors of Turkey's energy sector—Electric Power, Natural Resources, and Sustainable Energy—earned transition scores of 3.25 on a 4.0-point scale in the EBRD report, putting them on par with or ahead of all but one of the subsectors in the economy making the transition to competitive operation.

"In the past five years, Turkey has accommodated an efficient investment environment as many foreign investors have made greenfield investments, formed partnerships with local players and acquired state-owned and private companies," the Deloitte report concludes. "Turkey has also a significant potential for renewable energy. Due to substantial renewable energy resources and recent developments in renewables legislation and liberalization in the electricity market, there is a suitable environment for renewable energy investments."

Boosting FDI are continuing reforms in the economy and the judicial system as well as prospective membership in the European Union, says the CIA Factbook. Turkey began accession talks with the EU in

A cautionary tale called Ilisu

A unique investment risk is the situation in Turkey's unstable Southeast, an impoverished backwater where a guerrilla war with Kurdish separatists has blown hot and cold since it began in 1984, has claimed 30,000-40,000 lives, and has displaced millions. This region is also the locus of a huge hydroelectric development that includes Ilisu Dam, the largest dam now under construction in Turkey. Conceived as one of 22 dams, 19 hydroelectric powerplants and extensive irrigation projects making up the $32-billion Southeastern Anatolia Project (known by its Turkish acronym GAP), Ilisu has drawn intense opposition and criticism from environmental and human-rights groups, both Turkish and international, because its reservoir will inundate archeological sites dating from the dawn of civilization in the Fertile Crescent and displace tens of thousands of people. Estimates range from 25,000 to 78,000 people who will be forced to resettle because of Ilisu Dam alone.

Costing an estimated $1.7 billion, Ilisu is designed to be a 1200-MW hydroelectric and irrigation project on the Tigris River about 65 km from the Iraq-Syria border. Planning began in the early 1980s, aiming for a construction start in 1999. But the first consortium, consisting of contractors from the UK, Italy, Sweden and Turkey, and the first financing arrangements by nine Western governments and a Swiss bank, fell apart under international pressure.

Another consortium of French, German, Austrian and Swiss export-credit agencies and engineering-construction companies was formed in 2005 and ground was broken in 2006. But in 2009, the governments withdrew their financial support for the project, citing Turkey's failure to comply with 153 World Bank standards for environmental and cultural preservation, much the same reason the first consortium collapsed. Undeterred, Turkey is continuing construction using loans from three Turkish banks.

International Rivers, the umbrella environmental organization advocating for river protection, calls Ilisu "one of the most controversial dam projects worldwide." In addition to the allegations of damage to the environment and cultural treasures, GAP is a major political irritant. Its projects, which are proposed for and being built in the upper basin of the Tigris and Euphrates rivers will affect water availability downstream in Syria and Iraq, but the governments of those countries oppose the projects as well, saying they have not been consulted. In this context, the Kurdish guerrilla war has flared on and off for nearly three decades.

Completion of Ilisu is scheduled for 2016, but the contractors have accelerated the work in response to a call from Turkey's Prime Minister Recep Tayyip Erdogan to complete it in the first half of 2014. Whether that will happen is in question. In March 2011, a Turkish regional court ordered an investigation into the dam's impact on the area's environment and archeological sites. It is the first court action in more than a decade of litigation against the Ilisu project. Depending on the findings, the court could halt construction.

Credit: HAYKIRDI

BTC oil pipeline, completed in 2005, snakes from Baku around Azerbaijan's rival Armenia to the Georgian capital of Tbilisi, down to Erzerum in Turkey and terminates at the Turkish Mediterranean port of Ceyhan

2005, but they have met with ambivalence in the EU because of Turkey's Muslim identity. Shifts in the country's political sands have added to European reservations about admitting as a member a country with Muslim roots. Turkey was founded as a secular parliamentary republic in 1923 on the ruins of the Ottoman Empire, but in 2002, the conservative Islamic Justice and Development Party (AKP) won election to become the governing party. The AKP has repeatedly pledged to respect the secular nature of the government, but tensions have persisted as the government has acted to allow greater latitude in public expressions of Muslim religious belief. Possibly in response to the cool attitude among some EU members, Turkey has shown signs recently that some observers interpret as reorienting itself politically and economically to the Middle East, its historic base.

Military meddling in politics has been a destabilizing tradition in Turkey since 1960. The military has acted as the self-appointed guardian of the secular political tradition, and there were three military coups between 1960 and 1980, plus a nonviolent intervention in 1997 that resulted in the fall of the government without overturning the constitution. Its influence has waned since 2003, when a score of military officers were arrested on suspicion of plotting a coup. The investigation has dragged on since then, finally resulting in trials of nearly 200 officers beginning in 2010 and continuing today.

Analysts still are unsure whether there was a plot against the government or whether the government is prosecuting mainly to reduce the military's prestige. In any event, investors in Turkey should beware of the unresolved tensions represented by this case. Further, the resolution of the trials could have a bearing on whether Turkey is successful in its negotiations for EU accession because it would be seen as an indicator of Turkey's commitment to EU standards of justice and political openness.

Electricity

"The Turkish electricity market is one of the fastest growing in the world," says the Deloitte investment report. Power demand grew at an annual average of 5.4% through the last decade and peaked at 8.8% in 2007, outstripping supply growth. The global financial crisis and two years of abundant rainfall relieved some of the pressure on Turkey's generation capacity by restraining demand growth while improving hydropower generation, but a January 2011 report from TEIAS, the transmission operator, forecasts that demand will surge back to average one to two points higher through 2019. Privatization is expected to expedite new capacity construction with the infusion of investor funds as the economy recovers.

The liberalization of the generation and distribution sectors was launched at the same time as the boom in demand growth was occurring. The last remaining state-owned distribution grids were sold in December 2010, and full privatization of generation is expected to be complete in 2014. A wrinkle developed in the generation sell-off in mid-2010 when potential bidders for 8000 MW of coal- and lignite-fired capacity hesitated to bid because the coal mines that were the plants' sole source of fuel were not bundled in the sale. Bidding was suspended pending legislation to allow the sale to be reorganized.

Despite the forecasts of demand for generation capacity and the money to provide it, "in recent years uncertainty about the terms of market liberalization has delayed financing for projects," the Economist Intelligence Unit reported. "The result is that there is a list of nearly 30,000 MW of licensed projects that could meet demand growth for the next 20 years, but only a fraction is under construction." This large backlog, plus the surge in wind-farm licenses and the still-uncertain prospect of the first nuclear plant's coming on line have given rise to fears that a capacity glut might develop late in the coming decade. The Deloitte report says, "The estimated investment required for the period of 2010-2030 is between $193-225 billion, which comprises $180-210 billion for generation, $6-7 billion for transmission, and $7-8 billion for distribution."

Turkey has ratified the Kyoto Protocol, and the country is making efforts to reduce its greenhouse-gas emissions. Installed capacity of natural-gas powerplants has grown in recent years while plants fueled by oil, diesel and other liquids have been replaced. The installed capacities of hydropower on one hand and coal and lignite on the other have remained fairly stable. Today, gas fuels 36% of the country's capacity and serves nearly 50% of power demand, thanks in part to generous offtake guarantees for the country's first privately built gas-fired powerplants.

After gas and ahead of coal, hydropower is the third major energy source for pow-

TURKEY ENERGY STATS

Oil Proved Reserves 2011 (bbl)	270 million
Oil Production 2009 (bbl/day)	53,000
Oil Pipelines 2009 (km)	3636
Refinery Capacity 2010 (bbl/day)	714,275
Gas Proved Reserves 2011 (m^3)	6.17 billion
Gas Production 2009 (m^3)	708 million
Gas Pipelines 2009 (km)	10,630
Hard Coal Recoverable Reserves 2007 (tonnes)	860 million
Hard Coal Production 2007 (tonnes)	3.5 million
Lignite Recoverable Reserves 2007 (tonnes)	534 million
Lignite Production 2007 (tonnes)	62 million
Installed Generation Capacity 2010 (MW)	45,226
Electricity Production 2009 (kWh)	185.2 billion
Transmission Lines 2009 (km)	46,974
Generation: Coal/Lignite/Asphaltite 2010 (MW)	11,090
Generation: Gas 2010 (MW)	16,443
Generation: Nuclear 2011 (MW)	0
Generation: Hydropower 2010 (MW)	14,677
Generation: Oil/Diesel 2010 (MW)	1820
Generation: Non-hydro Renewables 2010 (MW)	1196
Goal for Renewables Capacity by 2023 (includes hydro)	30%

Sources: CIA Fact Book, Euracoal, Austrian Energy Agency, Energy Information Administration, Republic of Turkey's Ministry of Foreign Affairs, Turkish Electricity Transmission Corporation

er generation, with 135 plants providing 32.5% of the system's capacity. But in 2009 it supplied only 17% of the country's electricity because of a prolonged drought. The state water authority, Devlet Su Isleri (DSI) has 53 more hydroelectric installations in planning, development or construction stages, and the Economist Intelligence Unit projects that hydropower capacity will grow 64% to 24,188 MW by 2020.

"The Turkish hydropower market provides huge opportunities for investors and suppliers," says a report by INTPOW Norwegian Renewable Energy Partners, a nonprofit organization promoting Norwegian companies' participation in international investment. But it cautions, "Successful market entry is not easy. The market is still not fully liberalized, competition is increasing and there is a need for local knowledge. As is typical for an emerging economy, there are also potential political, reputational and environmental risks to consider."

Non-hydro renewable energies are a negligible factor, comprising just 2.6% of capacity, but their potential for growth is good, assuming they can be economically competitive. Turkey "has almost 90,000 MW of theoretical wind energy potential and about 10,000 MW of economic potential," says a report by Black & Veatch for the EBRD. The best wind resources are located in the western part of the country, with the highest, 51.9 watts per m^2, in the Sea of Marmara region. In mid-2010, Turkey had 974 MW of operating wind farms, according to Platts energy news service; 66 other plants totaling 2257 MW were licensed and either in construction or awaiting it, and 12 more totaling 851 MW had been approved and were awaiting licenses. In September 2010, Alstom entered the Turkish wind-energy market, contracting with Turkey's Eolos Wind Energy Generation for construction of a new 24-MW wind farm in southern Turkey.

Solar energy is also abundant, 1311 kWh per m^2, according to the EBRD report. At present, solar installations are mostly rooftop flat plate collectors for heating water. A 2005 renewable-energy law that provided feed-in tariffs was judged a failure because the tariffs were too low. Critics have panned a modified law passed in January 2011 for similar reasons.

Geothermal energy may be Turkey's most promising non-hydro renewable resource. Already competitive in many respects, it can earn a feed-in tariff of $0.105 per kWh plus bonus payments for "made-in-Turkey" components. The EBRD report says the country has 35,600 MW of geothermal potential, of which 4500 MW could be used for electricity and the rest for thermal applications. Most of the resources are found in western Turkey, in the Aegean and Marmara regions.

The geothermal industry received a vote of confidence in January 2011, when Italy-based Enel Green Power and the Meteor Consortium, part of Turkey-based Uzun Group, agreed to joint-venture to explore and develop geothermal resources in Turkey. The move has been hailed as the first time a large foreign investor has committed to development of Turkey's geothermal resourcees. The JV will hold 142 exploration licenses belonging to Meteor, but analysts say Turkey's geothermal industry has been poorly managed by the government agencies that award licenses as well as by the developers who have improperly exploited their resources. In some cases, a confirmed geothermal resource has been divided between multiple licenses; in others, the presumed resource has been found to be nonexistent. The doubts may be dissipated if Enel's investment is successful.

Cairn Energy

TPAO, the state-owned Turkish Petroleum Corporation, wants to make the Black Sea the world's next oil and gas hotspot. TPAO estimates 10 billion barrels of oil and 1.5 trillion m^3 of gas could be awaiting discovery there

After a series of fruitless efforts dating back to 1970, Turkey appears to be on the verge of constructing at least one nuclear powerplant, and possibly two of them. The Turkish and Russian governments both have ratified an intergovernmental agreement reached in May 2010 to build a $20-billion plant at Akkuyu on the Mediterranean coast, with four 1200-MW VVER units to be in commercial operation between 2016 and 2019. Russia will own the plant and Atomstroyexport will operate it, with an option to sell up to 49% of the shares to investors once the plant is operating.

Turkey also wants a nuclear plant at Sinop, on the Black Sea coast, and the government has repeated its insistence on that goal even after the Fukushima Dai-ichi disaster in Japan. Turkey opened negotiations with Japan's Toshiba Corp in December 2010 after failing to reach agreement with Korea Electric Power Corp on construction of a four-unit plant in Sinop. The Japanese negotiations were suspended in April 2011, ostensibly to allow the Japanese to focus on recovering from the earthquake, tsunami and nuclear disaster, but the negotiations had not produced agreement by the end of March, the stated deadline.

Under the 2001 law on liberalizing the power sector, transmission will remain under state control, so investment opportunities there are limited. But generation and distribution losses average around 15% per year. As demand growth has outstripped capacity growth in the last decade, power shortages have resulted, even in major cities, and electricity quality can be uneven. Chronic underinvestment in the system could prove the undoing of Turkey's goals for development of conventional generation as well as renewable energy because the grid is unable to accommodate the intermittent supply from solar and wind energy, and congestion issues could hinder increased power flows from new plants of all kinds.

Even so, the transmission grid took a step toward closer integration with Europe's interconnected systems in September 2010, when it was synchronized with the European grid for a one-year trial. Linked to Bulgaria with two 400-kV lines and to Greece by one, Turkey will be able to commercially exchange power with the European Union, increasing the security and quality of its own supply and eventually gaining access to the European Electricity Market.

Oil and Gas

The bulk of Turkey's oil is found in the Hakkari Basin in the southeast, with additional deposits in Thrace, the northwestern part of the country in Europe. As noted earlier, the proven oil reserves are modest at 270 million barrels, but TPAO, the state-owned Turkish Petroleum Corporation, wants to make the Black Sea the world's next oil and gas hotspot. TPAO estimates 10 billion barrels of oil and 1.5 trillion m^3 of gas could be awaiting discovery there. BP, Petrobras, ExxonMobil, and Chevron are in joint ventures with TPAO for these explorations, lending some credibility to

the estimates. Additional deposits are believed to lie under the Aegean Sea off Turkey's south coast, but exploration there has been blocked because of long-standing territorial disputes with Greece.

With capacity of more than 700,000 barrels per day, Turkey's refineries far exceed the country's 53,000-bpd oil production rate. Still, to meet the European Union's standards for environmental operation and fuel quality, the country's six refineries are being modernized, and at least three new refineries have been proposed for Ceyhan, the Mediterranean port that is the terminus for two existing pipelines and a third now in construction. Tupras, the Turkish Petroleum Refineries Company, operates about 85% of the total refining capacity. Tupras has been privatized, and 51% of the company now is owned by a consortium of companies that includes Koc Holding, Avgaz, and Shell. The remaining 49% is publicly traded.

Turkey's gas resources are smaller than its oil, but still large enough to attract foreign investment. The Thrace Basin contains the country's largest reserves, and in February 2011, Canada-based Transatlantic Petroleum Ltd. acquired a pair of Turkish gas operators producing 708,000 m^3 of gas per day in that basin, plus 388,000 onshore and offshore hectares in the basin and 123,000 in southeast Turkey's Hakkari Basin. Transatlantic brings North American hydraulic fracturing techniques to the Thrace Basin's "tight sand and shale formations that do not produce under normal conditions," Chairman Malone Mitchell told Oil & Gas Financial Journal.

Marmara Kuzey, an offshore field in the Sea of Marmara, is the largest of the country's 14 gas fields, and TPAO, BP, and Shell collaborate on production there. Toreador is operating several producing fields a bit farther east in the Black Sea offshore, and additional Black Sea projects are expected to come online later in 2011. Turkey uses natural gas mainly for power generation and space heating.

Transportation

One of Turkey's most interesting aspects may be its role as a bridge between energy producers and consumers, an East-West energy corridor that has been called the Silk Road of the 21st century. Through the Turkish Straits—the Bosporus and Dardanelles—flowed 3.4 million barrels of oil per day at its peak in 2004. But the Straits is the world's narrowest strait used for international navigation and one of the busiest, with 50,000 vessels passing it annually, 5500 of them being oil tankers. Analysts say the occurrence of a maritime mishap, leading to a catastrophic oil spill and possibly a blockage of the strait, is just a matter of time. This fear has prompted a number of schemes to bypass the Straits. Such schemes necessarily are subject to the vagaries of energy politics as well as of economics, but one has been completed and a few others are still in development.

Novorossiysk in Russia has long been a principal port for oil shipments from the former Soviet republics in the Caucasus and Central Asia as well as from Russia's own fields. But the former Soviet republics, resource-rich and wanting to assert their independence, had sought a way to export their production without transiting Russia. They were strong supporters of the Baku-Tbilisi-Ceyhan oil pipeline (BTC), completed in 2005, which snakes from Baku around Azerbaijan's rival Armenia to the Georgian capital of Tbilisi, down to Erzerum in Turkey and terminates at the Turkish Mediterranean port of Ceyhan. It is the first line able to deliver production from the Caspian while avoiding Russian territory. One expert has estimated that, without BTC, the volume of oil transiting the Turkish Straits could be 50% higher than it now is.

Turkey's acquiescence to construction of oil and gas pipelines across its territory has opened a wider channel to the energy resources in the Caspian Basin seeking another route to markets in Europe. The Turkish government estimates that 6-7% of the world's oil will transit through Turkey by 2012.

The continued development of Caspian oil and gas makes it certain that shipping pressure on the Bosporus will return and continue to grow. Construction of a 1.5-million bpd pipeline running from Samsun on Turkey's Black Sea coast to Ceyhan on the Mediterranean at a cost of more than $3 billion has been a perennial of industry headlines for most of the last decade. Sponsored by Turkey's Calik Enerji and Italy's Eni, the front-end engineering design has been done, and a groundbreaking in 2007 was hailed as the project's start, but the progress has stalled as Russia and Turkey haggled over costs, shipping rates and commercial issues.

An intergovernmental agreement in May 2010 opened the way for Russia's Rosneft and Tatneft to join the consortium, and they will supply some of the oil necessary to make the pipeline commercially viable. The two countries have concluded a number of agreements moving the project incrementally forward, but major pieces of the puzzle, not least an agreement on construction of a 1.5-million-tonne refinery and petrochemical complex at Ceyhan, remain to be placed. Predictions of a construction start in early 2012 seem as improbable as earlier such forecasts proved to be.

One alternative on the table is the Trans-Balkan Pipeline, planned to receive Russian oil at the port of Burgas, Bulgaria, for delivery at Alexandroupolis, Greece. Initially, Bulgaria's government welcomed it, but a new government elected in 2009 has been cool. "In public, Bulgaria does not support the project, and the Bulgarian government expresses its concerns over its environmental footprint and its commercial implications. At the same time, unofficially, the Bulgarian government believes that the project is excellent," said Nikolai Tokarev, president of Transneft, one of the companies promoting it, in a June 2010 interview in Oil & Gas Financial Journal. Other proposals for bypassing the Bosporus, the narrower of the Straits, include canals between the Black Sea and the Marmora Sea, but these ideas have less support.

Options for shipping oil are limited, but there is no shortage of proposed pipelines to move natural gas to Turkey and through it to other countries. The likely winners in this race, however, are even harder to pick than for oil.

As noted earlier, natural gas fuels a substantial and growing part of Turkey's powerplants and serves the consumer market as well, and 70% of it comes from Russia. The $2.3-billion Blue Stream pipeline, which runs from Krasnodar, Russia, under the Black Sea to Turkey, became operational in 2003, delivering 8 billion m^3 of gas per year to Ankara. Russia and Turkey have discussed the possibility of extending the pipeline from Ankara to Israel via the Mediterranean Sea, a scheme dubbed Blue Stream-2. Another pipeline runs overland west of the Black Sea from Russia and one from Iran, which shares a border on Turkey's east.

The other major gas pipeline to Turkey delivers gas from the Caspian Sea via the Baku-Tbilisi-Erzerum Pipeline (BTE), which became operational in 2007 with about the same capacity as the Blue Stream. Two lines, still in development and most often paired as rivals, are the Nabucco Pipeline and South Stream. These lines are profiled in the introductory section on the European Union.

Finally, Iraq is returning as a producer of oil and gas. An oil pipeline has been in place since 1975 between Kirkuk, Iraq, and Ceyhan, Turkey, and Iraqi oil deliveries were resumed in 2003 after the United Nations lifted sanctions imposed on the Saddam Hussein regime. Iraq has committed to support the Nabucco project and, in connection with that, in 2009 Iraq and Turkey signed a memorandum of understanding to establish a natural-gas corridor for a gas pipeline following the right-of-way of the existing oil pipeline. To date, no plans for construction have been announced.

GSP

Following a 2009 ruling by the International Court of Justice in The Hague resolving a 12-year-long maritime boundary dispute between Romania and Ukraine, auctions for oil and gas exploration licenses in the Black Sea have attracted a lot of interest

Energy independence buoys confidence in long-term growth prospects

The good news is that Romania is coming back. Until 2008, the country enjoyed the most rapid economic growth of any country in Eastern Europe, averaging 6.3% per year from 2001 to 2008, when it grew 7.3%. But in 2009, the economy hit a wall; GDP contracted 7.1%. While other economies regained ground in 2010, Romania's contracted a further 1.9%. The forecast is for 1.5% growth in 2011 and 4.4% in 2012, with gradual recovery till 2015, when growth rates are expected to return to the levels of the past decade.

Romania was spiraling down into poverty in 1989, when the long-time president, Nicolae Ceausescu, was overthrown and executed with his wife, Elena. But the cause of its decline was severe mismanagement, rather than inherent weakness of the economy. It entered the 1990s with an obsolete industrial base and a pattern of output unsuited to the country's needs, according to the CIA Factbook, but it is the only Central European country with significant primary energy resources. Its endowment of oil and coal in particular makes Romania more nearly self-sufficient in energy than any other country in the "transition" region except Russia and the Caspian nations, says the Economist Intelligence Unit. Freed from its communist ideology and Ceausescu's paranoid personality cult, Romania righted itself and has begun to build its economy and its politics on a solid, realistic foundation.

Even under the Communist regime, Romania for some decades was more independent and more West-oriented than some of its Soviet-Bloc comrades. Ceausescu criticized the 1968 Soviet invasion of Czechoslovakia that ended the "Prague Spring," for example, and refused to actively participate in the Warsaw Pact, the Soviet answer to NATO. Since its revolution, the country has continued on that West-oriented path. Romania joined NATO in 2004 and, with Bulgaria, acceded to the European Union in 2007.

Unfortunately, Romania has yet to break some old habits. Critics note, for example, that its retail electricity market was rapidly opening to competition, rising from 10% in 2004 to 50% in 2007 as it made the case for EU accession that year, but market opening has stalled at 50% since then. Privatization of the power sector also seemed on the horizon in 2000, when CONEL, the national electricity company, was dissolved to create five separate companies along largely functional lines. Recently, however, the government has proposed to reconsolidate the companies to form two "national champions" with a large proportion of government ownership. The idea is facing strong criticism, both domestically and internationally, and may yet be blocked by the EU. The government suspended the plan for further study in 2010, and most sources expect it to be canceled.

Still, the government has earned respect and praise for dealing straightforwardly with the fiscal crisis it faced when the recession struck. The International Monetary Fund already had bailed out Hungary to the tune of $27 billion in late 2008 when Romania, early in 2009, applied for help. In return for $27 billion in financial assistance, the IMF, the ECB, and the World Bank required the Romanian government to undertake a severe austerity program to reduce the budget deficit, cut public-sector employment, and restructure local and national government agencies. Similarly bitter medicine was prescribed for both Hungary and Romania, but Hungary eventually refused to implement the entire program, while Romania has faithfully followed it. The prolonged recession was one result; investors are hoping a more robust recovery will be another.

Romania's request in February 2011 for

a $6.9-billion "precautionary loan" from the IMF and EU further reassured investors that the country is prepared to stay the course of fiscal responsibility, as the loan is available but will be drawn down only if necessary. "The stabilization achieved with fiscal policy measures, together with the slow but gradually strengthening economic recovery in Romania, is boosting international investors' confidence in the country, which is reflected in higher inflows of capital from abroad," said Peter Brezinschek, head of Raffeisen Research, Vienna.

Politically, "Romania has made great progress in institutionalizing democratic principles, civil liberties, and respect for human rights since the 1989 revolution," according to the US State Department. "Political parties represent a broad range of views and interests, and elected officials and other public figures freely express their views. Civil society watchdog groups remain relatively small but have grown in influence. The press is free and outspoken, although there have been incidents of politically motivated intimidation and even violence against journalists and media management, particularly prior to the 2004 national elections. Independent radio networks have proliferated, and several private television networks now operate nationwide. In addition, a large number of local private television networks have emerged."

One of the more intriguing developments relates to the restitution of private property seized under previous regimes, which, says the State Department, "continues to move very slowly." The Romanian government established the Fondul Proprietatea in 2005 as a $4.6-billion closed-end fund to compensate those whose property had been confiscated. Claimants were allotted shares in a pool of 83 state-owned and formerly state-owned companies, largely concentrated in the energy sector. In January 2011, FP was listed on the Bucharest stock exchange, becoming at a stroke the second-largest play on the exchange and increasing the stock market's overall free float by 81%. "This is going to be a shot of adrenaline to the system," Mark Möbius told The Financial Times. Möbius is executive chairman of Templeton Emerging Markets Group, whose Franklin Templeton Investment Management is managing FP.

The Country and the Economy

Emerging from two years of deep recession, Romania's economy is not yet out of the woods. Its 2011 growth forecast of 1.5%, or 2% at best, is anemic, and analysts are not optimistic about a quick return to the robust growth of the 2000s.

Romania's population of 21.9 million is educated and skilled. Bucharest, the capital, is one of the largest industrial and financial centers in Eastern Europe, but the country's recent economic growth has only begun to create a middle class. The population is aging and slowly shrinking; the median age rose from 38.4 years in 2010 to 38.7 in 2011, the CIA Factbook estimates, and the 2011 population growth rate is minus-0.252%. Life expectancy at birth is 70.5 years for men and 77.66 years for women. Urbanization, on the other hand, is rising at an estimated annual rate of 0.6%. In 2010, it stood at 57% of the total population.

Some old problems linger. The hyperinflation of the 1990s was tamed a decade ago, but its ghost has continued to haunt. Inflation in April 2011 was clocked at an annual rate of 8.34%, the highest in 32 months. The National Bank of Romania's (BNR) target band is 2-4%, but the bank is now forecasting 5.1% for the year. Perhaps more significantly, a survey of Romanians in May 2011 found them anticipating a rate above 6%.

Regulatory fiat has held Romanian prices for natural gas and electricity among the lowest in the EU, but the government is under pressure from the European Commission, the IMF, foreign investors, and the gas and electricity utility companies to raise tariffs to market prices. Indeed, the utilities are unable to upgrade and expand their facilities to meet newly-rising demand because the rates they receive are inadequate to fund the work. In addition, the higher value-added tax required by the 2009 financial bailout conditions is increasing the prices of goods across the economy. To restrain inflation, the BNR has kept interest rates at a record low of 6.25%, and analysts expect that policy to continue.

sxc.hu

In 2010 alone, Romania's installed wind capacity jumped from 14 MW to 462 MW, and the Global Wind Energy Council projects that 600-800 MW more will be added in 2011

Energy Industry Players: Romania

ANRE	National regulating agency for energy
EnergoNuclear	Nuclear power developer
Hidroelectrica	State-owned hydro operator and largest power producer
Nuclearelectrica	Nuclear operator, 2nd biggest power producer
Petrom	Oil and gas company
Romgaz	Gas supplier
TPP CE Craiova	Gas supplier
Transelectrica	Power grid operator/TSO
Transgaz	National gas distributor, Nabucco consortium member
TSO Transelectrica	State-owned transmission system operator

The government planned to convert to the euro in 2014, then postponed the change to 2015. In April 2011, it postponed eurozone accession indefinitely.

Unemployment steadily declined from a 1999 high of 11.5% until 2008, when it reached 4%. The global financial crisis caused it to spike, and the rate reached 8.4% in March 2010. By April 2011, it had declined again to 5.4%, and economywatch.com forecasts a continued slow but steady slippage to 4.8% over the next five years. The employment statistics augur well for Romania's economy, as economists consider unemployment a lagging indicator; it normally rises only after recession has gripped an economy for some months, and it falls only when employers are no longer able to meet growing demand with a shrunken work force.

The equity market also helps to fill in a positive picture for Romania's economy. Raffeisen Bank International notes that the market booked gains in 2011, continuing a trend begun in 2010. "Increasingly, investors' attention is turning to the long-term growth perspectives that Romania offers for its companies and investors," said Raffeisen in "Strategy Romania," a report published in March 2011. "All in all, we expect a fundamentally positive development on the Bucharest stock market over a one-year horizon," said Raffeisen Research's Brezinschek. "The stabilization achieved with fiscal policy measures, together with the slow but gradually strengthening economic recovery in Romania, is boosting international investors' confidence in the country, which is reflected in higher inflows of capital from abroad." The listing of Fondul Proprietatea on the Bucharest exchange in 2011, noted above, likely will help to sustain the trend.

In its Doing Business 2011 report, the World Bank ranked Romania's "ease of doing business" 56th out of 183 countries. The country's lowest rank in the survey was 151st for paying taxes, with a total tax rate of 44.9% of profit. In getting credit, on the other hand, Romania ranked 15th in the world, scoring 8 out of 10 in the strength of legal rights index. Dealing with construction permits, at 84th, was deemed a time-consuming and costly chore, but investor protection earned the country a rank of 44th, with contract enforcement a bit lower at 54th.

Forbes magazine ranked Romania 52nd in a field of 134, echoing the World Bank's low score for taxes with its own score of 104. Trade freedom, however, came in at a high of 12 and investor protection at 35. Corruption's rank of 58th buried Romania deep in the center of the bell curve. Transparency International also ranks Romania's corruption at 69th in the world. The government is taking steps to deal with corruption under a "Co-operation and Verification Mechanism" agreed with the European Commission as a condition of accession to the EU in 2007 to bring Romania's judiciary and corruption performance up to EU standards. An interim EC report in February 2011 commented favorably on Romania's progress while noting the need for continued efforts in judicial reform.

A survey of senior executive sentiment of the world's largest companies, however, gave Romania, literally, a vote of confidence. The A.T. Kearney FDI Confidence Index, published in January 2010, ranked Romania 16th in the world "in spite of a severe recession, fiscal troubles and a standoff over budget deficits in 2009 that marred relations with the EU and International Monetary Fund," said the report. "However, investors are positive about the future. The 2007 EU membership has made Romania a safer destination, and its large population, the continent's 10th biggest, is attractive to investors. Many investors see Romania as an attractive, low-cost near-shore destination for European operations, especially as the established regional leaders, the Czech Republic, Hungary and Poland, have seen costs rise rapidly in recent years."

Romania Energy Stats

Oil Proved Reserves 2009 (bbl)	600 million
Oil Production 2009 (bbl/day)	91,660
Oil Pipelines 2010 (km)	2424
Refinery Capacity 2009 (bbl/day)	516,557
Gas Proved Reserves 2008 (m^3)	630 billion
Gas Production 2009 est. (m^3)	10.9 billion
Gas Pipelines 2010 (km)	3652
Hard Coal Recoverable Reserves 2007 (tonnes)	801 million
Hard Coal Production 2007 (tonnes)	2.5 million
Lignite Recoverable Reserves 2007 (tonnes)	1364 million
Lignite Production 2007 (tonnes)	35.1 million
Installed Generation Capacity 2008 (MW)	21,753
Electricity Production 2007 (kWh)	60.7 billion
Transmission Lines 2011 (km)	8932
Generation: Coal/Lignite 2007 (MW)	15,000
Generation: Gas (MW)	4133
Generation: Nuclear 2009 (MW)	1412
Generation: Hydropower 2009 (MW), including pumped storage	6391
Generation: Oil/Diesel (MW)	0
Generation: Non-hydro Renewables 2009 (MW)	211
Goal for Renewables Capacity by 2020	24%

Sources: CIA Fact Book, Euracoal, Austrian Energy Agency, Energy Information Administration, BP Statistical Review of World Energy 2010, Oil & Gas Journal, Economist Intelligence Unit, Transelectrica

Investment Climate

The European Bank for Reconstruction and Development (EBRD), in its Transition Report 2010 on countries in transition to a market economy, observes, "The environment for doing business (in Romania) has proven to be very difficult during the crisis, highlighting the need to push ahead with labor market and fiscal reforms and the removal of excessive licensing procedures." The EBRD stresses that the country's "state-owned enterprises still dominate electricity generation and competition is limited."

This is a long-standing issue in Romania; the government has taken some steps toward privatizing the energy sector, but progress has been fitful. Successive governments over the years have stalled market reforms, privatizations and public-private partnerships. The government sold the largest oil company, Rompetrol, to Austrian company OMV in 2004. It has since retained control of all five of the electricity companies, but it has lacked the funds to modernize them because it would not charge politically difficult market rates for the output. One sign of the problem is the declining capacity factor of the country's power stations: 58.9% in 1998, by 2008, it had fallen steadily to 46.3%

Significant oil and gas reserves make energy a principal national asset. Since OMV purchased control of Rompetrol, the loss of this symbol of national pride has weighed heavily on the government. It has reluctantly offered shares of other energy companies under pressure of the conditions for the 2009 IMF financial rescue, which obligated the country to reduce its budget deficit and debt.

The Romanian Academic Society's (SAR) Annual Policy and Forecast Report for 2010 sharply criticized the government's indecisive approach to energy market reform. Until 2006, "Romania advanced faster than some old (EU) member states" on the path of reform, and the results of some powerplants, even in state hands, showed improvement, SAR said. "A competitive energy market emerged," and "an independent regulator…became a good practice model for the region in its first years…Private investors became interested in energy." Since 2005-06, when EU accession was assured, SAR lamented, "reforms have stalled…despite our commitments to the EU and the consumer interests."

The lack of commitment to market reform has hindered investment and brought the energy sector to a critical point. In January 2011, Alexandru Sandulescu, head of the Economy Ministry's energy policy department, said, "Romania must shut down power production units totaling 5544 MW, or 28% of overall capacity, by 2020. During this time, energy consumption will rise by more than 2% a year, so there will be need of new production units." By 2035, more than half of the system's capacity must be replaced, he added.

Now the government may be ready to let go. In May 2011, the International Monetary Fund official for Romania's IMF rescue package was reported saying that the government planned to sell a large number of energy assets, including minority stakes in the nuclear and hydropower operators, the gas and electric transmission operators, and OMV Petrom. "They also agreed to sell minority or even majority stakes in some coal-fired powerplants," said Jeffrey Franks.

Sales of the assets offer opportunities for corruption, however, and critics have warned the government against temptation. SAR said, "In the Romanian energy sector, a major source for corruption and/or distortions of the competitive market is the sale of resources below true market value to preferred customers." Mark Gitenstein, US ambasador to Romania, echoed SAR's warning in a speech at the Bucharest Stock Exchange, when he urged Romania to emulate Poland's sale of state enterprises to raise funds to modernize its energy sector. "Poland did this not by giving preferential deals to political allies who bought the assets below their fair value, but by using its equity markets," he said. He disparaged the government's reform tinkering as "rearranging the deck chairs on the Titanic."

For wind energy, however, Romania is one of the most promising markets in Eastern Europe, said Hans Jörn Wieks, president of Vestas Central Europe, in January 2011 when he opened a Bucharest office for the global wind equipment maker. Building renewable-energy generating stations is the only way for Romania to meet its obligation under the EU 20/20/20 program to reduce greenhouse-gas emissions, and wind-farm development has become one of the most active plays for foreign energy investors. Romania has an estimated 14,000 MW of wind-energy potential and investors have blown in from all over the world to develop it. In 2010 alone, Romania's installed wind capacity jumped from 14 MW to 462 MW, and the Global Wind Energy Council projects that 600-800 MW more will be added in 2011. A list of wind developments approved and in construction totals over 6300 MW, almost all of them foreign-owned.

Florea Marius Catalin

In return for $27 billion in financial assistance in 2009, the IMF, the ECB, and the World Bank required the Romanian government to undertake a severe austerity program, which prolonged the country's recession but will hopefully spawn a robust recovery

But even the wind-energy success story has issues that give pause to potential investors. The Romanian legislation intended to encourage renewable-energy development, for example, operates through a complex system based on "green certificates" that power suppliers must purchase to satisfy their quota for the percentage of renewable energy sold. Other countries in Europe use a feed-in tariff that directly rewards renewable energy generators without the administrative bureaucracy of green certificates. Dana Dulca, executive director of the Romanian Wind Energy Association, told Platts, the energy news service, that this "unstable legal framework" and the economic crisis together were the main reasons developers were having difficulty financing their projects. Amending legislation was passed in July 2010 to increase the attractiveness of renewable development. Whether it will strengthen the program has yet to be seen, but Dulca called the changes "encouraging for investors."

Surprisingly, given the state of the economy, local opposition to a wind farm also has disrupted one major development. Authorities in the village of Cogealac, where Czech power company CEZ is building 252 MW of a $1.42-billion, 600-MW wind farm, led protesters breaking into the construction site in July 2010, claiming they had not granted permission for the work. CEZ said that it has received all the necessary permits from national and regulatory authorities, and work was suspended in August. It was resumed in February 2011, and CEZ is expecting completion in 2012.

Foreign investors are active in a number of other parts of the electricity-generation sector, but their participation generally is limited because the government is reluctant to allow foreign control of a strategic industry and because government indecision reduces the predictability energy investors require. The shortcomings of that policy are on display at the Cernovoda nuclear plant. The first and second 720-MW CANDU-6 units of this plant began commercial operation in 1996 and 2007, respectively. EnergoNuclear was formed in 2009 to build and operate Units 3 and 4, with a consortium led by state-owned Nuclearelectrica (with a 51% share) that included Czech power company CEZ, global steelmaker Arcelor-Mittal, Italian power company Enel, Germany's RWE, Electrabel of Belgium, Iberdrola of Spain and French utility GDF Suez. CEZ dropped out in October 2010, citing cost increases and schedule slippages. Iberdrola, GDF Suez and RWE withdrew three months later, pointing to "economic and market" reasons in public, but privately complaining of a lack of support from the government.

The remaining three partners are soldiering on and other foreign investors are expressing tentative interest, but weak government commitment to privatization is clearly a major challenge for foreign investors in Romania's energy sector. The catastrophe at Japan's Fukushima Dai-ichi nuclear plant, on the other hand, has had virtually no effect on Romania's interest in expanding Cernavoda.

Following a 2009 ruling by the International Court of Justice in The Hague resolving a 12-year-long maritime boundary dispute between Romania and Ukraine, auctions for oil and gas exploration licenses in the Black Sea have attracted a lot of interest. In July 2010, Romania awarded 20 licenses to international companies, including five in the formerly disputed offshore area. Russia's Lukoil, US-based Vanco, UK-based Melrose Resources, and two Romanian companies, Petromar Resources and Petro Ventures, won the offshore licenses, which excited intense bidder interest. International investors won a number of the onshore exploration blocks as well, demonstrating that investors were not completely put off by Romania's energy policies. Soon after the award, Melrose halted planned investments in the US, where 78% of its oil reserves are located, and said it was considering selling its US assets to concentrate on the offshore Romanian prospects.

Ensuring the supply of natural gas to Central and Eastern Europe is one of the major preoccupations of energy officials today. Recurring gas-supply cutoffs from

Russia because of disputes with transit country Ukraine have pushed energy security to the top of the EU priority list. The European Commission has applauded the initiative by Hungary-based oil and gas company MOL to develop the New Europe Transmission Systems (NETS), a network of interconnecting pipelines between the countries of the region.

The goal is to create a single, large, unified gas market out of the many small national markets of the region, with the transmission capability to make the region attractive to major gas suppliers, breaking Russia's market dominance, and bidirectional flows that will allow all participants to share supply if shortages develop or cutoffs occur. The first pipeline, connecting Szeged, Hungary, with Arad, Romania, was completed in 2010, and others are planned to link Hungary with Croatia and Slovakia. Through Croatia's and Romania's links with their neighbors, the NETS will eventually become reality.

Other plans for gas supply in Southeastern Europe are murkier. As noted elsewhere in this handbook, Russia's Gazprom is promoting its plan to deliver gas through the South Stream pipeline under the Black Sea. The European Commission and especially the EU states of Central and Eastern Europe want to avoid becoming even more dependent on Russian gas than they already are. The EC therefore has promoted the Nabucco pipeline, and a number of EU states have committed to support that line. Paradoxically, however, and perhaps even hypocritically, some of those states are also negotiating with Gazprom to participate in South Stream.

Bulgaria's previous government had agreed to be the western landfall for South Stream emerging from the Black Sea, but the new government has put a hold on that to review whether it is in the national interest of Bulgaria. So Gazprom and Romania have begun to talk seriously about routing South Stream through Romania. While this has been happening, Électricité de France and Wintershall, the oil and gas subsidiary of Germany-based BASF, have taken stakes in South Stream along with Italy-based Eni, which had originally partnered with Gazprom to develop the project.

South Stream appears to be on schedule for completion by 2015. Nabucco Gas Pipeline International, on the other hand, had to announce in May 2011 that it was unable to obtain commitments from gas suppliers and would have to delay the final investment decision. The company now says it will begin to flow gas in 2017. With European countries and companies buying into South Stream, Nabucco's prospects are looking weaker all the time. At this rate, the only gas filling the Nabucco pipeline will be the hot air from EU politicians supporting the plan with their rhetoric while they get in line to buy the fuel to be delivered by Gazprom's South Stream pipeline.

Politically stable but Russia vulnerable

The Slovak Republic has taken heavy blows in the global recession while dealing with several additional major challenges. The country, which joined the European Union in 2004 after a slow transition from planned economy to market economy, acceded to the Eurozone in January 2009, just a few months after the Wall Street panic sparked the global financial crisis. That same month saw the clash between Russia and Ukraine.

Russia cut off the flow of gas through Ukraine that month in a dispute over prices, and Europe as a whole was in crisis because of its dependence on Russian gas. The cutoff cost Slovakia $135 million per day over the 10-day duration of the crisis, according to sources cited by the Institute for the Analysis of Global Security (IAGS), a Washington, DC-based think tank. In the European Union, only Bulgaria took a worse hit.

The recession drove Slovakia's already high 2008 unemployment rate of 9.5 percent up to 15 percent in 2010, and the Organization for Economic Cooperation and Development (OECD) forecasts unemployment exceeding 12 percent into 2012. Between 2004 and 2008, the country averaged 7.4 percent annual GDP growth. But in 2009, the country, highly dependent on international trade, suffered a decline of 4.7 percent in real GDP, one of the steepest of the countries of the OECD. The difficult economy was a factor in the June 2010 election of a new, business-friendly government, which replaced a government that had a more statist policy.

But Slovakia's economy now is recovering at an above-average pace, the OECD says, and its exports of goods and services, which plummeted 16.5 percent in 2009, is recovering strongly, with 14.1 percent growth forecast for 2010 and 9.9 percent for 2011. Slovakia's 2009 accession to the euro area helped to cushion the shocks; its 2008 core inflation of 2.8 percent was reduced to 1.8 percent in 2009 and 0.6 percent in 2010. In September 2011, Forbes rated Slovakia at 33 on the list of Best Countries for Business, immediately behind Italy and just ahead of Hungary,

E.ON Elektrárne

A 434-MW combined-cycle merchant plant in Malzenice, Slovakia's first private powerplant, was completed in late 2010 by E.ON Elektrárne.

Slovenske Elektrarne

Hydropower generates 18% of Slovakia's electricity and is by far the largest single renewable energy source for power

improving two spots from the previous year.

As befits a developed European country, 56 percent of whose 5.4 million people are in urban areas, Slovakia's economy is largely industrial. Products include metal and metal products; food and beverages; electricity, gas, coke, oil, nuclear fuel; chemicals and manmade fibers; machinery; paper and printing; earthenware and ceramics; transport vehicles; textiles; electrical and optical apparatus, and rubber products, according to the CIA World Fact Book. Machinery and electrical equipment make up 36 percent of its exports, followed by vehicles, 21 percent; base metals, 11 percent, chemicals and minerals, 8 percent, and plastics, 5 percent. Of its 2.6 million workforce, 27 percent are employed in industry and 69 percent in services.

On the whole, the country has navigated the treacherous waters skillfully and well. The European Bank for Reconstruction and Development (EBRD) commended Slovakia's handling of itself in the recession, crediting its past progress with structural reforms and its banking sector's conservative funding structure and focus on traditional banking activities. But the bank warned that the previous government's policies had reduced labor market flexibility, halted key privatizations and increased state involvement in the energy sector, threatening to undercut the country's future progress and competitiveness.

As Slovakia continues its transition to a fully functioning market economy, the EBRD recommends continuing structural reform of the energy sector with further privatization and the promotion of energy efficiency and renewable energy. Modernization of municipal energy infrastructure also is required, but will require assistance from the EU, given the strained state of municipal finances. Safeguarding security of supply, another EBRD priority recommendation, may provide one of the most fruitful opportunities for foreign direct investment.

Energy Sector

Slovakia's long-standing role as the EU's single most important transit country for Russian gas into Western Europe, the conduit for two-thirds of the gas arriving via Ukraine, left the small country vulnerable in the January 2009 gas crisis. The republic had neglected to improve its energy security or its diversification strategies since separating from the Czech Republic in 1993. It had upgraded its market functioning and regulatory regimes to qualify for EU membership, and it had overhauled its legal framework and expanded both its domestic distribution network and its transit capacity, but it had not interconnected with EU neighbors or modified its transit pipelines for bidirectional flow.

Neglecting the energy-transportation infrastructure is a potentially catastrophic oversight for a country that imports more than 90 percent of its energy. Russia supplies all the republic's nuclear fuel and nearly three-quarters of its imported oil and, before 2009, supplied all of its natural gas, according to IAGS.

Slovakia's energy policy is based on the Energy Act (No. 656/2004), which took effect Jan. 1, 2005. Among other objectives, it aims to reduce energy intensity to the level of EU member countries, build up storage capacities of oil and oil products to a 90-day supply, strengthen the country's strategic position in the area of transit of strategic energy supplies through development of gas and crude-oil pipeline enhancements, increase the use of renewable energy sources for primary-energy resources, and settle on a method of spent nuclear fuel disposal. The policy's main priority for renewable energy is to develop the biomass sector, particularly for district heating.

Slovakia is dependent on international trade because it is poorly endowed with natural resources. Brown coal and lignite are its principal resources, with small amounts of iron ore, copper, and manganese ore. But nature has stinted even the coal resources. While some 1 billion tonnes of lignite lie in the ground, only 70 million of that is exploitable, estimates the European Association for Coal and Lignite. Three companies extract it at five underground mines in central, southern and western Slovakia.

In August, the new government took a sharp turn toward business-friendly policy by lifting the regulatory price controls instituted by its predecessor so as "to minimize political and public influence." The government also pledged to increase the electrical interconnection with Hungary, a move consonant with the EU's policy to improve north-south power links in Central Europe.

Electricity

A substantial drop in electricity demand in 2009 has relieved pressure on utilities

Energy Industry Players: Slovakia

Eustream	SPP's transport company
Javys	State nuclear operator
Nuclear Energy Company of Slovakia	CEZ-Javys joint venture
SEPS (Slovenska elektrizacna prenosova sustava, a.s.)	HV transmission grid operator
Slovenske Elektrarne	Largest electricity producer
SPP (Slovenský plynárenský priemysel, a. s.)	Gas importer/seller
SSE (Stredoslovenska Energetika)	Distribution company

Gazprom

Severe energy dependence. Russia supplies nearly three-quarters of Slovakia's imported oil and, before 2009, supplied all of its natural gas, according to IAGS

Kranimex, Ltd

Mochovce 3 and 4 are now expected to enter commercial operation in 2012 and 2013 at an estimated cost of $3.6 billion, the largest private investment ever in Slovakia

to quickly build new capacity fueled by natural gas, allowing them to focus on enhancing the conventional power sources and to float requests for proposal on small renewable-energy resources.

Nuclear energy supplies 54 percent of Slovakia's electric power. The closure of two 440-MW, Russian-designed VVER pressurized-water reactors in 2008, required as a condition of Slovakia's 2004 accession to membership in the European Union, forced the country to import power. The government has stepped up its efforts to replace the units and, in mid-2009, signed contracts with Skoda JS, Atomstroyexport and some other companies to complete two other units with an updated VVER design. Construction of Mochovce 3 and 4 began in 1986 but was suspended in 1992. They are now expected to enter commercial operation in 2012 and 2013 at an estimated cost of $3.6 billion, the largest private investment ever in Slovakia, according to owner Slovenske Elektrarne, the country's largest generation entity.

Feasibility studies are in progress for two new reactors at Jaslovske Bohunice, where the old units were shut down. If approved, they would be scheduled to begin operation in 2020. But the new government has sent conflicting signals about the nuclear plants. In August 2010, the government said it would not provide any direct or indirect financing or any state guarantees for construction of the new reactors, even though it also wants to keep state-owned nuclear operator Javys's 51% stake in that company's joint venture with Czech utility CEZ, which is conducting the studies for the reactors. The Prime Minister subsequently explained that the government wants to generate nuclear power only for domestic use, not for export.

Powerplants using fossil fuels provide 26 percent of the country's electricity. Hard coal and lignite fuel the bulk of that, about 20 percent of total power generation. Their emissions profile has kept coal-fueled plants often on the bench until they can be retrofitted with air-pollution control equipment. Until recently, only one gas turbine plant was in operation, but a couple of others are being built to back up renewable-energy plants. One, a 434-MW combined-cycle merchant plant in Malzenice and Slovakia's first private powerplant, was completed in late 2010 by E.ON Elektrarne. Slovenske Elektrarne has dropped plans to build more, preferring to concentrate on its nuclear powerplants.

Hydropower generates 18 percent of Slovakia's electricity and is by far the largest single renewable energy source for power. Biomass, at 2 percent of power production, is the largest non-hydro renewable, and the energy policy encourages biomass use for both electricity and district heating. Two geothermal projects are located in the Kosice area in eastern Slovakia, one for a 3.5-MW power station now in construction and the other being developed for district heating.

Wind and solar energy play a negligible role in the power production. In 2007, the government set a goal of 10 MW of solar power installations. In December 2009, Seps, the high-voltage transmission network operator, approved 120 MW of applications for solar plants under a quota system designed to limit the potential disruption of the grid from intermittent resources. The plants were to be completed by 2011.

Slovakia's power transmission grid consists of 2,641 km of 400-kV and 200-kV lines. The system was interconnected with neighboring countries in the 1990s, but mostly in an east-west direction, according to the Austrian Energy Agency. Significant improvement in north-south interconnections

Slovakia Energy Stats

Oil Proved Reserves 2010 est. (bbl)	9 million
Oil Production 2009 (bbl/day)	200
Oil Pipelines 2009 (km)	416
Refinery Capacity 2010 (bbl/day)	136,132
Gas Proved Reserves 2010 (m^3)	14.16 billion
Gas Production 2009 (m^3)	113.3 million
Gas Pipelines 2009 (km)	6769
Hard Coal Recoverable Reserves 2005 (tonnes)	1.8 million
Hard Coal Production 2009 (tonnes)	0
Lignite Recoverable Reserves 2005 (tonnes)	260 million
Lignite Production 2009 (tonnes)	2.6 million
Installed Generation Capacity 2008 (MW)	7357
Electricity Production 2009 (kWh)	24.7 billion
Transmission Lines 2007 (km)	2641
Generation: Coal/Lignite (MW)	1180
Generation: Gas (MW)	Not available
Generation: Nuclear 2010 (MW)	1656
Generation: Hydropower (MW), including pumped storage	2395
Generation: Non-hydro Renewables 2008 (MW)	183
Goal for Renewables Capacity by 2020	14%

Sources: CIA Fact Book, Euracoal, Austrian Energy Agency, Energy Information Administration

is still needed. To enhance system reliability after the EU-required shutdown of the older nuclear units, Slovenske Elektrarne planned to upgrade existing 200-kV lines to 400-kV, and also to add 400-kV lines to Hungary, Austria and Ukraine.

Oil and Gas

The vulnerabilities of the natural-gas transmission system were on naked display in the 2009 gas crisis. That incident precipitated intense efforts to create better interconnections among the countries of Central and Eastern Europe. In November 2010, the European Commission published a statement of "energy infrastructure priorities for 2020 and beyond" to set the stage for a Europe-wide push to create an integrated European energy network. One priority is to create natural-gas infrastructure that will allow physical access in every EU state to at least two different sources. A feasibility study is underway on a pipeline linking Slovakia and Hungary in what the EC communication calls the North-South Corridor for the region. Another pipeline is planned to extend the link from Slovakia to Poland, where it will ultimately reach a liquefied-natural-gas terminal being developed.

Open seasons on the Hungarian leg have elicited insufficient demand, and some analysts have expressed concern that the interconnection may be uneconomical. But that may not be a deal-breaker. The EU has named the North-South Corridor a priority for the gas grid, and the EC's Energy 2020 strategy statement says, "For projects of 'European interest' which have no or poor commercial viability, innovative funding mechanisms will be proposed for maximum leverage of public support to improve the investment climate for the coverage of main risks or to speed up project implementation."

Domestic oil production supplies only 3 percent of Slovakia's consumption annually. As in the case of gas, the country depends mainly on Russia for its oil imports, and has a long-term supply contract with that country. In accordance with the International Energy Agency's recommendation, Slovakia has committed to diversifying its oil-supply sources, but it has made little progress toward the goal. No projects to enhance interconnections for that purpose are currently in the works.

Investment

Political stability makes Slovakia an attractive destination for investment. The country is a member of the EU, NATO, and numerous world trade, economic and security organizations. An A+ rating from Standard & Poor's also attests to its economic stability. Among other factors in favor of investors, according to Slovenske Elektrarne, are its currency stability as a member of the Eurozone, a flat-tax regime of 19 percent with 0 percent withholding taxes on dividends, a highly skilled and experienced workforce, a good and developing transportation infrastructure in the heart of Europe and continuously improving law enforcement.

The high energy intensity of Slovakia's large industrial sector and the country's high levels of greenhouse-gas emissions may offer opportunities for investment in countermeasures. In March 2010, the EBRD provided $122 million in new funding under the Slovakia Sustainable Energy Finance Facility to finance energy efficiency and small renewable-energy projects. The facility was launched in 2007 with $82 million to encourage Slovak enterprises and housing associations to make better use of energy resources. The money is lent to four participating banks and some partner institutions to finance efficiency and renewable-energy projects for the industrial and residential sectors.

In a November 2010 economic survey, the OECD urged the Slovak government to remove entry barriers in the regulated energy sector and to promote energy market competition by limiting non-price discrimination and the power of incumbent companies. The analysis suggested clarifying rules for access to the grid, the enforcement of contracts and the authorization procedures as examples of areas that could be improved.

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