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Globalisation, Cleaner Energy and Mega-Cities: Options and Messages for Turkey/Istanbul

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Summary

Tectonic changes are occurring not only in the world financial system, trading and investment, energy, geopolitics, and technology; a fundamental transformation is also underway in the way the cities have been managed and regenerated, creating profound implications for mega-cities such as Istanbul. The global population is congregating in our cities. Eighty per cent of the world's estimated nine billion people in 2050 are expected to live in urban areas. Our cities and urban areas face many challenges from social to health to environmental. The impacts of cities and urban areas are felt in other regions which supply cities with food, water and energy and absorb pollution and waste. However, the proximity of people, businesses and services associated with the very word 'city' means that there are also huge opportunities. Indeed, well designed, well managed urban settings offer a key opportunity for sustainable living.

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Myriad trends indicate that the current world energy system is far from being sustainable. It will be shaped by rising demand over the long term, dominance of fossil fuels, inaccessible supplies, price volatility, inadequate investment, geopolitical tensions, and climate change. The most pressing decision facing the next generation may be how best to accelerate the transition from a fossil-fuel-based energy system to a system based on climate-friendly energy alternatives. Turkey has emerged as an important actor to reckon with as a consumer, transporter, investor, regional hub, and security provider in world energy and geopolitics. Likewise, Istanbul as a global city and gateway to the world's major producers and consumers offers so much opportunities for energy investment, conservation, efficiency, distribution and shipment. It also faces serious energy-related challenges including from climate change, congestion, power black-outs, and local pollution.

Globalization and Bigger Cities[2]

If the world is so flat, then why are cities growing so quickly, especially in the third world? One might have thought that striking declines in the costs of shipping goods and communicating knowledge across space would have led to a great dispersal of population. After all, it is at least technically possible to telecommute over great distances. Yet the share of the world living in urbanized areas increased from 41 percent in 1985 to more than 50 percent today.

In the developing world, urbanization has often taken the form of exploding populations in megacities. In 1800, only 3 percent of the world's population lived in cities, a figure that has risen to 47 percent by the end of the twentieth century. In 1950, there were 83 cities with populations exceeding one million; by 2007, this

[2] Why Has Globalization Led to Bigger Cities?, 19 May 2009, Today's Economist, Edward Glaeser, professor at Harvard.

number had risen to 468[3]. If the trend continues, the world's urban population will double every 38 years. The UN forecasts that today's urban population of 3.2 billion will rise to nearly 5 billion by 2030, when three out of five people will live in cities.

This increase will be most dramatic on the least-urbanized continents, Asia and Africa. Surveys and projections indicate that all urban growth over the next 25 years will be in developing countries. One billion people, one-sixth of the world's population, now live in shanty towns. In many poor countries overpopulated slums exhibit high rates of disease due to unsanitary conditions, malnutrition, and lack of basic health care. By 2030, over 2 billion people in the world will be living in slums. Over 90 percent of the urban population of Ethiopia, Malawi and Uganda, three of the world's most rural countries, already live in slums.

Mumbai's population increased to 19 million in 2007 from 10.8 million in 1985. Bangalore, the urban symbol of the flat world, has had its population double over two decades, to 6.8 million today from 3.4 million in 1985. Istanbul quadrupled its population since 1980. The growth of these cities and the continuing strength of older urban areas — like New York, London and Paris — is no accident. Globalization and new technologies attract people to big cities, by increasing the returns to urban proximity. While it would be technically possible to sit and write software somewhere in the Vale of Kashmir the innovators in Indian information technology cluster around one another in Bangalore. America's computer wizards likewise choose to cluster in Silicon Valley rather than disperse.

More than 2,500 years ago, the knowledge of the Mediterranean world made its way to Greece through Athens. Twelve hundred years later, Greek and Indian knowledge entered the Islamic world through the Abbasid Caliphate's House of Wisdom in Baghdad. Eastern wisdom came west again, through Venice and the cities of Spain. The circle continues today, as Western technology makes its way east, again through urban portals like Bangalore and Shanghai. Since there is so much for developing countries to gain economically by integrating with the developed world, the urban gateways to the West attract millions.

There is a great deal of concern today about whether the megacities of Asia are just too big. After all, from a Western perspective, many developing cities have bad air, bad water, awful congestion and poor housing conditions. The right response to the problems of megacities is not to get misty-eyed about village life, but rather to work to improve the quality of infrastructure in those growing urban areas. Abundant land hides many sins, including the failures of government. But when people crowd into cities, the costs of governmental failure become painful and obvious.

The great challenge facing the growing cities is whether the public sector can take the difficult steps that would lead to clean water, efficient energy use, better toilets, faster commutes and less crime. Restricting the growth of cities would mean restricting the economic progress. A better path is to figure out how to make those cities more liveable even as they continue to grow.

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[3] "Megacities Of The Future". Forbes.com. http://www.forbes.com/2007/06/11/megacities-population-urbanization-biz-cx_21cities_ml_0611megacities.html. Retrieved 2010-09-01.

What Makes Cities Great

The proximity of people, businesses and services associated with the very word ‘city’ means there are also huge opportunities and benefits associated with urban living especially in terms of sustainability and resource use. Already, population density in cities means shorter journeys to work and services, greater use of walking, cycling or public transport, and living in apartments of multi-family houses or blocks requiring less heating and less ground space per person. As a result, urban dwellers on average consume less energy and land for living per capita than rural residents.

Istanbul is currently in the throes of uncontrolled growth. The city is experiencing the attendant problems of aesthetic decay, overcrowding, environmental degradation and infrastructure collapse. Most importantly, metropolitan Istanbul faces life-threatening air and water pollution from solid and toxic waste disposal, automobile and industrial emissions, and lignite coal burning. In order to arrest the rapid decline of Istanbul's environmental quality, stringent measures must be adopted by the city's government, i.e. curb the uncontrolled construction activity, limit the growing use of automobiles in the city, eliminate leaded gasoline as a source of fuel and forbid the burning of lignite coal in space heating systems.

A major step toward the goal of a healthier Istanbul is the formation of district heating systems, conversion from coal to natural gas and elimination of leaded gasoline. It is imperative that the Metropolitan Government of Istanbul integrate urban planning and energy planning and thereby control settlement density via strict regulations and standards, allowing for reformed energy consumption, transport design and land use in the metropolitan area.

Designing the future

We need to forecast what’s to come over the next decades. After all, economists did not anticipate the deep recession of 2008-2010. It seems like only yesterday that Alan Greenspan was viewed as a god. They have been humbled by recent events. Cities are ecosystems: they are open and dynamic systems which consume, transform and release materials and energy; they develop and adapt; and they interact with humans and with other ecosystems. They must therefore be managed and protected like any other type of ecosystem.

Through rethinking urban design, architecture transport and planning, we can turn our cities and urban landscapes into ‘urban ecosystems’ at the forefront of climate change mitigation (e.g. sustainable transport, clean energy and low consumption) and adaptation (e.g. floating houses, vertical gardens). Furthermore, better urban planning will improve quality of life across the board by designing quiet, safe, clean and green urban space. It creates also new employment opportunities by enhancing the market for new technologies and green architecture. Cities, due to their concentration of people and activities, matter for Europe. Also, the problems of cities cannot be solved at the local level alone. Better policy integration and new governance, involving closer partnership and co-ordination at local, national and European level, are required.

For decades, economists have debated the “Dutch Disease” and other ailments associated with too much success. The discovery of natural gas in the North Sea supposedly helped to de-industrialize the Netherlands by raising exchange rates and making Dutch manufacturing less competitive internationally. Can some types of prosperity imperil cities as well as countries? The American Rust Belt is full of places like Buffalo, Cleveland and Detroit that became rich a century ago because of access to natural resources and that are now less prosperous. But the examples of cities that were once richer than they are today proves only the vicissitudes of urban fortunes, not that resources lead to poverty.

There are myriad theories that could explain a negative connection between natural resources and subsequent urban innovation. Too much coal can, as it did in Pittsburgh, lead to the establishment of a few dominant companies, like the vast enterprises managed by Andrew Carnegie and Henry Clay Frick. The problem of big companies becomes more severe if they are vertically integrated. A resource curse can also occur if success of one sector eliminates industrial diversity. Natural resources can also deter growth by lowering levels of education. Edinburgh is more prosperous today than Glasgow, in part, because it was less successful as an industrial town and therefore attracted fewer less-skilled workers.

Witness the economic and social miracle of Denmark - poor in natural resources and rich in human resources that tiny country has invested heavily in its people. Its workforce is among the best educated in the world. A highly restrictive immigration policy, preserving its cultural homogeneity at the expense of diversity and openness, also makes the implementation of progressive social policies much easier, and less politically divisive, than in places like New York City where every measure is instantly gerrymandered along racial and ethnic lines.

New wealth does not start in the cities. Cities recycle wealth. Agriculture, mining and energy produce new wealth every year. Mining is a one-time harvest; agriculture harvests the sun. All new renewable wealth essentially arrives from the sun. Without that inflow of new wealth, economies would stagnate. Switzerland has basically no natural resources at all but a very high standard of living. Ecuador has abundant natural resources but a miserable education system and no support for business. Look at the results.

The Paris region’s western county known as the Yvelines is currently gearing up to reinforce its dominance in the automotive sector. Considerable investments by French carmakers PSA Peugeot Citroen and Renault operate alongside public subsidies and initiatives. If we are to listen to French public authorities, ‘the car of the future’ will be developed here. This is where the last hundred years of development in France’s auto industry has taken place, so why should the next hundred years be any different? The industry jobs created by auto manufacturers will likely benefit other sectors as diverse as IT and aeronautics.

The best example of an advanced nation that has zero resources to start with is Singapore. Kicked out from Malaysia in the 1960s with no resources including sufficient water supply, Singapore reinvented itself and invested on its human capital and prepared itself for every stage of world development. When open to global challenges such as job outsourcing, Singapore’s consistent high saving rate and

public investment worldwide has helped the nation to reinvest in its infrastructure to attract foreign talent and businesses. Having said that, as a global city, the income disparity in Singapore is widening significantly. A great city economically understands its position, competition and plan for the future and not entirely lives for today.

Profound Changes in World Energy

Modern countries need ever increasing amounts of oil, gas, and other fuels to run their economies. It is the life-blood. As globalization lifts millions out of poverty, the demand for energy worldwide will continue to grow, and we risk ending up with a volatile, “beggar thy neighbor” style of competition between countries to control sources of supply, especially in the developing world. Mankind has had access to electricity for only 130 years. In just over a century, we have extended transmission lines, providing refrigeration and lighting to 5 billion people around the world. NASA's "Earth at Night" map[4] highlights this world of prosperity, yet 24 percent of humanity still lives in the dark.

Ironically, the choices we made to achieve our unprecedented prosperity may bring about our downfall. In 1950, there were 2.5 billion people and a global economy of $7 trillion. In just 6 decades, we are now 6.7 billion with a $66 trillion gross world product. The burning of fossil fuels in the first half of the 20th century had a relatively small ecological footprint. Today, the consequences of energy Use are felt in every wallet, on each continent, coastline and in our shared atmosphere.

We are forced to embark on a journey to create a new energy system, one that will continue to fuel human progress and help to raise living standards. But importantly, one that leaves a healthy planet. Today, there is emerging awareness and understanding that the carbon based energy system we have depended upon to fuel growth and development is not sustainable. World oil reserves are in fact limited and, even more problematic, are located in politically volatile regions of the world. Our dependence on foreign oil continues to increase, further compromising economic and national security.

What this adds up to is simple and sobering: the end of the world as we have known it. In the new, energy-centric world, the price of energy will dominate our lives and power will reside in the hands of those who control its global distribution. In this new world order, energy will determine when, and for what purposes, we use our cars; how high (or low) we turn our thermostats; when, where, how or even if, we travel; increasingly, what foods we eat (given that the price of producing and distributing many meats and vegetables is profoundly affected by the cost of oil or the allure of growing corn for ethanol); for some of us, where to live; for others, what businesses we engage in; for all of us, when and under what circumstances we go to war or avoid foreign entanglements that could end in war[5].

As a result of these developments, the global energy scene is going through a fundamental transformation that will not only change the rules of the game; it will

[4] http://apod.nasa.gov/apod/ap001127.html
[5] The Rise of the New Energy World Order, Michael Klare, http://peakenergy.blogspot.com/2008/04/rise-of-new-energy-world-order.html

also change the game itself and its players. The following facts and trends underscore the severity of the world's growing *energy insecurity* today[6]:

Strong demand growth

Energy of all sorts was once hugely abundant, making possible the worldwide economic expansion of the past six decades. This expansion benefited the United States above all - along with its "First World" allies in Europe and the Pacific. Over the past two decades, however, a select group of former "Third World" countries - China and India in particular - have sought to participate in this energy bonanza by industrializing their economies, selling a wide range of goods to international markets, and enabling their populations consume more. This, in turn, has led to an unprecedented spurt in global energy consumption - a 47 percent rise in the past 20 years alone, according to the US Department of Energy (DoE)[7].

Just consider one fact. The United States consumes 25 barrels of oil per capita annually and Europe ten barrels. Although the OECD countries are still the largest oil consumers, the current increase in demand for oil and gas is mainly driven by fast economic development in developing countries such as India and China, which account for one-third of the world population but only consume 17 percent of world energy. Each Chinese, however, consumes only two barrels a year, so even a small increase in Chinese consumption could have a massive impact on the market.

With fossil fuels set to dominate energy consumption for many years to come, and with demand projected to rise even further in combination with a greater import dependency on the part of importing countries such as the US and Europe (holding for China and India as well), this trend is likely to strengthen inexorably. In addition, large oil and gas consuming regions will become increasingly dependent on fewer and fewer countries.

This fundamentally shifts the balance of power to those countries upon whom continued energy flows depend. With economic recovery under way, the steady upward march of global energy demand is resuming. Many developing countries have weathered the economic crisis in much better shape than the developed ones, a testimony to the dynamism that underscores the momentum in their vibrant economies. And there are signs of a fragile recovery in the rest of the world.

Global energy demand is expected to nearly double in the first half of this century. That is partly due to population growth. The world will be home to about nine billion people in 2050, up from 6.8 billion today. As incomes grow and living standards improve, people are buying their first cars or refrigerators – which need energy. Worldwide, we expect the number of cars and trucks on the roads to rise from around 900 million today to around two billion by mid-century.

As energy demand accelerates, the world will need to develop all energy types, even assuming heroic steps to Use existing energy sources more efficiently. That means everything from traditional fossil fuels and nuclear to renewables such as biofuels

[6] Rising Powers, Shrinking Planet: The New Geopolitics of Energy, Michael T Klare Metropolitan Books, 1 edition, 2008.
[7] http://www.atimes.com/atimes/Global_Economy/JD17Dj04.html

and wind. There is a need for “energy revolution” on the demand side, where big changes could be effected relatively quickly. Those in the developed world have an obligation to use energy more efficiently as part of their contribution to the improvement of living standards in the rest of the world.

The insufficiency of primary energy supplies.

As the world’s need for energy grows, the ability of the traditional suppliers to continue to meet the demand is far from certain. Europe, for example, is increasingly dependent on Russian oil and gas. But Russia’s currently exploited energy reserves are depleting fast. Russians now consume more and more of their own gas at home, and the country’s energy output is shrinking due to a lack of investment in new technology, and in developing new fields.

The capacity of the global energy industry to satisfy demand is shrinking. By all accounts, the global supply of oil will expand for perhaps another half decade before reaching a peak and beginning to decline, while supplies of natural gas, coal and uranium will probably grow for another decade or two before peaking and commencing their own inevitable declines. In the meantime, global supplies of these existing fuels will prove incapable of reaching the elevated levels demanded.

There are few countries - perhaps a dozen altogether - with enough oil, gas, coal and uranium (or some combination thereof) to meet their own energy needs and provide significant surpluses for export. Not surprisingly, such states will be able to extract increasingly beneficial terms from the much wider pool of energy-deficit nations dependent on them for vital supplies of energy. These terms, primarily of a financial nature, will result in growing mountains of petrodollars being accumulated by the leading oil producers, but will also include political and military concessions.

In the case of oil and natural gas, the major energy-surplus states can be counted on two hands. Ten oil-rich states possess 82.2 percent of the world's proven reserves. In order of importance, they are: Saudi Arabia, Iran, Iraq, Kuwait, the United Arab Emirates, Venezuela, Russia, Libya, Kazakhstan and Nigeria. The possession of natural gas is even more concentrated. Three countries - Russia, Iran and Qatar - harbour an astonishing 55.8 percent of the world supply. All of these countries are in an enviable position to cash in on the dramatic rise in global energy prices and to extract from potential customers whatever political concessions they deem important.

Worldwide demand will continue to grow as hundreds of millions of newly-affluent Chinese and Indian consumers line up to purchase their first automobile (some selling for as little as $2,500); key older "elephant" oil fields like Ghawar in Saudi Arabia and Canterell in Mexico are already in decline or expected to be so soon; and the rate of new oil-field discoveries plunges year after year. So expect global energy shortages and high prices to be a constant source of hardship.

Yet, there are still huge unexplored areas in the world. For example, the Arctic is estimated to hold reserves of 51bn tons of oil and 87 trillion cubic metres (cu m) of gas, of which 9bn tons of oil and 10 trillion cu m of gas fall in Russia’s territory. The Russian Arctic is already a major driver of the national economy, accounting for 11

percent of national GDP and 22 percent of exports (mostly hydrocarbons). Melting ice and progress in border demarcation is likely to open up further opportunities in the exploration of natural resources, maritime transport and fisheries[8].

Another significant discovery, according to a leaked document[9], has sparked the largest onshore oil rush in North America's history. How large: about three trillion barrels worth of oil and more than one quadrillion cubic feet of natural gas. That's more oil than 11 Saudi Arabias. That's enough fossil fuels to power the US for the next 673 years! Canada and the US together sit at the top of global oil deposits. This oil is no "new" discovery. The problem has never been finding the oil; it has been getting it out.

A rising concern for security of demand among major producer countries may prevent large scale of investment from happening. To meet the rising energy demand, a huge amount of investment is needed.[10]. Energy investment worldwide has plunged over the past year in the face of a tougher financing environment, weakening final demand for energy and lowering cash flow. It is estimated by IEA that global upstream oil and gas investment budgets for 2009 were cut by around 19 percent compared with 2008 — a reduction of over $90 bn.[11] The 2010 figures are not encouraging, either.

Intense competition between older and newer economic powers

This new world order will witness fierce international competition for dwindling stocks of oil, natural gas, coal and uranium, as well as by a tidal shift in power and wealth from energy-deficit states like China, Japan and the Us to energy-surplus states like Russia, Saudi Arabia and Venezuela. In the process, the lives of everyone will be affected in one way or another - with poor and middle-class consumers in the energy-deficit states experiencing the harshest effects.

The recession has cut energy use throughout the developed world, but as growth returns so will the pressure. Meanwhile, the fastest-growing economies are in the developing world. The largest of these are Brazil, Russia, India and China, which are all currently experiencing rapid growth despite their differences. Indeed, the two biggest, China and India, experienced no recession at all.

From an energy perspective, the two most important developing economies in the world are China[12], which has just passed the US to become the world's largest emitter of carbon, and Russia, which is on a par with Saudi Arabia. The steps China

[8] Most of the Arctic is already divided up among relevant states, which limits the potential for remaining disputes to disrupt neighbourly co-operation. The border treaty agreed with Norway on 15 September 2010 testifies to the multilateral political will to solve disputes peacefully. The agreement improves Russia's prospects of claiming a larger area of seabed as its continental shelf and strengthening its claim over disputed reserves.

[9] We Just Dwarfed Saudi Arabia, Brian Hicks, Energy and Capital, September 29, 2010

[10] 'Drive on Biofuels Risks Oil Price Surge,' Javier Blas and Ed Crooks, *Financial Times*, 6 June, 2007.

[11] The capital required to meet projected energy demand through to 2030 in the IEA Reference Scenario is huge, amounting in cumulative terms to $26 trillion (in year-2008 dollars) — equal to $1.1 trillion (or 1.4 percent of global gross domestic product) per year on average.

[12] China plays a critical role in all this. The Chinese alone are projected to consume 17 percent of world energy by 2015, and 20 percent by 2025 - by which time, if trend lines continue, it will have overtaken the US as the world's leading energy consumer. India, which, in 2004, accounted for 3.4 percent of world energy use, is projected to reach 4.4 percent by 2025, while consumption in other rapidly industrializing nations like Brazil, Indonesia, Malaysia, Thailand and Turkey is expected to grow as well.

takes to limit its energy Use and the manner in which Russia continues developing its oil and gas resources in a sustainable manner therefore have a huge impact on all of us.

However, while the balance of importance has shifted away from the established developed economies to these “new” ones, it would be wrong to assume that what Western business does is less important. Quite the reverse – it matters more. For a start, much of the technology that the emerging economies are now applying has been developed in the West and, in many cases, is being supplied by European and North American corporations. Other technology is being made available under license. This applies not just to high-profile, low-carbon products, such as wind turbines, but towards many less glamorous items, such as more efficient diesel stand-by generators.

By dint of their sheer size and population -- and their collective decision to embrace their own particular brand of capitalism -- BRICs are the economic future of the world. The BRICs today already account for a combined GDP of $15.435 trillion on a purchasing power basis[13]. By that measure, they are already collectively larger than the US.[14] Together, the BRICs encompass more than 25 percent of the world's land mass and 40percent of the world's population. China and India will become the dominant global suppliers of manufactured goods and services. Brazil and Russia will be the world's leading suppliers of commodities.

These rising economic dynamos will have to compete with the mature economic powers for access to remaining untapped reserves of exportable energy - in many cases, bought up long ago by the private energy firms of the mature powers like Exxon Mobil, Chevron, BP, Total of France and Royal Dutch Shell. Of necessity, the new contenders have developed a potent strategy for competing with the Western "majors": they have created state-owned companies of their own and fashioned strategic alliances with the national oil companies that now control oil and gas reserves in many of the major energy-producing nations.

The “Green Economy” and Energy Alternatives.

New sources of energy are desperately needed to compensate for the eventual disappearance of existing fuels as well as to slow the build-up of climate-changing "greenhouse gases" in the atmosphere. In fact, wind and solar power have gained significant footholds in some parts of the world. A number of other innovative energy solutions have already been developed and even tested out in university and corporate laboratories. But these alternatives, which now contribute only a tiny percentage of the world's net fuel supply, are simply not being developed fast enough to avert the multifaceted global energy catastrophe that lies ahead.

According to the DoE, renewable fuels, including wind, solar and hydropower (along with "traditional" fuels like firewood and dung), supplied but 7.4 percent of global energy in 2004; biofuels added another 0.3 percent. Meanwhile, fossil fuels - oil, coal

[13]Build Your Fortune BRIC by BRIC The Global Guru, www.theglobalguru.com/article.php?id=307&offer=GURU

[14] But per capita income and military comparison will continue to give a different perspective. For example, this year the US defence budget will again be around $600 billion which is larger than the next ten countries combined. If all national security spending was included, that figure would rise to around $800 billion.

and natural gas - supplied 86 percent of world energy and nuclear power another 6 percent. Based on current rates of development and investment, the DoE offers the following dismal projection: In 2030, fossil fuels will still account for exactly the same share of world energy as in 2004 while the expected increase in renewables and biofuels is so slight - a mere 8.1 percent - as to be virtually meaningless.

In global warming terms, the implications are nothing short of catastrophic: Rising reliance on coal (especially in China, India and the US) means that global emissions of carbon dioxide are projected to rise by 59 percent over the next quarter-century, from 26.9 billion metric tons to 42.9 billion tons. The meaning of this is simple. If these figures hold, there is no hope of averting the worst effects of climate change[15].

An ocean of ink and a lot of finger pointing has been offered to explain the near collapse of the Copenhagen talks last year. Much attention has been paid to the complexity of the issue and the intricacies of the UN process. Sage voices have suggested that it was always unrealistic to expect 192 nations to reach agreement on such a difficult topic. Others have offered ingenious schemes for reforming, or even ignoring, the UN Framework Convention on Climate Change (UNFCCC).

The central reason that Copenhagen failed was simply a lack of political will. Politicians determine outcomes, not processes. When they find processes getting in the way of a genuinely desired outcome they are well accustomed to ignoring, by-passing or innovating around the barriers to agreement. But nowhere could they see an OECD government in which the volume of capital flowing into low carbon energy investments was getting even close to the volume of capital flowing into high carbon energy investments. In politics, as in so many other walks of life, actions speak louder than words and money speaks loudest of all.

As climate change impacts on energy exploration and transit routes, it will also increasingly impact our security. As the polar icepack melts, and the Northwest Passage to Asia opens up, an increasing amount of shipping will pass through one of the most remote and inhospitable parts of the world. Intervening in the event of an environmental disaster or even a terrorist attack would be very difficult indeed.

There are real economic risks and a great many unresolved political problems in making the transition to the carbon neutral energy system needed to avoid dangerous climate change. If OECD governments are not yet willing to take these risks and solve these problems, it is hardly surprising that emerging economy governments are also reluctant to do so. Therefore, for the climate negotiations to have any prospect of making progress, it is essential that the OECD nations, the Annex 1 countries in the parlance of the UNFCCC, put their money where their mouth is. Only when the ratio of low carbon to high carbon energy investments is clearly changing in Europe and the US will the rest of the world take our talk of climate change seriously.

The winds of economic destruction are flattening not just retirement accounts but also naive visions for a green economy. Public support for costly new green mandates is weakening, and government budgets to fund them are bleeding red

[15] Independent,Tom Burke, 3 September 2010

ink[16]. Plummeting prices of oil and other fossil fuels have made it harder for green to compete in the marketplace. IPOs of firms working on "clean tech" green energy that have fuelled fantasies of the coming energy revolution have crashed to a halt.

The market, it is now clear, is not a reliable force for driving the adoption of green technologies. Just as the role of government is rising across banking and other sectors of the economy, new green will be much more wary of market forces as the route to profit. Supporters of renewable energy have been much more effective in affecting regulation: in most of the US it is now nearly impossible to get approval to build new coal plants (even when they replace older, less efficient units) and half the states force power companies to buy rising amounts of renewable electricity almost regardless of cost.

Cleaner energy

Cities are critical geographical units in the formulation and implementation of sectoral policies – in water, transport and communications, energy, waste management and construction – that will shape our future for better or worse. Over the next few decades, climate change related disasters will have a significant economic and human impact on cities, in developing as well as in the most developed countries. Cities are also where a range of environmental and developmental challenges find their crude expression – air and water pollution, greenhouse gas emissions from transport or energy consumption, social exclusion and slum developments, poverty and criminality.

When we realise that cities emit three quarters of pollutant emissions worldwide, we should think that cities are the place where the 'big push' should be undertaken. Greening our cities cannot just have immediate multi-dimensional economic benefits, but also long-term positive effects as it will reduce the impact of cities on climate change, and de facto the impact that climate change will have on cities.

The topic of clean energy for cities should be positioned as a strategic economic, industrial and foreign policy issue for Turkey, and other countries because:

- The international context has fundamentally changed. In the last 2-4 years a variety of substantive factors have now aligned to create a unique point to tackle the energy and environmental challenges ahead, particularly climate change;
- Creating the conditions where significant capital flows into the clean energy sector is a vital part of capturing this new circumstance – and the role of government policy will be vital;
- Part of this debate is considering, today, what kind of society, and what kind of energy economy will be resilient in 2020/2025, in a world facing uncertain, and potentially destabilizing global conditions. Fostering an environment now, that enables the next phase of leaders to thrive, is what could be termed the 'new competitiveness'.

The new energy future will likely be a world powered by cleaner fossil fuels, more renewable energy and nuclear. It will be a world where cars, appliances and buildings are much more energy-efficient. Biofuels, wind and solar will grow rapidly

[16] The New Greens Like It Big, David G. Victor, 29 November 2008, Newsweek.

from their small base. Renewables could make up 30 per cent of the world's energy by 2050, if we include hydroelectricity. Fossil fuels and nuclear will make up the rest. In the transport sector, consumers will enjoy a wider array of fuel choices. Vehicles will be powered by everything from advanced petrol and diesel to biofuels, electricity and, eventually, hydrogen.

However, describing this cleaner energy system is a lot easier than creating it. The transition will take time. History shows that once a new energy technology is proven, it takes about 30 years for it to achieve 1 per cent of the overall market. There is no easy solution, no technological fix and no single answer. Weaning ourselves off fossil fuels will require a combination of greater efficiency, changes in habits and lifestyle, and deploying major renewable energy projects that some people will not like. But there is another fly in the ointment of this and other alternative energy schemes – it is going to cost money.

The global business community is the crucial link that will enable the world to get to grips with the energy challenge of the coming decades. Governments will set the framework, scientists will invent the technologies and consumers will adapt to a less energy-intensive world, but it is business that will develop, deliver and apply the technologies at every level. How successful it is will determine how successfully the world copes.

Natural gas and nuclear energy as game-changers

In a post-Kyoto world, gas is a relatively important source of energy not only for power generation but also for household activities and large industries such as those found in the petrochemical sector. A development that has and is transforming the landscape of the natural gas industry is the advent of Liquefied Natural Gas (LNG). The share of natural gas in the primary energy mix is rising faster than that of oil and coal and the gas industry is simultaneously undergoing immense changes as new technologies, demand and supply patterns entice new market forces.

This mode of transport allows gas exporting countries to ship their gas over long distances and releases them from the traditional dependence issues associated with pipelines. Pipelines are expensive and once built indefinitely tie producers and consumers while LNG allows both exporting and importing countries to escape this form of captivity. This understandably has both commercial as well as geopolitical consequences. Be that is it may, Europe is increasingly dependent on rising pipeline imports from Russia and Norway as well as Algeria while LNG imports form only a modest share of Europe's gas imports (10 percent), concentrated mainly in Spain, France and Italy.

Shale gas is also becoming a force for change. The "shale gale" sweeping across North America the past few years has more than doubled the size of the discovered natural gas resource in North America-enough to satisfy more than 100 years of consumption at current rates, according to a major new analysis of the leading unconventional gas plays in North America by IHS Cambridge Energy Research Associates[17]. The study says that the recent expansion of natural gas resources

[17] Upstream, 10 March 2010.

provides the potential to transform North America's energy landscape. Shale gas has the potential to be a "game changer," dramatically augmenting natural gas supply and opening new opportunities for competition among different energy sources. Substitution of coal-fired generation with natural gas-fired power generation will result in short term greenhouse gas emission (GHG) reductions (a natural gas-fired plant has half the carbon emissions of coal-fired plants), but there is a limited pool of "spare" gas- fired capacity which prevents wholesale fuel switching.

Shale gas cannot be seen yet as a game changer in Europe as it is in the US, where roughly 50 percent of the country's needs are met by developing unconventional gas. To illustrate the possible impact of developing shale gas in Europe, the US Geological Survey said that in an area the size of the Benelux countries, there would have to be up to 6,000 wells, an impact that would probably attract environmental opposition. The reason for such concentration was that unlike natural gas, unconventional gas needs a high density of wells, including horizontal wells. Conventional gas costs less, as it is extracted at much higher volumes from only a few vertical wells[18].

The countries where shale gas is presumed to exist in the EU are Germany, Poland, Sweden, France, Austria, Hungary and the UK. Warsaw is harbouring major ambitions to develop shale gas, the switch towards which is like "the 21st Century's gold rush"[19]. In recent statements, Gazprom officials have shown disdain for shale gas and cited the possible negative environmental impact of developing such technologies. Specialists see the strategic importance of developing shale gas in Europe as a means of reducing the continent's dependence on Russian imports. Some have argued that developing shale gas is even more important for Ukraine, a country which has no gas resources of its own but is rich in coal.

The holy grail of alternative energy sources is nuclear fusion, where power is generated by fusing atomic nuclei together in a reaction that releases immense amounts of energy. Fusion is the same reaction powering the Sun. It has the advantage over conventional nuclear fission power in that it is clean and virtually waste-free – but it only seems to work at the intensely high temperatures found in the Sun, a problem for a reactor on Earth.

Nuclear power stations have proven to provide a steady “base load” whether the wind is blowing or the sun is shining, and of course, they do not require fossil fuels – although there is the question about continued supplies of uranium and what to do with the nuclear waste. Nuclear power is undoubtedly the key to going forward in meeting the 'lights on' requirement and meeting the decarbonisation commitment. Without nuclear, one would never say impossible, but it would be an incredible challenge to meet those two requirements.

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[18] Operators need to reach agreements with land owners. This was an easy task in Texas, but much more difficult in the New York area, where in his words "a lot of debate" on water issues had been taking place. Europe is more densely populated and has more infrastructure than the United States. The development of shale gas, which sees chemicals added to the water to facilitate the underground fracturing process that releases natural gas, is a concern to environmentalists. Fracturing fluids, designed to free gas trapped between layers of shale, are developed by companies to suit the geologic characteristics of each individual site.

[19] Between 2007 and 2010, Poland granted 58 concessions for shale gas development to US giants such as Exxon Mobil and ConocoPhillips. According to estimates, Poland's shale gas reserves stand at 1.4 to three trillion cubic metres, enough to satisfy the country's needs for the next 100-200 years. However, there is not yet enough evidence to prove this. The first estimation is due in 4-5 years and the first potential production in 10-15 years.

Energy for mega-cities

A megacity is usually defined as a metropolitan area with a total population in excess of 10 million people. Some definitions also set a minimum level for population density (at least 2,000 persons per square km). A megacity can be a single metropolitan area or two or more metropolitan areas that converge.

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A global city (also called world city or sometimes alpha city or world center) is a city deemed to be an important node point in the global economic system. The concept comes from geography and urban studies and rests on the idea that globalization can be understood as largely created, facilitated and enacted in strategic geographic locales according to a hierarchy of importance to the operation of the global system of finance and trade[20].

The most complex of these entities is the "global city", whereby the linkages binding a city have a direct and tangible effect on global affairs through socio-economic means.[21] Cities can fall from such categorization, as in the case of cities that have become less cosmopolitan and less internationally renowned in the current era, e.g., Kaliningrad, Russia; Thessaloniki, Greece; and Alexandria, Egypt.

In 2011, 21 megacities were in existence[22] – with such cities as Mumbai, Tokyo, New York City, Istanbul and Mexico City having populations in excess of 10 million inhabitants. Greater Tokyo already has 35 million, which is greater than the entire population of Australia and New Zealand combined. By 2025, Asia alone will have at least 10 megacities, including Mumbai (33 million), Shanghai (27 million), Karachi, Pakistan (26.5 million), Dhaka, Bangladesh (26 million) and Jakarta, Indonesia (24.9 million people). Lagos, Nigeria has grown from 300,000 in 1950 to an estimated 12.5 million today, and the Nigerian government estimates that the city will have expanded to 25 million residents by 2015.

In 1950, New York City was the only urban area with a population of over 10 million. Geographers had identified 25 such areas as of October 2005, as compared with 19 megacities in 2004 and only nine in 1985. This increase has happened as the world's population moves towards the high (75–85%) urbanization levels of North America and Western Europe. The 1990 census marked the first time the majority of US citizens lived in cities with over 1 million inhabitants.

The twenty-five largest megacities, according to these criteria are:

Rank	Megacity	Country	Continent	Population	Annual Growth
1	Tokyo	Japan	Asia	34,200,000	0.60%
2	Guangzhou	China	Asia	24,900,000	4.00%
3	Seoul	South Korea	Asia	24,500,000	1.40%
4	Delhi	India	Asia	23,900,000	4.60%

[20] http://www.history.ac.uk/reviews/review/737 UK History
[21] Sassen, Saskia - *The Global City: New York, London, Tokyo.* (1991) - Princeton University Press. ISBN 0-691-07063-6
[22] 7 Billion, National Geographic Magazine". Accessed January 2011.

5	Mumbai	India	Asia	23,300,000	2.90%
6	Mexico City	Mexico	North America	22,800,000	2.00%
7	New York City	USA	North America	22,200,000	0.30%
8	São Paulo	Brazil	South America	20,800,000	1.40%
9	Manila [22]	Philippines	Asia	20,100,000	2.50%
10	Shanghai	China	Asia	18,800,000	2.20%
11	Jakarta	Indonesia	Asia	18,700,000	2.00%
12	Los Angeles	USA	North America	17,900,000	1.10%
13	Osaka	Japan	Asia	16,800,000	0.15%
14	Karachi	Pakistan	Asia	16,700,000	4.90%
15	Kolkata	India	Asia	16,600,000	2.00%
16	Cairo	Egypt	Africa	15,300,000	2.60%
17=	Buenos Aires	Argentina	South America	14,800,000	1.00%
17=	Moscow	Russia	Europe	14,800,000	0.20%
19	Dhaka	Bangladesh	Asia	14,000,000	4.10%
20	Beijing	China	Asia	13,900,000	2.70%
21	Tehran	Iran	Asia	13,100,000	2.60%
22	Istanbul	Turkey	Europe & Asia	13,000,000	2.80%
23=	London	United Kingdom	Europe	12,500,000	0.70%
23=	Rio de Janeiro	Brazil	South America	12,500,000	1.00%
25	Lagos	Nigeria	Africa	12,100,000	3.20%

Source: Th. Brinkhoff: The Principal Agglomerations of the World, 2011-01-01

Energy challenges

Cities are responsible for nearly 75 percent of the world's energy consumption; expectedly, about 90 percent of future growth will occur in urban areas. Megacities are leading drivers of economic and environmental change. Due to rapid population growth and booming economies, consumption of energy as well as of any other kind of resource in emerging megacities is constantly growing. Energy supply is not only problematic due to a lack of infrastructure. In many countries, private investors compete with government agencies in the field of energy supply.

However, we consider that cities will be at the forefront of implementing groundbreaking technologies and policies, as evidenced in the initiatives taken by many cities here and worldwide to resolve issues in energy and climate change. In addition to affording energy and environmental benefits, investments in energy efficient and renewable technologies have huge potential to boost local economies.

Inclined to give priority to stopgap measures, many cities tend to regard comprehensive long-term planning as secondary. However, such solutions would bring multiple benefits to the community. An energy and environment systems model will provide a quantitative vision of technology and management strategy options for effectively deploying energy efficiency and renewable energy for reducing the carbon footprint, while sustainably maintaining the energy demands of the community and the servicing environmental infrastructure. Combined with appropriate stakeholder participation, such a technology explicit bottom-up approach holds the promise of

influencing the current energy planning, environmental regulatory regime, including multimedia aspects of carbon control for cities locally and internationally.

As fossil fuels still provide much of the energy in megacities, especially in the developing countries, emissions of greenhouse gases and air pollutants such as sulphur and nitrogen oxides could dramatically increase. The motorization of urban environments all around the world has produced local smog in hundreds of cities.
Most of the emissions in cities can be traced back to inefficient energy and insulation systems. Inefficient consumption of natural resources is an imminent threat to future economic growth and general wealth. That is why energy-efficient technologies and products which make use of renewable energy resources could be the answer to people's cry for more energy.

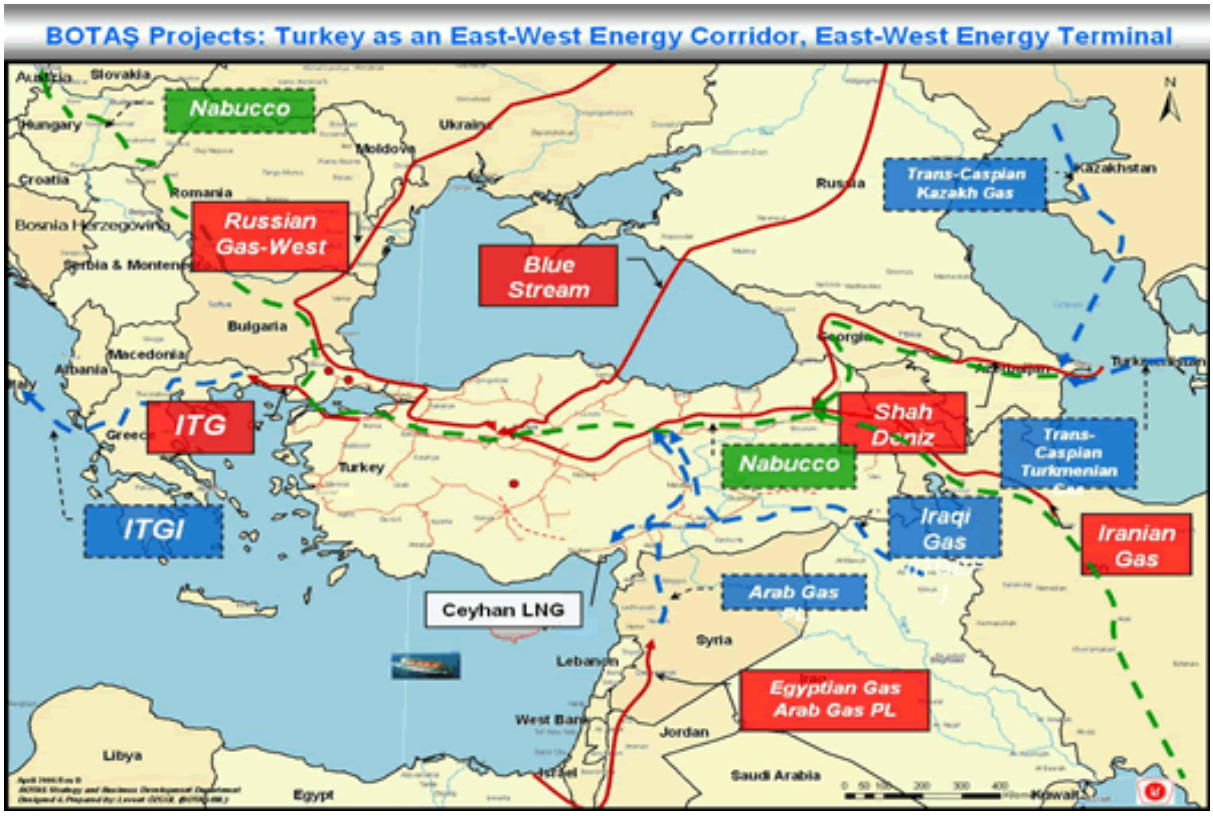
Energy efficiency in buildings is also a central part of efforts to combat climate change under the Kyoto Protocol, since the building sector accounts for up to 40 percent of the final energy consumption. Tokyo is the best city in terms of the mass public transportation[23]. The use of private automobiles is smallest in Tokyo among these four cities. In contrast, London and Paris has poor performance. This is an important factor for better emission performance of Tokyo. Assessment on the quality of subway and regional rail network also ranks Tokyo as a best city. The CO2 emission performance of Tokyo is outstanding in comparison to selected cities and countries. Some cities, such as Seoul, have developed in a similar way as Tokyo. However, economic structure, geography and many other factors influence the energy use and CO2 emissions.

Turkey as a Major Actor in International Energy Diplomacy

In this changing world energy landscape, Turkey has emerged as one of the newest and most dynamic and proactive players in ensuring secure, uninterrupted, clean, and reasonably priced energy resources. As a significant emitter of carbon dioxide and an ideal ground for solar, wind, hydro, geothermal, and (perhaps) nuclear energy, it is also set to become a major player on the world's increasingly important climate change and green energy stage.

A key transit/terminal hub of both oil and gas to the heavy consumer nations of Europe, Turkey is a nexus of multiple important pipeline projects and provides access to the Bosporus Strait and the eastern Mediterranean via the Ceyhan terminal. Not only a significant consumer in its own right, Turkey is also geographically close to 72 percent of the world's proven oil and gas resources, and thus is a natural energy hub between major oil-producing areas in Russia, the Caspian Sea basin, and the Middle East, and European consumer markets. It has thus become the "Silk Road of the 21st century."

[23] Please see for further details. Ichinose, T., H. Hanaki, T. Matsuo. 1993. International comparison of energy consumption in urban area. Proceedings of Environmental Engineering Research, Japan society of Civil Engineers, 30, 371-381. (in Japanese); Hanaki, K. 2002. Integrated approach for best mix of technologies of reduction of carbon dioxide emissions - Tokyo Half Project (THP); TMG, 2000. *Tokyo Vision 2000*. Tokyo Metropolitan Government, Tokyo; MITI, 1998. *Annual Automobile Transportation Statistics 1998*. Ministry of International Trade and Industry, Japan; IPA, 2000. *The Four World Cities Transport Study: London, New York, Paris, Tokyo.* Institute for Public Administration.



Turkey, poor in energy resources and one of the high growth energy markets, also commands major chokepoints and transit routes for energy shipments. In natural gas, Turkey is Gazprom's second largest market in the world after the EU. Despite difficulties in sustainable supply, Turkey is the only market for Iranian gas exports to date. It is the major outlet for Azerbaijani oil via BTC, and gas via the TGI Interconnector and the South Caucasus Pipeline. Iraq's entry to the Mediterranean markets is through Turkey's Yumurtalik deep-sea port. Russia plans to send gas beyond Turkey through Blue Stream-II.

Turkey is not blessed with its own domestic energy resources, and imports more than 60 percent of the energy it consumes. The Turkish government predicts that energy needs will increase 10 percent each year for the next 20 years. Energy supply security[24] is of prime importance to the country's sustainable growth and development. Russia plays a critical role in Turkey's energy supply security, as it provides around 68 percent of its natural gas supply, and 50 percent of crude oil imports. Azerbaijan has emerged as a key supplier of oil and gas. Iran has the largest potential, if its domestic production can be mobilized. Iraq and the Arab peace pipeline coming from Egypt could also be other potential insurers of Turkey's energy security.

Turkey's domestic supplies, particularly in oil and gas, are miniscule. Its own oil and gas reserves account for only a tiny fraction of its rapidly rising demand. Oil consumption, at 35 percent, accounts for the majority of Turkish energy consumption (675,000 barrels per day - bpd) while crude production stood only at 48,000 bpd in

[24] Energy security may be achieved when a state is able to minimize vulnerability to resource supply disruptions, access reliable energy at reasonable and/or market-driven prices, and consume resources that least damage the environment and/or promote sustainable development.

2009, This is followed by natural gas at 29 percent, coal at 25 percent, hydroelectric and renewable consumption at 11 percent. Nuclear electric energy consumption is zero, for the time being– two nuclear power plants are under consideration with Russian and Korean support.

The expected growth in oil consumption is expected to continue at a rate of about 2 to 3 percent per year. Turkey's oil consumption, 76 million tones of oil equivalent (Mtoe) in 1998 and 179 Mtoe now, is expected to reach 319 Mtoe by 2020. Turkey's natural gas consumption is expected to grow rapidly, quadrupling within the next 20 years, with 1,400 billion cubic feet (bcf) gas consumption projected for 2020.

Russia is currently Turkey's top supplier of oil, followed by Iran and Saudi Arabia, with lesser volumes supplied by Libya, Iraq, and Syria, among others. Turkey is playing an increasingly important role in the transit of oil supplies from Russia, the Caspian region, and the Middle East to Europe. Growing volumes of Russian and Caspian oil are being sent by tanker via the Bosporus Straits to Western markets, while a terminal on Turkey's Mediterranean coast at Ceyhan allows the country to export oil from northern Iraq, via a pipeline from Kirkuk and from Azerbaijan, via the Baku-Tbilisi-Ceyhan pipeline.[25] To ease increasing oil traffic through the Bosporus Straits, a number of Bosporus bypass options are under consideration in Bulgaria, Romania, Ukraine, and Turkey itself (i.e. Samsun-Ceyhan).[26]

While Turkey gets oil from a variety of sources, more than 60 percent of its gas needs are met by just one supplier: Gazprom.[27] At the moment, Turkey is not short of gas. On the contrary, the long-term contracts that it has signed with Russia, Iran, Azerbaijan, and other suppliers, including LNG, commit it to buying more than it actually needs. This leaves it potentially liable to pay penalties for breaching the take-or-pay contracts. So Turkey needs to build infrastructure for storing gas, for re-exporting surpluses to the EU, and, most importantly, for distributing the gas imports around the country so that factories, power plants, and households can Use it.

Turkey is positioned to play an even bigger role linking gas producers in the Caspian and Middle East to consumers in south-eastern and central Europe with the proposed Nabucco gas pipeline project and a potential Iranian gas transit deal. The Nabucco project is geopolitically significant as it will secure access to new gas supplies from new sources in the Caspian region as well as the Middle East. For this reason it has been regarded as vital for the EU's long-term strategy to boost supply security, yet it suffers from a couple of problems including the lack of an exclusively dedicated reserve base.[28]

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[25] The port of Ceyhan has become an important outlet for both Caspian oil exports as well as Iraqi oil shipments from Kirkuk. Turkey is seeking to build up Ceyhan as a regional energy hub, with private investors receiving approval to build several refineries at the oil terminal. The Kirkuk-Ceyhan pipeline has a capacity of 1.65 millions of barrels per day.

[26] Several other possible Bosporus bypass options are being examined, some of which do not involve Turkey. One proposal that has received significant attention is a pipeline that would pump crude oil from Bulgaria's Black Sea port of Bourgas to Greece's Mediterranean port of Alexandropoulos, known as the Bapline project.

[27] "Making sense of the current phase of Turkish-Russian relations," Igor Torbakov, *Jamestown Foundation Occasional Papers*, October 2007.

[28]"Shall we carry on accession talks with the EU?," Mehmet Ogutcu, *Today's Zaman*, 8 December 2008,http://www.todayszaman.com/tz-web/detaylar.do?load=detay&link=160919

For Turkey to function as a gas transit state, it must be able to import enough gas to satisfy both domestic demand and any re-export commitments, as well as provide enough pipeline capacity to transport Caspian and Middle Eastern gas across Turkey to Europe.

A Genuine Regional Powerhouse and Energy Hub?

By any objective criteria, Turkey is a regional power with which to reckon. A country of 780,576 square km, Turkey is almost the size of Germany and France put together. What opponents of Turkey's EU accession complain most about is that its population is too poor, and too big (at 73 million today and 80 million by 2015), although they are increasingly better educated and prosperous. If calculated in terms of purchasing power parity, Turkey is among the world's top 17 economies, with a GDP size of around $750 billion (the largest in its region and seventh largest in Europe), with a total trade volume of $243 billion in 2009[29] and F.D.I .inflow of $18 billion in 2008 (stock value: $85 billion).

Added to these facts are Turkey's huge military power (second largest in NATO after the US and biggest in its region), world class manufacturing and construction capacity, its status as a cultural center of attraction, and vast tourism potential. These facts imply a medium-size, global, economic, and military power. Turkey can do much better over the longer term, judging from the performance of dynamic Asian economies, if it can pursue a "high growth" (i.e. 7-8 percent per annum) path.[30]

Conscious of its unique assets in hand, Turkey pursues a long-term strategy of becoming a major Eurasian energy hub.[31] Better connections with both supplier countries and energy consumers not only serve to increase Turkey's geopolitical standing, they also bring lucrative business opportunities in the form of transit fees, or through new refineries, LNG terminals, and trading facilities. Another value is to diversify Turkey's own energy supplies and to re-export any surplus gas it may have.

Yet, whether the Turkish goal of becoming an energy bridge along east-west and north-south axes (and serving not only as a transit country, but also as an aggregator and center of trade) is a realistic one remains largely unanswered. True, Turkey is located at the crossroads of regions possessing three-quarters of the world's oil and natural gas reserves – sandwiched between major centers of energy production and consumption. Oil is fungible and could easily find its way to international, high-value markets, once it is loaded on a tanker. The critical fuel is natural gas.

In many ways, Turkey already fulfils the role of an energy hub. It does so in transporting oil through the Bosporus strait and through several new pipelines linking it to Russia and the Caspian. Every year, some 10,000 tankers pass through the Bosporus strait, which connects the Black Sea with the Mediterranean. Traffic keeps

[29] "2009 sees significant recovery in foreign trade deficit," 5 February 2010, *Today's Zaman*, http://www.todayszaman.com/tz-web/news-200051-105-2009-sees-significant-recovery-in-foreign-trade-deficit.html

[30] See www.oecd.org/eco/surveys/turkey

[31] In this part of the paper, much use has been made of "Turkey's role in European energy security" by Katinka Barysch, CER, December 2007, http://www.cer.org.uk/pdf/essay_turkey_energy_12dec07.pdf

growing rapidly, and today a tanker maneuvers through these narrow, busy waterways every 20 minutes during the daytime.[32]

For its part, Turkey appears to be pursuing a two-pronged energy strategy. First, it seeks to diversify its own sources of imported fuel. Second, the Turkish strategists see the turning of their country into an east-west energy corridor as part of a broader plan aimed at enhancing Ankara's geopolitical role in the region. Indeed, the main components of the Turkish energy corridor are the Straits, the Baku-Tbilisi-Ceyhan crude oil pipeline, the Shah-Deniz natural gas pipeline (Baku-Tbilisi-Erzurum), the Blue Stream, Iraq and Iran pipelines, and the Trans-Caspian/Nabucco Gas Pipeline projects.

Issues and messages for Turkey/Istanbul

How to cope with heavy energy traffic

❖ Bosporus means in Greek "ox ford" or "ox passage"; the name comes from a Greek myth about Io's travels after Zeus turned her into an ox for her protection. The ancient Greeks referred to this strait as the Thracian Bosporus. The Straits are one of the world's busiest (5,500 oil tankers), and most difficult-to-navigate waterways.

❖ Some of the export routes for crude oil production from the Caspian Sea region pass westwards through the Black Sea and the Bosporus Straits en route to the Mediterranean Sea and world markets.

❖ Increased shipping traffic through the narrow Bosporus Straits has heightened fears of a major accident that could have serious environmental consequences and endanger the health of the 13 million residents of Istanbul that live on either side of the Straits. The Straits have witnessed an increase in shipping traffic since the end of the Cold War to the point that around 50,000 vessels per year (nearly one every 10 minutes) now pass through them.

❖ Around one-tenth of these are crude oil or liquefied natural gas tankers. This increased congestion[33] has led to a growing number of accidents; between 1988 and 1992, there were 155 collisions in the Straits. Turkey is concerned that the projected increase in large oil tankers would pose a serious navigational safety and environmental threats to the Bosporus Straits.

[32] Although Turkey has spent billions on high-tech navigation systems and other safety features, maritime experts say that it is only a matter of time before one of them spills its toxic cargo. This would be a disaster for Istanbul's 13 million residents. And a big headache for the transporting companies that run up costs of tens of thousands of dollars for every day that one of their tankers' crossings is delayed. Turkey and the other Black Sea countries have been looking at a number of bypass options.

[33] Under the Montreux Convention of 1936, commercial shipping has the right of free passage through the Straits in peacetime, although Turkey claims the right to impose regulations for safety and environmental purposes. In October 2002, Turkey placed new restrictions on oil tanker transit through the Bosporus that have slowed tanker transit, including a ban on night-time transit for ships longer than 200 meters, effectively including all crude oil and large petroleum product tankers. Poor weather has caused transit delays as well; during the past winter, delays reportedly reached as much as 20 days for oil tankers waiting to transit the Straits, costing about $50,000 in demurrage charges per day.

Istanbul faces environmental hazards

❖ In addition to the earthquake risk, Istanbul faces the increased risk of accidents as traffic will likely increase as the six countries surrounding the Black Sea develop economically. With tonnage on the rise as well, the threat of collision is not the only danger: on December 29, 1999, the Volgoneft-248, a 25-year old Russian tanker, ran aground and split in two in close proximity to the southwest shores of Istanbul. More than 800 tons of the 4,300 tons of fuel-oil on board spilled into the Marmara Sea, covering the coast of Marmara with fuel-oil and affecting about 5 square miles of the sea.

❖ In addition, while major spills can bring about immediate environmental consequences, the presence of large oil- and gas-carrying ships in the Straits causes other problems, such as the day to day release of contaminated water as the ships ballast their holds. Pollution in the Straits contributed to a decline in fishing levels to 1/60th their former levels.

Vast room for energy efficiency improvements

❖ Turkey needs to retool its industry progressively to compete in a low-carbon economy and move away from energy-intensive and “dirty” sectors, such as iron-steel mills, cement, fertilizer and aluminium. Turkey should be able to adopt a specific target to reduce the energy intensity of our economy by at least 2.5 percent a year.

❖ It needs to increase the effectiveness of its capacity to implement robust policies, market-based mechanisms, business models, investment tools, and regulations with regard to energy use, and recognize that improvements in energy efficiency remain one of the most effective means of both cutting carbon emissions and improving access to energy. As the EU proposes tighter emissions caps and auctioning of allowances in Phase III of the EU E.T.S., energy intensive industries must demonstrate their level of exposure to external competition in order to qualify for protection, and avoid carbon leakage.

❖ Energy efficiency means using less energy through better technology for buildings, street lighting, and industry. Reducing energy consumption is one of the most cost-effective and fastest ways to save energy and reduce global warming pollution. Every city can make substantial energy efficiency improvements by putting policies in place to promote efficient technologies and integrating them into planning decisions.

❖ $170 billion per year invested in ‘energy productivity’ internationally out to 2020, could feasibly cut projected energy demand growth by half, by 2020. On average, this investment would generate an Internal Rate of Return of 17 percent from future energy savings. So unlocking the ‘bottom left hand side’ of the curve – the zero and below zero abatement cost options – is where the money potentially lies. It is definitely appearing on the finance sector’s radar, but the challenge is creating a regime that enables the value to be tapped in a commercially relevant way.

❖ Integrating energy efficiency, new decentralised options, combined heat and power, smarter grid and metering, into the overall policy approach for renewable energy and grid and distribution infrastructure, as well as consideration of energy storage, will be crucial. Pressing, politically sensitive, rising consumer energy prices are an added impetus. Getting policy, regulations and business models right is vital. This simply recognises the importance of aligning demand reduction initiatives with underlying commercial imperatives of a range of actors, from energy utilities to the

building sector and product manufacturers. Without this it won't be possible to optimise and capture the opportunities for demand reduction and efficiency.

Alignment of foreign/security and energy policies

❖ Being an energy hub is not having pipelines criss-crossing your territory. Turkey's first priority must be to secure its own supply for its own citizens, uninterrupted, and with affordable prices.[34] The new Turkish interest in non-western directions has been the outcome of Turkey starting to "read" its neighborhood and energy interests through its own lenses, from where it firmly dwells. Turks are not content only to be a simple "bridge" over which energy flows; they aspire to become a regional "hub," extracting greater value for the crisscrossing oil, gas pipelines, and power interconnections, and turn this role to foreign/security policy gains.

❖ Turkey's external energy outreach starts from China's north-west province of Xinjiang-Uyghur Autonomous Region and extends to the North African tip of the Mediterranean, as well as from the Straits of Hormous, all the way to the Arctic, where 22 percent of the world's oil and gas reserves are located. As the virtual boundaries have been removed, Turkey is now facing the East, the North, and the South directly. Those who define Turkey's will to be part of the solution to the problems of the East with its self-formulated prescriptions as a "shift of axis in foreign policy" are falling into the grave mistake of trying to read Turkey based on its erstwhile habits, both in foreign and security policy and in energy equations.

Being a reliable transit/hub country is of paramount importance

❖ No matter what the political or economic problems are, Turkey must maintain its credibility as a country over which energy flows will not be disrupted. It has become almost commonplace for Turkish government leaders to assert that energy transit to Europe via Turkey is not only an economic project but also a Turkish geopolitical project that strengthens Turkey's hand strategically vis-à-vis Europe and producing regions around it.[35] Any misuse of Turkey's energy transit role by the Turkish government for political leverage on the EU could diminish Turkey's value to the EU.[36] Overplaying Ankara's hand could, moreover, cast doubt on Turkey's reliability as a transit country from a business perspective, quite apart from EU debates and European politics.

Moving towards smarter industries

❖ Many alternative energy advocates claim that it is possible to replace our fossil fuel economy with a cleaner one that runs on a combination of nuclear power and renewable energy from the wind, the sun, and the farm. Credible scientific

[34] Turkey needs suppliers to fuel energy hub role, Delphine Strauss, Financial Times, 11 June 2010. http://blogs.ft.com/beyond-brics/2010/06/11/turkey-needs-suppliers-to-fuel-energy-hub-role/

[35] Erdoğan, Putin: Israel won't get our gas, Bloomberg, 8 June 2010

[36] During one of his visits to Brussels, Prime Minister Erdogan implied that Turkish support for Nabucco would be conditional on the EU accelerating the negotiations toward Turkish membership in the EU. He even implied a possible linkage between Turkish support for Nabucco and the EU's position on Turkey's disputes with Cyprus. Most recently, Prime Minister Erdoğan said that the government shelved a plan to export natural gas to Israel via a new Blue Stream-II pipeline in retaliation to the Gaza episode. In Brussels, supporters and opponents of Ankara's integration with the EU are bound to feel irritated by Ankara's use of the "energy trump card." Opponents, mostly in Western Europe, are growing more resentful over Ankara's "delusion" that it can pressure the EU. Supporters, mostly in Central and Eastern Europe, are growing frustrated with Ankara's stalling on the Nabucco project, which this group of countries particularly values.

estimates suggest that they are right. However, those advocates often fail to consider one critical issue that could derail their plans: the rate-of-conversion problem.

❖ How long will it take to make such a transition? In this context, the policy-makers should ask: Is Turkey going to support some of the most effective policies that have yet been deployed for transitioning Turkish business and industry to a clean energy future and away from the dangers of fossil fuel, or will Turkey walk away from the green shoots of this economic recovery to let other nations lead in the coming low-carbon economy? What areas of renewables and alternative fuels can it focus on, and aim to be the leading player on the world stage?

Making important strategic investments in clean energy

❖ Turkey should be a pioneer, rather than a follower, in solar, geothermal and hydro energy technologies. It should extend funding for short-term financing programs, which are proving their worth by jump-starting the development and construction of such clean energy projects. The need to incentivize private capital flow into clean energy development is greater than ever and will become more urgent with time. Financing mechanisms and incentives will evolve as the market demand for clean energy evolves.

❖ Exchanging investment risk for upfront cash grants to cover 30 percent of the clean energy project costs makes investing in the development of clean energy projects attractive to investors and is the right boost for the nascent clean energy industry. These short-term financing mechanisms that encourage private capital flow into clean energy must be complemented by policy to enhance domestic manufacturing capacity and productivity. Building a clean energy industry in Turkey not only means more electricity from clean, renewable sources. It also means more high-paying jobs in every region of the country, because clean energy will require Turkey to get to work producing and assembling new technologies on a mass scale.

Creating Turkey's own, internationally competitive "energy champions."

❖ Turkey should re-energize its companies (on their own and in public-private partnership mode), its public energy policy management and external outreach to serve the ultimate goal of making Turkey a regional energy powerhouse in every sense of the word. There is a pressing need to, without further delay, create its own regional energy champions to operate both at home and in neighboring regions. Turkey needs to support the emergence of internationally competitive, corporatized, staffed and financed international oil companies in the style of Petronas, Petrobras, or ENI.

❖ TPAO and Botas should possibly be merged under a new corporate identity. Turks are much better placed than most international oil companies to operate in Russia and other countries in the region because of the close political ties at the highest level, and because they know the key drivers and the business culture in these geographies.

Hammering out an integrated public policy, energy management and vision

❖ The government leaders should see Turkey's energy policy as a sub-set of a wider government vision encompassing industrial, competition, tax, environment, foreign and security, and trade/investment policies. Management structures must be streamlined and made more effective and responsive to the needs of the energy economy, finance, and geopolitics. The human capital, too, must be enriched, as at the end of the day, everything boils down to the quality of its people, who can invent new energy technologies and fuels, manage complex policies, and engage with the external world.

Other suggestions

❖ Make Istanbul a financial capital for energy finance
❖ Invest in renewable energy technologies
❖ Develop a futuristic vision of Istanbul and start making it happen as the future begins now

Last but not least, make people feel happy

❖ If they believe that their standards of living is improving we declare that society is making progress. Of course, progress should not be based solely on perceptions of quality of life. Typically, especially around election time, the health of the economy is the key determinant for how we are doing. All economists know that natural growth in per capita income is not a great indicator of progress. We need to incorporate non-market goods such as a clean environment and leisure opportunities into national accounts.