

## Energy Security

### Abstract:

*This paper contends that, while the current competition-based approach to energy production, as practised by Europe and the European nations, does provide a certain level of energy security, it is insufficient to guarantee in all circumstances the steady supply of energy that Europe needs.*

### Resumen:

El presente trabajo propone que, aunque el actual sistema de obtención de energía basado en las reglas competitivas del mercado en cierta medida asegura la obtención de energía, no basta para garantizar en todas las circunstancias el suministro permanente que Europa necesita.

### Keywords:

*Energy, security, pipelines, tankers, oil, gas, LNG.*

### Palabras clave:

*Energía, seguridad, oleoductos, gasoductos, petroleros, gaseros.*

**\*NOTA:** Las ideas contenidas en los **Documentos de Opinión** son de responsabilidad de sus autores, sin que reflejen, necesariamente, el pensamiento del IEEE o del Ministerio de Defensa.

*“There can be little disagreement with the proposition that security is a basic human need and therefore has to be of fundamental importance to the high business of state. But it can be almost embarrassing to ask seriously what it is. [...] In addition to desiring to know just what security is, and therefore also (logically) is not, we would like to know how we buy it; indeed, can we buy it? From whom or what do we buy security? Is there a usable common currency to meet security concern? And probably most important of all, how will we know that we have bought it successfully and therefore should be sufficiently secure?” Professor Colin Gray*

## THE ESSENCE OF ENERGY SECURITY

Today, the nation-state has the monopoly of the provision of security. To be sure, nation-states do associate in collective organizations, such as NATO, to obtain synergies in security, but decisions as to the use of force – the ultimate provider of security - remain firmly in the national governments’ hands, not only because they are the owners of the force, but more significantly because they can – and sometimes do - choose to refuse to contribute to a collective action, even if this decision contravenes strict treaty provisions.

When we move from the strategists’ realm of general security to the more specialised field of energy security, things start to become more complicated. In principle, energy security should not be conceptually different from other security aspects: we find nothing in Professor Gray’s wise words quoted above that cannot be applied to energy security. Moreover, the monopoly that the state exerts on security is reinforced by the fact that 85 to 90% of the world’s oil reserves are estimated to fall under government control. But energy security encompasses the fields of politics, economy and defence, and in each of these contexts the primary security actor is different: diplomacy, market forces, and hard power, respectively. The objectives of energy security are also multiple, depending on the interests of the expert trying to pin down the concept: energy independence, avoiding of price volatility, reducing accidents, preventing disruptions of primary fuel supply, or final energy supply (refined products, electricity), and several others are deemed by different authors to be the true object of energy security. Many of these objectives, moreover, are difficult to reconcile. For example, nuclear energy is proposed by some as reinforcing energy

security because provision of nuclear fuel is remarkably reliable; others, however, contend that it reduces security because of the severity of nuclear hazards.<sup>1</sup>

Therefore, if Professor Colin Gray finds it so difficult to elucidate the basics about security, we can declare that, if security is an elusive concept, energy security is even more so. The *International Journal of the Political, Economic, Planning, Environmental and Social Aspects of Energy* compiles 37 different definitions of energy security<sup>2</sup>, none of which is quite satisfactory, because they all tend to consider it exclusively from within one specific context. Daniel Yergin, the author of the seminal book “The Prize” on the history of oil, as well as of other works of significant importance to energy, provides one of the best definitions<sup>3</sup>, albeit it addresses the object of energy security, rather than energy security itself as the subject. The EU Commission also points in the right direction with its proposal, although it describes the strategy for energy security, rather than the concept itself, and it is rather verbose<sup>4</sup>. A more succinct synthesis of both could be: *energy security is the assurance that a nation receives the primary energy it needs for its economy and welfare.*

## THE ROLE OF SECURITY ORGANISATIONS

Even if it is the nation-states that are entrusted with the responsibility of ensuring their citizens’ security in general and energy security in particular, they frequently form multinational organisations to obtain synergies and avail themselves of the collective capacities, military, diplomatic and political. In our case, as for most of Europe, the organisations entrusted with supporting our security are NATO and the EU. This should make particular sense in energy security, since risks and threats are essentially transnational, and production, storage and distribution of most energy sources are deeply integrated at international level. Although any preventive or reactive actions against threats or risks

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<sup>1</sup> Actually, this last consideration belongs to *safety*, and the first one to *security*, therefore they should not be set side by side. But in many languages, Spanish included, the semantic fields of *safety* – which deals with risks posed by nature, such as storms, or by man’s stupidity, such as accidents - and *security* – which deals with man’s criminal actions - are embraced by one single word, and as a consequence both concepts are thoroughly mixed leading to conceptual mistakes like this one.

<sup>2</sup> Conceptualizing energy security. Christian Winzer. *Energy Policy* 46 (2012) 36–48. [www.elsevier.com/locate/enpol](http://www.elsevier.com/locate/enpol)

<sup>3</sup> *The objective of energy security is to assure adequate, reliable supplies of energy at reasonable prices and in ways that do not jeopardize major national values and objectives.* D. Yergin, “Energy Security in the 1990s,” *Foreign Affairs*, vol. 67, no. 1, Fall 1988.

<sup>4</sup> *Strategy for energy supply security must be geared to ensuring, for the well-being of its citizens and the proper functioning of the economy, the uninterrupted physical availability of energy products on the market, at a Price which is affordable for all consumers (private and industrial), while respecting environmental concerns and looking towards sustainable development.* EU Green paper - Towards a European strategy for the security of energy supply.

should therefore be taken collectively, nations nevertheless tend to actively resist any attempt to place energy security under a collective umbrella, in contrast to the relative willingness to abide by international agreements to curb emissions of greenhouse gases (GHG) and on emissions trading systems (ETS), which also affect national energy policies.

## NATO

Attempts to seriously consider energy security in the North Atlantic Council have never reached very far – beyond discrete reactions to specific circumstances, such as the anti-piracy operation *Ocean Shield*<sup>5</sup>– in no small part because some Allies deem the economic aspects of energy security to be outside NATO competence. Certainly, all recent NATO Summits at Riga, Bucharest, Strasbourg-Kehl, Lisbon, and Chicago, up to the recent one in Wales have produced declarations in which energy security has featured, but unfortunately always near the end of the document and buried under the more pressing subjects of current concern. Heads of State and Government have repeatedly agreed that NATO can provide added value in the five following key areas of energy security:

- *information and intelligence fusion and sharing;*
- *projecting stability;*
- *advancing international and regional cooperation;*
- *supporting consequence management; and*
- *supporting the protection of critical infrastructure.*

These platitudinous generalities – the meagre result of consensus decision making – amount to training and exercises, encouraging the use of fuel-efficient military materiel, and, inevitably, combating piracy – although only if and when mandated by the United Nations Security Council Protection of critical infrastructure, which also clearly entails the use of force, is mentioned, but only to underline in the clarifying text that it is a national responsibility, with NATO being merely in support. The maritime domain, although commendably not been totally forgotten, appears only in amplifying texts.

## European Union

The European Union, even more reluctant than NATO to use hard power in defence of its interests, does however go farther with some initiatives resulting from recurrent winter scares triggered by Russia-Ukraine conflicts and the subsequent diversion of Caspian gas supplies intended for Central Europe. The *Nabucco* gas pipeline and its variations, the South-East Europe interconnectors, linking with the Baku-Tbilisi-Ceyhan and Baku-Tbilisi-

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<sup>5</sup> *Ocean Shield* was not specifically intended to protect energy traffic, but primarily to protect World Food Programme shipping and maritime traffic in general.

Erzurum pipe networks, several reverse-flow facilities, and very important for us, the Spain-France *Midcat* interconnector, are some of the initiatives sponsored by the EU Commission. Also, as early as 2006, the Commission declared that the three pillars of the EU's energy policy are efficiency, sustainability and (last but certainly not least) security.

Of much more relevance to energy security, the Commission also issued on the 28th May this year a commendable *Communication on Energy Security Strategy*, in which nearly everything pertaining to energy security is analysed, and actions are proposed. Unfortunately not quite everything, as will be seen below, leaving a gap that this paper will try to cover.

The European Council, in a demonstration of how different the outlooks are between the two halves of the EU, one focused on collective policy, the other in the individual components, on 23 October this year issued its own *Conclusions on 2030 Climate and Energy Policy*. Reflecting the national misgivings pointed out above, energy security appears in this document practically as an afterthought at the end of lengthy considerations of GHG emissions reduction, ETS, energy efficiency and other subjects marginally relevant for security. Energy security itself is being dealt with by agreements on improvements in internal links, gas storage capacity and other measures meant to improve the EU's resilience in an energy shortage. Hard security is only addressed in one sentence: "... *further develop a policy to address the protection of critical energy infrastructure, including against ICT risks*" which cannot be considered satisfactory for this crucial subject.

#### Four Steps to Improve Energy Security

Therefore, whatever little is being done in pursuit of the tantalizing illusion of energy security is mostly entrusted to market dynamics and to limited EU prodding, a combination which may not produce optimal results.

It happens at several different levels:

##### Diversifying the types of energy

In principle, renewables are excellent candidates to achieve security, because the sources – wind, sun, gravity, earth's heat - tend to be plentiful at home, where they are easy to protect. Unfortunately, forecasts say that the growth of these energy types over the coming decades will be less than the expected increase in general energy demand, and use of fossil energies will continue to grow, albeit at a lower rate than today. It is important to realise, however, that it is diversity that improves security, not renewable sources by

themselves, as climate change, the unpredictability of crops (and attendant impact on prices), reduced rainfall, sustained high cloudiness, or lack of wind, all of them occurring naturally but increasing in frequency and impact through the influence of climate change, might imperil some of those renewables.

Nuclear is another candidate to improve diversity, but since Chernobyl 1986, decisions on whether to go down this avenue are taken more with emotion than tough logic.<sup>6</sup>

It should be mentioned that methane hydrates promise to make methane available for nearly all maritime nations, as they are found in virtually every ocean and at not too great depths. Unfortunately delivering that promise is predicated upon finding a safe and economical way of exploiting them, something that still seems to be out of reach for some years.

Today the distribution of primary energy in Europe is: 32.8% gas in its different forms, which has recently overtaken oil (30.3%), with coal (16.8%), nuclear (9%), hydropower (7%) and renewables (4.1%) trailing well behind<sup>7</sup>. This seems reasonably well diversified, and certainly Europe appears as one of the world regions with more diverse sources of energy. However, this regional balance hides many local imbalances, as consumption by the individual EU Member States tends to be slanted towards a single source, a consequence of domestic politics (local populations' reluctance to accept a nuclear plant in the neighbourhood, subsidies to domestic coal, etc.), North Sea oil, or geographical proximity to an assertive Russia that needs to be appeased. Clearly, an integrated EU energy market, toward which the Commission is belatedly working, not only would lead to significant savings – estimated as high as €40 billion annually by 2030<sup>8</sup> – but would also enhance Europe's energy security making it less vulnerable to external pressures, a good example of market forces positively driving energy security.

### **Diversifying the sources**

Fossil fuels tend to concentrate in specific areas, and it is an unfortunate fact that most of them happen in politically unfriendly or unstable parts of the world and/or connected with Europe through fragile chokepoints and war-prone areas. This is a situation which is not bound to improve, because oil companies, in reaction to difficult markets, rising

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<sup>6</sup> Although it has been precisely Russia, the successor to the originator of that catastrophe, that has just announced the forthcoming delivery of the first floating nuclear power plant, "*Academician Lomonosov*", to service coastal places in Siberia, no doubt just the first of a series which will help promote development in those remote regions.

<sup>7</sup> BP Statistical Review of World Energy 2014, p. 42.

<sup>8</sup> Europe's Energy Essentials. Ana Palacio, Project Syndicate 3 Nov 2014. <http://www.project-syndicate.org>

prices and depletion of fields, not only drill deeper and deeper, which is risky and expensive, or try new techniques, such as the now generalised but still politically contentious *shale oil* and *fracking*, but also try to open fresh fields in regions farther away, even if they suffer from greater political instability and greater vulnerability to conflict, piracy or terrorism.

Moreover, some source areas hitherto considered stable and friendly are becoming increasingly unstable or hostile. Consider for instance Nigeria, never a model for stability, but recently made worse by the emergence of piracy in the Gulf of Guinea, armed robbery along its coasts, and flagrant oil looting in the Niger Delta and surrounding waters, let alone the Boko Haram threat farther inland. Russia is another case in point, evolving as it is towards an increasingly hostile stance, aggravated by the fact that its share of the European gas supply is, and probably will remain, as high as 25%. We can be sure, therefore, that even in the highly improbable case of the Middle East suddenly becoming an oasis of peace, piracy disappearing altogether, and Russia ceasing to pursue its aggressive policy towards its *near abroad*, obtaining oil and gas will remain fraught with risks.

### **Diversifying the means of delivery**

For two of the three components of the fossil fuel part of the mix, namely gas and oil, there are two alternatives for international trade, pipeline or maritime transport<sup>9</sup>. Each has advantages and disadvantages: pipelines cannot be easily shut down, if demand drops the fuel needs to be diverted or stored, a particularly tricky requirement in the case of gas; they also require large investments, and once in place they cannot be switched to safer areas if a part of their route becomes politically hot.

Ships, on the other hand, are very flexible as to the choice of loading and unloading ports and routes in between, but are more vulnerable to deliberate attack. They are indispensable when the distance to the production site precludes a pipeline. Gas transported in *liquefied natural gas* (LNG) tankers needs to be liquefied at the point of origin and re-gasified on arrival, which on top of the technical complication and attendant expenses introduces an important limitation in the choice of delivery ports. What follows is the evidence that we cannot do without either pipelines or shipborne transport, we need a certain amount of both.

Distribution for both transport systems is hard to estimate, in no small measure because figures shift continuously owing to market forces, international politics and other factors. However, it can be estimated that only 20% of Europe's oil imports arrives via

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<sup>9</sup> Pipelines for coal in slurry form do exist, but of limited importance and generally for domestic transport.

pipeline, with most of the remaining 80% being transported in tankers, and very small amounts by rail and road<sup>10</sup>.

As gas in its LNG form is considered a different product from its pipeline version, it is easier to compute the relative contribution of both forms. Thus, at global level, natural gas moves through pipelines at the rate of 710,6 billion cubic meters per year<sup>11</sup>, and as LNG at 325,3 Bm<sup>3</sup>, therefore 31,4% of all gas moves in ships. At European level the figures are respectively 397,1 Bm<sup>3</sup>, 51,5 Bm<sup>3</sup> and 11,4%, reflecting the enormous dependence of Europe on the pipelines bringing gas from Russia and to a lesser extent from the Caucasus basin and North Africa. Against these figures the case of Spain is striking: 15,3 Bm<sup>3</sup> and 14,9 Bm<sup>3</sup>, which means that practically half of our gas comes by sea. No wonder that Spain counts about one third of all Europe's re-gasifying plants (6 plus 1 in construction, versus 21 in the whole of Europe).<sup>12</sup>

Putting together both sets of statistics, and adding those of coal most of which imports travel by sea, means that, in a conservative estimate, Europe as a whole imports by sea about 36% of its primary energy needs in fossil fuels form, and Spain an impressive 55%.

### Protecting the means of delivery

Which brings us to the fourth measure to increase energy security, the only one that governments keep under their direct responsibility, which is to actively protect the means of delivery whenever the need arises, and the only one that the Commission does not touch upon in its recent and otherwise comprehensive *Communication on Energy Security Strategy*. But here is where history comes to our help, because there is nothing inherently new in transporting different types of fuel that has not been the subject of reflection by strategists in the past, even if the primary commodities at the time were not energy-related. It seems forgotten today, but the famous naval strategist Alfred Thayer Mahan pronounced that *the primary function of navies is the protection of maritime commerce*.

But this is easier said than done, and certainly not easier today. First, warships capable of protecting commerce are on the decline. Today an enlarged Europe can muster fewer than 100 frigates, the workhorse of trade protection, well down from the several hundred at the end of the cold war provided by fewer European countries, and of which about 80 are now more than 15 years old, not a healthy age distribution for ships with a

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<sup>10</sup> Gas and Oil Pipelines in Europe. EU Parliament, Directorate General for Internal Policies, p.10 para 2.3

<sup>11</sup> BP Statistical Review, p. 28 & ff.

<sup>12</sup> In a recent development, re-gasifying plans intended to feed the LNG arriving in ships into the commercial network, are also being used for liquefying the gas received via pipeline so that it can be re-exported. This adds a new layer of flexibility to the use of gas as a primary energy source thanks to maritime transport.



lifespan of about 30 years. Both in Europe and the US they are being – and have been for years - replaced by smaller numbers of more capable destroyers<sup>13</sup>. And while it is very satisfactory to launch a Tomahawk missile from the sea against a tent in the middle of the desert accommodating a bunch of turbaned terrorists, it is small consolation for the fact that the numbers of these wonderful units do not begin to fill the needs of trade protection in distant waters, where transit times represent perhaps 30% of the deployment, and where one ship on station means another three in various stages of preparation, transit and recuperation. We are forced therefore to send to the conflict area expensive and underused destroyers of 6,000Tm<sup>14</sup>, instead of far more affordable 3,000Tm frigates or Offshore Patrol Vessels (OPV) of 2,000Tm, which few countries procure because they are less effective at showing the flag.

Worse, these dwindling numbers of destroyers and frigates – predominantly provided by just six maritime nations in Europe - are being pulled by opposite forces. When in 2008 the United Nations Security Council issued Resolution 1851 authorizing anti-piracy operations in the Western Indian Ocean, both NATO and the EU – which share 80% of their membership – saw fit to mount independent operations, *Ocean Shield* by NATO and *Atalanta* by the EU, a particularly nasty consequence of the competitive *participation issue*. The result is that neither has sufficient assets, and inconsistencies like the UK contributing the shore headquarters to *Atalanta*, but her frigates to *Ocean Shield*.

The scarcity of assets in Europe is not restricted to surface ships. That other sea control workhorse, the maritime patrol aircraft (MPA), now only exists in precariously small numbers. Anti-submarine aircraft have capabilities that encompass those of MPA, but they are being withheld to protect the airframe lifespan and avoid the high cost of operation. But new MPA, despite their relative inexpensiveness, are not being commissioned in remotely adequate numbers.

Away from the navies, ship owners, in search of savings in a business where personnel costs are perhaps more than 30% of the total operating costs, have for a long time now found the way to sidestep exacting EU legislation on sailors rights and wages, through *open registries*, popularly known as *flags of convenience*. Thus, about 65% of the ships beneficially owned by European companies – 55% in the case of Spain - operate under

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<sup>13</sup> Report to EDA on Future EU Maritime Operations Requirements and Planned Capabilities. A Study by Wise Pens International, European Defence Agency Mar 2012, passim.

<sup>14</sup> Escort ships of 6,000Tm and above are destroyers, even if some nations choose to call them frigates for reasons of political expediency.

foreign flags of dubious repute, in open defiance of the Montego Bay Convention<sup>15</sup> and of the recommendations of the International Chamber of Shipping<sup>16</sup>.

This is an old problem, which started in the 19<sup>th</sup> Century, but in Europe it began in earnest when Greek Prime Minister Andreas Papandreu suddenly raised taxes on the merchant fleet and forced their migration to other flags of a good part of what was then the biggest merchant fleet in Europe. The dire consequences were not felt until some years later.

The typical tanker today carrying oil for one of the big energy companies would be a 100,000Tm Aframax type managed by a single-ship company – in order to drastically limit eventual liabilities - which would be in turn be beneficially owned by another company sitting maybe in a nondescript address in the Bahamas; it would be insured in an insurance company registered in the Virgin Islands, with no known reinsurance; her master and chief engineer would be Greek, the deck officers Norwegian or Indian, the crew made up of Filipinos with a Chinese cook; and, finally, the ship would be flagged in the not very prestigious open registries of Panama, Liberia, Cyprus or even Bolivia, which facilitate organizational and legal disaster. Therefore one can legitimately pose the question: Whose taxes pay for those ships' protection? Where is the link between the flag state and the ship? In summary, who has the duty to protect them? Certainly not the Bolivian navy.

These are not just rhetorical questions. A frigate's commanding officer may have to decide whether to assist a small fishing boat under Spanish flag being threatened in the middle of the Indian Ocean, or a chartered big tanker under the Liberian flag with 200,000Tm of sweet crude owned by a Spanish oil company, being also assaulted by pirates but somewhere else in the vast Indian Ocean. What should his decision be? We know the implications: the capture in 2008 of the Liberian registered MV *Sirius Star* by Somali pirates, produced an immediate rise in oil prices by 1.4% worldwide, following a hike in insurance premiums impossible to quantify. However, legally and morally the flag takes precedence.

But the ship owners' vision of reduced personnel costs does not stop there. The EU's MUNIN robot ships project aims over the next 20 years to have increasing numbers of autonomous ships, eventually including tankers, smaller and slower – hence cheaper to operate - than today's conventional ones, but with no crew. They would be controlled from

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<sup>15</sup> United Nations Conference of the Law of the Sea. Art. 91: *There must be a genuine link between the [flag] State and the ship.*

<sup>16</sup> International Chamber of Shipping (2014 Annual Review): *A balance has to be struck between the commercial advantages of ship owners selecting a particular flag and the need to discourage the use of any ship register that does not meet its international obligations. While it is shipping companies that have primary responsibility for the safe operation of their ships it is the flag state that must enforce the rules.*

ashore, with double or triple redundant systems, and they might be environmentally cleaner and safer than the manned ones, at least while on the high seas. But while safety will be enhanced, security will unavoidably suffer, as autonomous tankers would be easy prey for rogue operation by criminals.

It is therefore in the means of delivery where risks are not being balanced by market forces, or addressed by the action of the state, not to mention international organisations. The means of delivery are forgotten in most theoretical or political works about energy security because the sea, which continues to provide the most economical means of transport for non-time-critical goods, has for quite some time now been generally devoid of risk, until piracy placed ships and maritime transport in the headlines. The dominance of the sea by the established powers – mostly Western - has historically been an antidote to the crises that have emerged from time to time: Suez, Malacca, Hormuz, the Horn of Africa, the Gulf of Guinea and other places. All have been, or are being, overcome with the use of force. But there is nothing in the current global situation indicating that they will not happen again, or worse. And the energy market is more and more sensitive to these risks and threats as the nation's economy and welfare becomes more critically dependent on energy being available *just enough, just in time*.

## CONCLUSIONS

### The security risks

Market forces, while trying to balance risks and profit by multiplying and diversifying the sources and introducing redundancy in the pipeline system, do contribute to the attainment of reasonable level of energy security, but they succeed only in part. In the maritime transport of energy at least, important security risks will remain and may even increase, for two reasons:

Because forces other than just the markets are at play, which are unpredictable. Piracy, terrorism and local wars are just a few. And

Because some decisions and measures being taken are ill considered and counterproductive. Both providers of security, the nation state and the market forces, are to blame. Three developments are particularly damaging in this respect:

The reduction in ships' crews, leading eventually to full automation,

The widespread use of open registries, and

The rash reduction of naval assets for sea control.

### The answers

Remedies to these problems are clear:

Security considerations must be included in the EU MUNIN project, or any other ship automation project, as well as purely safety related ones.

National and EU legislation as to the use of open registries must be tightened. The special registry of Canarias is a step in that direction, but much more must be done. The EU has much to say in this respect, and UNCLOS is on our side. And

Sea control assets, such as regular frigates, OPV and MPA must be given a higher priority in the naval procurement and shipbuilding programs.

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