European Energy Companies – Paths Towards the Future

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Abstract

The typical European energy company is a large-scale oriented, autonomously operating concern, with an experimentally, emergent strategic decision making style. This strategic behaviour is unlikely to create the kind of industrial structure required to meet the significant challenges facing the industry, if it is supposed to serve the public goods of universal, cheap access to high quality energy. Furthermore, the overall regulatory tendency of European governmental and public institutions in charge of the energy industry are unlikely to induce a substantially different strategic behaviour, unless they focus on the strategic dynamics of the industry. There is therefore a real danger that the public goods in question for the European (and particularly) Dutch consumers and industrial customers, are not optimally served. An alternative course of regulatory action to achieve a vibrant, progressive and market leading Dutch energy industry, contributing to the overall competitiveness of the Dutch economy, could be one that stresses various ways of achieving innovation in the industry. For that purpose this paper introduces a framework arranging what types of public policy paradigms for achieving macroeconomic growth are interacting with what types of company innovation strategies for achieving microeconomic growth.

The challenges for the European energy industry

Though the energy industry in Europe has largely been liberalized and privatised, the special circumstances of complexity around production and consumption of energy that originally gave rise to its public administration have not gone away. Furthermore, new challenges have added to the complexity, such as medium term pending capacity shortages, convergence with other infrastructure, alternative raw materials or environmental impact reduction. Translating the challenges and the expectation of society towards the energy industry yields a preferable profile of strategic behaviour: to be network-oriented, deliberate-planning and locally focused. The needs of the energy industry are different from the public good, however, which is why their strategic behaviour is mostly the opposite of what that public preference should be. This will be explained in more detail in the first section on the preferred strategic profiles. (A more in-depth analysis of these strategic profiles can be downloaded from www.strategy-academy.org)

The second section then shows that those preferred strategic profiles are embedded in national heritage systems of industrial structures, which keep on influencing heavily the way companies operate in the different nations. The German, UK and French energy industry structures are compared.

In the third section, the framework for "Strategy Dynamics of Innovation" is introduced. The framework is suggested as a tool to think about strategic ways for the energy company executive to embrace innovation in interaction with the public policy makers instruments for achieving macroeconomig growth.

Section 1:

The preferred strategic profiles by European energy companies

THE NEED FOR NETWORK-ORIENTATION VS THE NEED FOR AUTONOMY:

Due to the profound regulatory and ownership changes in and around the energy companies, the energy companies are generally going through significant internal cultural changes. While adapting to new organization charts, different hierarchies, stricter financial targets, changed objectives, complex competition and many other aspects, the companies remain inward looking to a large degree. Therefore their strategic stance is generally to be autonomous or discrete-oriented, rather to engage into business networks.

The need of the public good differ from that. Most of the challenges and expectations of the industry require very high sums of investment. Investment may be needed for expensive research and development to innovate for better solutions, to build new assets, to erect network infrastructure or to change operating systems. The investment sums required for instance for establishing a hydrogen network, to research photovoltaic electricity generation, or to widely introduce the power line, are so large, that they surpass the means of any single energy European company. In order to spread the investment risk among several shoulders, and also in order to make sure, that all industrial players are investing in compatible system components, such a situation typically requires network-oriented industrial structures.

As long as these networks do not emerge, such as was the case for instance in the gas industry of the 70's, the public goods associated with the necessary high investment will not be served.

THE NEED FOR LONG-TERM, DELIBERATE PLANNING VS THE NEED FOR SHORT-TERM, EMERGENT REACTION:

The quick pace of frequent regulatory change in the energy industry over the past years has created an unstable environment for doing business. Companies were forced in short intervals to consider upcoming choices and opportunities, and fend off threats and dangers resulting from regulatory and ownership changes. Pending regulatory choices left business decisions pending as well. In such an environment, companies cannot help but being short-term oriented and reactive to unfolding developments. This behaviour is furthermore helped by the fact that the short-term energy trading markets throughout Europe offered short-term opportunities for superior profits for the skilled trader mentality and for small scale, incremental innovations.

On the other hand, there are various reasons why energy companies should be long term-oriented and deliberate planners of their future, if they want to successfully meet the challenges facing their industry. The key reason is again the expensiveness of the required investments. A power plant for instance is a rather inflexible asset: it cannot be relocated, it cannot be trained on a different fuel, it cannot be made smaller or bigger, it is quite stuck to where and how it is. This is further compounded by the fact, that the economic use of these assets range up to 30 or 50 years, far surpassing any surefooted forecasting abilities of anyone. Investing or maintaining such kind of assets requires therefore "robust" planning. Robustness means, that the asset can be useful even under many different scenarios of the future unfolding, despite the fact that its characteristics cannot easily be changed . A short-term view in planning is unlikely to result in such "robust" decisions. Another reason has to do with the need for network-orientation. The choice of partnerships and network engagements have similar long-term implications for the business, even if in theory they are easier to unravel. But shared investments, jointly operated businesses or commonly agreed upon standards and systems are difficult and painful to separate, often creating de facto lock-ins of the partners involved. Therefore the choice of partnerships, networks and alliances should be carefully deliberated against possible developments in the future, in order to produce again a “robust” choice.

Here again, unless the industry adopts a more long-term oriented, deliberate strategic planning style, the public goods related to infrastructure and asset spendings, or systems innovation, are not likely to realize.

THE NEED FOR LOCAL ATTENTION VS THE NEED FOR LARGE SCALE:

The production of energy benefits from large economies of scale and scope. Simply due to physical reasons, larger power plants are far more fuel efficient than smaller ones. Furthermore, a network of production assets can be better utilized than a single plant, because the fuel mixes and regional consumption patterns can be better evened out. Thus, there are significant economies of scale and scope of having a diversified portfolio of production assets. Both, scale and scope economies make it attractive to grow large in size, and benefit from the resulting cost savings. The European energy company’s overriding strategic aim therefore, has been and still is, to grow in size.

However, the cost advantages of the economies of scale and scope do not necessarily feed through to the end consumer. The public goods in question are measured from the perspective of the customer, not the supplier. There the picture is different. For better or worse, the European energy market will for decades still feature heritages of its national past. These heritages often create local conditions of assets, infrastructure, customer expectations and habits that require a locally adapted solution. The consumption of energy is also by definition an inherently local affair, bound to a certain geographic location. The use of energy is not like banking for instance, whose services can be consumed via the phone or per internet, but where the back office is located in India. Even though the streams of photons and electrons are in themselves a commodity – they are a local commodity, needing to cater to the local circumstances, tastes and heritages. Furthermore, in the industrial sector, both cost and quality of energy products cannot necessarily be measured in terms of Euro per mwh. Complicated energy mixes, combined with base and peak load needs, require local solutions for optimal cost and quality performance. In the retail sector, it is different segments of the market that can be catered to, in order to enhance the performance of the product. Improvements are thus to a large degree tied to respect and appreciation of diversity.

Therefore, the public good of better and cheaper energy products is much more likely to be served by companies with a local attention span, who are responsive to diversity, than by companies who aim for convergence and global economies.

STATIC COMPETITION – THE RESULT OF THE CURRENT INDUSTRIAL STRUCTURE:

In summary, the reasons for the observed strategic behaviour of the energy companies, are that they can be most profitable in this fashion, given the business dynamics of this market. Overall this leads to a state of static competition, with low degree of innovation, low degree of new entry, and only slow improvements in cost and quality improvements of the products. The industrial structure is such that new investments in assets or innovation usually do not pay. Thus players can enjoy healthy profits on existing assets, with little threat of new entry endangering these profits in the near future.

CHOICES FOR THE PUBLIC POLICY MAKER:

For the public policy maker this poses a dilemma. If they leave the current unsatisfactory conditions of the market to be sorted out over time by market forces, then they may neglect important public goods. If on the other hand they become active to achieve perfect competition (to achieve elastic marginal cost pricing), they would need to micromanage the industry for creating a level playing field. In this way they would end up strangulating the very same market forces they may be hoping to achieve. It also cannot be certain, whether perfect competition would even alter the market dynamics. A third alternative would be to break the modus of static competition and try to induce dynamic competition instead. In dynamic competition, the level playing field becomes less important, as new entrants will be rewriting the rules of the game by introducing new products or new services, or by offering the old products at much lower prices with new business models. Dynamic competition can be achieved by motivating specific types of strategic behaviour, in particular a more network-oriented, deliberate planning and locally focussed strategic behaviour.

Section 2:

The heritage industrial structures of national energy industries

The achievement of the first wave of European triggered deregulation and liberalization of the energy markets have an entirely different quality from the suggested results of a the recently enacted second wave. The second wave is supposed to drain hidden monopoly rents that are still presumed to be in the national systems. It is not clear, whether these monopoly rents exist, and even less apparent, how they could be drained. On the other hand, it is quite possible, even certain, that there are huge pools of profits that are being made at the expense of lower prices to the consumer. But, since these might be the result of commodity based “static” competition, the public would then have neither right nor means to contest these profits.

Besides settling into static competition, the energy industry has also created at least three different varieties of industrial structures, which are quite incompatible with each other. UK deregulation has produced companies such as Centrica or National Grid, which specialize in one part of the value chain. They do not vertically integrate, but expand with their core competence into as many markets as possible. The French model is the opposite of that. The French players are completely vertically integrated, but are focusing only on one type of product. The Germans pursue the third variety, the multi-utility approach of being both vertically integrated and in many product areas at the same time, but be less dominant in each activity.

These three industrial structures are not compatible with each other. In practice it is barely possible to create a level playing field among industrial structures which are as diverse as such. The reason is, that the governments would have to change very deeply ingrained rights and privileges of the respective companies in the local markets. This is even a difficult effort when the companies concerned belong mostly to the state, as they still mostly did in the first wave of EU-deregulation. Currently, most companies are actually privatized. Even from a legal viewpoint it is not so easy to change business conditions too drastic. But certainly within the complicated network of government-business relations encompassing labor and consumer issues, it is also difficult to enact very drastic changes.

Germany

France

UK

Ge + Ex = Generation and Exploration

Tr + In = Transmission and Infrastructure

Tr + Sa = Trading and Sales

Section 3:

A framework for Strategy Dynamics of Innovation

The ultimate goal of the European energy policy is to achieve macroeconomic development for the European economy. It is firmly tied to the so-called Lisbon agenda of turning Europe into the primary economic powerhouse of the global economy by 2010. However, there are widely divergent views among and within national policy makers on how public policy can facilitate such macroeconomic development. Furthermore, there are equally divergent views by companies on how best to promote their own microecnomic growth. Only one thing is certain: development requires to do at least some things different than they were done before, that means, development means to do something new, or to “in – novate”.

THE VARIOUS FORMS OF INNOVATION

TECHNOLOGY PUSH INNOVATION

Often innovation is taken to mean technological or even scientific innovation. In that view a “new thing” may emerge from the research laboratories of a company or a university, which has the power to accomplish a given task faster or cheaper, or even make things feasible that were not before. In the energy industry for instance, scientific advances have eventually enabled first stage blades in gas turbines that were both very large and very heat resistant. As a consequence gas turbines began to operate in magnitudes of output and efficiency that made combined cycle power plants highly competitive for many energy needs, including even base load demand in some instances.

A varied number of scientific disciplines have contributed to the development of these high performance first stage blades. Metallurgy for one worked out precision metal alloys with amazing features. Mechanical engineering developed vacuum ovens where such alloys could be heated and cooled with such a precision that a 30 cm metal blade could be cast as a single crystal (which means that it crystallizes literally molecule by molecule). Aerodynamics contributed the know how on how to shape such blades for improved airflow efficiency. Thermodynamics developed a better understanding on the interaction of hot and cold gases – and all those disciplines needed to rely on the pioneering front of the best computer hard- and software available to calculate its mathematical formulas. All these disciplines labored away in some natural scientific laboratories around the world, working out some esoteric knowledge that eventually found its way into a gas turbine.

One stage further there were technologists in some R&D department of some company which turned the findings of all these scientists into a technology – a gas turbine technology to be precise. And yet another stage further there were product engineers who developed particular products from that technology – gas turbines products to be precise. After all a gas turbine consists of many other parts which are considerably less high tech, but which need to be determined just as well in order to become a full product, the casings, valves, controls, etc.

At the beginning of all this were scientific discoveries, the advancement of knowledge available to humanity – and therefore it could justifiably be said that science and technology “pushed” these advances forward, ultimately allowing cheaper and cleaner energy, facilitating overall economic development.

MARKET PULL INNOVATION

Yet there is another side to that view. Combined cycle power plants are particularly attractive in markets where prices for energy fluctuate with supply and demand. In contrast to nuclear or coal fired plants, CC plants can be shut down and ramped up very quickly. In times of high demand they can thus take advantage of peak pricing periods, during low demand they can be slowed or shut. The basic principle of combined cycle energy creation is nothing new, it has been around since many decades. But only when wholesale markets for energy were created, where energy could be traded, did it start to make sense to really invest into this technology in a significant scale. Before that the markets often did not allow for profitable operation of such a plant. Therefore it was equally necessary to innovate the market mechanisms by which energy was supplied so that this development could occur.

When the markets were created a different type of utility company emerged – the IPP, the Independent Power Producer. In contrast to the integrated power utilities of before, the IPP might only have a single power station to offer, and would rely on other companies to supply the fuel in, or carry the energy out. In this way a completely different organisation of economic activity was created. And further, new business models of power generation were developed as well. Equipment suppliers began to lease the machinery, venture finance supported the companies, power purchasing agreements were developed, financial instruments like weather swaps were offered and so on. These new types of businesses became the typical buyer of the new generation gas turbine technologies, not the incumbent players. And it was to the needs of these kind of buyers that the products were catered to and developed for.

Thus it could be said with equal justification, that it was not the TECHNOLOGY PUSH which enabled the economic development, but it was the MARKET PULL which created it.

In essence it is important to note, that innovation is not only restricted to science and technology, but innovative practice extends to products, business, organisation and markets as well. When Intel Corporation began to brand its microprocessor with what has by now become one of the world's best known and most valuable brands "Intel Inside", then the resultant creation of economic development had nothing to do with technological breakthroughs – it was a market innovation. Likewise Michael Dell did not invent computer technology, but a better way to be a computer business. And with that business innovation he probably contributed as much to the spread of the PC revolution as IBM with the product invention of a "Personal Computer" (which was technologically speaking, hopelessly behind the time at the time).

PARADIGMS FOR PUBLIC POLICY ON ECONOMIC GROWTH

If companies have a wide array of choices to be innovative for microeconomic growth, what about the public policy makers in trying to promote macroeconomic growth? Here as well, a bandwidth of paradigms exist on how such development can be supported.

A well known tool among policy makers is for instance industrial policy. It is the attempt to single out particular companies in particular industries to turn them into strong players in international competition. These companies then receive favorable conditions for their activities, gain privileged access to resources or have protected control over markets. The prototype of this paradigm are the postwar Japanese MITI activities. In recent years this type of industrial policy has gone a bit out of favor among policy makers, but it is by no means finished. Large sectors of European national economies are still managed under this paradigm, (if often unofficially), and the infrastructure industries of transport and energy are particularly liable to this enduring entreatment.

A less company specific style of industrial policy is the orientation towards industrial clusters. Under the paradigm of cluster theory, it is not particular companies which are promoted but clusters of industrial activity. The idea behind clusters is that regional networks of factor conditions favor a certain type of industry over others, (which can be customer preferences, accumulated labor knowhow, installed bases of equipment, natural geographic conditions, and several others), and thus turn an entire cluster of companies into a global champion. The prototype of clusters is American Silicon Valley. Even if for the individual firms in that cluster life's fortunes can be up and down, overall the cluster will deliver superior economic growth and employment for the country.

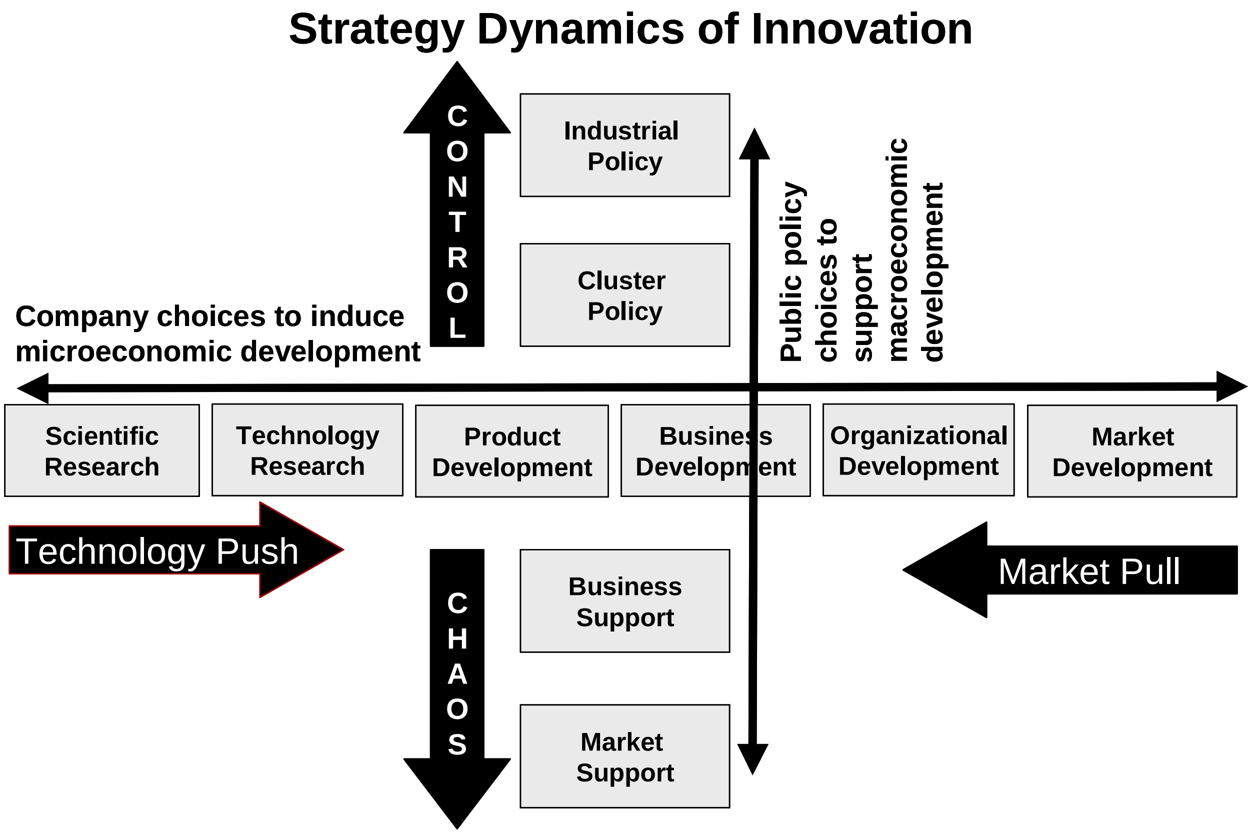
A yet less specific style of economic promotion by public policy is to be generally "business friendly", but not towards particular companies or industries. Generic subsidies, general protection of markets, a high emphasis on preserving existing employment and a strong dose of fine-tuned regulation to protect companies from the vagaries and risks of the free market are the hallmark of this style of economic policy. A typical example of this is the "Rheinische Kapitalismus" of Germany, where deep woven networks of companies, banks and ministries aid each through a complicated web of public and private sector arrangement – officially not discriminating against outsiders, but effectively softening the market forces.

Finally, the least specific public policy for promoting economic development, (short of not having one at all), constitutes the increasingly fashionable paradigm among multilateral institutions like the World Bank, the IMF or also in the European Commission – a school of thought summarized under the title of New Institutional Economics. This paradigm is generally "markets friendly", which is different from being "business friendly". NIE thinking subscribes to the theory of comparative advantage between producers, not only among nations but among all economic subjects. The more specialized economic subjects become, the more will trading among them produce growth in economic output. However, there is one countervailing force, which are the transaction costs of trading. If the transaction cost of an additional trade is higher than the marginal comparative advantage of increased specialisation, then it is not worthwhile to take advantage of that additional room for productivity improvement – and hence growth will not occur. It should therefore be the policy makers task to reduce transactions costs as much as possible, for instance through a reliable legal framework, by stable long term conditions, by uncorrupted institutions, by clear and functional standards, etc. By improving these institutional conditions, businesses will develop on their own, and the economic output will grow without further promotion.

While each of these four paradigms is distinctive, they can be charted along a continuum of believing in more controlled organizational patterns on the one side, and the more chaotic inducive organizational patterns on the other side. Only the extremes of both sides are distinctly unfashionable these days, them being socialist planned economies and Manchester liberalism. But the four gradations between them, the four paradigms of public policy just sketched, are widely practiced, with each having ardent proponents and fierce opposers.

Across the European energy industry, all manners of public policy among governments, and all attitudes towards innovation among companies can easily be observed. Thus the two axis can be seen independent of each other, yielding an analysis instrument for charting the strategy dynamics of innovation.

Such charting would help to explain the differing industrial structures in the various nations, and it would help to illuminate the differing attitudes towards innovative behaviour by companies. By that it would clarify why governments and companies take the kind of action they do, or even predict what their next move might be in the context of their prevailing paradigm. In this way the formulation of the national energy policy in response to and in support of a European harmonization of the energy markets might be substantially facilitated.


Strategy Dynamics of Innovation
CONTROL
Industrial Policy
Cluster Policy
Public policy choices to support macroeconomic development
Company choices to induce microeconomic development
Scientific Research
Technology Research
Product Development
Business Development
Organizational Development
Market Development
Technology Push
Market Pull
CHAOS
Business Support
Market Support