Reform of Energy Infrastructure in the European Union

An analysis of the legislative conditions for reforming EU energy infrastructure, with a particular view to the beneficial aspects of linking wind energy and Combined Heat and Power plants.

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ABSTRACT

The share of renewable energy is steadily growing in the European Union. Ambitions of strengthening this development was underlined in the Commission climate action package presented in January 2008. However, increasing the share of renewable energy destabilises the electricity production, resulting in increased pressure on the transmission nets.

One way of countering this challenge is by integrating wind parks with Combined Heat and Power plants (CHPs). By taking advantage of the district heating nets attached to these plants it is possible to transform electricity into heat. This facilitates both effective usage of electricity from wind turbines, and at the same time relieves pressure on the transmission net.

However, this technology is relatively new and has so far not been implemented. Further, the role of CHPs in national electricity production varies significantly between the member states of the EU. If such an approach was to be pursued, it would require a legislative set-up conducive to both CHPs in general and to the integration of wind energy and CHPs more specifically.

In the current thesis, a number of barriers to pursuing this approach will be identified. This is done by scrutinising current EU initiatives directly dealing with CHPs and with broader policies concerned with the European energy sector. Finally, by applying main schools of integration theory possible explanations for the existence of these barriers will be discussed.

It is concluded that in all three policy areas analysed, barriers for pursuing the proposed strategy exist. Also it is concluded that both resilience of member states and historically grounded preferences in the Commission could explain the existence of these barriers.

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1. Introduction

From being a policy area characterized primarily by technical provisions relating to transmission, distribution and pricing structures, the field of energy policy has been elevated to the summit of the European public agenda. Rising energy prices, the increased dependency on external providers of raw materials and enlarged focus on the relationship between energy consumption and climate change has led to unprecedented attention being given to this policy area (e.g. Commission 2006; Commission 2007).

Of these reasons, the growing understanding of and attention given to climate change has perhaps been the most dominant. Also the scarce energy resources within the EU, which has lead to a growing dependency on particularly Russia, the Middle East and North African states has drawn headlines and raised issues concerning security of energy supply (Coreljé & Linde 2006; Spanjer 2007; Constantini et.al. 2007). As a consequence the Commission has taken several steps to make the European energy sector more efficient and more environmentally friendly. Most notable are the three legislative packages on liberalisation of the energy sector – the third and so far final one was presented in the fall of 2007 – and the long awaited climate package was presented in January 2008.

Increasing the share of renewable energy and making the energy sector more efficient is generally accepted as reasonable goals. However, in doing so the importance of adapting infrastructure to the future demands is not always portrayed as vigorously. It is the ambition of this paper to look at how some of these challenges could be met, and identify potential barriers to such a development.

2. Problem Field

Central in the motivation behind most initiatives in the energy sector is a wish to secure low and stable energy prices. Since the raw materials used to produce energy are mainly found outside the EU the energy prices are to a great extent out of the hands of European policy makers. One could argue that in a free market economy this would always be the case, yet numerous EU policies show that price fixation is by no means outside the reach of policy makers – the Common Agricultural Policy (CAP) being the primary example of this (Wyn 1997; Bohman et al 1999). The obvious difference is that agricultural products are to a higher degree produced within the EU, than is the case for energy. Having little control over the basic elements that end up as electricity in our power plugs and gas in our fuel tanks, it is possible to identify at least four problems faced by the Community.

(1) Any energy import based on fossil fuels would entail problems in relation to climate change. An obvious answer to this would be renewable energy sources, yet (2) these are expensive and still far from able to cover the overall demand. Nuclear energy is very common in some member states, but (3) faces stiff opposition in others. A further problem (4) is related to the malfunctioning of the European transmission net. Thus, not only is energy import costly, the distribution within the EU is also done in a less than optimal manner. The sector is fragmented, and infrastructure is in many areas suffering from underinvestment.

So far problems related to infrastructure has primarily concentrated on development and maintenance of the existing networks. Since financing of infrastructure is typically paid by the national governments, there have often been discrepancies in the quality of such investments between member states. It obviously leads to inefficient usage of the infrastructure if top modern networks on one side of the boarder is not being used to its full capacity because of old and worn infrastructure on the other side of the boarder.

Another problem often discussed in relation to infrastructure is ownership. During at least the last 15-20 years the notion of ownership unbundling has been pursued in both the energy and transport sector as a mean to secure infrastructure investment and avoid the misfortunes of monopolies. By separating the ownership of infrastructure from the users of the infrastructure (unbundling), it has been argued that competition will be intensified, investment incentives increased and following this that prices will fall (Copenhagen Economics 2005: 39; Alesina 2005: 819). Due to substantial opposition from certain member states, total unbundling has so far not been achievable, yet the Commission continues to devote much energy on achieving this goal (Geradin 2006; Commission 2007a).

2.1 Problem Formulation

Although, the energy infrastructure problems mentioned above are often addressed, there may be a different and perhaps even more fundamental problem relating to infrastructure on the horizon. As the ambition of combating climate change becomes steadily more predominant in a broad array of Commission proposals, it becomes evident that the energy sector is facing several structural challenges in the future. In the Energy and Climate Change Package from 2008, it is stated that a 20% reduction of CO2 emissions is to be reached by 2020. One of the means to achieve this goal is by ensuring that 20% of energy production by 2020 is derived from renewable energy sources (Commission 2008:2).

If such a goal is to be reached, environmental engineers and economists have already pointed to a severe challenge relating to the current functioning of the electricity infrastructure[1]. Since most renewable energy sources are not capable of producing a stable energy outcome, a potential energy production surplus or deficit will potentially exist at any given time. To exemplify, let us look at wind turbines. When there is no wind, they obviously generate no electricity. Therefore it is necessary to have other energy sources that are able to cover the shortage of wind energy production. This means that when there is wind, there will potentially be an excess of energy produced. To take the example further, we might imagine a storm in the night. At night the energy consumption is minimal, yet during a storm wind turbines will create vast amounts of energy. This results in a huge excess of energy. In Denmark, who is leading in wind energy, this is partly solved by exporting excess power to Germany. This solution is,

[1] See chapter describing the DESIRE project (chapter 3)

however, not viable in the long run due to at least two circumstances. Firstly, exporting electricity naturally requires a market which is willing to purchase the excess power produced – and thereby at least a market which, at that given time, will find it advantageous to buy. Yet, with an increasing focus on wind energy throughout Europe, the risk of having a general surplus on, say, the common Danish / German network increases. In other words, relying solely on the possibility of exporting electricity whenever an excess quantity is produced seems somewhat short-sighted. Secondly, the last of the three 2020 goals, is the ambition of increasing energy efficiency. Producing excess electricity in one region, which is then transmitted across a great distance – with the energy loss this entails – hardly helps in attaining this goal.

Scientists have pointed to a number of solutions to tackle this problem. Basically the current problem is bound to the fact that excess electricity cannot be stored, and will therefore potentially become useless. As will be accounted for, a way to overcome this is by transforming excess electricity into heat – e.g. by using it to heat up water basins. Alternatively scientists have pointed to the potential of linking transportation and electricity, so that electrically driven vehicles may be charged by excess electricity (e.g. Kerner 2008:17). While at least the last example may still seem a bit intangible, and somewhat futuristic, it remains that larger fluctuation in energy production is a matter that will need to be dealt with in the future. In order to do so, the way infrastructure is planned and composed should be part of the reforms that will inevitably take place in the energy sector.

These considerations lead to the problem formulation around which this thesis will revolve.

To what extent are the future demands for infrastructure incorporated into the current EU's energy policy?

In answering this question three specific areas of legislation will be dealt with: 1) Community legislation on Combined Heat and Power Production (CHP), 2) Programmes designed to promote energy infrastructure, and 3) The liberalisation of energy markets. All three areas are central in relation to the ambitions of creating conditions for the balancing of fluctuating electricity production. In each area potential obstacles for infrastructure reform will be identified and discussed.

2.2 Demarcation

Before addressing the question raised in the problem formulation per se, it seems conducive to dwell a bit on the rather extensive research objective, namely the energy policy of the EU. Thus, how does one analytically approach an object as immense, complex and multifaceted as this? It should be noted that the thesis will not seek to develop any kind of exhaustive presentation of the sector, but rather focus on a few central problems relating to climate change and malfunctioning of infrastructure. By concentrating on the content of EU legislation and objectives, the focus will be centred on the EU decision making bodies. This does not mean that market driven elements will be left out of the equation. Thus, factors concerning the creation of monopolies in the energy sector, incentives influential for investment flows, and the like, will be touched upon. However, the thesis will not consist of new research into these fields. Rather, these issues will serve as a part of the framework within which the different policy options and administrative considerations are to be understood.

To tangle the large and complex research object I will therefore draw on an extensive study conducted by a conglomerate of economists and engineers under the umbrella of the Commission's 6th framework program for Research and Technological Development. This study addresses exactly problems related to the future interplay between renewable energy sources and energy infrastructure. In chapter three an elaborate presentation of the study and its main results will be conducted.

2.3 Why study energy policy?

While energy policy deals with issues concerning the provisions of the internal market and the legislative challenges relating to this, it also pivots around very basic needs for the European consumer – namely energy prices and eventually access to energy. Discussions on the third energy package and the composition of infrastructure may seem very technical and far removed from the citizen of the European Union. However, these negotiations and the results hereof may have direct implications on the price on the future electricity bill and on the possibilities of attaining a more sustainable energy sector.

As already mentioned a main tool to overcoming the problems in the European energy sector has been to liberalise markets and seek vertical unbundling. In short, the latter is the separation between energy producers

and owners of the transmission networks. This strategy has also been touted as central in relation to fighting the concerns relating to climate change. At the same time renewable energy sources are given increased attention. As will be argued below, changes in the composition of the European energy infrastructure are necessary to achieve this goal. Ultimately, the thesis therefore becomes an assessment of the coherence of the Commissions strategy relating to energy and climate change, and thereby touches on one of the most hyped policy areas in recent years.

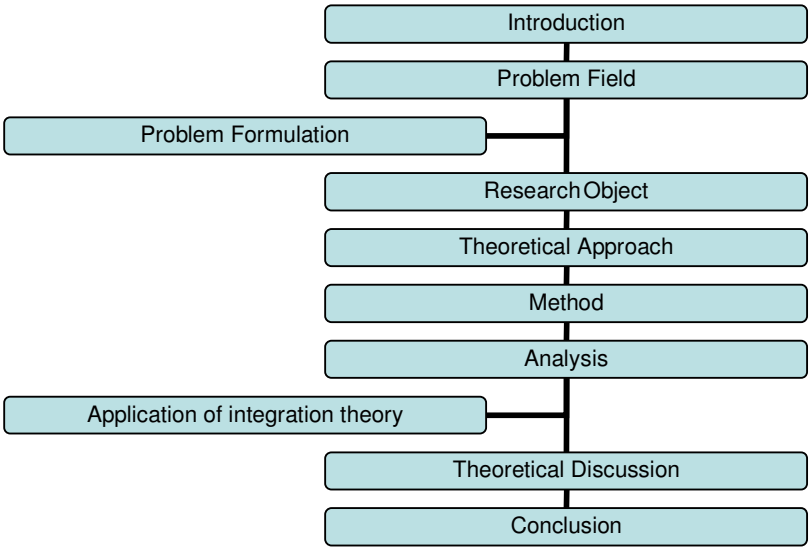
On a more abstract level the topic presents a classic problem in international relations theory, namely the struggle between national authorities and international institutions. The Commission is here acting in a field which is traditionally very closely attached to national state supremacy. While the supranational institution (European Commission) appears to be addressing sectoral problems by increasing market power and adopting a trans national approach, the member states may see this as an attempt to wrestle away powers, in order to either weaken member states, strengthen the supranational institution, or ideally both. These powers would include close relations with so-called "national champions" – i.e. state owned energy companies.

Thus, both in relation to the everyday life of European citizens, concerning traditional policy analysis and also on a more abstract theoretical level, energy policy provides interesting fields of study.

2.4 Structure of the thesis

The thesis consists of seven main chapters. The introduction was the first of these and the above presentation of the problem field and problem formulation is the second. Thirdly, considerations concerning the research object will be outlined. This includes a presentation of a study concerned specifically with infrastructure challenges stemming from increased use of renewable energy sources. In chapter four the theoretical approach of the thesis will be developed. After this, the aspects relating to method will be addressed. The sixth chapter will comprise the analysis. Here potential obstacles to meeting the challenges of fluctuating electricity production will be identified and discussed. The seventh chapter will seek to put these findings into a theoretical framework, thereby identifying possible explanations to the existence of these obstacles. In this connection a short presentation of main thoughts in European integration theory will be

conducted, yet the chapter will mainly seek to actively use the current research findings as a mean to better understand and perhaps contribute to these theoretical approaches. Finally, in chapter eight the thesis will be concluded and future perspectives on the issue will be reflected upon. A graphical outline of the thesis can be found below:



3. Research Object

On an overall scale the research object is the energy policy of the European Union. Issues concerning this particular area have been subject to numerous studies following not least the three liberalisation packages. Often studies have focused on the degree to which liberalisation of energy networks are profitable from an economic perspective (Pollitt 2007; Davies and Price 2007; Haucap 2007). However, in the current thesis the aim will be to scrutinize and discuss the linkage between the necessity of optimizing the functions of the electricity infrastructure and the Commission's action in the area of energy and climate change. Climate change is by no means a new issue on the European agenda, yet with the package on Energy and Climate Change from 2008, the member states have for the first time committed themselves to achieving clearly defined goals. As has been mentioned the three goals are: by 2020 a 20% reduction of GHG emissions is to be attained, 20% of energy consumption is to be derived from renewable sources and overall energy use is to be reduced by 20 %. While issues concerning climate change and energy are already predominant both among policy makers and political researchers, it is the ambition of this thesis to dwell on an angle not often portrayed in this debate. As will be described in detail below, a study (DESIRE) from 2007 partially funded within the sixth framework programme of the European Commission, pointed to the necessity of substantial changes in the composition of European energy infrastructure. It is from this corner of the debate, that the thesis will evolve.

The presentation will due to the focus and scope of the thesis not dwell on technical niceties. However, a basic understanding of the purpose, methods and achievements of the study is crucial to secure a reasoned analysis of how these findings could be taken into account in the European legislative toolbox.

3.1 Purpose of DESIRE

Behind the abbreviation DESIRE lays the core purpose of the study *"Dissemination strategy on Electricity balancing large Scale Integration of*

Renewable Energy"[2]. While this is perhaps not readily comprehensible to the layman, a clear definition of the problems dealt with in the study is offered in the following quotation:

"The European electricity market is facing upcoming problems. Proportions of renewable electricity rise in Europe, while local electricity systems are unable to absorb the excess capacity. This means that we are unable to use the renewable electricity produced. Interconnectors of electricity are blocked up by the need to transport excess supplies across the EU borders. At the same time, the competitiveness of the European electricity market is constrained. The DESIRE project addresses these problems." (DESIRE 2007:2)

The consortium behind the study consisted of a number of European universities, consultancy companies and R&D organisations. All in all 10 different organisations took part in the different fractions of the project. The project ran from 1st of June 2005 to 31st of May 2007, and of the total budget of € 1.6 millions, € 1.2 millions were funded under the sixth framework programme of the European Commission.

Central in the project is the focus on small and medium sized Combined Heat and Power (CHP) plants. In the study, a number of simulations on future electricity production and consumption demand are made to facilitate research on how the energy market will be affected, and what role CHP plants may have in this respect. More precisely, how may CHPs help balance the expected increased fluctuations in energy production? The study distinguishes between solving problems on short and long term.

On the short term it is concluded that CHPs have the potential of not only reducing excess electricity production, but also have a positive impact on the economic feasibility of renewable energy. These benefits are based on a model where excess energy is used locally by either limiting the "standard" electricity production at the CHP, or transforming excess energy to heat. Thus, instead of exporting cheap excess energy it is used locally, thereby also saving transmission costs.

On the long term, it is discussed what impact a future increase in wind energy will have on the composition of the current infrastructure. Among other things, it is demonstrated that as electricity fluctuations becomes

[2] A complete presentation of the project can be found at: www.project-desire.org

higher, the possibility of dealing with excess electricity will exceed the capacity of trans regional / trans national interconnectors. Therefore, the study calls for a restructuring of the transmission networks to facilitate integration between wind turbines and CHPs with heat stores.

3.2 DESIRE obstacles and desired recommendations

In the concluding parts of the study five main barriers for solving problems with fluctuations in electricity production by the use of CHPs are identified. 1) The investment risk in CHPs is very high due to fluctuating energy prices and oligopolistic behaviour of incumbent market actors. 2) Electricity prices on the spot market do not reflect the external environmental costs. 3) Taxation systems hinder electricity produced at CHPs from entering the heat market. 4) Price transparency for rental of transmission networks is not sufficient. 5) Initiatives to develop district heating infrastructures are not sufficient.

Finally, the dissemination from the DESIRE project offers a number of proposals to how these barriers are overcome. Firstly, to limit the investment risk in CHPs a price compensation system is suggested, which secures that prices on electricity produced at CHPs at least equals the long run marginal costs at a new large coal or natural gas-fired power plant. This would make CHPs less vulnerable to price fluctuations, and thereby more attractive to private investors. Secondly, in order to include external environmental costs, a CO2 regulation system with stable and sufficiently high prices could be established. Thirdly, the taxation system should be changed, so that it becomes economically attractive to produce electricity at CHPs and sell it to pump-based heat production, when there is a surplus of electricity from wind turbines. Fourthly, vertical unbundling between power companies and the owners of the transmission grid system should be accomplished throughout Europe, to advance price transparency on rental of the transmission capacity. Fifthly, a general plan to develop district heating infrastructure in Europe should be pursued.

3.3 Summary

It is imperative to understand that the DESIRE project should not be considered as a definitive solution package for all future problems in the European electricity sector. This is never claimed in the project itself, and such a claim should certainly not be perceived as the point of departure for this thesis. However, the DESIRE project raises a number of interesting challenges, of relevance to both current developments in the composition of

energy production (increased investments in sustainable energy), and to the ambitions of European policy makers (primarily visible in the package on energy and climate change). Thus, determining to what extent barriers to this approach exist in current EU initiatives and legislation seems both interesting and relevant as an evaluation of EU energy policy choices.

With these preconditions, the DESIRE study in summary underlines the beneficial aspect of producing electricity closer to the consumers, and in this context integrating wind energy and CHPs. Together with a number of other initiatives, the future problems of balancing electricity production could be held in check by this approach, leading to both cheaper energy and a better utilisation of the resources at hand.

4. Theoretical approach

Having presented the problem field an elaborated on the approach offered by DESIRE, looking at how EU decision making takes place in the field of energy, seems a logical next step. Understanding the allocation of power in the preparatory legislative phase is crucial to determine which factors shape the policy outcome in any policy sector. The formal competences are of course set out in the treaty, yet a number of external actors will at any time seek to influence the decision making process. Also to understand the full picture, it will be conducive to look at to what extent preferences are more than a sheer allocation of interests and ideas.

It is not the ambition here to perform a long and exhaustive presentation of current theories on European integration. I find that such exercises often result in pointless name dropping and basically fruitless weaving with little relevance to the research object. Instead a profound discussion of the applicability of different theoretical approaches in the current context will be performed after the analysis, hopefully resulting in a more dynamic interplay between empirical knowledge and theory. However, to map out the allocation of power and ultimately to acquire the tools for conducting the research, it is imperative to determine which cog wheels are central in running the decision making process. Determining what affects the policy choices is central in the current research, and an extensive presentation of the different actors and factors in play will therefore be conducted below. Yet, rather than presenting the content of different integration theories, focus will in the following primarily be on a cardinal disagreement in IR theory, namely that of the role and power of international institutions. In modern realist theories it is often argued that the role of the Commission and other overstate actors is limited to the good will of states (Moravcsik 1991; Mearsheimer 1990). In the following I will present an opposing argument. This will eventually serve as a motivation for addressing Commission initiatives which have not yet been accepted by member states in the analysis.

4.1.1 *What do the treaties say?*

The role of energy policy was from the outset central in the European Community. Two of the founding treaties dealt primarily with energy issues, and the promotion of enhanced cooperation in this field (1951 Paris Treaty establishing the European Coal and Steal Community (ECSC) and 1957 Euratom Treaty). It therefore seems paradoxical that energy policy was for many years referred to the outskirts of EU policy making. The reason for this development shall probably be found in the fact that the second part of the 1957 Rome treaty – establishing the European Economic Community (EEC) – does not contain a single word on energy (Roggenkamp et.al 2007: 227). The EEC Treaty soon became the driving force in European integration, and it is still only in areas related hereto that exclusive competence has been given to the community. In connection to energy policy Roggenkamp (2007: 31) explicate that *"to date there are no areas of exclusive EC competence over energy matters".*

All other things aside, this would indicate that decision making powers in energy policy should be looked for at the national or interstate level. However, a number of provisions in the EC Treaty have led to initiatives in the energy field being addressed through the backdoor so to speak. Particularly rules laid out in the Single European Act (SEA) from 1986 considering the establishment of the internal market has been instrumental in this respect. The internal market provisions (primarily article 14 and article 95) were used by the Commission as the legal base for initiatives in the electricity and gas sector (Roggenkamp 2007: 228). In connection to the internal market, the rules on free movement have been deemed applicable to the energy sector by the European Court of Justice (ECJ) (Roggenkamp 2007: 234). Despite the "Europeanization" of energy policies, the legislative toolbox is, however, still some way from being complete. This has led to occasional disagreements on the correct legal base for community initiatives in the energy sector (e.g. OJ 2006 and OJ 2006a). Yet, that the EU has an increasing role in policy making in the sector seems clear, and following changes in the treaties and rulings of the ECJ, the Commission has consequently become central in this context.

4.1.2 *Role of National Interests*

It is however not all scholars who find the powers laid down in the treaty decisive. Within classic realist theory, the importance of the treaty would be if not null, then at least limited. The sheer notion that a member state would abide by international law, if it is not accompanied by real military threat is

unlikely. Drawing on this approach, yet significantly altering the premises, liberal intergovernmentalists would argue that the decisive factor in the formation of EU energy policies is the intensity to which the matter is dealt with in the different member states (Pollack 2000: 9). In other words, if member state A has a particular interest in the matter, and member state B will neither win nor lose significantly from a legislative proposal, chances are that the preferences of member state A will become predominant in the final text. Following this logic, the real power distribution will be determined by the relative power between the member states and to what extent a given legislative proposal will influence internal matters in the different member states. The framework laid down in the treaty, the position of the Commission and other institutionalised aspects will be of little importance in this regard.

Intergovernmental theory adds both interesting and valuable insights into the dynamics of decision making in the EU. The importance of national interests should definitely not be underestimated in any policy and given the strong national attachment of e.g. power companies, even less so in energy policies. An example of national interests taken into consideration can be found in article 175 of the treaty (TEC). Thus in paragraph 2(c) of this article it is stated that it requires a unanimous decision from the council to adopt: *"measures significantly affecting a Member State's choice between different energy sources and the general structure of its energy supply."* The connotation of this phrase signals a wish of member states to protect national interests and perhaps even national companies. It is a "get out of jail free" card so to speak.

When, nevertheless, I feel that the role of member states is at times exaggerated in intergovernmental theory, it is primarily based on the role of the ECJ. Within its own logic intergovernmental theory would refuse the possibility of member states abiding to ECJ rulings, if the state did not itself gain on either short or long term. However, since ECJ rulings are in fact abided to (see e.g. Haltern 2004: 180) and implemented into the administration of national laws, it seems that this institution does in fact dispose of real power in relation to sovereign states. Stringent defenders of intergovernmental theory would perhaps argue that this is due to the long term beneficiary aspect of the ECJ. This is however a problematic argument. Firstly, determining whether or not accepting a reprimand is done because it is beneficial will at times basically be impossible, and secondly – and most

important – the logic inherent in the argument makes it impossible to predict anything and therefore eventually makes the whole theory less useful. Thus, if a state stands to gain from a given directive it would be expected to implement this. On the other hand another directive may not be beneficial, but to avoid being subjected to an ECJ ruling the state chooses to implement this directive anyway. Basically we end up with a theory which provides little help in predetermining the cause of events. Rather it can be used – quite futile – to observe politics, take note of the outcome, and concluding that the result – whatever this is – was due to the benefits obtained by the member state.

4.1.3 The role of the Commission

Pointing to shortcomings in intergovernmental theory naturally does not imply that national interests are not important. Rather it suggests that there may be other actors in the field. As mentioned above, treaty revisions and ECJ rulings, have allowed for the Commission to play a stronger role in the field of energy policy. What then has the implications of this development been, and what should be expected in the future? Looking at the intentions declared by the Commission and the legislative proposals connected hereto, it is obvious that harmonisation and liberalisation also in this area is high on the agenda (see: e.g. the electricity directive 1996). Looking again at the Treaty it is pointed out that the role of the Commission is to: *"ensure the application of the Treaties, and of measures adopted by the institutions pursuant to them"* (Article 17 TEU). Given the basic goals of creating a common market and ensuring the four fundamental freedoms, it should not be surprising to see the Commission continuously working for liberalisation and harmonisation.

In doing so, the Commission's primary power is probably as the initiator and engineer of European legislation. Through strategies and legislative packages which will be addressed below, the Commission has played a crucial role in shaping the legislative framework, and perhaps even the discourse in which European energy policy is formed and decided. This is, however, not the only power attributed to the Community, which is relevant in the current context. Thus, aside from the legislative toolbox, at least one other crucial instrument springs to mind, when dealing with infrastructure – namely finance. Traditionally, infrastructure has been financed through national budgets, be it in the telecommunications sector, in transport, or as here in the area of energy transmission systems. In recent years this tendency has changed

somewhat as private investors have become more interested in the potential long term revenue of infrastructure, and crucial in the current context, with the introduction of the Trans European Networks (TENs) in the Maastricht Treaty (articles 154, 155 and 156). This strategy will be returned to in the analysis, but in short, while not administrating big amounts itself, it opens for the community co-financing in infrastructure projects. This has provided the Community with a new tool for influencing the course of energy policy.

As a side note it should be mentioned that the European Parliament has continuously been pushing for market liberalisations and transparency in the energy sector. While industry uses significant resources on lobbying the MEPs, this has not altered the general attitude of the EP. A plausible explanation could be found in the constant focus on consumer conditions and protection in the EP. Thus, as the only directly elected policy makers in the EU, it makes sense first and foremost to take care of the needs of potential voters. When I have decided not to pay particular attention to the European Parliament's role in the thesis, it comes down to the exploratory nature of the research object. As has been mentioned, the DESIRE project presents a relatively new challenge and also a somewhat unknown solution to this challenge. While the Commission is perhaps more than anything a policy entrepreneur, the European Parliament does not have the right to propose new legislation. The same is the case for the council, but as the council consists of ministers with executive powers in the member states, they do in fact on a national level act as political entrepreneurs.

4.1.4 External Actors

It is perhaps in acceptance of this electoral check on MEPs, that it is often argued that lobbying is most effectively done at an early stage of the legislative process – and preferably at Commission level (e.g. CEO 2007). With the amounts of money nested in the energy sector it is evident various actors in the energy market will be interested in affecting the policy makers. The influence of external actors, be it industrial organisations or NGOs has been the subject of much research. A fundamental problem in this regard is the difficulty of determining exactly when, how and with what effect interest representatives manage to alter the actual outcome of a given policy. Interestingly, the different actors cannot always be put into clearly demarcated boxes. For instance the owner of the Danish transmission grid "Energinet" is a semiautonomous agency under the ministry of Climate and Energy. This means that while it acts on the energy market it also serves as

a source of information to the Danish minister of Climate and Energy – which is of course a member of the council.

In the current research I have decided not to deal specifically with the role of interest representation. Due to the scope of the paper, the risk of blurring the focus of the study seems predominant, especially considering the difficult circumstances for gaining credible data. The role of external actors should however be taking into consideration when reading the concluding remarks of this paper.

4.1.5 Institutional inertia

A final element worth noting when exploring the power distribution in EU energy policy stems not from the actors involved, but from the structure surrounding the decision making. Drawing on the basic line of reasoning in historical institutionalism, it can be argued that the room for manoeuvre is to a large extent determined by previously made decisions. In the current context, one could argue that by delegating certain powers to the Commission and the ECJ, the member states have created institutions which at times make unfavourable decisions. Adding to this, institutions in this approach not only seek but have the potential of increasing their own power. This could help explain the significant contribution of the ECJ and the Commission.

Also sociological institutionalist scholars have argued that common interpretations and values provide not only a frame within which decisions are made, but also directly influence the outlook of these decisions. In more plain words, it could be argued that when decisions are made in the EU system we should look further than the sum of national preferences.

4.1.6 Drawing up the map

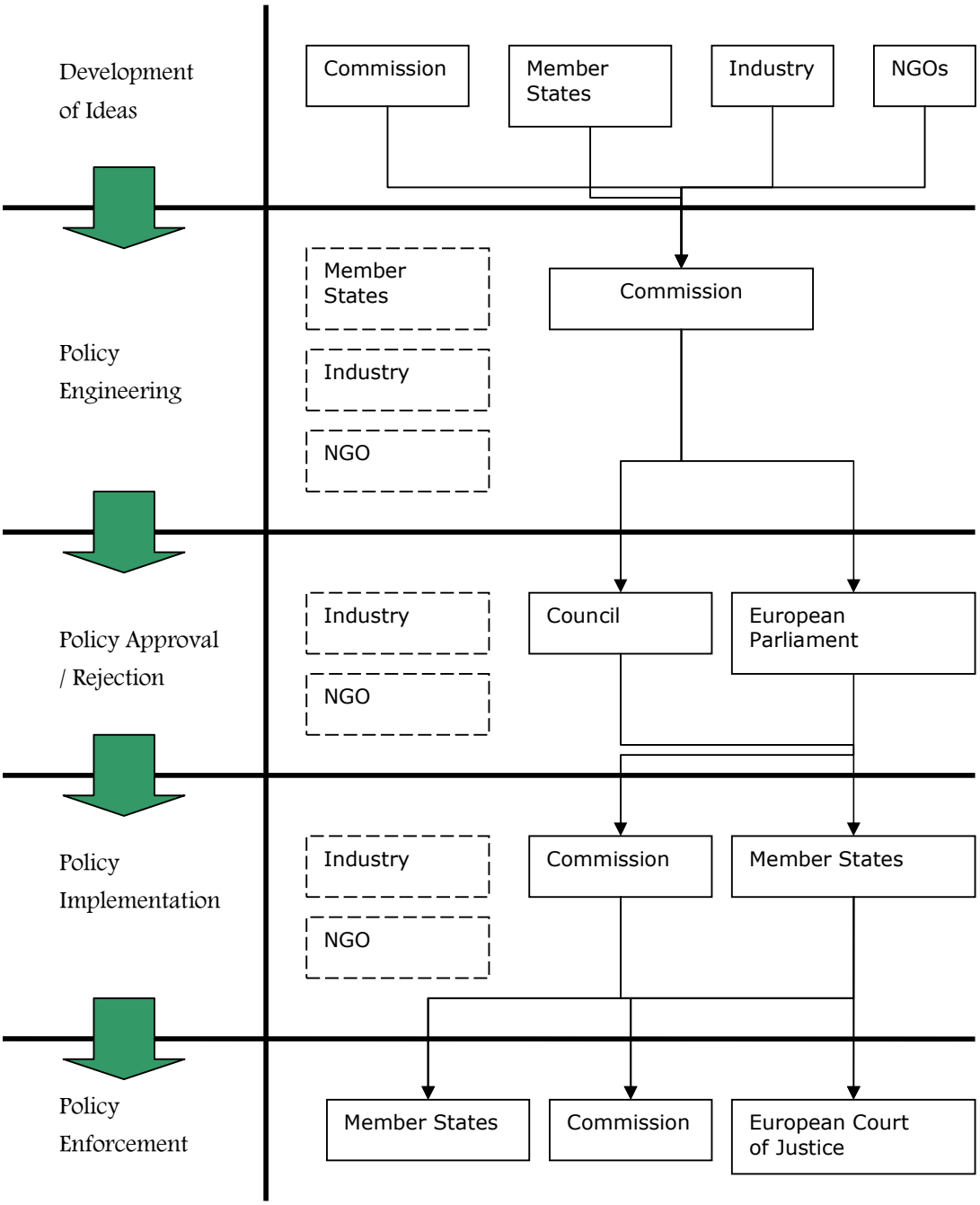
While the assessment above gives interesting insight concerning the actors and factors involved in the decision making process, it does not paint a particularly clear picture of the relative importance of these elements. While different theories each deliver plausible and applicable suggestions to how we should understand the policy process, individually they seldom manage to exhaust the possible cardinals of influence. Thus, each theory seem to aspire to holism, yet at the same time seek to simplify a system whose composition, actors and history are immensely complex.

On the other hand, a number of essential clarifying points can be drawn from the above. Firstly the notion presented by intergovernmentalists that the Commission has little impact on what parts of the legislative text eventually makes it through the eye of the needle, seems questionable. In fairness intergovernmental theory is not developed to the rather unique case of international cooperation in the EU. It is however, often used in relation to EU matters deeming it necessary to discuss in the current context. The position has faced increasing opposition following the both widening and deepening of EU integration, and not least as the powers of the Commission and the ECJ has been underlined. Also the increased executive powers of the Commission through the expanding use of comitology procedures[3] have enhanced shortcomings in this approach.

As outlined in the beginning of this chapter, the purpose was not to make any kind of exhaustive presentation of theories dealing with European integration. In stead I have focused on a key divide in the theoretical debate, namely that of relative power attributed to international institutions. It should be clear that while the member states are central in this respect, the Commission and the ECJ have also played a significant role in the development of EU energy policies, even when this did not follow the immediate interests of member states. Among the key tools available for the European institutions, and not least the Commission are the engineering of EU legislation, and allocation of financial means. Therefore, when conducting the analysis a significant focus will be laid on the role of the Commission, by addressing proposals laid forward by Berlaymont. To clarify the policy process the figure below illustrates the position of the different actors and how they are linked throughout the different policy phases (page 19).

The figure draws a simplified sketch of how a policy develops from the formation of an idea, over legislative approval to the final implementation and enforcement, and how different actors are involved in this process. While the figure is definitely open for discussion, I have tried to show how the role of different actors change during the process, and by inserting dotted boxes, I have sought to account for actors that are outside formal decision making in the different stages, yet may still affect the policy outcome. Concerning the first phase, all four boxes have been included, as naturally no formalised rules for the development of policy ideas exist.

[3] EU regulation enacted as implementation measures under the executive duties of the Commission. This is done when the Council delegates executive powers to the Commission.


Development of Ideas
Commission
Member States
Industry
NGOs
Policy Engineering
Member States
Industry
NGO
Commission
Policy Approval / Rejection
Industry
NGO
Council
European Parliament
Policy Implementation
Industry
NGO
Commission
Member States
Policy Enforcement
Member States
Commission
European Court of Justice

In the analysis not all factors will be involved. Above I have sought to account for the choices made in this respect. Referring to the figure, my analysis will primarily deal with phase 2 (policy engineering) and to some extent to phase 3 (policy approval / rejection). Furthermore, in phase 3, I will mainly focus on the role of the council. This does not mean that e.g. lobbyists from industry organisations are unimportant. However in the current context their influence will not be addressed.

5. Method

Before addressing specifically how I will conduct the analysis, and ultimately by which means I intend to answer the problem formulation, a few comments on the term method itself deserves mentioning. It may seem uncalled for to discuss the definition of what seems a rather basic element in any paper and it certainly involves the risk of overcomplicating things that are not directly concerned with the focus of the thesis. However, it is my experience that the task of choosing how to conduct an analysis and considerations linked hereto is often given too little and to vague attention in political science and international relations, especially when compared to other branches within social science. To compensate for this, it seems reasonable to start with the term method itself, and develop a clear definition of what it entails and what it does not entail.

A common confusion stems from the mix up of method and data collection. Data collection in this context refers to the tools being used to acquire empirical data, i.e. a grounded choice made by the researcher as to how to get information about the research object, usable for answering the problem formulation. In social sciences this is often done by interviews, questionnaires or observation. While such methods fit very well into areas strongly attached to social action – such as sociology and anthropology - I do not necessarily find them particularly suited for research in political science and the study of international relations. A more elaborate discussion of this issue will be addressed in the method chapter below.

Returning to the definition of method, it is essential that it comprises more than the sheer technique used for collecting data. Rather method should be seen as a general approach to conducting the research that ultimately sets the limits for what we can expect to learn from the study. In more plain words, the method chapter should present a strategy describing how the research will be conducted, present how the data to perform the analysis will be acquired, and finally how the use of theory will be applied in the study. In the following three chapters I will perform this exercise.

5.1 Research Strategy

In the current thesis the research object has been described broadly above as the energy policy of the European Union. More precisely the goal is to obtain information about the circumstances for addressing the challenges concerning the future composition of the European energy infrastructure as presented in the DESIRE project. This does not mean that policies will be evaluated in relation to whether or not they mention DESIRE specifically – chances are that probably they do not. Rather it is the objective to evaluate whether current legislation and strategies are potentially supportive or detrimental in relation to meeting these challenges.

How do we then determine whether or not the existing EU policies are beneficial to meeting the challenges pointed to in DESIRE? This is by no means a simple task, and because the thesis moves around in a highly complex myriad of actors, interests and interpretive differences it is not possible to give a simple answer either. It is assumed in the DESIRE project that the share of wind energy will increase. As this is also in line with current EU ambitions, it seems reasonable to focus on the development of CHPs and the infrastructure linking wind parks and CHPs. As will be returned to in the analysis, at least three circumstances can be identified as particularly urgent in this context:

1. **Promoting CHP at a European level**
2. **Promoting investment in infrastructure connected to CHPs**
3. **Achieving a liberalised energy sector**

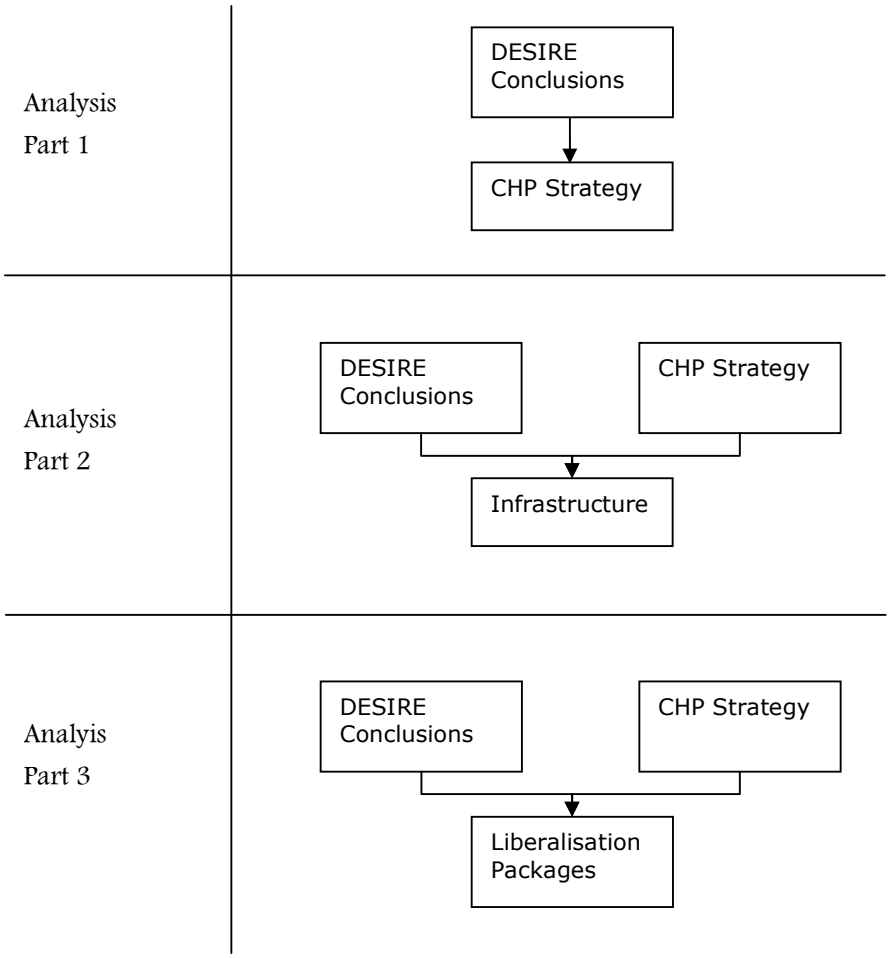
The three initiatives are rather different in both focus and intention. Choosing the two first initiatives is directly inspired by the ambitions of DESIRE, whereas number three concerns a more broad EU ambition, dealing with central aspects of the future energy policy. One could argue that to meet the DESIRE project ambitions only requirements related to 1 and 2 are necessary. On the other hand the policy strategy towards a liberalised energy sector will to a large extent determine future market conditions in the sector, and therefore influence on the potential for achieving the ambitions set out in DESIRE.

The three policy areas should however, not be seen as equals. The promotion of a general CHP strategy will in the analysis be considered as

both the most basic requirement for progress in the DESIRE field, yet also as a source of information when evaluating the coherence of the community's energy policy. Thus, in the Commission's motivation for pursuing CHP a number of interesting features are attributed hereto, and comparing the approach and arguments of this strategy to other policies in the area seem both interesting and necessary. Therefore, the DESIRE conclusions will be used when evaluating the CHP strategy, whereas both DESIRE and the CHP strategy will be drawn upon when analysing infrastructure initiatives and the liberalisation of the energy market.

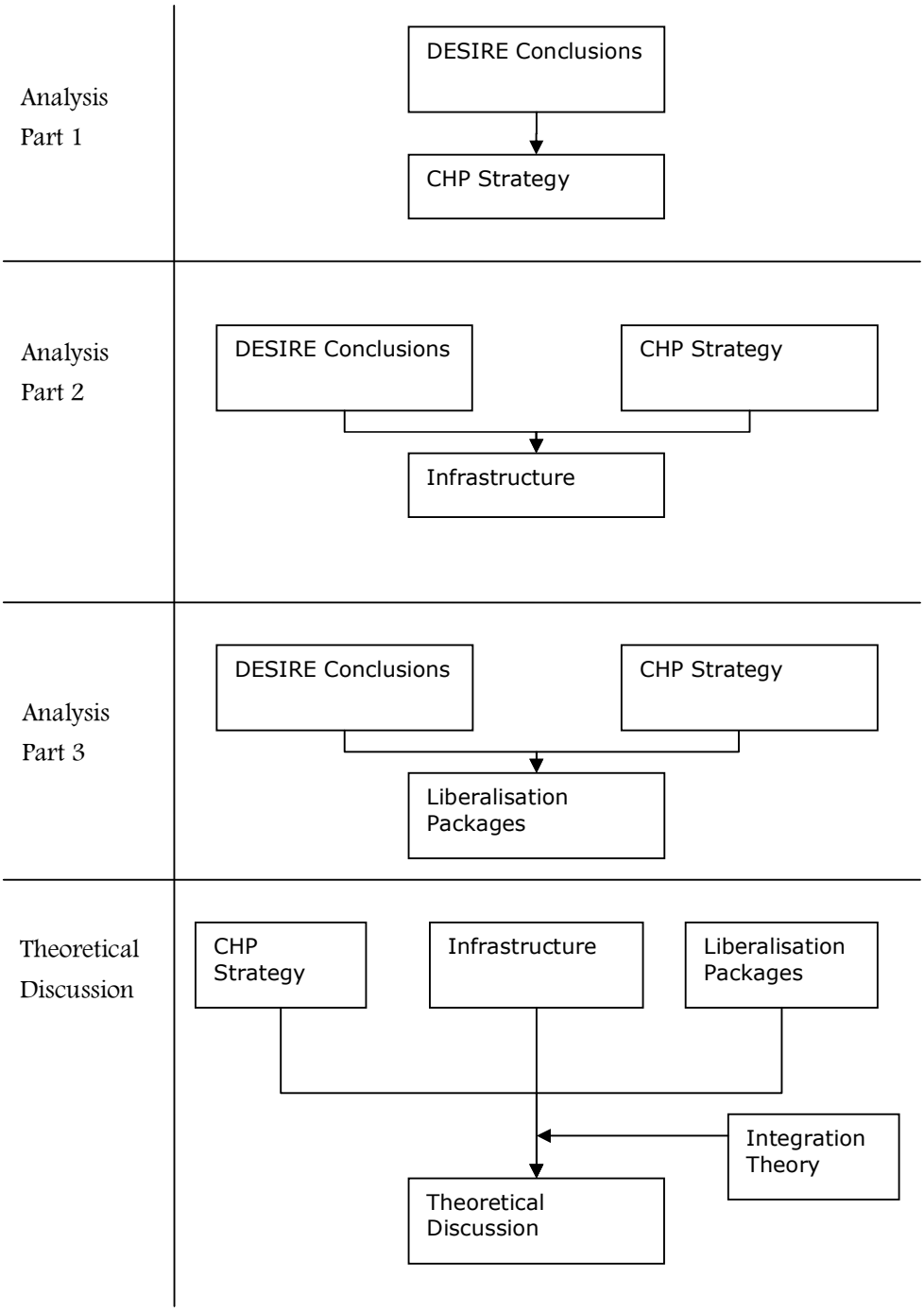
Given the open and wide-ranging approach of the thesis, the conclusions to the analysis will not be final and absolute, yet they will entail interesting aspects to the coherence of EU's energy and climate change policy, and to how well these are equipped to meet some of the challenges resulting from a change in the composition of energy production.

The evaluation of the EU policies could be summarised as such:



While evaluating the current policy outlook in itself presents interesting insights, it also calls for deliberations on the reasons behind this outlook. Therefore, by contextualising the discussion with the theoretical schools dealing with European integration, a theoretical discussion will be conducted to explore how the different theoretical approaches may help in understanding the outlook of the policies evaluated in the analysis. In doing so, the findings of the three policy areas – CHP strategy, infrastructure and the liberalisation packages, will be discussed by applying relevant contemporary integration theory.

This leads to the final design, within which the analysis and the theoretical discussion will be conducted:


Analysis Part 1
DESIRE Conclusions
CHP Strategy
Analysis Part 2
DESIRE Conclusions
CHP Strategy
Infrastructure
Analysis Part 3
DESIRE Conclusions
CHP Strategy
Liberalisation Packages
Theoretical Discussion
CHP Strategy
Infrastructure
Liberalisation Packages
Integration Theory
Theoretical Discussion

5.2 Collection of data

While the distinction between what is being analysed and how the research data is acquired is central, it should also be noted that these are of course closely connected. Thus, how the research data is acquired draws the frame of what we may expect to learn. Also, what is being studied should be pivotal in deciding how the collection of data will be carried out.

Above I have sought to account for what the thesis focus will be, and what factors will be drawn upon to answer the research question. As mentioned, the community policies will be evaluated by identifying potential barriers in concrete policy initiatives. Furthermore, the background for the results of this examination will be explored, and the theoretical implications of these findings will be discussed.

Yet, in order for these boxes and lines to come together we need to add some flesh to the bone structure of the thesis. This brings us to the second part of the distinction mentioned above, namely explaining how and from where data will be collected, and accounting for the choices made in this context. As already mentioned above, I find that traditional approaches in social sciences, such as interviews and questionnaires are not necessarily well suited for studies of international relations. Thus, in international relations the elements that influence decisions are often systems, structures or institutions rather than individuals or socially defined groups. More specifically, it may be useful to ask a person why he or she smokes. Setting all circumstances related to subconscious behaviour aside, he or she could probably give a fairly reasoned and plausible explanation. However, asking a politician why he or she voted for the second energy liberalisation package will, in my opinion, not provide a strong proof of why 15 member states at the time agreed upon the deal, why the Commission decided to initiate the process, why the European Court of Justice (ECJ) later opened proceedings against a number of member states for not implementing the directive etc.

How will it then be determined whether obstacles for achieving the DESIRE ambitions exist? There may be several ways of determining this. For instance an economic calculus may be set up to predetermine a certain set of circumstances necessary to make the elements of DESIRE achievable. Such an approach, while interesting, lies outside of the scope of this paper, as does a more juridical approach determining which type of legislative acts

may best accommodate the desirable provisions. Instead the analyses will take its starting point somewhere in between these to approaches.

By scrutinizing official community documents in the field central articles in relevant legislation and community initiatives will be identified. These will then be discussed regarding effect on e.g. the market conditions for CHPs and the connecting of wind parks and CHPs. In other words the conclusions of DESIRE will not be drawn into question. Setting into context this assumption with general energy ambitions of the EU, should accommodate an evaluation of both the coherence of community policies in the area, and of the potential for the realisation of the ambitions set out in DESIRE.

As has previously been mentioned, the DESIRE project is relatively new, and deals with a problem that does not yet have a central position in the international energy debate. It therefore seems meaningless to limit the research to hard core legislative texts, as the result would inevitably be that little or no initiatives have been taken. Instead it will be relevant to involve initiatives, which may not directly deal with or mention the DESIRE project, yet could still be relevant in relation to the challenges presented in the DESIRE project.

Limiting intervention to only involve legislation would further entail the risk of legislative proposals and preparatory work, which could become central in the future. An example of this would be the third energy package which has not yet been adopted, but among other things aims at reforming the rules of ownership of transmissions networks.

On a more general note, the method of document research naturally has both strengths and weaknesses, which should be kept in mind when reading the thesis. Thus, while community papers are very much a primary source, they have the fallibility of being officially accessible. In the spirit of good cooperation, this entails that the background for the outcome is generally not visible in the texts. In other words, the external influence rendered on the drafting of the text, will not be visible for the researcher. This, however, is primarily a problem when seeking explanations behind the policy outcome. In the current analysis, though, the primary ambition is to identify and discuss obstacles for obtaining the DESIRE ambitions. Less so to explore why these obstacles exist. Instead this exercise will be done within the theoretical discussion. Furthermore, a number of positive elements can be attributed to

document research. Firstly, community documents are primary texts, making them more readily accessible for interpretive research. Secondly, document research is suitable for analysing the continuity in both sectoral policies, and in the coherence of cross sectoral policies, and thirdly documents are produced independently from the researcher, excluding the risk of data being the result of lip service being paid by e.g. respondents of a questionnaire (Sørensen & Torfing 2005: 184).

With this in mind it seems appropriate to adopt an open approach to the term community initiatives. Initiatives aimed at optimising energy infrastructure and making the energy market more efficient in general seems relevant places to look for initiatives that influence the potential for addressing the DESIRE challenges. Therefore, the analysis will take its starting point in the three policy areas above, and discuss whether they are profitable or detrimental in relation to the DESIRE challenges. A concrete mentioning of these challenges will not be a precondition.

5.3 Use of Theory

As it will be noted the use of theory has not played a major role in the thesis up to this point. This is a clear and well considered choice which leads back to the argument in the beginning of chapter three. As stated, it is my experience that reflections on how to conduct scientific research are often given too little attention in political science and international relations. This particularly shows itself in the application of theory. Often projects and thesis work is initiated with long, general presentations of various theoretical approaches, which may or may not have relevance for the research being conducted. In the current thesis, this may had been done by presenting and discussing strengths and weaknesses of the different integration theories traditionally used to explain EU decision making.

However, theory seems to be of little usage when it is only used as such – as the subject of theoretical premises and discussions of differences and similarities between different theories. Rather it should be used as an explanatory factor in context with "real" politics, in context with the detail negotiations. How then should this be accomplished?

By applying theory after the analysis, it becomes relevant to look at how we would traditionally explain the existence of barriers in the current research. Reasons for the existence of alleviations and obstacles in addressing the

challenges related to infrastructure investment and management may be many and diverse. Yet, by applying traditional theories of integration, it will be discussed whether the reasons behind the findings of the analysis can be explained through traditional theories of integration. Hereby, the traditional discussion of the importance of international institutions, which was central in chapter 4 (theoretical approach) will be revisited, and to some extent tested on the grounds of the findings in the current thesis.

It should be noted here, that performing this exercise does not in itself provide documentation for why member states, Commission as well as other actors have acted in a specific manner. Although a profound analysis of different member states attitude towards the ambitions of DESIRE could provide interesting information, this will not be done in the analysis. However, by applying theory after the analysis and setting the findings into a broader context, does add to the understanding of certain dynamics in the policy process, which are not readily visible.

Although the explanatory power of the selected integration theories, are not thoroughly tested against empirical evidence, the exercise remains highly relevant. Thus, identifying when and in which type of policies e.g. member states have been particular influential, will add to the understanding of the power distribution within different phases of the decision making process. In other words, by applying theory it becomes possible to suggest why barriers exist.

As such the theoretical discussion will have a more explorative character. Consequently the DESIRE project will play a less significant role, as attention will here be turned to what dynamics in the EU decision making process may affect the choices made within the energy policy more generally.

6. Analysis

6.1 Recap of DESIRE findings

The main problems identified and the proposals to solve these were the following:

1) The investment risk in CHPs is very high due to fluctuating energy prices and oligopolistic behaviour of incumbent market actors.

2) Electricity prices on the spot market do not reflect the external environmental costs.

3) Taxation systems hinder electricity produced at CHPs from entering the heat market.

4) Price transparency for rental of transmission networks is not sufficient.

5) Initiatives to develop district heating infrastructures are not sufficient.

Solutions:

1) To limit the investment risk in CHPs a price compensation system is suggested, which secures that prices on electricity produced at CHPs at least equals the long run marginal costs at a new large coal or natural gas-fired power plant.

2) To include external environmental costs, a CO2 regulation system with stable and sufficiently high prices could be established.

3) A change of the taxation system would make it economically attractive to produce electricity at CHPs and sell it to pump-based heat production, when there is a surplus of electricity from wind turbines.

4) Vertical unbundling between power companies and the owners of the transmission grid system should be accomplished throughout Europe.

5) A general plan to develop district heating infrastructure in Europe should be pursued.

While all of the above add interesting perspectives to future challenges in the energy sector and provide viable solutions to these challenges, a few issues needs to be raised concerning the prioritisation in the analysis. As mentioned in the method chapter I will not limit the analysis to the specific

challenges and solutions raised by DESIRE. Rather these will serve as an inspiration to discussing the underlying argument in DESIRE, namely the need for infrastructure reform. Also in the method chapter I mentioned three circumstances acquiring particular attention in the field of energy infrastructure:

1) **Promoting CHP at a European level**
2) **Promoting investment in infrastructure connected to CHPs**
3) **Achieving a liberalised energy sector**

Though these are not identical with the challenges mentioned in DESIRE they do to some extent relate to challenges number 1, 4 and 5. However, I feel that the challenges presented above provide for at more open approach to the policies already in process in the sector. Thus, for all three challenges above concrete European directives and strategies are available, which allows for a thorough scrutiny of current EU initiatives. A concrete assessment of these initiatives will be conducted below.

While considerations concerning energy taxes and a system to internalising external environmental costs could provide interesting insights they will not be dealt with in the analysis. A basic reason behind this is that there seems to be a divide between challenges relating to basic structural needs, and needs related to economically and environmentally aspects. Thus, when DESIRE argues for the implementation of a taxation system favouring the production of heat at CHPs, this does not directly concern itself with the funding of infrastructure. The allocation of this funding may very well be grounded on what is economically viable, and a potentially unfair taxation system is therefore not irrelevant. Yet, while energy taxation has come within reach of EU policy makers, the notion of EU taxes still raises eyebrows in most member states. As I in the current thesis seek to focus on initiatives more directly related to infrastructure policies, it seems that an assessment and discussion of a particular taxation system bears the risk of blurring this focus somewhat.

The issue of CO2 regulation as well as the creation of a particular taxation scheme could be characterized as being market correcting. This bears a difference from at least challenge number 1 and 2 presented above, which in their nature has a more market building character. CO2 regulation is

definitely a hot topic considering both the provisions of the Kyoto Protocol, and the ongoing development of a European Emissions Trading Scheme (ETS) for greenhouse gases (GHG). While internalising external costs will be touched upon in the analysis it will not play a central part, per se. Thus, GHG regulation is typically considered as the basic provision for any promotion of sustainable energy sources. Thus, in the 2008 package on Climate Change, the development of a European ETS was touted as the imperative tool to achieving the 2020 goals. Advantages gained from this strategy in relation to energy infrastructure and CHPs are expected, but they are not as precisely directed towards them.

One may ask why then achieving a liberalised energy market is essential for the current analysis. After all, as is the case for the previous examples this is not directly meant for investment in infrastructure. However, in the ambition of liberalising the European energy markets, the separation of transmission and distribution management from incumbent energy producers has played a central role. The move from single national owners of the transmission grids to an open access infrastructure constitutes a very fundamental change in the possible compositions of the overall energy mix. Therefore, while this initiative also has a market correcting approach, I consider it to be vital for the possibility of meeting the challenges of DESIRE, deeming it necessary to include it in the current analysis. Also the liberalisation of European energy markets has been absolutely central in all European energy policies within the last 15-20 years, so leaving it out of the equation would seem careless.

In summary, the three challenges presented above will be at the core of the analysis. In this connection I will focus on the central initiatives – both legislative and non-legislative – in the respective areas. Regarding the DESIRE project this will still be referred to as a source for inspiration and information, yet as already mentioned, it will not be considered as a "fact book" from which to determine whether a specific initiative is right or wrong.

6.2 Promoting CHP at a European level

Within the promotion of CHP lie inevitably considerations concerning prioritisations of infrastructure. Thus, pursuing establishment of further CHP plants naturally entails establishment of infrastructure capable of making best possible use of the composition of energy produced at the plant. That promoting CHP is an ambition of the EU will be accounted for below.

6.2.1 *Community strategy on CHP*

As early as 1977 the council invited member states to establish advisory bodies that among other things should identify and eliminate barriers to the development of CHPs (Council 1977: article 1). This recommendation was reinforced in 1988, when both the beneficial aspects of CHP regarding efficiency and environment were underlined, and a recommendation to remove market entry obstacles for CHPs was given (Council 1988: articles 1 & 3). In 1992 the Commission responded to this recommendation by concluding that one of the main barriers for CHP development was that the internal market in electricity had still not been accomplished (Commission 1992:12).

It was, however, not until 1995 that the Commission in effect initiated the pursuit of an actual EU policy in the field. This was done within the white paper on Energy, in which the Commission committed itself to producing a strategy to promote cogeneration and district heating (Commission 1995:116). As a result of this, the Commission in 1997 issued a strategy for the use of CHP aiming at doubling the share of electricity derived from CHP to 18% in 2010. In the Commission's own description of the strategy it is underlined that *"CHP production should be promoted as a measure protecting the environment and reducing energy dependence on satisfactory economic terms"* (Commission 1997:4).

Generally the strategy focuses on the positive implications in relation to both the environment and energy security, thus touting two elements which still today are considered at the very core of the challenges facing the EU in the energy sector. Also aspects related to energy efficiency in the co-generation of heat and power is central in the strategy. Concerning barriers to CHP development, the communication identifies three different types. Firstly, economic barriers, which include mainly the low prices of remuneration for cogenerated electricity exports and contrarily high prices when CHPs buy grid electricity in cases of unavailability of the CHP plant. Secondly, regulatory barriers including e.g. planning regulations and high costs for obtaining operating licenses. Thirdly, institutional barriers including the possibility of CHP plants being connected to the electricity network. In response of these barriers the communication calls on concrete national strategies as the overriding tool to overcome the challenges. This included setting specific targets and cooperation between member states and the

Commission. It is addressed that the difference in CHP share of total electricity generation varies from 1% (Ireland) to 40% (Netherlands). Besides the need for national strategies the communication presents a number of initiatives directed at promoting cogeneration at the European level. Among these is that an increased share of EU funding is directed towards CHP development. In this connection the JOULE-THERMIE programme is mentioned in relation to technological research and development and SAVE II and ALTENER is called upon to investigate barriers to CHP in the liberalised energy market. Finally a mechanism to monitor the implications of the expected lower energy prices resulting from the liberalisation of energy markets on CHP competitiveness is referred to (Commission 1997:15).

In terms of setting specific goals the Commission underlined the heterogeneous outlook of CHP development among member states, and perhaps therefore did not propose any specific national targets. Instead a general target of reaching 18% of total electricity production in 2010 was proposed, yet in the resolution referring to this strategy, the council somewhat watered out the weight of this target by stating that: "*The indicative target to double the overall share of combined heat and power in the Community as a whole by the year 2010, as mentioned in the Commission's communication, could give useful guidance for increased efforts at all levels"* (Council 1997: article 6). In other words, despite the ambition of the Commission, no real commitment was given by member states.

In the resolution the Council encourages the Commission to continue its work in the area, and in 2002, the Commission presented a legislative proposal on *the promotion of cogeneration based on a useful heat demand in the internal energy market* (Commission 2002). Behind this rather cryptic title lies a slightly altered approach to co-generation than was the case for the 1997 text. Thus, the Commission now underlines that while co-generation has preferable implications it should not be considered as a goal in itself. In this respect the Commission points to the fact that CHP should only be pursued where there is a real need for heat (OJ 2004: article 7). The directive proposal repeats the previously announced claim that the main responsibility for achieving increased use of CHP technology lies with the member states. In this respect the barriers identified in the 1997 communication are reiterated. In line with this reasoning the proposal calls

for a harmonised approach to a number of technical provisions regarding public support for development of CHP plants. Therefore criteria are set up, stating only the first 50 MW produced at a given plant would qualify for funding, and only plants that operate on the basis of an economically justified heat demand should receive public support. To determine whether or not a plant is "economically justified" a common reference frame for such calculations is set up. For new cogeneration plants energy savings of at least 10% are required, and for existing plants minimum 5% energy savings is necessary. Regarding support schemes it is further required that member states analyse the potential for increasing the share of cogenerated electricity and finally, that these schemes include a phasing out clause. The latter is due to expected internalisation of external costs, which will remove the justification for public support. Finally the proposal sets up provisions guaranteeing that electricity produced at cogeneration plants will be transmitted and distributed on the grid system (Commission 2002:15).

The final directive was adopted by the Council and Parliament early in 2004 and to a large extent followed the proposal laid out by the Commission. Notably, though, the threshold of 50 MW production was taken out of the final text, due to opposition in both the Parliament and the council. The Commission's argument for including the threshold was that large cogeneration plants should not compete with large scale traditional electricity producers on the basis of public support schemes. On the other side the Parliament argued that this fear was basically exaggerated, and the Council argued that the Commission was interfering with the autonomous right of member states to decide what projects should and should not receive public funding (European Parliament 2003:14/74).

6.2.2 Impact on CHP and infrastructure reform

The role of CHPs in the balancing out of surplus energy production as pointed to in the DESIRE project is not mentioned in any of the above mentioned Commission papers. As has previously been stated, this does not make the case less interesting. Nevertheless, within the current EU policy, initiatives such as the CHP strategy are vital for the further development of the DESIRE recommendations. Thus, if CHPs in the future are to have a positive effect on the utilisation of wind energy, it is imperative that a clear strategy exists in the field, and that this is orchestrated in a manner which make CHPs competitive in the market. That the strategy does not concern

itself specifically with the issues raised in DESIRE is less important in this respect.

Looking first at the target of achieving an 18 % share of cogenerated power in 2010, the outlook for this objective does not look particularly good. In 2006 the percentage for EU 27 was 10.9 and for EU 15 10.1% (up from 9% in 1994) (Eurostat 2008). Though this constitutes a small increase the trend is towards stagnation at around 11% and thereby far from reaching the goal of 18% by 2010. While this certainly has problematic connotations for the overall ambition of promoting CHP, it could perhaps be argued that it is not fatal for the prospects of CHPs playing a role in balancing out fluctuating power flows from renewable energy sources. On the long haul, a significant number of strategically placed CHP plants will be necessary, yet as this technology is still in its very early age, it seems that an insufficient number of CHP plants is not among the most pressing problems. Contrary, it would be relevant to look at how CHPs are placed and how the planning of new capacity is administrated according to placement. Thus, for the DESIRE challenges to be met a general plan aimed at situating CHP plants in areas with potential for establishing renewable energy production – e.g. windy areas or south facing slopes ideal for solar energy – could be an areas worth of further research. Unfortunately, a comprehensive account of CHP placements do not exist, and in terms of planning such factors are understandably not yet taken into consideration. However, doing so in future planning scenarios would seem conducive within the context of this paper.

The call for national strategies mentioned in both the 1997 and 2002 texts seem both relevant and reasonable. A major problem in this connection, though, is the enforcement of such a request. Concretely, the Commission asked of member states to analyse the potential for increasing the share of electricity generated at CHP plants. At the same time though, the Commission acknowledges the different energy set ups in member states, and underlines that CHP should not be seen as a self serving target, underlining that only when a "real" heat demand exists, should CHP capacity be pursued. In late 2008, four years after the adoption of the directive, 11 member states had responded to the request of reporting on the potential for increasing CHP market shares. Concluding on these reports the Commission stated that: "*The existing reports do not give much clear information or figures that can be meaningfully compared. It is therefore difficult to have a complete overview of the cogeneration potential in the*

whole of the EU" (Commission 2008b:6). The Commission conclusion on these rather differing reports, is not exactly hard-line, in that it is stated that the potential for CHPs are still big, and that member states need to pay attention to such policies (Commission 2008b:6). Whether this process of exploring the potential for increased capacity has benefited the case of meeting the challenges presented in DESIRE is difficult to decide. However, the criteria set up for measuring this potential is relevant for discussion, in particular when it is related to the points raised above.

Thus, assuming that placing CHPs near wind parks is viable, it seems clear that the guidelines used to determine whether a justifiable heat demand exists, should be reconsidered. It should be obvious that placing a CHP plant in a deserted wind park does not serve much purpose. Yet adopting an integrated approach, where both economic feasibility and the potentially higher share of renewable energy production are taken into consideration, seems advisable. In this relation both environmental criteria and the reference mark for heat demand should be open for discussion. Irrespective of whether planning new capacity in relation to geographical placement is feasible, it remains that the potential benefits presented by DESIRE changes the basis on which economic calculations in the field are made. Ultimately, by producing reports on the prospect for further CHP development on the basis done in this example could hamper the possibility of meeting the challenges and exploiting the opportunities as described in DESIRE.

Finally, a few remarks on the redistribution of research funding as mentioned in the 1997 strategy deserves mentioning. The two programmes SAVE II and ALTENER designed to identify barriers to market entry were terminated in 2002, and replaced by the programme "Intelligent Energy." In the period 2003 – 2006, 9 research projects relating to cogeneration were initiated, including a project establishing a forum for monitoring national political and legislative measures in the field of energy efficiency. Determining the impact of such projects is of course a questionable task, yet out of the total of 354 projects done in the area it does not seem that the issue of cogeneration is at the top of the agenda. Particularly as none of the 9 research projects were directly focused on market entry barriers or even on the promotion of CHPs in general.

6.2.3 Concluding remarks

It is clear that significant progress has been made in policy development concerning CHP. From consisting of a loosely attached group of national

experts, a real European legislative act is now being implemented in member states. Also it is a declared goal of the Commission to promote the use of cogenerated power, although this aim has been limited to instances where a real heat demand is present. The pursuit of cogeneration has not lead to a significant growth in overall market shares though. Whether this is problematic in relation to meeting the DESIRE challenges is uncertain, yet to achieve full utilisation of this approach, a strategy designed to place CHP plants near sites suited for renewable energy production seem desirable. In the 2004 directive, the Commission asked member states to report on the potential for increasing CHP market shares. The basis of these reports was naturally done without taking into consideration the beneficial aspects of CHP, pointed to in DESIRE. If these reports are to become instructive for future planning, this could be problematic. Finally EU research funding seems not to be sufficiently directed at problems related to the cogeneration sector.

6.3 Investment in infrastructure connected to CHPs

In the following, focus will be turned to the investments in energy infrastructure necessary to facilitate the beneficial aspects between wind power CHPs and consumers described in the DESIRE project. The energy infrastructure in Europe is closely fitted to the traditional composition of energy production entailing national monopolistic energy producers and big centralised power plants. This build up seems both natural and efficient. Yet within the frame of this paper, and thus assuming the findings of the DESIRE project to be viable, this approach to developing infrastructure should be reconsidered. This is not to say, that traditional energy infrastructure should be abolished or even down graded, but an alternative or rather supplemental strategy seems vital to meet the demands of the future energy production mix.

In addressing this matter I will primarily focus on the Community's program directed at energy infrastructure funding and development, namely the Trans European Energy Networks (TEN-E). Again, this will not address which initiatives have been taken to accommodate the DESIRE conclusions, but rather look at the main policy in the infrastructure area, and determine how it corresponds to the recommendations of the DESIRE project and the CHP strategy.

6.3.1 *TEN-E Programme*

The main EU programme concerning infrastructure development is the Trans European Energy Networks (TEN-E). The TEN-E was created by articles 154-156 of the Maastricht Treaty. Together with initiatives designed to create Trans European networks in transport (TEN-T) and telecommunications (eTEN), TEN-E was established to secure and promote the functions of the European internal market. In 1994 a summit was held in Essen, Germany, where a number of priority projects for Trans European transport and energy networks were agreed upon. All in all 10 projects relating to energy infrastructure were given priority, seven of which dealt with cross boarder interconnections. Another two were domestic natural gas networks and one was designed to establish electrical interconnectors between Danish islands (Council 1994: annex 1). This prioritisation falls well in line with the guidelines set up in the treaty which states that: *"action by the Community shall aim at promoting the interconnection and inter-operability of national networks as well as access to such networks. It shall take account in particular of the need to link island, landlocked and peripheral regions with the central regions of the Community" (TEC art. 154).*

In the actual prioritisation of projects within the TEN-E, a decision from the Council and the Parliament sets up specific guidelines – most recently done in 2006 (OJ 2006). In this decision the scope is defined as concerning high voltage lines and connected equipment used for interregional or international transmission. In the execution of this decision a number of projects are identified as being of common interest and / or of European interest. With the ambition of ensuring a common European energy market, obtaining security of supply and aiding the development of renewable energy production, these priorities are consequently in line with the "European approach" in supporting cross boarder linkages and interconnectors.

In 2001 the Commission issued a communication on European energy infrastructure aimed at identifying the main challenges relating to infrastructure and outlining the measures necessary to solve these (Commission 2001a). In line with the general provisions of the TEN-E programme the communication deals almost exclusively with cross boarder connections and specifically interconnection capacity. However, issues of decentralised electricity generation and distributed generation are in fact touched upon briefly, and the necessity to further explore the potential in these technologies is underlined (Ibid: 17). Further, in 2006 a Commission

study pointed to the potential beneficial effects of CHP plants in relation to optimal utilisation of the grid system (IEE 2006:7). The guidelines of the TEN-E programme were most recently updated via a Parliament and Council decision from 2006 (OJ 2006). Here CHP and decentralised energy generation is however not mentioned. In this newest document the number of priority projects in the field of energy has risen to 16 of which 9 are related to electricity. All 9 electricity projects deal with cross boarder linkages.

It is essential to understand that while the TEN-E guidelines set up priority projects and commit financial means to support the execution of these projects, it is left to member states both to negotiate the more specific terms, and allocate the vast majority of the funding. In fact, the TEN-E funds themselves are mainly designed to finance feasibility studies, whereas the Community structural funds may allocate funds to the actual construction of the projects – again only if projects fall within the guidelines of the TEN-E and only as a supplemental funding to the commitments of member states (Council 2006:2). Looking at the actual allocations of the TEN-E funds it is therefore not surprising that they follow the guidelines and are to a large percentage distributed among projects that are of trans national nature and seek to accommodate shortages in the existing infrastructure set-up.

6.3.2 Impact on CHP and Infrastructure reform

It seems evident that cross boarder investments in energy infrastructure has been insufficient, and the TEN-E could be beneficial in this regard. Yet, at the same time, looking both at the concrete financial commitment and the symbolic signal attached hereto, it is clear that the TEN-E at the same time promotes investment in traditional types of infrastructure designed to the traditional production of energy. This is problematic in relation to the preferable attributes of CHPs pointed to in DESIRE, but paradoxically it is also problematic in relation to the problems that TEN-E is designed to accommodate. Thus, by producing and distributing energy locally via CHP, and using CHP to balance out production in peak periods, the pressure on cross-boarder interconnectors should presumably become smaller, and additionally increase the security of supply across the Community.

As the name indicates the program is targeted towards large cross boarder projects, which would normally not include the scope of CHPs. In article 7 of the TEN-E guidelines three criteria are underlined, which priority projects

must meet. Interestingly, though, all three of these seem to be compatible with the promotion of CHP. 1) *Projects should have a significant impact on the competitive operation of the internal market*. By enhancing the role of CHPs these will become a competitor to the incumbent power producers, and by adopting the approach presented in DESIRE, wind energy will furthermore become more energy efficient and thereby more competitive. 2) *Projects should strengthen the security of supply*. CHPs can themselves not guarantee security of supply, but just as large scale power producers work as backup for CHPs, so can CHPs act as an alternative in the case of malfunctioning in the incumbent producers. Including DESIRE, the efficient use of wind power should make dependency on fossil fuels smaller. 3) *Projects should result in an increase in the use of renewable energies*. Increasing the efficient usage of electricity produced from wind as envisaged in DESIRE, should do exactly this. And in fact the EU system at least used to agree. As mentioned the Commission in the 1997 strategy backed a Council resolution stating that CHP production has the ability of *"protecting the environment and reducing energy dependence on satisfactory economic terms"* (Commission 1997:4).

Interestingly, a notion of wind energy is mentioned in three of the projects in the 2006 TEN-E guidelines. Thus, the purpose of projects in UK/Continental/Northern Europe UK/Ireland, and Denmark/Germany/Baltics is described as: *"establishing/increasing electricity interconnection capacities and possible integration of offshore wind energy."* Now, mentioning the possible integration of wind energy in relation to increasing interconnection capacities is hardly done to accommodate the DESIRE conclusions or CHP development in general. Yet, in the execution of these projects it would seem obvious to conduct further research on the potentially beneficial aspects of introducing CHPs in this integration procedure.

Finally, returning to the overall perspectives of having adopted a programme specifically aimed at promoting cross boarder infrastructure projects, it could be expected that such an approach has further reaching effects than the year to year allocation to specific projects. As mentioned, the TEN-E programme has limited funds itself, and these funds are primarily directed at feasibility studies. In other words, for a study to be funded under this programme, the approach would have to fall within the guidelines and thereby have an approach focusing on large scale energy transmission. An approach that e.g. DESIRE would never fall under. Does this mean then, that

the EU is in fact promoting a particular type of studies, which could limit rather than expand the political tool box from which the equipment necessary to meet the future challenges in the energy market are to be found? Well, DESIRE was in fact funded by another EU programme, indicating that alternative approaches are not being neglected. Still, the set up of TEN-E draws on an internal logic, which CHPs and the DESIRE project will probably not gain from.

6.3.3 Concluding remarks

The TEN-E programme was established to facilitate the infrastructural challenges related to the creation of the internal market. In doing so, the inherent trans national logic of the internal market was applied directly in the programme, in that focus and priority was from the outset given to large scale cross-boarder transmission challenges.

Although the stated ambitions of the TEN-E programme corresponds well with the advantages of CHP development identified by the community itself, there is a real risk that the TEN-E programme will hamper the possibility of CHP development both short-term and in the long haul. On the short term, funding related to the TEN-E programme will primarily support large scale power producers, and thereby potentially hamper the competitiveness of CHP plants. On the long term, funding research exclusively targeted at large scale transmission challenges, could limit the research initiatives focusing on alternative methods, such as the DESIRE project.

Ironically, the main challenges sought to overcome in the TEN-E programme could to some extent be solved by enhancing the development of CHPs. Thus, by producing electricity locally, the need for large interconnector capacity should be expected to fall, as the need for long distance transport of electricity would lessen.

6.4 Achieving liberalised energy markets

The ambition of making transmission grid owners independent from the energy producers, have long been an ambition of both European and domestic policy makers. This has been the case both in relation to electricity networks and gas pipelines. The opportunity to wrestle away the energy sector from its traditional strong attachment to national administrations has been attributed to the fall of the Soviet Union and the following "capitalization" of Russia and other former Soviet states. This led to less concern over supply issues, and also of the development of new gas fields in

Russia (Jamasb & Pollitt 2005: 6). Another – or rather an additional – explanatory factor to the demand for liberalisation is offered by Green (2007: 5). Green (and many others) argues that the rising energy prices in the 1970s culminating with the 1979 oil crisis, led the way for market liberalisation in the energy sector. This claim is backed by the initiation of liberalisation packages in both the US and UK in the early 1980s (Makholm 2007:25).

However, it was not until 1991, that the European Commission proposed its first directive on electricity liberalisation. The proposal was subject to substantial and long discussions between member states which were at very different stages in the liberalisation process. When the directive was finally adopted in 1996, it therefore left significant leeway for member states in the implementation procedure, setting minimum standards which were at the time already met in the most liberalised markets (Green 2007: 5). What then was the content of the 1996 directive?

The directive concerns primarily three areas: Generation, Transmission and Distribution of electricity. The aim of the directive was to set up common rules, but as will be exemplified below, creating clear and omnipresent rules proved difficult. In relation to electricity generation[4] the directive sets up rules for the procedure of constructing new capacity. This entailed defining a general strategy and a set of rules for the expansion of generation capacity. On one side, member states agitating for complete market liberalisation, argued that while certain criteria should be set up, defining the need for new capacity should be left to the market (*authorisation procedure*). On the other side, a more moderate approach suggested that member states should themselves plan and estimate the need for new capacity (*tendering procedure*). Basically what this meant was that in the tendering procedure, a member state makes a call for new capacity when necessary, while in the authorisation procedure member states are not given the possibility to refuse new capacity due to a lack of demand (Schaeffer et.al 1999; Pareto 2001). In the end, both procedures were brought into the text, and it was left to member states to decide which one they wished to pursue (OJ 1996: article 4).

On transmission the directive instructed member states to designate a transmission system operator (TSO), who was to be responsible for the

maintenance of the transmission grid and for dispatching[5] power plants to the grid in a given region. In this connection standards concerning even competition and economic consideration were put into place. Despite the goal of non-discrimination, a provision was however put in the text which allowed for TSOs to give priority to electricity produced from renewables, waste and CHPs. Closely related to the issue of transmission was the ambition of vertical unbundling. This was met with significant opposition from especially the big power companies, and the end result was that integrated energy companies only had to have separate accounts (OJ 1996: article 14(3)). This was to avoid cross subsidization, i.e. using profits generated from the transmission grid to support other activities of the company. However, the separation of accounts has been seen as a very small step in the unbundling process (van Koten & Ortmann 2007: 7), and as will be elaborated below, further unbundling is still pursued by the Commission (the prospects of unbundling is itself subject to considerate academic discussion see e.g. Davies and Price 2007; Smeers 2008; Pollitt 2008).

In relation to distribution the directive is less extensive. It does however set in place a Distribution System Operator (DSO) with a role comparable to that of the TSO. Also it is underlined that member states may demand from the DSO to maintain specific distribution networks to meet public service obligations (OJ 1996: article 10).

Finally, the provisions on access to the network and public service provisions deserve mentioning in the current context. Concerning access to the network this was also subject to substantial deliberations, which ended up with three different approaches adoptable by the member states. The Negotiated Third Party Access (neg TPA) entails direct negotiations between producers and consumers, who then jointly negotiate access with the network operator. Regulated Third Party Access (reg TPA) is similar to neg TPA except that the access price is a standard published tariff and therefore non-negotiable. Finally the single buyer model introduces a legal person responsible for centralized electricity purchase and sale (typically the TSO). In the case that this single buyer is part of an integrated energy company, its accounts shall be separate, just as is the case with the TSO. In this context it is underlined

[4] The transformation of "solid energy" (e.g. oil, coal or natural gas) to electricity
[5] The process of connecting a power plant to the transmission system

that no flow of information can occur between the single buyer, the production and distribution (OJ 2006: article 9).[6]

6.4.1 *Following up on the Electricity directive*

Although the first electricity directive was touted as a big step towards market liberalisation, it was also clear that the directive had considerable shortcomings. In 2001 the Commission issued a working paper in which it reviewed the progress made in member states towards market liberalisation. It was declared that the liberalisation process was going well, but that both quantitative and qualitative improvements still needed to be fulfilled (Commission 2001:39). During negotiations it was agreed that all non-household customers were to be eligible to market opening from 1 July 2004 and all consumers from 1 July 2007 (Talus 2007: 443). In the original proposal only customers who consumed more than 100 GWH, were obligatory eligible. Regarding qualitative improvements the unbundling provisions were taken a step further. While in the 1996 directive only separate accounts were required, the new directive demanded a functional division between TSOs, DSOs and any other activities in the integrated company. In practice, the directive has four concrete requirements: 1) Persons responsible for the management of the transmission system operator may not participate in the day-to-day business in other areas of the integrated electricity undertaking, 2) Appropriate measure to ensure that the persons managing the transmission system act independently, 3) The TSO shall have effective decision making rights, independent from the integrated electricity undertaking, and finally 4) A compliance programme to ensure that these requirements are met, shall be established and reviewed yearly (OJ 2003: article 10). Overall the second electricity directive sought to follow up on the success of the first directive in further liberalising markets. However, the implementation of the second directives went less smooth than the first, and in September of 2005, the Commission referred 6 member states to the ECJ for not having transposed the directives into national law (Talus 2007: 439).

The so far final step towards liberalisation was initiated in 2005. On account of the mid term review of the Lisbon Strategy, it was decided to launch screenings of the barriers to competition in the energy sector along with a number of other areas (Commission 2005:8). In the energy sector this resulted in a sector enquiry which was aimed at assessing current conditions

[6] This separation of information is also called the "Chinese Wall"-clause.

for competition and determining the reasons for the potential market malfunctions (Commission 2007a:2). In the inquiry eight main concerns regarding the establishment of competitive energy markets were listed. Regarding unbundling the inquiry concluded that *"the current level of unbundling of network and supply interests has negative repercussions on market functioning and on incentives to invest in networks. This constitutes a major obstacle to new entry and also threatens security of supply."* In other words, although both the first and second electricity directive entailed concrete provisions on unbundling, it was concluded that vertical integration was still hampering competition in the European energy sector. As a result of the enquiry the Commission in September 2007 launched the third energy package (Commission 2007b). In this package the Commission underlined the necessity of taking the final step in the unbundling process, and secure that the ownership of the transmission net was to be completely separate from the ownership of other stages in the progress from generation to retail. In other words, the directive entails a crucial change from the previous more technical demands of separate accounts and the separation of personnel between transmission management and the day to day business. By demanding ownership unbundling, the Commission is seeking a final and complete closure to vertically integrated electricity.

6.4.2 Impact on CHPs and infrastructure reforms

The three packages on liberalisation in the energy sector, sets out the rules and the framework for the future battle on energy markets. Contrary to the two other policies analysed (CHP strategy and infrastructure funding) it does not entail direct prerequisites for the fulfilling of the challenges set out in DESIRE. The liberalisation packages will however be pivotal in any form of strategy, legislation and execution related to the European energy sector for years to come. Therefore, examining how the packages may influence CHP development in relation to the opportunities presented in DESIRE will add to the overall picture of whether the EU energy policy is geared for the challenges related to infrastructure reform as presented in this paper. As the legislation is aimed broadly at the sector in general, I will adopt a broader and longer term approach, thus not focusing particularly on the implications for the DESIRE challenges here and now, but rather on the possibility for CHPs to play a role in the future energy market.

Regarding generation two rather different procedures were adopted in the 1996 directive, yet both served the purpose of creating common European

rules. This should be expected to create transparency and thereby make access to the market easier. However, while the tendering procedure allows for member states to plan new capacity, and thereby play an active role in promoting particular solutions, this is hardly the case for the authorisation procedure. Although member states may have the possibility to use e.g. planning law actively to influence the establishment of new capacity, whether there is an actual demand for this expansion will not play a part in the decision (OJ 1996: article 5; Schaeffer et.al 1999: 17; Pareto 2001: 93). The motivation behind including the authorisation procedure was to prevent member states from acting in a protectionist manner, and ensure the possibility for new actors to enter the market. In the 2003 directive the step was finalised, when the tendering procedure was further weakened, so that it was only eligible when the authorisation procedure was considered insufficient to ensure the security of supply (OJ 2003: article 6). This development becomes particular interesting when comparing with the concurring framing of the CHP directive described above. As mentioned, the final directive underlined that CHP development should only be pursued where a real heat demand exists. In contrast the Commission pursues intense competition in the general electricity generation with considerations concerning demand seen as an obstacle for the free market. In other words, regulatory barriers for establishing traditional power plants are being removed, whereas CHP plants face particular requirements to the need of energy when seeking to expand capacity. Eventually, CHPs could be the losers in this battle. Not because they are uncompetitive but because the rules are biased against them.

On an opposite note the promotion of CHPs is given leeway in the chapter concerning Transmission system operation. Here it is specified, that member states may give priority to renewable energy, energy generated from waste and CHPs. Although this prioritisation is presented as an option to member states, thus not entailing any requirements, it at least has the possibility of being beneficial for the development of CHP plants and for the competitiveness of these. Concerning the ongoing negotiations on the third energy package, it should be noted that the Parliament in June 2008 proposed an amendment to the directive, in which it is stated that member states *shall* rather than *may* give priority to energy produced from renewables, waste and CHP (European Parliament 2008:78). Was such a provision to be adopted it would of course change the outlooks for CHPs

considerably. However, the Council in its text from October 2008 decided not to support this change (Council 2008:39).

The 2003 directive sought to further expand the separation of energy producers from the management of transmission networks. As listed above, four concrete requirements were set in place to ensure that the personnel dealing with transmission access did not participate in day-to-day business of the company, and that reporting to national authorities took place on a regular basis. It seems though, that while intentions are good, the actual benefits of such a system in terms of achieving free and equal access to the transmission grid would be very hard to evaluate. Thus, allowing for an integrated power company to manage transmission access within its own ranks can at best be characterised as questionable. Thus, there is no check on the density of this information wall, and within an integrated company, how should such a tail gate be possible? The risk of information flowing from transmission operators to other parts of the company will in any case enhance the risk of limited market (transmission) access, which is a core barrier to the open market (Madlener & Schmid: 2003:118). To deal with the weaknesses of this approach, the directive request that member states set up national authorities to ensure non-discrimination and effective competition. While this could definitely prove a helping hand for CHPs seeking market entry, it does not fully meet what would be desirable in the current context. Thus, having transmission managers closely connected to a main competitor (the integrated power company) inevitably raises points of concern. Will the maintenance priorities of the transmission manager and the electricity producer remain separate? Will investments in new infrastructure be used (or rather remain unused) to prevent new actors on the market? Will information concerning long term planning of infrastructure remain unavailable to the integrated power company? All questions that are hard to answer – and this is exactly the problem. If the answer is yes, the problem is obvious, and if the answer is no, a glimmer of doubt from other actors in the market would be hard to reproach. The overall point of discussion in the current negotiations on the third energy package revolves around exactly the unbundling issue, and specifically on the request of complete ownership unbundling. Currently the council is divided in to groups with Germany and France leading the opposition towards ownership unbundling and the UK and the Netherlands leading the proponents of this option. Whether this will lead to the promotion of a connection between wind energy and CHPs or not is

less predictable. However, chances of this development occurring without full ownership unbundling seem smaller.

6.4.3 Concluding remarks

When it comes to constructing new capacity in the energy sector, the Commission with the support of member states, have opted for a market based approach. In a quest for increased competitiveness in the energy sector, the possibility of national authorities to control the construction of new capacity has been limited, not regarding whether there is a real need for this expansion. At the same time, the CHP directive from 2004 stressed that CHP plants should only be established when a real heat demand exists. In the worst case scenario this will lead to dominating power companies outmatching CHPs via cost-inefficient capacity, financed through other parts of the company.

Though it has been a long standing ambition of the Commission to wrestle away transmission grid ownership from large integrated power companies, the progress has so far been limited. Ongoing discussions concerning the third energy package will reveal whether third time around is really the charm. The current set-up with a Chinese wall administered by market actors who stand to gain from tearing it down is not optimal. Checks are difficult to perform, and because of this the actual impact is equally difficult to measure. To accommodate CHP growth, total ownership unbundling therefore remains the desirable outcome in the current context.

7. Theoretical Discussion

Having in the analysis discussed the potential obstacles for fulfilling the ambitions of the DESIRE project, the remaining part of the thesis, will concentrate on how these findings can be explained. In this context the theoretical approach described in chapter three will be revisited, and different theoretical approaches will be elaborated upon. As has previously been mentioned the ambition of this exercise is to explore how integration theories may help explain the development and outlook of the EU energy policies touched upon in the thesis. In performing this exercises I will draw on two main schools of thought related to EU integration: Liberal Intergovernmentalism and New Institutionalism. Both have been frequently used to understand and explain developments in European integration and cooperation, and both have been subjected to significant criticism concerning their inability to explain different concrete events in this relation. Also some of the core elements of these two theories provided the basis for the presentation of my theoretical approach in chapter three. By using these theoretical considerations in context with the findings in the analysis, suggestions will be made as to why obstacles to meeting the DESIRE project exist.

A presentation of the main elements of each approach as well as a discussion of their shortcomings will serve as an introduction to the two chapters (*Liberal Intergovernmentalism* and *New Institutionalism*) in the overall discussion. Subsequently, findings from the analysis will be introduced and a discussion of how the separate theoretical approach may help understand the background of these findings will be performed. Finally, a discussion of alternative theories will be conducted, in which the previous findings will also be set into context.

7.1 Liberal Intergovernmentalism

Emerging during the 1990s, Liberal Intergovernmentalism (LI) is a theory drawing on different elements of classic International Relations theories. The

term Intergovernmentalism describes therefore not only European politics, but also all politics in international organisations.

The characteristics of Intergovernmentalism is that the EU, respectively the Council of Ministers is a platform on which states can meet to either share ideas or negotiate agreements. (Cini, 2003:95). However, LI distinguishes itself in at least two ways from a traditional realist theory. Firstly, national preferences are not generated by security issues and secondly, bargaining power is not determined by military capacities. Rather, national preferences are derived from domestic issues and bargaining is influenced by the relative intensity of the latter. (Pollack, 2000: 4) It remains, however, that a main character of Intergovernmentalism is its state centric view. Therefore LI clearly considers the preferences of states and their bargaining power as the main influence in EU negotiations. All decisions made by the EU are in the last instance a result of bargaining amongst states and agreements are usually reached on the smallest common denominator (Cini, 2003: 103).

Generally considered the founder of LI, Andrew Moravcsik agrees that the EU itself is a system of complex and multileveled institutions and actors interacting in a trans national political sphere. But this does not mean that European integration cannot be controlled by national governments. On the contrary, Moravcsik argues that only national governments control integration and that unintended gaps in government control does not occur – as other scholars suggest[7]. Three patterns can be identified as steering forces in negotiations on the European level. Firstly, governments pursue national, mostly economic interests. Secondly, negotiations are influenced by relative bargaining power, where – according to Moravcsik the larger states have relative power in negotiations over smaller states – and thirdly, that international institutions exist merely to increase the credibility of interstate commitments (Moravcsik & Vachudova, 2003: 241). Following this argument, agreements reached in the negotiations usually mirror the relative power of national governments, because the negotiation outcome is a result of preferences formed on the domestic level. After the formulation on the national level, these preferences are then negotiated on an intergovernmental level. If the preferences of the member states are matching, integration takes place. Another possibility described by Moravcsik is that the larger member states can negotiate agreements on the lowest

[7] As will be described below, Multi level governance theory argues that a whole array of actors on numerous levels influence decision making in the EU.

common denominator and then buy the agreement of smaller member states through the use of side payments (Pollack 2000: 4). The role of the supranational institutions in this process is basically to provide more efficiency in the intergovernmental bargaining process. They help to avoid high transaction costs in the negotiations but in general do not influence the outcome of them whatsoever (Moravcsik and Vachudova 2003: 246).

7.1.1 LI in relation to infrastructure reform

The core elements of Liberal Intergovernmentalism seem to be applicable in relation to at least some of the conditions identified in the analysis. Thus, it was a clear and stated goal of the Commission to increase CHP share of electricity production to 18% by 2010, yet very little progress seem to have been made in this respect. The specific target has since been removed from official EU policy, yet an aspiration of enhancing the use of CHP is still central in Commission initiatives. This alone does not mean that the unfulfilling of the target was due to member state opposition. Yet, looking a bit closer at the events following the 2004 directive, suggests that the reluctance of member states to act in this area has played a role.

In the 2004 CHP directive, the enhanced focus on CHP was primarily pursued by calling for national strategies on CHP and studies on the potential to develop this technology. Yet, as was mentioned in the analysis, only 11 of 27 member states had reported back to the Commission in late 2008. Firstly, the sheer fact that member states themselves are responsible for determining the potential for CHP development falls well within the LI notion of national governments controlling trans national integration. Thus, having agreed on a common ground concerning the development of CHP, the scope and details of this policy is thereby to a large extent left to member states. Secondly, that only 11 member states managed to report back in late 2008, when in fact the deadline for these reports was in early 2007 further suggests that member states do not feel overwhelmingly obliged to follow what was agreed upon on the supranational arena.

Another area where Liberal Intergovernmentalist thought could have a strong case is in the market liberalisation process. Although significant process has been made in this field, the road has been very long, and the Commission's original target of complete ownership unbundling has still not been attained. Especially concerning the latter some very interesting negotiations are going on as this thesis is being written. Thus, the third

energy package is negotiated during the fall and winter of 2008, and a clear demarcation line has become obvious in relation to support and opposition towards ownership unbundling. A group of 8 member states, lead by Germany and France and carrying sufficient weight to block a decision in the council, have all indicated that they will vote against any elements involving ownership unbundling (Udenrigsministeriet 2008:10). A central point in relation to LI is that the three biggest energy companies in Europe are French (EdF) and German (RWE and EoN) and all three of these are vertically integrated companies, i.e. both producers and owners of the transmission net (Jamasb and Pollitt 2005:18). Protecting domestic business interests falls well in the logic of LI. Furthermore, that a minority of 8 member states are able to block decisions in the council speaks very much in favour of the argument that member states still have the ability to control community policies.

Although the role of member states is obvious, the importance given to them in LI seems at times to be exaggerated. As mentioned above, the case of Germany and France blocking legislation along with 6 other member states, could be used as an example of member state control based on economic interests of large member states. On the other side, the blocking minority in the council requires 91 votes, and France and Germany combined only possess 58 votes. This means that France and Germany could in fact be forced to accept ownership unbundling, had they not had support from other member states.

Now, LI supporters would probably point to alternative ways for member states to respond to such a situation. For one slow and imperfect implementation of EU legislation is not exactly an unknown strategy. Also article 175 of the EC Treaty concerning the member states' autonomy in relation to determining the general structure of its energy supply could potentially be drawn into the debate.

In summary, Liberal Intergovernmentalism provides interesting aspects to some of the decisions laying out the potential for an increased role of CHPs in balancing fluctuating power production. Especially the slow response of member states to the 2004 CHP directive and the opposition in certain member states to ownership unbundling point to the strong role of member states and their ability to block decision in the council. However, the progress made in market liberalisation and the limited possibility to block

decisions in the council, suggests that the whole story can not be told within the explanatory power of LI.

7.2 New Institutionalism

Within New institutionalism a distinction is often made between three main types: rational choice institutionalism, historical institutionalism and sociological institutionalism (Pollack 2000, Weingast 2002). While the three variations all take their starting point in the traditional base that "institutions matter", they vary significantly in regard to both their focus of study and what explanatory variables are considered to be essential. When setting theory in context with the analysis, I will focus primarily on historical institutionalism. However, to attain as thorough an understanding hereof as possible it is conducive to look also at the rational choice and the sociological variant. This, primarily to establish clear boundaries as to what historical institutionalism is, and what it is not.

Though it is clear that institutions matter it is not always clear exactly how they matter. In Rational Choice institutionalism institutions are primarily seen as being the structure within which negotiations take place (Lowndes 2002: 95). This means that institutions are taken into consideration when actors choose a specific strategy for obtaining their goals – institutions set the rules of the game, so to speak. Furthermore institutions are seen as being providers of information ensuring that decision making becomes not only more efficient but also more contingent (Hall & Taylor 1996: 943). Finally it should be noted that the focus on institutions as a framework for negotiations also entails a dismissal of institutions significantly influencing actor preferences (Hall & Taylor 1996: 945). In other words actors are seen as acting instrumentally (or utilitarian), but because negotiations take place within a formal set of rules, institutions play a role in regard to actors' strategies.

Historical Institutionalism can be described as the idea that actors operate in an institutionally framed environment but that their action can only be understood if set into a historical perspective (Kay 2005: 55). This differs fundamentally from rational choice institutionalism in that the notion of rational actors is no longer obvious. This does not necessarily imply that actors do not act rational at a given point of time but rather that a decision may have unintended effects and even affect the same actor's position in the future (Pierson 1996: 126). Pierson states that these unintended effects can

create gaps in the predominantly member state controlled setting of international relations, meaning that supranational or international institutions gain autonomy – to a certain extend. Once these gaps have occurred a new juncture appears. Member states may try to regain control, while EU institutions may try to prevent this from happening. Equally important institutional barriers and sunk costs may further complicate changing a previous decision (Pierson 1996: 142).

While rational choice institutionalism is obviously based on an assumption of rational actors, and historical institutionalism sees actors as being rational, though their decisions influence and are influenced by other decisions, sociological institutionalism rejects the concept of rational actors more consequently. Generally sociological institutionalists go beyond the idea of institutions being mainly the structure and the "rules of the game." Instead proponents of the sociological approach concern themselves with the existence of culture in institutions (Hall & Taylor 1996: 947). This implies that to understand decisions and changes made within an institution it is imperative to understand the culture of this institution. Unlike rational choice institutionalists who see institutions as setting the framework that determines specific strategy choices, sociological institutionalism goes further and argues that institutions "*affect the most basic preferences and identities of individuals*" (Hall & Taylor 1996: 948). The notion of rationality is not completely dismissed but it needs to be understood as being socially constructed. A rational choice is seen as being such if it expresses the identity of a given person or institution – and this identity is exactly socially constructed (Hall & Taylor 1996: 949).

7.2.1 New institutionalism in relation to infrastructure reform

A key finding in the analysis was the seemingly incoherent conditions when comparing the 1997 strategy on enhancing the development of CHP and the guidelines of TEN-E from 2006. Thus in the guidelines it was stated that priority should be given to projects which contributed to 1) the competitive operation of the internal market, 2) strengthen the security of supply and 3) increased the use of renewable energies, and exactly these features were attributed to CHP in the 1997 paper. The paradoxical element in this condition builds on the assumption that TEN-E investments are primarily targeted towards large scale energy producers, and that this hampers the competitiveness of CHPs thereby limiting the potential of expanding the use of CHP technology.

Now, the reasons for focusing solely on trans-boundary infrastructure could be many, but within the scope of historical institutionalism, a few comments concerning the basic construction of the EU deserve mentioning. Thus, having as a very basic aim that goods and services should move freely across boarders could have some implications on how policy on a more concrete level is constructed. When the set up is targeted towards trans-national cooperation it seems plausible that policies should as a rule also have a trans national character. Therefore, when determining that the creation of the single market required infrastructure investments, it seemed natural that also energy infrastructure problems should be solved by strengthening cross-boarder connections. This hypothesis fits well into the logic of historical institutionalism, in that the decision to solve infrastructure problems via cross-boarder investments seem to be a rational choice, yet this rationality is grounded on the premises on which European integration is constructed, and therefore may not be rational for an outsider. In fact, it could be argued, that also sociological institutionalism has some bearing here. Thus, from a sociological perspective, this indicates that it is in fact inherent values and ideas that determine the trans-national approach, rather than an "imagined" rational choice.

Supplementing this line of reasoning, the notion of gaps in member state control could help further explain the prioritisation of infrastructure funding in the EU. As mentioned, the fact that the Commission decided to focus on trans national infrastructure could be based on the trans national logic inherent in the treaty, but additionally, the way in which the treaty is constructed could also affect Commission priorities based on the general power distribution. Thus, given that the Commission will enhance its powers whenever a policy area is given a trans national angle, it would seem likely that this condition plays a role when proposing new policies. In other words, if the Commission is asked to make proposals on how to solve infrastructure challenges related to the single market, why not focus on a trans national approach, which would enhance the role of the Commission itself. While at it, why not then include energy infrastructure in the programme, since integration in the energy sector has been progressing relatively slowly, leaving little room for manoeuvre for international institutions. This line of reasoning falls well in line with the general credo of new institutionalism in stating that: "institutions matter." Although the level to which the creation of TEN-E was a colonisation of the energy policy by the Commission is

debateable, it is noteworthy that Commission paper communication on TEN from this period motivates the establishment mainly by focusing on the trans national aspects to infrastructure (Commission 1990:6).

On a more general note, it could be argued that the Commission in relation to promotion of CHP faces a rather basic obstacle in influencing policy development. Thus, CHP plants are by definition relatively small entities, which produce electricity and heat in a local or regional district. This set up inevitably brings to mind the principle of subsidiarity. Thus, in article 5 of the EC treaty it is outlined that: *"in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level…"* Given the nature of CHP plants, it would seem evident, that the development and promotion of such entities should be left to national or regional authorities. An opposing view, may argue that the Commission could seek to develop its competences in relation to acting directly towards the energy sector, e.g. through the use of competition policy (see e.g. Salerno 2008 for a more elaborate discussion hereof). Also it could be argued that this obstacle could be overcome by addressing environmental concerns and climate change, which in their nature are neither local nor regional. However, following this path would presumably end at the same dead end, as has been mentioned several times previously, namely the provision guaranteeing member state their own choice of energy composition as it is laid down in article 175. Assuming that the Commission is primarily concerned with expanding its influence, it would therefore make little sense to promote an approach – CHP – where the power distribution as laid down in the treaty, is clearly favouring national authorities.

7.3 Alternative theoretical explanations

While, I have chosen primarily to focus on Liberal Intergovernmentalism and New Institutionalism, alternative theories could offer other and interesting perspectives to the discussion. In the following, I will shortly discuss the explanatory power nested in some of these theories.

7.3.1 Neo-functionalism

In traditional integration theory the key divide was between the proponents of Intergovernmental theory and Functionalist theory. In recent years both theories have somewhat been overtaken by their updated younger siblings Liberal Intergovernmentalism and Neo-functionalism, which are at the same

time more applicable to the case of European integration. The key divide between the two is the notion of state sovereignty. While LI, as described, argues that states have the capacity to dominate any international institution, it is a central Neo-functionalist claim that integration in one policy area will influence other policy areas – forcing these to integrate further cf. the so called "spill-over effect." A prime example of this is the common market, which due to free movements of goods and services entailed the necessity of a number of common rules on e.g. environmental standards and consumer protection. Using this logic, neo-functionalists argue that this process will only accelerate leaving member states less and less influential. In the current context, one could perhaps argue that the increased focus on environmental issues and climate change has prompted a community strategy to promote CHP development. However, as has been described, the ambition of increasing CHP market shares has so far not been attained. On the other side, the establishment of the single market was in fact used as the primary reason for establishing the TEN-E, which according to the argumentation above will be influential in relation to choices on the future energy composition. Also the single market was a driving argument for the energy liberalisation packages.

The main critique of neo-functionalism has been based on historical data continuously disproving the accelerating nature of the integration process. The Luxembourg compromise[8], the stagnation in European integration lead by Prime Minister Thatcher in the 1980s and the slow institutional reforms best exemplified by the rejection of the Constitutional Treaty and the Lisbon Treaty all seem difficult to fit into the scope of neo-functionalism. Considering the ambitions toward a Europeanization of EU energy policies, it is also noteworthy, that the composition of energy production is still very much in the hands of member states. Therefore spill-over effects in energy policies may be identified, but it has so far been limited.

7.3.2 Multi-level governance

The idea of Multi-level Governance was primarily fostered by Gary Marks in the early 1990s, where the funds allocated to the structural funds were increased significantly in the EU budget. This was accompanied by programmes designed to promote regional development, and importantly, programmes where regional authorities were directly involved in negotiations

with the Commission (Marks 1992; Marks et.al 1996; Hooghe 1995; Hooghe 1998). As a consequence Hooghe (1995) argues that national government control is not only being challenged by supranational institutions, but also by regional authorities and by networks consisting of regional authorities from different member states. In the current context the struggle between member states and regional authorities have not been touched upon, and commenting on whether a conflict of interest exists within infrastructure reform and promotion of CHP is therefore problematic. Also the role played by regional authorities in relation to energy policy is typically limited. However, returning to the paradox raised previously concerning the principle of subsidiarity, an interesting aspect concerning power distribution between regional authorities and the Commission arises. Thus, if we consider CHPs to be regionally rooted, within the logic of Multi-level governance, at least a partial power delegation to regional authorities in this policy area seems plausible. In line with the principle of subsidiarity this would imply decisions being made on a lower tier, and thereby removing it further from Commission influence. On the other side, proponents of Multi-level governance would argue, that were this to happen, it would be the member states loosing out. Thus, delegating powers to the regional authorities would imply stronger attachments both among regions, and among regions and the Commission, eventually reducing the influence of national governments.

7.3.3 Marxist Theory

Though not traditionally related to the field of international relations, Marxist theory has by various scholars been used to describe the international system. At least in classic Marxist theory the importance of states is downgraded, and in stead the classic class struggle is up heaved to an international struggle. In this context the struggle becomes less an interstate rivalry and more a rivalry between the owners of production capacity and the rest. In the current context it would seem straightforward to label integrated power companies at one end of this scale, and the consumers at the other end of the scale. Consequently, an interesting focus would then be on the ability of industry organisations to lobby decision making powers in the EU. While, this angle is definitely vital, it should be noted, though, that all theories accounted for above, takes the influence of external actors into effect as well, yet to a lesser extent, though, than in Marxist theory.

[8] Following strong French opposition towards a suggestion that would increase the use of qualified majority voting, a compromise was reached in 1966, underlining that the Commission would

Attached to a Marxist approach to international relations theory, is the notion of dependency theory. This evolves around the relationship between developed countries and undeveloped countries. It is the claim of Dependency theory, that the developed and undeveloped world are dependent on each other, as most natural resources are found in the undeveloped part while it is consumed in the developed world. In relation to the issues raised here, it is noteworthy that e.g. CHP plants are often run by gas imported from Russia and large scale power plants is often run on either oil or gas imported from various parts of the world. An area of research in this context could be to identify the attitude of different developing countries to the increased focus on renewable energy sources in the EU. On one side, it is a strategy with beneficial aspects in relation to environmental concerns, yet on the other side, export of e.g. fossil fuels account for a significant revenue in a number of developing countries, suggesting that they would have an interest in maintaining a certain degree of e.g. oil based energy production.

postpone a proposal if "very important interests of one or more partners are at stake."

8. Conclusion

By linking wind parks to combined heat and power plants, it will be possible to transform excess electricity into heat, thereby reducing transmission costs as well as covering heat demand. However, a number of barriers to this approach exist in current EU policies. In all three policy areas analysed above such potential problems could be identified. In the following I will account for the barriers identified and for how they may be explained. Also reflections on how these barriers could be overcome will be made, and finally potential shortcomings in the analysis will be addressed.

A strategy on CHP

Within EU's strategy for promoting CHP at least two problems can be identified:

1. *Development of CHP is not considered a goal in itself*

In the cogeneration directive from 2004, ambitions of increasing CHP share are limited. Thus, while in 1997 increasing the share of CHPs was seen as a goal in itself, the directive from 2004 underlines that the development of CHPs is only to be pursued if a real heat demand exists. Specifically in article 7 it is underlined that "*member states shall ensure that support for cogeneration […] is based on the useful heat demand and primary energy savings*." This indicates that the priority given to CHP is lowering.

2. *Specific national target are not set*

Also it is noteworthy that the directive does not set specific national targets. This confirms the lacking will to a real CHP commitment which was also present in the 1997. Instead of specific targets, article 6 of the directive lays upon member states to analyse the national potential for expanding the use of CHP. While the result of these analyses could create the breeding ground for new focus on cogeneration it does not exactly send a signal of urgency. This is confirmed by the slow response from member states. While the deadline for the national reports was in February 2007, in November 2008 only 11 member states had reported back.

The beneficial aspects of promoting CHP has been pointed to on several occasions (e.g. Madlener and Schmid 2003; Cardona & Piacentino 2005). However, while the 2004 directive may indicate an understanding hereof, it seems that binding national targets have a long way to go.

Infrastructure

In relation to infrastructure especially one problem seems eminent:

1. *Funding is heavily eschewed towards large scale transmission networks.*

Although the Trans European Energy Network Programme does in its own sense seem justifiable, it has negative effects on meeting the challenges pointed to in DESIRE. While the DESIRE project would potentially relieve pressure on transmission lines by using electricity locally, the TEN-E programme is exclusively designed to deal with cross boarder transmission interconnectors. This is perhaps most clearly spelled out in article 2 of the TEN-E guidelines, where it is underlined that the decision applies to electricity "*provided that this infrastructure is used for interregional or international transmission or connection"*. This does not necessarily imply that TEN-E would be detrimental to integrating wind parks and CHPs. Addressing problems related to trans national network problems, does not automatically prevent initiatives designed to solve problems related to small scale infrastructure. However, as TEN-E is the only EU programme designed specifically to address energy infrastructure, the risk of both funding and research being directed away from CHPs and the DESIRE solution is prevalent.

The DESIRE project presents a solution which is both energy efficient and which would additionally relieve trans national interconnectors of the pressure they currently face. The latter underlines the unfortunate set-up of TEN-E. Thus, adopting the DESIRE approach would not only result in a more efficient use of wind energy. It would also minimise the fluctuations on the transmission network, thereby becoming beneficial to meeting the ambitions of TEN-E.

Achieving a liberalised energy sector

Two significant barriers can be identified in the provisions connected to liberalising the energy sector.

1. *Equal access to transmission networks is questionable*

Although progress has been made in facilitating ownership unbundling, and separate accounts and functional divisions within vertically integrated power companies are now required, it is difficult to account for the actual effect hereof. Both concerning maintenance of the net and access hereto integrated power companies have been called into question. Setting in place rules as the "Chinese wall provisions" designed to ensure that transmission network operators act independently from the power producing division of the company indicates that problems related to integrated power companies are acknowledged. However, this is still a far cry from actual ownership unbundling, which would, if nothing else, limit the claim of TSOs acting as straw men for large scale power producers.

2. *Regulations for expanding capacity of large scale power plants are too loose*

In the directive on electricity liberalisation from 2003 the tendering procedure, which allowed for national governments to design and plan the establishment of new infrastructure, was everything but put out of force. Instead the authorisation procedure which allows for power companies to expand their capacity, giving they meet a number of provisions on safety, public health, efficiency etc. was strengthened. However, the demand for additional capacity is not included in these provisions. This is particularly interesting when comparing to the rules for expanding capacity for CHP plants. The directive proposed in 2002 and adopted in 2004 on the promotion of CHP, underlined that CHPs should only be pursued if a real heat demand existed in the given area. Assuming that this barrier is overcome and a CHP is build, national authorities cannot prevent the establishment of a coal plant covering the exact same demand. In other words, current legislation is biased against the energy efficient CHP plants and for traditional power production.

Explaining the barriers

By solely comparing Commission proposals and the final directives a clear indication of member state opposition to the direct promotion of CHP is visible. However, while the Commission itself has spoken warmly of the benefits of CHP, it has in policy areas made decisions that are detrimental to the development of CHP. By applying two main schools of integration theory to the findings of the analysis it is possible to identify a number of plausible explanations to the current outlook. An actual documentation of the

motivations behind the current policy outlook cannot be derived from a theoretical discussion as this. However, it provides relevant insights into dynamics affecting international cooperation, and how this may help explain the findings of the current thesis.

Liberal Intergovernmentalism

Liberal Intergovernmentalism proved helpful in explaining two of the barriers identified

1. *Specific national targets are not set*

Intergovernmentalism seem relevant in relation to the unwillingness of member states to commit to national targets. Thus, drawing on the basic assumption that states will seek to protect its own autonomy, it should not be surprising that a general target set by the Commission meets opposition. Also, in traditional intergovernmental theory, energy policy is regarded as a high profile area, in which states will be particularly concerned with securing sovereign power.

2. *Equal access to transmission networks is questionable*

In relation to ownership unbundling it was noteworthy, that especially member states with big economic interests nested in integrated power companies, have acted dismissive to this idea. Again, this falls well within the claim of LI, that preference building is based on domestic economic interests. However, while big member states have had some success in protecting integrated power companies, the liberalisation tendency indicates that other factors than that of big business plays a role.

New Institutionalism

New institutionalism also proved applicable to two of the barriers identified.

1. *Funding is heavily eschewed towards large scale transmission networks.*

The role of fundamental values within the community central in both historical and sociological institutionalism seems suited to explain the biased set-up of the TEN-E programme. Based on the ambitions of trans national cooperation and with the powers of the Commission being dominant here, it makes sense that investment in small scale infrastructure is not being pursued. Locally based problem solving is an area where the Commission

has little power (cf. the principle of subsidiarity) and the trans national approach is a very basic value within the EU.

2. *Regulations for expanding capacity of large scale power plants are too loose*

The same logic can be applied to the deregulation of provisions on expanding capacity for large scale power plants. By promoting the authorisation procedure it has become easier for new players to enter the market. This could have detrimental effects for CHPs, yet it falls well within the ambitions of the Commission in relation to both liberalisation and harmonisation. This should further enhance the role of the Commission, and thereby fits well to the logic of both historical and sociological institutionalism.

8.1 Suggestions to overcome institutional barriers

It is clear, that barriers for the development in current EU legislation exist, and that both member states and the Commission have been the architects of these barriers. One way of addressing the lacking commitment of member states is offered by Salerno (2008). In what he calls the "competition law-ization," Salerno argues that by adopting elements of enforcement from the field of competition law, it would be possible to strengthen both national and European regulation. As an example, he uses the abolition of the national energy regulator in Italy in 2001-2002. The reason given was that energy matters should be entrusted to a ministry rather than an independent body (Salerno 2008: 17). By adopting enforcement provisions from competition law, regulation of the energy sector would be directly under the authority of the Commission, thus limiting the influence of protectionist national governments. Also this could enhance unbundling. As has been mentioned, the implementation of especially the second electricity package has been remarkably slow, yet by strengthening the enforcement capacities of the Commission, it would no longer be national authorities administrating laws that could potentially harm national interests.

However, as mentioned, the Commission has itself been responsible for initiatives damaging the development of DESIRE ambitions and CHP development in general. In this relation, it seems that the overall challenge is one of coordination and prioritisation. As a primary task, the guidelines of TEN-E should be revised to make them coherent with Commission ambitions in the sector. Currently, this policy is steered solely by ambitions related to internal market challenges. Instead a more integrated approach which builds

on broader ambitions within the energy sector should be adopted. Central in this respect, should be energy efficiency and use of renewable energy sources. Most importantly, though, the uncritical focus on trans national infrastructure in comparison to locally based solutions should be reconsidered.

Finally, a new strategy on the development of CHP would be advisable. By setting binding national targets, and including the potential benefits of DESIRE when calculating cost-effectiveness, this could secure further technological development and public support. Also relevant in this context would be a provision ensuring that more attention is given to the implications for CHPs when adopting legislation in related policy areas. Barriers to developing CHPs and meeting DESIRE ambitions have to a significant extent been identified in related policy areas.

8.2 Reflections on explanatory limitations

As can be seen in the assessment above, an explanation of why CHP is not considered a goal in itself was not accounted for. While the opposition of member states could probably be explained within the logic of Liberal Intergovernmentalism, it should be noted that already in the Commission proposal from 2002 it was underlined that CHP should only be pursued if a real heat demand exists. As mentioned this was a shift from the ambitions presented by the Commission in 1997. Offhand it seems difficult within the context of this thesis to explain this shift.

However, by revisiting the figure outlining the theoretical approach on page 19 it is obvious that both this condition and several others could – and probably have been – affected by factors not dealt with in the current thesis. As will be remembered, only phase 2 (policy engineering) and phase 3 (policy rejection/approval) has been subjected to scrutiny. Furthermore, only the actors formally involved in these phases have been considered. Therefore, a number of additional subjects could be studied to further enhance the quality of the conclusion. These include

1. *The ability of external actors to influence formal decision making*

In all phases of the policy process external actors will try to influence decision making. The influence hereof has not been addressed. Especially the ability of power companies to influence national governments as well as the Commission could be an interesting area for further research.

2. The economic and technological dynamics of power companies

One could argue that given the increasing share of renewables and the preferential access given to CHPs to the transmission net, power companies would have an interest in developing such entities themselves. To what extent economic and technological barriers exist for this to occur could presumably add to the overall picture.

3. Discrepancies in national implementation

While the speed of implementation procedures has been touched upon, the content hereof has not. It seems likely that member states with a strong tradition for CHP plants have probably been more keen to forcefully adopt the provisions hereof. Likewise, member states with liberalised energy sectors have traditionally been more stringent when implementing unbundling measures than member states in which liberalisation has not gone as far.

However, while limitations to the conclusions are obvious, so is the necessity of limiting the focus of a study like the present. While the conditions presented above, and probably many more, would open for new insights, accounting for additional factors would be outside the scope if this thesis. A number of barriers in current EU legislation have been identified, and by applying integration theory, explanations to this outlook have been suggested. Equally important, the conclusions indicate that further research from economic, juridical, technical and even political schools would be beneficial.

8.3 Future Perspectives

In November 2008 the Commission issued a green paper aimed at securing *a secure sustainable and competitive European Energy Network*. In this paper the necessity to review the TEN-E programme to direct it better to coherent policy goals is underlined (Commission 2008c:4). Interestingly in relation to the current thesis, the green paper devotes considerable attention to the integration of offshore wind parks (Ibid: 7). However, in doing so the potential beneficial linkage to CHPs is not mentioned. Also in the concluding chapter, six main priorities are identified. All of these relate to trans national infrastructure. Remarkably, on the exact same date (13th of November 2008) the Commission issued a Communication on the valuable contribution of CHPs in relation to energy efficiency. Yet, not a single word on infrastructure

is mentioned in this text. While the TEN-E guidelines may be reviewed, it does in other words not look like the trans national bias will be addressed. Further, coordinating policies in a way which could help develop CHPs apparently still have a long way to go.

The current thesis is built on the assumption that the DESIRE ambitions are viable. However, even if this was not the case, the importance of considering the composition of the European energy infrastructure with an open mind seems highly relevant. Current energy infrastructures were planned and build in conditions vastly different from the present in relation to market structures, geopolitical conditions and environmental aspects. Therefore, when planning and prioritising future energy infrastructure these new criteria should also be taken into consideration. As this thesis indicates, the risk of distorting competition in an unfavourable manner should furthermore be taken into consideration in energy legislation in general. Furthermore, the necessity of further research and a stronger link between researchers and policy makers seem advisable.

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