

*POLINARES is a project designed to help identify the main global challenges relating to competition for access to resources, and to propose new approaches to collaborative solutions*

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# Part I: Current Trends and Strategies

By Clingendael International Energy Program with contributions from all POLINARES partners



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## Contents

Introduction	2
Theme 1: Access to energy & mineral markets and the role of institutions and governance	6
Theme 2: Trade and rent distribution in energy and mineral value chains	14
Theme 3: Energy and mineral market structures, ownership and market behaviour	25
Theme 4: Technology for development?	37
Theme 5: Recent developments in the aftermath of the financial and economic crisis of 2008/2009	43

## Introduction

### *The state and the market*

From WP1 and 2 it was already clear that the scare about resources is a recurring theme in economic history. Resources have been a driver to expand states' geographic reach in earlier periods to overcome shortages at home or to benefit from the exploitation of another state's resources. In the post-war period, a system of governance among states was established which implied a firmer recognition of their sovereignty over natural resources. The establishment of the United Nations was an important step in the development of sovereign rights of nations. The exploitation of resources then became a matter of the modern firm, engaging in both domestic and foreign direct investments. The companies had to gain the rights to exploit from the state they wished to invest in and abide by that country's rules and regulations. Initially, the unequal institutional, political and economic development among states gave the companies from more advanced industrialised countries a head start in gaining or maintaining access to resources. They were able to better organize the legal access, the capital and the technologies to exploit resources. This provoked political and economic responses in countries owning the resources to facilitate access to resources for national industries, enterprises and capital, sometimes leading to the nationalization of resource sectors to reap a larger part of the economic rents and gain a larger share of the processing industry. Balance of payment arguments, employment and capturing economic rents played an important role in restructuring the value chains among countries, but also economies of scale and scope were instrumental in shaping and re-shaping the resource industries.

The involvement of the state in resource sectors has always been large, particularly when compared to other sectors, even in the period of liberal capitalism. The state's involvement varies between state ownership and strictly regulating the activities of private owners. Yet, consideration of ownership alone does not provide us with sufficient analytical tools to determine the orientation of the system. Some state-owned resource companies function like a private corporation in which the state is just a shareholder among others, while others are much more directly governed to act in the states' wider economic and political interests. Also among private companies a wide variety of models exist. Some have developed into truly international operating firms not beholden to the interests of any one state. Other companies function as part of the political elite of a country, combining certain private and state interests. The internationalization of capital markets and shareholders has depoliticized ownership to a large extent, but not completely. In essence, because resource companies always need to gain the state's permission or right to exploit resources and because the state is also interested in capturing the economic rents from resources, interests of companies and states are always entwined.

The entwining of public and private interests has merely varied in intensity in the various regimes, with the state as a more or less active participant. In sectors where rents were very high, the state tends to be more intensely involved, while also the distribution of risks and benefits in the value chain decides the type of state involvement. The structure of the industry (see WP2) not only depends on the relationship between the state and the market but also on institutional and technological developments. Communication technology has opened up new ways of organizing value chains across countries, while the internationalization of capital markets allowed savings and investments to be allocated across many economies.

At the same time, the mineral and energy industry remains geographically fixed and resources unevenly distributed. It is the above ground factors of state and the market organization that determine the level of exploitation of resources and the location of processing and distribution. The structure of the industry reflects these factors. For instance, from WP2 we learned that countries with relative small reserves or resource bases have developed into a large producer when the intensity of (allowed or intended) exploitation is much higher.<sup>1</sup> Political or capital constraints, for instance by reserving the exploitation of resources for domestic industries or due to conservation policies, impact the world demand and supply balance and as a result also the structure of the industry. Moreover, technology can unlock previously uneconomic deposits and change the distribution of reserves in the world, the flow of trade and investments and subsequently also the structure of the sector. The recent shale gas and oil revolution in the US is a good example of such an event. Also a change in political orientation can unlock reserves for more intense exploitation as the breakup of the Soviet Union has shown. The development of alternative resources is another way of changing the structure of demand and supply emphasizing that even something as geologically fixed as minerals and energy are part of a dynamic and much more fluid above ground reality. Nevertheless, periods of temporarily tight markets, particularly in an industry where lead times are long (and patience short) have drawn (political) attention to what is perceived as a structural dependence on resources. Structural dependence on resources has strategic consequences and feeds the power plays among the dominant states. This was the case in the 1970s, and was replicated in the early 2000s.

In the 1970s, when demand had been outpacing supply and states were particularly interested in taking direct control of their resource sectors, studies about a pending resource scarcity crisis were abundant. The understanding of demand and supply dynamics are still not always understood. The time lags to bring new capacities on stream were ignored and more emphasis was placed on political barriers to investments and trade. International relations in the 1970s were tense as a result.<sup>2</sup> The worries from that time were echoed in the more recent concerns. In the period between 2000 and 2008, demand was again outpacing supply. The emergence of China and other countries as large markets for resources stressed existing capacities. Again political factors were given more emphasis than economic and technical ones. The reports on critical energy and mineral resources repeat the same arguments from those in the 1970s.<sup>3</sup> The fact that the emerging countries not only entered the market as a consumer of resources, purchasing resources from the incumbent private and state companies, but also began to invest heavily through their own state companies, catalyzed the discussion on the emergence of a new regime in which state capitalism is more central. The new state company entrants in the resource sectors around the world benefitted from support of their home government through cheap capital and government-to-government side agreements, while particularly private international companies were scrutinized closely by capital markets and home governments to not engage in not transparent trade practises with host governments. The ‘competitive’ disadvantage of the incumbent firms to gain access to new resources thus depends on the internal governance system of states and the ability of the international community to enforce the mores of the system on these states. The new entrants were

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<sup>1</sup> See ‘Resource Fact Sheets’ in Annex 2 of POLINARES D2.1 report for data on production and consumption for various energy and mineral resources including oil, gas, coal, uranium, platinum group metals, tantalum, rare earths, lithium, cobalt and copper.

<sup>2</sup> Bassam Fattouh and Coby van der Linde, *Twenty Years of Producer-Consumer Dialogue in a Changing World*, IEF, p. 23-37, available at [www.ief.org/resources/files/content/about-ief/ief-history-book.pdf](http://www.ief.org/resources/files/content/about-ief/ief-history-book.pdf).

<sup>3</sup> Bram Buijs and Henrike Sievers, ‘Critical Thinking about Critical Minerals’, in: *Clingendael International Energy Programme (CIEP) Briefing Paper* (November 2011),

forced to gain access to the international resource sector in states that were deemed to be political and economically risky by the incumbents or their home governments. Some of these states were failing or resisted abiding by the international mores of the system (liberal capitalism) and saw the interests of the new entrants as an opportunity to capture rents that could not be reaped before. How sustainable a portfolio of such resources is for a country, which is fast integrating in the international economy remains to be seen. Increasingly countries such as China are called on to invest in the governance of the international system or lose some of the benefits of participation.

How these dynamics will translate in the future is unclear. The future world images (FWIs) that have been developed for POLINARES create a framework of analysis for the various combinations of state and economy driven futures with more or less international orientations. These sketch the future context in which the resource sector can or cannot develop. From these, both political and economic resource risks are derived for the world and the EU in particular.

### ***Five key themes***

To structure our analysis of the *current and recent practices and strategies of key actors* and the *assessment of major future risks for tension and conflict*, we have chosen to highlight developments through the lens of five major themes, which will illustrate recent trends and can signal future risks and sources of tension. The themes that we have chosen for this purpose are the following:

- **Access to energy & mineral markets and the role of institutions and governance**
- **Trade and rent distribution in energy and mineral value chains**
- **State and private ownership drivers**
- **Technology**
- **Recent developments in the aftermath of the financial and economic crisis of 2008/2009**

In these five themes we try to estimate the impact of major developments in the energy and mineral markets on the behaviour of key governmental and corporate actors in the energy and mineral markets. For this analysis, the Cases of part III are important sources of information. In Part II the identified major trends and strategies are extrapolated in the POLINARES WP3 Future World Images.

The first theme ***Access to energy & mineral markets and the role of institutions and governance*** has been chosen to investigate the relation between global governance issues, national governance and resource markets and availability. Producer-consumer dialogue and the functioning and effectiveness of global institutions play a major role in resolving or mitigating tensions, and avoiding the rise of such issues to the level of direct (inter-state) tensions or conflict. The key issue in this theme revolves around the seemingly increasing mismatch between institutional arrangements of energy and mineral markets and current and recent trends of geo-political and geo-economic power distribution.

The second theme ***Trade and rent distribution in energy and mineral value chains*** discusses the changing nature of energy and mineral trade, related capital flows and the changing distribution of rents in the value chain. In particular we attempt to assess the effects on the organisation of the sectors of the shift in collecting economic rents in the upstream part of the value chain. These are due to demand pressures, regulation and financialisation of energy and mineral resource markets. Subsequently, an assessment of the present and recent practices and strategies of key actors in the

redistribution of these trade and capital symmetries will be made, also called “recycling of petrodollars”.

The third theme *State and Private Ownership drivers on the energy and mineral value chains* examines the changing nature of rent maximizing and investment drivers and risk management strategies of state and privately owned companies relating to challenges in the energy and mineral sectors, as also described in WP3 theme 1 and WP3 theme 2. Important here is the diverging strategies of the state- and privately owned companies, especially with regard to integration along the value chain and the method with which to create demand and supply security in a world in which producing and consuming countries are more and more on opposite sides.

The fourth theme *Technology* acts as the dark horse of the WP3 themes in that it tries to assess through examples what the effect of technological changes and technology diffusion has been on global resource markets. The key issue is the potential for rapidly improving the cost-performance of different energy technologies.

The fifth theme *The aftermath of the financial and economic crisis of 2008/2009* explores the impact of this crisis and the recent developments in energy markets. With fragile economic growth in OECD countries and a deceleration of growth in emerging economies, oil prices are nevertheless very high, and can potentially delay economic recovery and change the renewable energy dynamics. The post-crisis policy dynamics in various countries and the policy space for different approaches is important with regard to the exploration of the future of international relations.

The main question of the WP3 themes of the *current and recent practices and strategies of key actors* thus pertains to the interaction between the developments in policy-making and the varying drivers for private and public actors in global energy and mineral markets.

## **Theme 1: Access to energy & mineral markets and the role of institutions and governance**

In this WP3 theme on access to energy and mineral markets and the role of institutions and governance, we focus on the shift in global multilateral (energy) governance system affecting the global level playing field, especially with respect to access to energy and mineral resources. The main rationale for this theme is that the interrelation between an institutional governance framework and access to energy and mineral resources affects the level playing field of (state and private) market participants. An unequal playing field of market participants trying to access upstream resources has the potential to lower negatively affect market efficiency and less efficient allocation of productivity factors.

In this theme we look at the relation between governance issues, national energy policy priorities and access to resources.

### ***Market Division***

From the WP2 “Criticality study”, segmentation of the market is identified as one of the main areas of concern in analysing resource scarcity and criticality.<sup>4</sup> The issue here is discrimination with regard to access to resources and markets of major players in different markets. Examples include:

- Different internal/external pricing of resources for different countries
- Unequal access to crisis mechanisms in case of a supply disruption and the subsequent asymmetrical impact of a supply disruption on the economy
- Discriminatory market access or investment opportunities

### **Shifts in the energy and mineral governance framework: a transition phase**

With changing geopolitical and geo-economic distribution of power globally from the early 2000s onwards, we see a the shift in “regimes” from a “liberal capitalist” towards a regime with more state capitalist characteristics, as identified by POLINARES WP1.<sup>5</sup> The “liberal capitalist” regime, which prevailed in the 1980s until the first decade of the 2000s, endeavoured to establish open and deregulated energy and mineral markets. Such a market would facilitate economic rents also to be captured downstream in the value chain, while multilateral institutions and global legal norms could guarantee the free flow of the resources globally. The main assumption was that energy and mineral resources were cheap and abundantly available. At some time, this was expressed by the term “commoditization of oil”, implying that energy and minerals would become cheaper and would reduce the market power of organizations such as OPEC. Although the energy consumer markets in the US and Europe liberalised, other markets did not, and access to markets and resources remained segmented. In minerals, access to resources and markets was less problematic, although the oligopolistic structure of many of these markets created their own issues. Nevertheless, national companies played a much less prominent role.

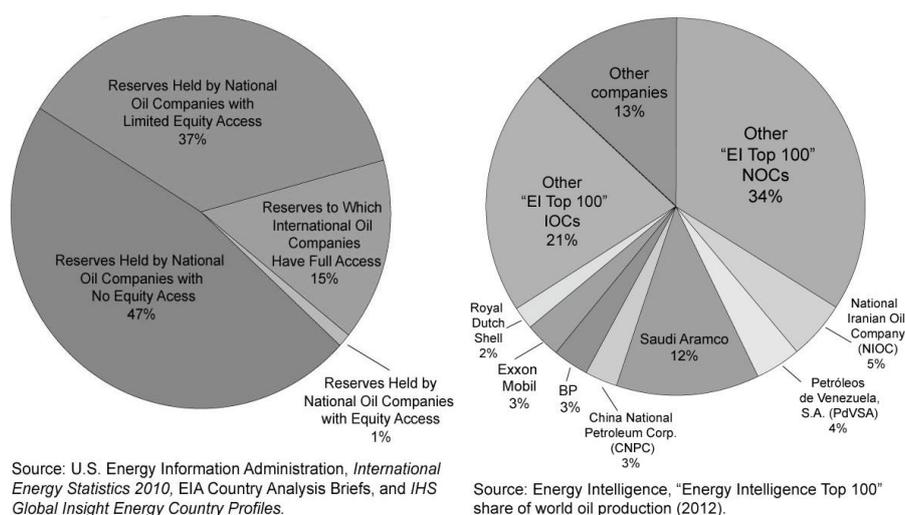
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<sup>4</sup> Bram Buijs and Henrike Sievers, ‘Critical Thinking about Critical Minerals’, in: *Clingendael International Energy Programme (CIEP) Briefing Paper* (November 2011),

<sup>5</sup> For POLINARES WP1, visit: [http://www.polinares.eu/publications\\_deliverables\\_d1\\_1.html](http://www.polinares.eu/publications_deliverables_d1_1.html)

The rise of new demand centres from non-OECD Emerging Economies in the early 2000s changed the preconceptions on which the “liberal capitalist”-regime was based when national companies, in particular from China and to a lesser extent India and Brazil, sought access to resources but at the same time were reluctant to open their markets. The latter two countries began to stimulate domestic companies and/or national companies, while in China’s case national companies expanded abroad while the domestic market remained fairly closed. At the same time, resource development in countries such as Qatar, Russia and Brazil was reserved for national capital, sometimes in joint venture with international companies with a minority stake. For instance, two national companies holding a majority share and IOCs in minority positions developed the North gas field in Qatar. In Russia, the government increased its share in oil and gas developments and exports, while foreign investors had some difficulty developing their assets.<sup>6</sup> The rise of national companies in international resource investments changed the playing field for IOCs when governments began to support the entry of national companies with accompanying economic programmes. As a result, access to energy resources for international direct investments was limited. National Oil Companies, as a result, dominate both oil reserves and oil production (see Figure 1).<sup>7</sup>

**Figure 1: Shares of World Oil Reserves Access (2010)  
and Shares of World Oil Production by type of Company (2010)**



This practise of government support was not new, western countries had done this before them, but in the liberal capitalist period, the political and economic link between companies and their home countries had become weaker as part of the new liberal regime. The rise of new players on the international market for resources, willing to use also political instruments, was perceived as running counter to the liberalist goals. From the perspective of the national companies, they needed to establish their international reputation to gain access and needed additional support to be successful. Initially, this access was gained in countries that were deemed a political risk by IOCs, but when the emerging

<sup>6</sup> See also POLINARES WP3 Case study 1 by Locatelli, C. & Rossiaud, S. (CNRS), ‘Russia, institutionalism and the effect on oil and gas investments’ (2012).

<sup>7</sup> See also Valérie Marcel, John Mitchell, *Oil Titans: National Oil Companies in the Middle East*, Chatham House/ Brookings Institutions Press, London/Washington, D.C., (2006).

country companies began to compete also in more attractive regions, the support from national companies home governments was seen as unfair. One of the reasons of the national companies' success was that investment recipient countries could circumvent the strict norms of the liberal capitalist world.

In short, we see a shift from a US dominated trade regime to a multi-polar world in which Emerging Markets such as China, India and Brazil wield increasing political and economic power to gain entry to resources and markets, while exploiting their control over domestic resources and markets. Their growing political and economic power is mainly based on their extraordinary domestic economic growth figures compared to the mature OECD-countries in the same period. The fact that South-South relations, as they are also referred to, could expand so rapidly and under different rules and norms is also an indication that the liberal capitalist regime was not embraced globally but rather more typical for the OECD countries. Yet, also in some OECD countries the intensity or depth of the liberal capitalist regime varies, as we have learned after the financial and economic crisis. Many countries harbour hybrid approaches, among which the liberal capitalist is one, but not always the only one. This can be seen as part of an incomplete process of liberalisation, but also as continued resistance in some countries to apply the liberalist rules throughout the economy. Nevertheless, the rapid rise of the Emerging Market and their successes seriously questioned the benefits of the liberal capitalist approach as a one size fits all. As a result, the preferences in economic and political governance of more powers need to be taken into account.

Energy and mineral markets were also affected by the shift from a predominant “liberal capitalist” based rule-set to a rule-set more influenced by state-capitalist tendencies.<sup>8</sup> Rising demand from the Emerging Markets tightened energy and mineral markets resulting in rising energy and mineral prices, and impacting the existing regime in three ways. First, rising prices and continuing demand pressures sparked fear among consumers – unaccustomed to a world in which energy and mineral resources are not abundantly available – about supply shortages and overall security. Second, rising windfall profits for energy and mineral companies attracted the attention of governments from producing countries, the ultimate owners of the sources (except in the US) demanding a greater share of the spoils. Third, consumer country uneasiness about security of supply resulted in certain national companies to secure upstream resources rather than source on international markets, reverting to backward integration to secure flows. For instance, the increasing activities of Chinese state-owned enterprises in resource rich African countries acquiring “equity-oil” stakes in resources secured oil flows for the company and the country. Much earlier, French and Italian national oil companies had also attempted this vertical integration strategy, but they had not been very successful in securing sufficient flows.<sup>9</sup> The fact that national companies again attempt to gain access to resources and markets is not new. The fact that particularly China is not expected to liberalise and privatise its national companies any time soon and that a western style democratisation is also deemed far away has raised qualms among the OECD countries and companies originating in these countries about the strength of the dominant regime to enforce its rules. These qualms have to do with the sheer size of the Chinese economy and the

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<sup>8</sup> Richard Stubbs and Geoffrey Underhill, *Political Economy and the Changing Global Order*, London, MacMillan, (1994); Daniel Yergin, *The Quest*, Allen Lane, London, (2011); Andreas Goldthau and Jan Martin Witte (eds.), *Global Energy Governance, The New Rules of the Game*, Brookings/GPPI, (2010).

<sup>9</sup> Anthony Sampson, *The Seven Sisters, The Great Oil Companies and the World They Shaped*, Viking Press, New York, (1975).

expected impact its integration in the world economy will have on the liberal regime. Instead, a different regime involving state-capitalist characteristics, as WP1 describes it, is expected to develop.

With the described pressures on the prevailing governance framework, including national governments increasingly active as market participants themselves instead of supporting the multilateral governance framework, we see a loosening of the embedded formal institutions (norms, beliefs and ideas) and institutional environment (less use and power of multilateral organisations, increasing mistrust between market participants, higher insurance premiums for international trade). The tendency towards a more bilateral set-up of economic relations is well captured by Heydon and Woolcock (2009) in which they argue that:

*“Preferential trade agreements (PTAs) conducted on a bilateral basis have become the centrepiece of trade diplomacy. With multilateral negotiations becoming increasingly complex and protracted, trade deals among selected partners are seen, rightly or wrongly, to hold the promise of quick and comprehensive improvements in market access and rules for trade and investment.”<sup>10</sup>*

### ***Searching for a new equilibrium in access to resources?***

The key transformations in the 2000s have been: (1) high (non-OECD) economic growth and improved living standards, and the subsequent growth of non-OECD energy and mineral demand (2) the shift in international energy and mineral trade flows mainly towards Asia, (3) rise of (consumer) State owned companies, (4) new supply sources from, among others, the Former Soviet Union, Latin America and Australia, (5) the growing importance of certain minerals in renewable energy technologies, and (6) the increasing import-dependency of Europe and some large Asian countries, implying larger interregional trade flows. These changes led to a rising importance of new energy and mineral players outside of traditional institutional frameworks, such as for instance the IEA and OPEC in energy. Three items here are important to take into account. First, the shifting interests of new key market participants. Second, market dynamics challenges existing institutional frameworks in facilitating changes. Third, stickiness of institutional frameworks results in a less coherent and effective institutional framework in energy and mineral markets.

### **Shifting interests of changing key actors**

The ongoing debate in the international energy and mineral sectors is underpinned by several trends in the changing interest of key actors. First, as discussed, the surge in demand for primary energy and mineral resources from emerging countries, as described in POLINARES WP2, made producing countries more aware of the market power of emerging countries. The rapid growth of demand in these countries shifted the share of total consumption away from OECD countries, increasing their importance in international economic relations. Moreover, the expansion of demand also provided producers with a more dynamic alternative to the more sedately growing markets of the OECD countries. Moreover, the downstream assets of the IOCs were located in the OECD markets or producing countries, not in the emerging countries. Second, under the tight market conditions in the 2000s, economic rents began to shift on the value chains towards the upstream part (see POLINARES WP3 theme 2), and market power of producers grew. As a result, the supply perspective in market

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<sup>10</sup> Kenneth Heydon and Stephen Woolcock, *The rise of bilateralism: Comparing American, European and Asian approaches to preferential trade agreements* (New York 2009).

relations gained prominence at the detriment of the power of companies of consuming countries in terms of contract negotiations, investment perspective and also access to resources. If technology or investment capital was not an issue, accessing the new and rapidly expanding markets in Asia through the IOCs was not logical. Because national companies owned the downstream parts, the IOCs could not always offer market access and the accompanying security of demand for producing countries. Instead the national companies of producing countries dealt directly with their counterparts in the emerging countries.

The strategic energy relationship between China and Saudi Arabia, for instance, spans all parts of the energy value chain in different forms. China is currently the largest customer of Saudi crude oil. In China, for instance, the Chinese oil company Sinopec works together with Saudi Aramco and Saudi Basic Industries Company (SABIC) on the development of downstream oil assets, such as the 3.5 Billion USD Fujian and Shandong refinery and petrochemical complexes, while Sinopec is now partnering in the Yanbu refinery, instead of ConocoPhillips. These cross-investments in the energy sector are supplemented by more traditional bilateral trade arrangements in goods and services such as telecommunications, engineering and construction, vehicles and a wide range of consumer products, as well as military sales.

The environmental debate is a third development that has influenced the dynamics between important actors. Particularly the European Union pushed for a multilateral agreement on the reduction of CO<sub>2</sub> emissions. Producing countries feared that such an agreement would greatly impact on their income from exports, while emerging countries were concerned that it would reduce their ability to grow, creating a shared interest in preventing such an agreement to come about in the near term.<sup>11</sup> Policies to further the introduction of renewable fuels in part to combat climate change and in part to diversify away from imported fossil fuels, challenged the interests of fossil energy producing countries, but also created opportunities for countries with biofuel and biomass potential. The group of OECD countries was divided in this debate, with resource rich countries, such as Australia and the US, taking a different view from the EU. While a multilateral agreement did not come about, various countries began to help their renewable industries to gain a foothold in the market.

With tighter market conditions in the 2000s, the new strategic alliances strengthened the ties between the emerging countries and the producing countries, while renewable industries gained prominence in consumer countries for their ability to diversify away from imported fossil fuels. With the shifting interests and preferences of the significant market participants, such as China and producers, the traditional security of supply and demand discussion changed as well, replacing the traditional OECD and OPEC agenda of the earlier years.

### **Challenged institutional frameworks**

With new entrants rapidly gaining traction in the energy and mineral market with their own business models, which rely less on the open market (for instance vertical integration along the supply and value chain), the dominant principles of the energy and mineral markets were impacted. The perspectives and interests of mainly OECD countries had shaped most of the institutional arrangements, which also govern mineral and to some extent energy trade relations. In energy these

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<sup>11</sup> See also theme 5 on “Recent developments in the aftermath of the financial and economic crisis of 2008/2009”.

relations were shaped by the interaction of OECD countries, organised in the IEA, and the OPEC. In addition, the emergence of China as a large net exporter to the rest of the world and the growth of international capital markets also challenged the global institutions governing trade and balance of payments relations, the WTO and IMF respectively. The integration of China, but also India, two very large sovereigns, is bound to change the international system itself.<sup>12</sup>

The IMF and WTO (preceded by GATT) were founded to govern post-WWII international economic relations. With the failure of the Bretton Woods exchange rate regime in the early 1970s, the IMF's main task was to assist countries in restoring fundamental balance of payment deficits, while WTO had replaced GATT in the late 1980s to include more services in addition to trade in goods. The inclusion in the 1990s of the former centrally planned economies such as China was meant to facilitate its transition to a market based economy. Instead, China developed its own model of competition (among state owned companies) and insisted on controlling trade and investments abroad. Just like the opening up of Japan had run into difficulties because of the organisation of the domestic economy, making access to the Japanese market difficult for foreign investors despite the fact that Japan complied with all the trade rules, access to the Chinese market remains complicated despite China's membership of the WTO.

With these institutions trying to uphold economic relations based on the OECD rule-set, promoting free liberalised trade and capital balances and the most-favoured nation principle, increasingly the interests and preferences of a larger and new contingent of countries is being neglected. As a result, we see that emerging countries are setting up their own parallel governance systems that reflect the terms and conditions that they deem important, and as reflected in the increasing number of preferential trade agreements (PTA) between emerging countries and their supplier and off takers. Three examples can illustrate the recent and current changes in and challenges to existing institutional arrangements.

First, the discussion between the European Union and Russia on market design of resource markets, or on for instance the Energy Charter Treaty (ECT), explains the rising prominence of demands from emerging markets. Russia's decision to unilaterally revoke its signature from the ECT in July 2009 signalled Russia's unease with the overall liberal capitalist or GATT/WTO inspired design of the ECT (as created in 1991) that embodies the institutional mindset of the European stakeholders in the ECT.<sup>13</sup> It also testifies the antagonistic position of the Russian state to any internationally prevailing rule of law.

For Russia, the WP3 case 'Russia, Institutionalism and the Effect on Investments' by POLINARES partners CNRS and OSW, argues that *"the two "institutional shocks" of the nineties (the transition process in the case of Russia and the liberalization process of the energy markets in the case of EU) has opened a period of instability, or at the very least of conflict relative to the organizational and institutional framework structuring the interdependence between Russia and the EU. Two models of*

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<sup>12</sup> Robert Gilpin, *Global Political Economy: Understanding the International Economic Order* ( New York 2001),

<sup>13</sup> For further detail on this topic, see: Christof van Agt, 'Tabula Russia', in: *Clingendael International Energy Programme* (September 2009),

*organization are in opposition at international level for defining the norms and standards structuring the organization of the industry and the interdependence between EU and Russia.*'<sup>14</sup>

Second, another well described example of growing prominence of emerging countries and increasing bilateralisation of international trade relations is the presence of China in Africa, and especially Angola.<sup>15</sup> With China being Angola's largest off taker of crude oil and other energy and mineral resources and Angola being China's number three source of imported crude oil, one wonders what economic logic applies in an open and globalised market which compelled China to set up intense and unequal trade relations with the relatively weak state of Angola. With various energy resources closer (lower transport costs) to China than Angola, like the Middle East, Australia and East Africa with ample additional volumes to be produced, you can question the economic rationale of large Chinese equity stakes in energy and mineral deposits in Angola in exchange for cash and infrastructure projects. While part of these resources is sold to the open market, most is dedicated for the Chinese market under long-term supply contracts. This strategy fits in the notion that governments use their NOCs to further their wider economic and political interests.<sup>16</sup> Interestingly, Angola joined OPEC and thus brought its production level to some degree under the cooperative decision-making of that organisation and perhaps diluting the influence of China over production decisions. The apparent lock-in of Angolan production for the Chinese market lowers prospective access to resources for other more market based operators, just as the wider political and economic obligations of NOCs questions the ability of these companies to invest efficiently in new resource developments.<sup>17</sup> Cases brought before the WTO about this market segmentation of Angolan resources and production do not change the tight Chinese – Angolan energy and mineral trade relations.

Third, the discussions about Chinese accession to the IEA resemble to some degree the uneasiness of incumbent stakeholders towards the growing prominence of emerging markets in energy and mineral markets. With China being the main demand growth driver for energy and mineral resources and declining market power for OECD countries, it is debatable whether the IEA without China will remain the prime OPEC counterpart in discussions on oil in particular and energy in general.

Energy-specific institutions, in a situation of an increasingly fragmented global institutional framework, have a hard time facilitating and arranging meaningful consumer – producer dialogues. With the IEA for the first time in its existence using oil releases, in May 2011, from strategic OECD oil stocks to influence markets and market behaviour after a stand-off with its counterpart OPEC, the International Energy Forum (IEF) is given the thankless task of mediation.<sup>18</sup> As the IEA is increasingly not representing the bulk of the energy demand, it is the question whether OPEC take heed from the OECD (IEA) countries or will instead turn to consumers from emerging countries.

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<sup>14</sup> POLINARES WP3 Case Study 1 by CNRS and OSW, 'Russia, Institutionalism and the Effect on Investments' (March 2012)

<sup>15</sup> Kenneth Heydon and Stephen Woolcock, *The rise of bilateralism: Comparing American, European and Asian approaches to preferential trade agreements* (New York 2009).

<sup>16</sup> Valerie Marcel and John Mitchell, *Oil Titans, National Oil Companies in the Middle East*, Royal Institute of International Affairs, Chatham House/ Brookings Institutions Press, London/Washington, D.C., (2006).

<sup>17</sup> Amy Myers Jaffe and Ronald Sligo, State-backed Financing in Oil and Gas Projects, in: Andreas Goldthau and Jan Martin Witte (eds.), *Global Energy Governance, The New Rules of the Game*, Brookings/GPPI, 2010, p.109.

<sup>18</sup> Bassam Fattouh and Coby van der Linde, *Twenty Years of Producer-Consumer Dialogue in a Changing World*, IEF (2011), also available at [www.ief.org/\\_resources/files/content/about-ief/ief-history-book.pdf](http://www.ief.org/_resources/files/content/about-ief/ief-history-book.pdf)

However, we also see renewed alignment between actors at various institutional levels. For instance, the level of cooperation between individual countries along the energy and mineral value chains, with for instance intense Saudi - Chinese cooperation in the refining and marketing part of the oil and gas value chains, is rising. Such cooperation seems on the rise when confidence in the multilateral arrangements furthering a country's special interests is in decline, while the ability to repair confidence through bilateral relations impedes institutional renewal to bring these interests on board. It is therefore not the question whether institutional arrangements will break down, but how inefficient international market participants allow it to become in its transition to a new equilibrium.

### **The Risks: Institutional asymmetries and access to energy and mineral resources**

The agility of an institutional framework to adjust itself to changing circumstances in international economic relations, albeit explicitly via a legal setting or implicitly via converging norms and values eventually determines its longevity and effectiveness. Currently, we see that global (WTO / UN / Kyoto) and resource market specific (ECT / OPEC / IEA) institutional arrangements have a hard time accommodating and articulating the changes in the energy and mineral markets.<sup>19</sup>

The stickiness of global and sector specific institutional arrangements in responding to changing market structures and the subsequent inability to articulate and govern the interests of new market players can cause fragmentation of the global market. A growing institutional misfit between top-down energy policymaking and bottom-up strategies of state and market participants with regard to access to energy and mineral resources emerges, stimulating competing formal or informal arrangements which benefit the special interests of the participants. Such developments signal the inability of institutions to accommodate emerging countries' interests properly and the boundaries of the liberal economic model to subordinate state interests to the OECD market economies' logic of economic efficiency. Discussions about the way the international economic order benefits some countries and not others have been recurring repeatedly. In the 1970s, developing countries called for a new international economic order, now the emerging countries respond by insisting on their domestic economic governance models and open up strategically when domestic capital is strong enough to compete. Establishing strong links along the (international) value chain is part of the strategy to build stronger sectors domestically and to gain access to international capital, knowledge and resources.

History has shown that only a few countries at a time manage to integrate successfully, changing their position in the international system in terms of wealth and power.<sup>20</sup> The emergence of China and others will impact the governance system in many ways, including the way trade and investment flows develop. The inability of the current international institutions to adapt to the new realities could either become a source of tension among major powers trying to get the upper hand in redefining the mandates or make certain institution irrelevant for the way international relations develop.

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<sup>19</sup> See for possible options on the future of the institutional energy framework: Noé van Hulst, *The Last Waltz: Reflections on Past and Future of the IEF* (2011),

<sup>20</sup> Louis Turner and Neil McMullen, *The Newly Industrializing Countries: Trade and Adjustment*, The Royal Institute of International Affairs, Allen & Unwin (1982); Peter Dicken, *Global Shift: Mapping the Changing Contours of the World Economy*, Sage Publications, London, (2007).

## Theme 2: Trade and rent distribution in energy and mineral value chains

This WP3 theme deals with changing energy and mineral trade, the related capital flows and the distribution of rents along the value chain. Three asymmetries play an important role. First, already alluded to in theme 1, there is a growing geographical dislocation between the main producing and consuming area's resulting in increased trade flows. Second, supply and (paper) demand pressures increasingly allocate more of the economic rents upstream in the energy and mineral value chains. Third, as a result of the first two trends we also see increasing monetary asymmetries between energy and mineral producing and consuming countries.

The behaviour and strategies of key producing and consuming actors in coping with the above mentioned geographical, rent and monetary imbalances in energy and mineral markets is an indication of the increasing difficulty in cooperation, of looming conflicts and higher dependence on institutional frameworks.

### *Rents moving upstream on Energy and Mineral Value Chains*

#### **Fundamental demand pressures**

The most important factors in the recent development of rents accruing more in the upstream part of the value chain are cyclical effects and changes in the supply and demand dynamics. From the early 2000s onwards, global energy and mineral markets had to deal with the growing impact of the extraordinary demand expansion in emerging countries, and in particular China. During what some analysts coined a "super-cycle", with demand growth outstripping supply, economic rents (profits above the risk adjusted rate of return) moved upstream on the value chain.<sup>21</sup> This is typical for a seller's market and reversed the trend of the period 1985-1998, where despite attempts of for instance OPEC to capture economic rents, they had been mainly collected in the downstream part of the oil value chain by consumer governments or companies active in that part of the value chain.<sup>22</sup>

In general, during tight market conditions when demand exceeds supply, prices will quite simply be bid up to levels that either draws more (high cost) production into the market or else, where this is not possible (because the supply simply isn't there and the cost curve is therefore vertical), go to whatever level is necessary to choke off the demand which cannot be satisfied. If there has been any interference in pricing here - pushing prices up further than the fundamentals would suggest necessary - it has very likely come not from producers' behaviour but from speculation.<sup>23</sup>

As a result, in the ramp up of energy and mineral prices from 2003 to 2008 and from 2010 onwards, low-cost producers were and are enjoying significant windfall profits. Additionally, the lag in new production capacity additions trying to meet short-term demand growth caused prices to rise even further until 2008, when the financial and economic crisis dampened demand and subsequently prices.

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<sup>21</sup> Bilge Erten and José Antonio Ocampo, 'Super-cycles of commodity prices since the mid-nineteenth century', in: *UN DESA Working Paper (2012)*,

<sup>22</sup> OPEC, *Who gets what from Imported Oil* (November 2011), [www.opec.org/opec\\_web/static\\_files\\_project/media/downloads/publications/WGWNovember2011.pdf](http://www.opec.org/opec_web/static_files_project/media/downloads/publications/WGWNovember2011.pdf)

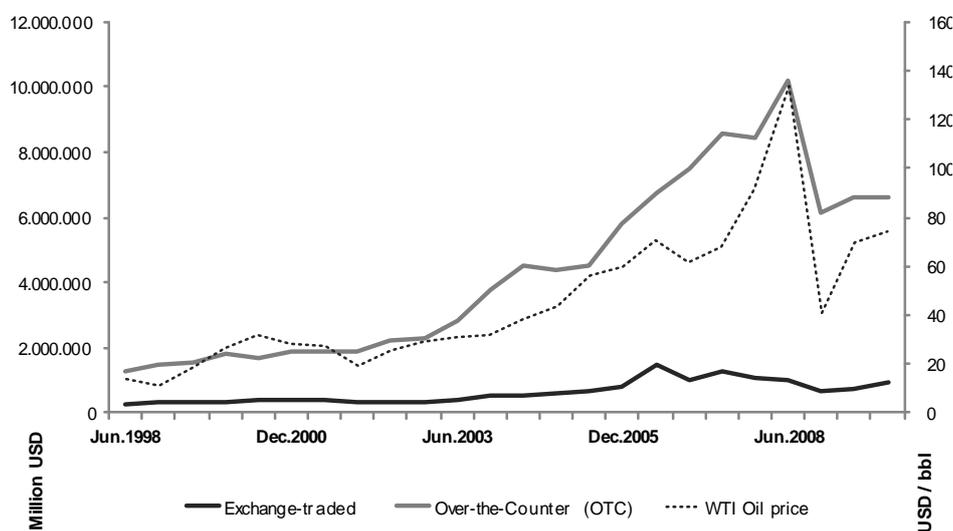
<sup>23</sup> David Humphreys, 'Pricing and Trading in Metals and Minerals', in: *Peter Darling (eds.) SME Mining Engineering Handbook* (2011),

The lag or “stickiness” of new production capacity and its impact on mineral markets is well described in WP3 theme 4 on investment and for minerals in the WP3 case 4, by David Humphreys.<sup>24</sup>

### “Paper” demand pressure

Apart from physical demand growth pushing prices up, there has been an expansion in paper demand for energy and mineral resources. There is a growing popularity of commodities (including some mature energy and mineral resources) as an alternative asset class in the portfolio of many institutional investors. This is shown for the oil market in Figure 2 in terms of paper oil volumes (in million USD). The increasing “long” paper positions of institutional investors are based on the future value of the particular resource. Especially the oil sector experienced the increasing “monetization” of oil flows, which has its up- and downsides.<sup>25</sup>

**Figure 2: Growing volumes of paper traded oil volumes (1998-2010)**



Source: Bank for International Settlements (BIS), EIA, CIEP Analysis (2011)

The simplistic understanding of the functioning of oil markets that the oil price is determined by present day demand and supply fundamentals (and expressed in the most liquid currency available, the US dollar (USD)), is increasingly replaced by the expectation of fundamentals, the expected value of the expressed currency (USD), expectations of traders / investors and expectations of expectations.<sup>26</sup> With natural resources increasingly becoming an investment class, in essence a forward looking exercise, paper positions derived from expected physical quantities of natural resources play an increasing role in the pricing of natural resources and investment climate (as will be dealt with in theme 4) of energy and mineral markets.

<sup>24</sup> David Humphreys, ‘The causes and consequences of capacity ‘overshoot’ in mining’, *POLINARES WP3 case 4* (2011),

<sup>25</sup> Among others: Ke Tank and Wei Xiong, ‘Index investment and financialization of commodities’, in: *NBER Working Paper 16385* (2010), Giacomo Luciani, ‘The functioning of the international oil markets and its security implications’, in: *CEPS working document 351* (2011),

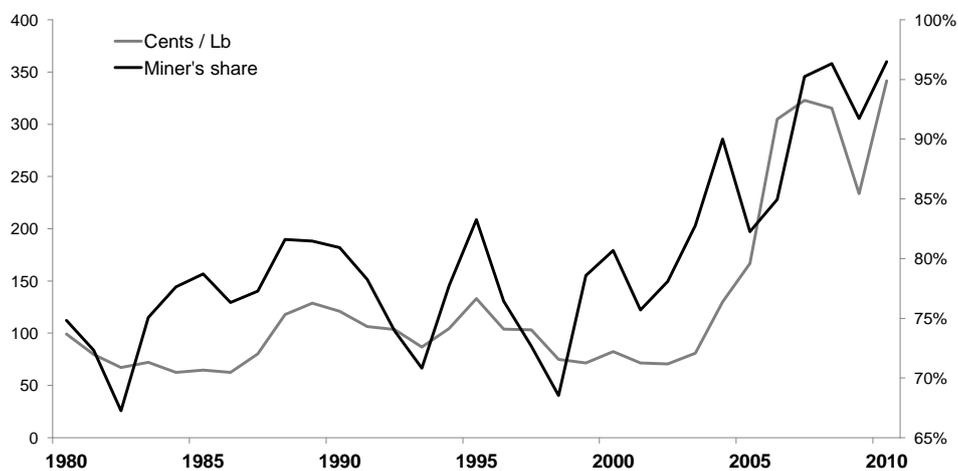
<sup>26</sup> Giacomo Luciani, ‘The functioning of the international oil markets and its security implications’, in: *CEPS working document 351* (2011),

Additionally, the popularity of momentum trading, whereby traders focus on prices that are moving significantly in one direction on high volume instead of the intrinsic value of a commodity due to fundamentals, increases the role of expectations in the price determination of commodities. As a result, financialisation amplifies – not causes – oscillations and undermines confidence in any concept of long-term price equilibrium.<sup>27</sup> As a result, the increasing transformation of commodities in a financial asset created a phenomenon of resonance and amplifies the structural instability of oil prices into wider and wider swings fuelled by momentum trading.

### Concentrated upstream reserves and diversified consumers

The industry structure has changed remarkably in the past period. New downstream capacity additions mainly took place in emerging and producing countries, introducing new players to the international market.<sup>28</sup> At the same time, capacity reductions in mature economies tends to decline slowly, allowing them first to benefit from growing demand in emerging countries, only to be confronted with new competition when capacities there expand. With domestic markets growing slowly, exports become a necessity to capture rents. Often, capacity downstream on the value chain tends to outstrip resource production capacity. For example, global oil refining capacity has, with exceptions, run at average global utilization rate of 87,2% from 1980 until 2010.<sup>29</sup> Including maintenance, this leaves the refining sector with a healthy surplus capacity. Also for metallic metals, there has been a tendency for metallurgical capacity to exceed mine capacity.<sup>30</sup>

**Figure 3: Copper prices and miners' share of revenues (1980-2010)**



Source: David Humphreys (2011)

<sup>27</sup> Giacomo Luciani, 'The functioning of the international oil markets and its security implications', in: *CEPS working document 351* (2011),

<sup>28</sup> See POLINARES WP3 Case study 3 by Rungi, A. (FEEM), 'Global value chains, state ownership and natural resources' (2012).

<sup>29</sup> BP, *Statistical review of world energy* (2011).

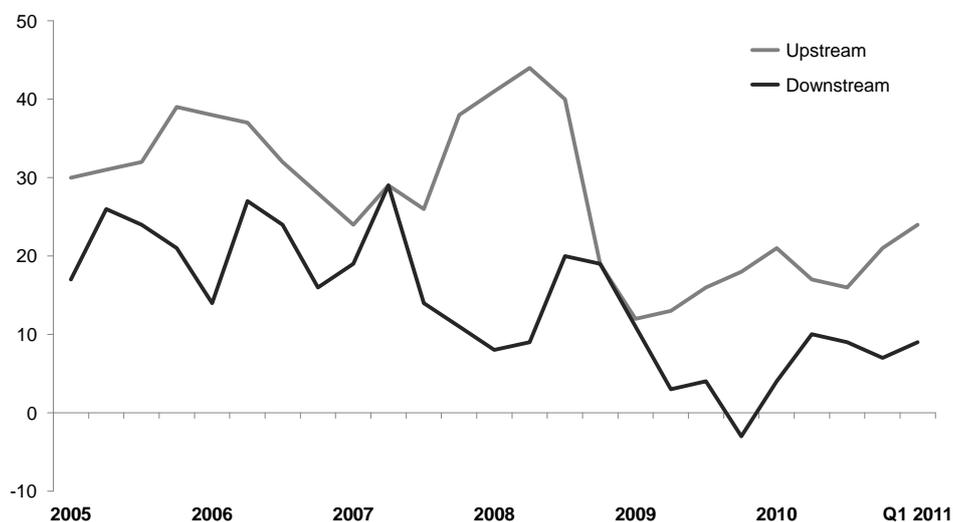
<sup>30</sup> David Humphreys, 'Pricing and Trading in Metals and Minerals', in: *Peter Darling (eds.) SME Mining Engineering Handbook* (2011),

As a result, under tight market conditions downstream metallurgic plants or oil refineries have to compete (almost to cost level) in order to acquire their feedstock, whether it is iron ore or oil. Producers naturally exploit the scarcity of their product during negotiations, pushing the economic rent up in their favour, while also governments want to capture their part of the rents. This is well illustrated by the copper market in which along with copper prices, we witnessed a rise in the share of revenues at the mine stage to a whopping 96% of the total copper price, which can be seen in Figure 3.

Investments have followed the rents to the upstream part of the value chain. In the oil industry, this is reflected by the Return on Average Capital Employed (ROACE), a key financial performance indicator for companies operating in the upstream and downstream part. As we can see in Figure 4, from 2005 until 2011 the ROACE in the upstream part of the value chain has (between 45 to 11%) consistently outperformed the ROACE for the downstream part of the oil value chain (between 29 and -3%).<sup>31</sup>

As a result of the changing structure of the industry and changing distribution of capacities over traditional and new countries, investments by the IOCs have become more concentrated on to the upstream part of the value chain. Although, IOC refinery capacities were restructured in the 2000s to follow the new demand structures in the world product markets, independent refiners purchased these capacities in Europe. After the financial and economic crisis of 2008/2009 and its aftermath the independent refiners ran into serious difficulties and closures followed. Only upgraded refinery complexes appear able to survive the current downturn.

**Figure 4: ROACE of the upstream and downstream part of the oil sector (2005-2011)**



Source: Barclays Equity Research (July 2011)

<sup>31</sup> Barclays Commodity Research, *Global Energy outlook: Oil upside, Rising CAPEX* (March 2012).

## Price regimes

Pricing regimes can also have an impact on the distribution of the rents on the value chain, as noted by Humphreys (2011).<sup>32</sup> In open and efficient market conditions most producers and consumers will respectively receive and pay the same price. However, under changing market conditions pricing regimes can change and result in (temporary) dislocations in prices. For instance, from 2008 onwards substantial volumes of Liquefied Natural Gas (LNG) traded on a spot price basis changed hands at a substantial discount to piped gas from, for instance Gazprom, whose gas contracts include an index to other commodities, in particular oil. This was mainly a result of significant additional volumes of LNG from Qatar entering market, coupled with lower demand for LNG volumes due to growing US shale gas production and the economic crisis.

Also the switch of sea-borne iron ore trading from yearly contracted prices to spot pricing as a result of the pressure from the actions of Chinese steel mills, resulted in a difference between spot versus contract prices. Buying of spot iron ore by small Chinese mills certainly helped destroy the contract market but the tendency was opposed by the larger mills and by CISA. From 2001 until 2008 spot cargoes for seaborne iron ore grew from 15% to 40% of total trade.<sup>33</sup> However, with regular renegotiations of contract prices it is expected that contracted prices will move to the prevailing spot price level during renegotiation. The lag in pricing can result in temporary dislocation of rents along the energy and mineral value chains, as happened in several market during the rise of prices until 2008 and fall (and rise) of prices from 2008 onwards.

## *Rent capturing, Petrodollar recycling 2.0, energy independence and alternatives*

Due to the maturity of markets in major OECD countries and the lack of market access in emerging countries, companies from OECD have increasingly moved their investments to the upstream part of the value chain, at least in energy. Stricter environmental regulations on process industries and high commodity prices made processing and distribution a more marginal business compared to production of the unprocessed resources, where technology and capital were able to fetch premiums in a market shielded for price declines by OPEC production policy. IOCs became particularly active in frontier developments in the deep offshore, arctic and tar sands in Canada. A new development is the production of shale oil in the US, an offshoot of the shale gas revolution in the US.<sup>34</sup>

## Upstream rent capturing in commodity boom times

From a producer's perspective, the main objective is and has been to capture and preserve as much of the upstream rents as possible. The discussion about the appropriation of rents between governments and companies is as old as the industry and includes the distribution of the risks and benefits in the various parts of the value chain. In international industries various governments and companies along

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<sup>32</sup> For definitions and discussion on different pricing systems, see also David Humphreys, 'Pricing and Trading in Metals and Minerals', in: *Peter Darling (eds.) SME Mining Engineering Handbook* (2011),

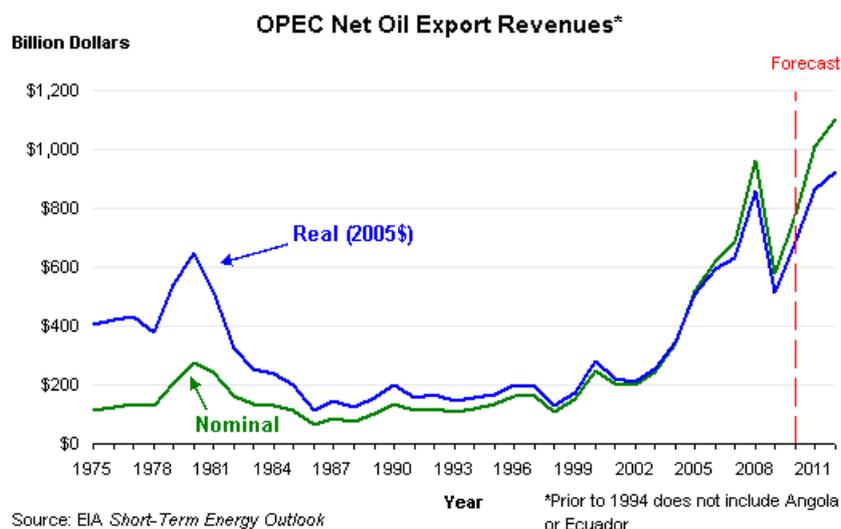
<sup>33</sup> Contributing factors include the (1) entry of new consumers, mainly steel mills from China, (2) the financial crisis which pushed spot prices under contract prices and (3) the politicization of the price negotiation process between the Big Tree (Rio Tinto, BHP Billiton, Vale) and the China Iron and Steel Association.

<sup>34</sup> Paul Stevens, *The 'Shale Gas Revolution': Hype and Reality*, Chatham House, September 2010, [www.chathamhouse.org/sites/default/files/public/Research/Energy.%20Environment%20and%20Development/r\\_0910stevens.pdf](http://www.chathamhouse.org/sites/default/files/public/Research/Energy.%20Environment%20and%20Development/r_0910stevens.pdf).

the value chain negotiate the distribution of rents. Consumer governments in many OECD countries tax final energy products. In oil, income from oil in consumer countries continued to be substantial, also in periods of a sellers market when producers capture more rents. OPEC countries have seen a substantial increase in oil revenues in the past decade however (see Figure 5).

The government of virtually every energy and mineral-producing country in the world has taken the opportunity presented by higher prices to raise taxes and royalties on the industry. In a few cases, governments have gone right to the source and appropriated the entire rent of producers through nationalization. Employees of mining companies have also sought to use the opportunity accorded by high prices and the leverage that this gives them to draw more of the benefits away from shareholders and management towards themselves, in some cases using the threat of shutting down the company's operations in order to do so.<sup>35</sup> The Organisation of the Petroleum Exporting Countries (OPEC) is a prime example of collaborated rent capturing that originated in the dissatisfaction of non-OECD oil producing countries in the 1960s and 1970s with the prices and related taxes the major oil companies were paying for crude oil, the so-called "posted price".<sup>36</sup>

**Figure 5: OPEC net Oil Export Revenues**



Source: EIA Energy briefs (2012)

The upward trend in energy and mineral prices in the 2000s has been followed by a parallel upward trend of the rate of taxes, the creation of new taxes aiming at capturing the "windfall profits" or, in some cases, a more systemic change in the form of the main taxes. For instance, one of the main rent capturing examples in the OECD area is the proposed May 2<sup>nd</sup>, 2010 Australian resource super profits tax (RSPT), a 40% tax on the profits generated by mining companies operating in Australia. Although this particular tax was killed off, another somewhat similar tax, the Mineral Resource Rent Tax

<sup>35</sup> David Humphreys, 'Pricing and Trading in Metals and Minerals', in: *Peter Darling (eds.) SME Mining Engineering Handbook* (2011),

<sup>36</sup> Oystein Noreng, *Crude Power, Politics and the Oil Market*, I.B. Tauris Publishers, London/New York, 2006.

(MRRT), will replace it on 1 July 2012.<sup>37</sup> In the non-OECD area, tightening regulation and state participation in major oil and gas fields of different CIS countries resemble rent-capturing strategies. For instance, the often forced enlargement in state participation of Russian state-owned enterprises (SOEs) in the product sharing agreements (PSAs) agreed on in the 1990s to develop major Russian oil and gas fields is a prime example, as Royal Dutch Shell experienced with Sakhalin II in 2007.<sup>38</sup> Also the increased participation of Kazmunaigaz (from 0 to 16,38%) in the offshore Kashagan project in the Kazakhstan part of the Caspian Sea is a good example of a government unhappy with the revenues from energy projects in a period of high prices.<sup>39</sup> Also China has introduced changes to its upstream resource tax for NOCs, from a fixed tax on oil and gas production to a percentage (5-10% of the value of oil and gas), in an attempt to raise local government income.<sup>40</sup>

However, it is difficult to assess, at a national and a global level, what the impact of this trend is on the future oil supply. In other words, it is difficult to assess for each country whether this trend can be considered as a “creeping expropriation” detrimental to future investments and production or whether these ex-post revisions can be considered as a “legitimate” answer underpinned by “government’s frustration with its relationship with foreign investors” (Mabro, 2008) and “may not matter right away” (Adelman, 1996).<sup>41</sup> Yet, in a period of high oil prices, investments in new capacity may not be impacted by this government behaviour, but, particularly in countries that are very depended on these incomes for government expenditure, NOC investments may suffer when other government priorities prevail. In periods of low prices bringing in other investors is tempting, only to change tack when prices rise.

### **Growing energy imbalance of payments**

The growing call of importing countries on imported energy and minerals, the balance of payment impact also increases. Oil, the main energy and mineral market in terms of volume, internationalization and fungibility, shows a growing regional imbalance of payments between the main oil import regions – North America, Europe, OECD-Pacific and Asia – and main oil export regions – Middle East, CIS, Africa and Latin America – in the period 2000-2010, as can be seen in Figure 6. In the period 2000- 2010, in parallel with rising oil prices, the global imbalance of oil payments grew from 787 Bn. USD to 1772 Bn. USD.

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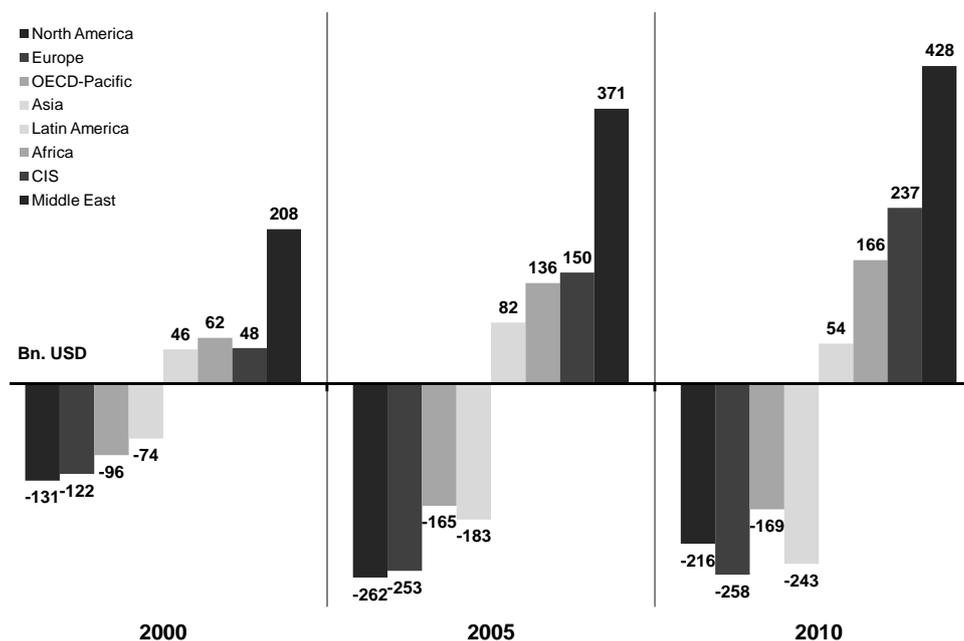
<sup>37</sup> UBS Investment Research, *Global Mining Taxation: Who will follow Australia’s lead?* (May 2010).

<sup>38</sup> In December 2006, after environmental and regulative charges the incumbent shareholders Shell, Mitsubishi and Mitsui sold a 51% equity stake of the Sakhalin II project to the Russian state gas company Gazprom. Andrew Kramer, ‘Shell cedes control of Sakhalin-2 to Gazprom’, in: *International Herald Tribune* (December 21, 2006); See also POLINARES WP3 Case study 1 by Catherine, C. and Sylvain Rossiaud, S. ‘Russia, institutionalism and the effect on oil and gas investments’ (2012).

<sup>39</sup> Nadia Campaner, Shamil Yenikeeff, *The Kashagan Field: A Test Case for Kazakhstan’s Governance of Its Oil and Gas Sector* (October 2008).

<sup>40</sup> Ernst & Young, *Global oil and gas tax guide 2011* (2011) 87.

<sup>41</sup> Catherine Locatelli, Sylvain Rossiaud, ‘A neo-institutionalist interpretation of the changes in the Russian oil model’, in: CNRS cahier de recherche (2011)

**Figure 6: Global oil imbalance of payments (2000-2010)**

Source: ENERDATA (2011)

Over time, we observe that in monetary terms Europe replaces the US as the main oil importer, but that Asia – and mainly China and India – has the fastest growing oil trade deficit. We can argue that Asia, as a result of its prolonged strong economic growth and low demand inelasticity due to domestic oil product subsidies, is most vulnerable in the future.<sup>42</sup> In North America and Europe we also see that taxes play a large role, whereby the US from 2005 – 2010 is more demand elastic than Europe and actually lowers its oil bill, while in Europe the oil bill continues to grow (albeit at a slower pace than from 2000-2005). Interestingly, with growing ‘domestic’ energy production (oil from Canada and shale gas from the US), North America is set to become less and less dependent on net imports of mainly energy resources.<sup>43</sup>

From an exporter perspective, it can be observed that the Middle East, CIS and Africa all post major increases in their oil export revenues and related surplus of payments. As especially energy and to a lesser extend mineral receipts from exports form a large part of the gross domestic product (GDP) and state revenue of oil and energy exporters, we find that over time countries rely predominantly on energy and mineral exports for their financial wellbeing, economic development and even political stability. This overreliance on windfall profits from natural resources and the induced structural weaknesses in the economy are well described in the literature as the ‘natural resource curse’.<sup>44</sup> One of the results is that without a diversified economic development, countries have a strong incentive to

<sup>42</sup> With this statement we assume a continuation of economic growth and domestic oil product price subsidies (which the Chinese are currently rolling back). In the POLINARES future world scenario’s

<sup>43</sup> Mineral resources here are of lower importance due to the lower volumes of physical and related monetary mineral trade flows.

<sup>44</sup> Jeffrey Frankel, ‘The Natural Resource Curse: A Survey’, in: *NBER Working Paper No. 15836* (2010)

continue energy and mineral exports and maintain their surplus or a general imbalance of payments. For example, in 2010 the oil price per barrel needed by Saudi Arabia to meet its state budget increased from around 70 USD/bbl to 89 USD/bbl.<sup>45</sup> This was due to higher wages for civil servants, social housing, higher subsidies for oil products and investments in infrastructure in order to suppress social instability after the Arab spring.<sup>46</sup> Thus the main oil exporter, Saudi Arabia, is highly incentivized to keep oil prices above 90 USD/bbl, effectively putting a floor under oil prices in the short term if demand holds at this price.

The example of oil here is used to show the imbalances for the largest and most international energy and mineral market available. For some mineral markets such as seaborne iron ore the insights from the oil market also apply. However, most mineral markets have less of an impact on the balance of payments and subsequently state revenues and budgets, although some individual countries would disagree. But overall we would like to state that for energy and mineral markets combined; the resource market induced imbalances do pose a challenge to institutional arrangements that govern behaviour of markets participant, state and private. The monetary impact can be very large indeed, impacting on exchange rates and the ability to compete in international markets of non-energy or mineral sectors.

### **Petrodollar recycling 2.0 and SWFs**

In the last decade, producing countries also changed the method in which they preserve the value of energy and mineral revenues on the medium to long term. In the 1970s, excess incomes from oil exports were largely recycled through western banks and to a much smaller extent through the IMF and World Bank.<sup>47</sup> They were recycled for relatively short periods of time in the expectation making of large investments in the domestic economy. However, inflation ate away the above ground value of oil. While the current capital flows have some similarities with the period 1973- early 1980s, there are also some major differences:

First, capital is predominantly managed in-house by Sovereign Wealth Funds (SWFs) often run by professional money managers, employing a diversified portfolio approach involving multiple asset classes such as equities, sovereign debt, commodities, direct investments (via private equity) and Real Estate. Historically, producing countries mainly bought equities and fixed income debt (sovereign and private) securities from OECD markets – for instance Eurodollar market in the 1980s – using investment and commercial banks that had access to these markets.

Second, with the surge in surplus balance of payments in the 2000s, net-exporting countries increasingly diversified their global portfolios.<sup>48</sup> Apart from the traditional debt securities from OECD countries, SWFs are increasingly buying physical assets abroad, including real estate, (energy) infrastructure and financial institutions. The FEEM database and Monitor shows that SWFs in 2010 allocated 9% of their total assets in direct investments. As shown in Figure 7, from 2000 until 2010, direct investments by SWFs grew significantly from 4 Bn. USD in 2000 to 109 Bn. USD in 2008 at

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<sup>45</sup> See also POLINARES WP3 Case study 2 by Giacomo Luciani, (GRCF), 'A case on MENA' (2012).

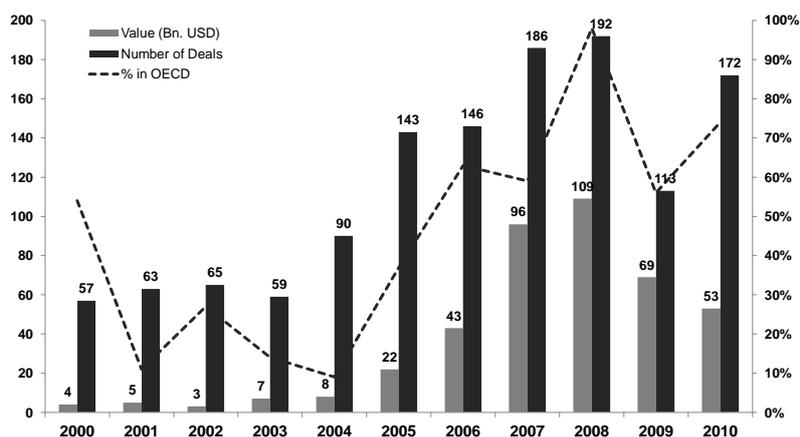
<sup>46</sup> Ali Aissaoui, 'Fiscal Break-even Prices : What More Could They Tell Us About OPEC Policy', in: *APICORP Economic Commentary* (2011).

<sup>47</sup> Terry Lynn Karl, *The Paradox of Plenty, Oil Booms and Petro-States*, University of California Press, Berkeley, 1997.

<sup>48</sup> FEEM, Monitor, *Braving the New World: SWF investment in the uncertain times of 2010* (2011).

the top of the investment peak and to 53 Bn. USD in 2010. Also the percentage of direct investments in the OECD region grew significantly, between 75 to 100% from 2008-2010. Around 20% of the direct investments are in the energy and mineral sector.<sup>49</sup>

**Figure 7: Direct investments by SWFs (2000 – 2010)**



Source: FEEM, Monitor Group (2011)

A prime example of the changing investment profile is the controversial acquisition of Dubai Ports (DP World) of the British firm P&O, which managed six US-ports, in February 2006.<sup>50</sup> The DP World controversy rose to prominence as a national security debate in the US. The OECD countries maintain an ambivalent position towards SWFs. On the one hand the relatively low transparency of SWFs make these countries suspicious of the motivations of their direct investments. On the other hand, SWFs are an increasingly important source of liquidity in a credit constrained post-crisis market environment.

From a net importer perspective, the relatively high price levels resulted in steep energy and mineral import bills (i.e. outflows on the Current Account) and inflows on the Capital Account (KA). In order to mitigate the energy and mineral import bill, consuming countries (1) reiterated their traditional aspiration to achieve “energy independence” and energy efficiency, and (2) pushed for a larger share of alternative and Renewable Energy Sources (RES). In the US, new fossil fuel developments may substantially reduce energy imports, while in Europe the share of renewables is increasing as a result of policy-making.

China is doing all it can to alleviate the pressures of energy and mineral imports on its Balance of Trade and to manage its Security of Supply by pushing for domestically produced coal, Renewable Energy Sources (RES) and possibly shale gas in the near future. For instance, 50% of current global Solar PV production capacity is located in China.

<sup>49</sup> FEEM, Monitor, *Braving the New World: SWF investment in the uncertain times of 2010* (2011).

<sup>50</sup> Stephen Zunes, ‘The Dubai Ports World Controversy: Jingoism or Legitimate Concerns?’, in: *Foreign Policy in Focus* (2006).

### ***Risks and rents***

Rent-seeking by companies and governments is as old as the resource industry. IOCs have been deft in capturing rents for a long time, adding technology and organisational capabilities to their attractiveness as investors. In oil, IOCs were separated from access to the cheapest to produce sources in the Middle East in the 1970s, turning them from crude-rich to crude-poor companies. From that time, their strategy was to develop new oil provinces, while maintaining a solid grip on the downstream part of the value chain. With the maturity of OECD markets for oil products and the growth of oil product demand to emerging countries, that strategy had to be adapted. The downstream industry in emerging countries is largely dominated by domestic companies, which are not open for foreign direct investments. The maturing downstream activities were consolidated in a round of mergers and acquisitions, while the upstream activities were intensified in the technological or organisational complex projects in the (deep) offshore, (semi) Arctic and unconventional oil and gas business. The economic rent on these projects is large.

National companies were keen to expand to the main markets for their products, and purchased capacities scrapped by international companies, while also developing capacities with other national companies in emerging countries. Forward vertical integration of national companies served to develop market outlets for their products, and create more value added for their crude or raw resources.

National companies from emerging countries increasingly engaged in backward vertical integration when the domestic sector could no longer satisfy domestic demand within the constraints of existing technologies or organisational capacities. Access to new technologies and organisational capabilities was achieved by participating in consortia with international companies.

Governments have always been active in capturing economic rents in resource sectors. Governments seek economic rents all along the value chain, including in transit countries. Their success in doing so depends on the market conditions and attractiveness for investors to develop and produce resources. In many countries, governments prefer to own resources rather than tax them. The distribution of risks and benefits along the value chain depends on both government policies and market circumstances. In a sellers' market, governments of producer countries may be able to generate more rents, while in a buyers market consumer governments could be more successful.

### **Theme 3: Energy and mineral market structures, ownership and market behaviour**

The energy and mineral markets have distinct characteristics that are important to understand the structure of the market and the market behaviour of the market participants. The first characteristic is that energy and mineral value chains cover more than one country and that often production and processing have become geographically separated. Energy and minerals are often organised in vertically integrated companies, although also horizontal integration takes place. In some cases, companies that originated in one part of the mineral or energy sector have developed into conglomerates, spanning several energy resources or minerals. The energy and mineral sector have gone through various phases of integration and de-integration, depending on their access to resources, technology and government policies. In this theme, the development of value chains and the type of owners and their strategies is investigated.

#### ***Integration and de-integration***

The energy and mineral sector share the long time lag between investment decision and first production and the capital intensity of certain parts of the value chain.<sup>51</sup> They often also share the growing distance between production and consumption, resulting in long distance shipping of resources, and a separation of the capital intense and labour intense parts of the value chain.

Access to open waters is important for both production and processing sites in order to benefit from integrated world markets. The concentration of steel mills in coal-rich regions characterised this sector in the past. With the internationalisation of coal and iron ore trade, investors can process their resources close to major markets for their products or when energy, labour or capital costs are important to gain a competitive edge locate there where they can make the most profitable combination of these production factors. In oil a similar development took place when refineries were relocated from the producing countries to the main markets for oil products. The separation of production and processing of resources took place largely between the 1950s and 1970s. New processing capacity in that period was mainly built in the OECD countries, relegating many producing countries to exporters of unprocessed resources compared to the semi-finished or finished products of the period before.

The long life of infrastructure and processing plants contributed to the fact that producing countries, despite their efforts to stimulate processing to take place in their economies, had difficulties to change the structure of the industry and add more value to resources at home. Very often these efforts were made more difficult by the protectionist policies of countries with a processing industry. The expansion of refining and petrochemical industries in oil producing countries after the oil price increases of 1973/74 and 1979/80 was hindered by the lack of market access in the main consumer markets where industry had successfully lobbied for protection. Such protection shielded less

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<sup>51</sup> POLINARES WP3 Case study 4 by Humphreys, D. 'The causes and consequences of capacity 'overshoot' in mining' (2012) and David Humphreys, 'Pricing and Trading in Metals and Minerals', in: *Peter Darling (eds.) SME Mining Engineering Handbook* (2011),

competitive companies from an influx of cheaper products on the market. The argument was that they needed protection to restructure their activities, which by hindsight could take decades, as long as the capital stock was not amortised. Ironically, the new plants in producing countries were often joint ventures of the same IOCs that had major plants in the consumer markets. The joint ventures were with the NOCs.

International companies or multinationals developed the resource sectors in many countries. They often dated back to colonial times and continued their activities afterwards. In the 1950s and 1960s, mineral and energy international companies were subject of a heated debate about the benefits of their activities for the resource holding country. Apart from North America, most mineral and energy producing countries at that time were developing countries. They saw most of the economic rents and profits disappear abroad, to the shareholders of the companies and/or the consumer government tax coffers. The oil crisis of 1973 was significant for all resource sectors in the sense that the nationalisation of the oil reserves and production assets of the IOCs was a signal for other governments to also actively pursue rent-seeking policies. Although a collaborated action such as the one OPEC countries pursued was not possible in most other resource sectors, it did change the distribution of risks and benefits between the host government and the resource companies.

The nationalisation of oil reserves and production created national oil companies, which were in charge of investment and trade of the resource on behalf of the government of the producing countries.<sup>52</sup> Initially, OECD country governments mistrusted the ability and motives of the NOCs and their governments to manage the resources. The commodity price shock was blamed for the economic difficulties they encountered in that period, although this was a gross simplification. The Bretton Woods exchange rate system collapsed before the oil price shock, while major resource industries were already restructuring their portfolios in the early 1970s. The competition from Japan, the ability to break up the production process in parts and use just in time delivery of inputs from all over the world, and new communication technologies were just as much a cause for economic stagnation in OECD countries.

The long period of relatively slow growth in the 1970s and 1980s created time for resource industries to adapt their business models. With the Washington consensus and push for liberalisation of trade and capital, Asian economies began to grow, and new markets opened up. The NOCs were able to become credible partners in the international markets, particularly because in oil they had absorbed a large part of the cost of stabilising the markets and expanded into major consumer markets. The greater openness of international markets, a more positive view of international direct investments and low commodity prices of the 1990s established new trust in international markets.

The SOEs from emerging consuming countries into resource sectors around the world represented what can be best described as consumer country resource nationalism. In the 1970s, resource nationalism was usually reserved to describe the SOEs of oil producing countries, which had nationalised the reserves and production. Emerging consumer country resource nationalism, although often presented as a new phenomenon, is not new at all. In the 1950s and 1960s, both France and Italy

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<sup>52</sup> See POLINARES WP3 Case study 1 by Locatelli, C. & Rossiaud, S. (CNRS), 'Russia, institutionalism and the effect on oil and gas investments' (2012); and See POLINARES WP3 Case study 2 by Luciani, G. (GRCF), 'A case on MENA' (2012).

engaged in similar strategies in an attempt to enter the international upstream market and secure resources for the French or Italian markets. In the 1990s liberalisation period, the state interests were first bundled and then privatised. As a reminder, only in 1987 did the British government sell its minority share in BP, showing that not only government resource strategies go through cycles. The case of Russia<sup>53</sup> shows that it was not only emerging consumer governments that were engaged in resource nationalism, but also producer governments. In Kazakhstan, initial agreements with the IOCs were redefined to include a larger government (company) share. Bolivia opted to undo the privatisation of its gas sector and renationalise it, and also Brazil and Norway increased the government (company) share in their energy sectors.

### ***Restructuring and opportunities in energy***

The late 1980s restructuring of the refining industry created opportunities for NOCs to engage in forward integration. PDVSA, Saudi Aramco, Kuwait Oil Company were among the first NOCs to purchase refining capacity in the US and Europe. These opportunities arose as a result of the restructuring of the downstream portfolios of the IOCs and the consolidation of a number of independent private oil companies. Some American IOCs retreated from the European market after their upstream assets from which they had sourced their refineries were nationalised. The restructuring process of IOCs and independents continued until the late 1990s, when oil prices were relatively low, and ended temporarily with some large mergers and acquisitions (ExxonMobil, Chevron/Texaco, BP Amoco, etc.). The forward integration wave of NOCs stopped in that same period of relatively low oil prices (and picked up again when prices began to increase in the early 2000s). In Europe a process of liberalisation and privatisation went underway in the 1990s. In France, CFP had become Total and consolidated its positions with the purchase of the previously government owned oil companies Elf Aquitaine and Petrofina and became a publicly traded company, while in Italy ENI went through a similar process of consolidation and privatisation.

The opening up of the former Soviet Union provided the IOCs with new opportunities to invest. Kazakhstan, Azerbaijan, and Russia attracted much upstream interest.<sup>54</sup> Increasingly, natural gas gained importance in the portfolios of the IOCs. This was due to the increasing emphasis of environmental policies of European OECD governments, predicting a switch from coal to gas in power generation, but also because access to gas potential was easier than gaining access to potential oil developments. In Russia, Sakhalin was a major development in which several IOCs were part of the two main consortia. Complex and very large upstream developments became the frontier in which IOCs were crucial. Onshore developments were harder to gain access to and oil was very often reserved for domestic oil companies or NOCs. In Africa, IOCs also moved to the offshore due to the continuing difficulties onshore with weak governments. Increasingly, IOCs also partnered with NOCs, such as Qatargas and Rasgas in the LNG development, Saudi Aramco in refining and natural gas, NIOC in offshore oil and gas, and Petronas in GTL, etc. in complex and difficult to access resources in the offshore or politically difficult countries, such as Iraq. Companies such as Petrobras had been

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<sup>53</sup> See POLINARES WP3 Case study 1 by Locatelli, C. & Rossiaud, S. (CNRS), 'Russia, institutionalism and the effect on oil and gas investments' (2012).

<sup>54</sup> See POLINARES WP3 Case study 1 by Locatelli, C. & Rossiaud, S. (CNRS), 'Russia, institutionalism and the effect on oil and gas investments' (2012).

active in the international market since the 1970s. Its success in developing its own offshore oil industry affirmed the technological progress of many of the NOCs.

When China became a net oil importing countries, its national oil companies entered the international market to engage in backward integration. Initially, it foreign direct investments focussed on politically difficult countries, where other companies did not risk to venture. Aided by government-to-government agreements, the Chinese companies were increasingly successful in gaining access to African resources, and later also elsewhere. Cooperation with IOCs has been and off and on relationship. The IOCs withdrew from the East-West pipeline project, but returned to China to begin to exploit China's shale potential. Abroad, Chinese companies are also part of partnerships, such as the one in Iraq.<sup>55</sup>

### ***Different stakeholder views on managing rents along the value chain***

Theoretically, the primary tasks of private sector firms are to try to maximize their share of the economic rents in the energy or mineral value chain, relying on scarce firm-specific resources. In a world where IOCs are confronted with mature home markets for oil products and have limited access to conventional reserves, apart from North America and Australia, and limited access to expanding oil product markets in emerging countries, the choice to focus their investment efforts on frontier developments in conventional and unconventional oil and gas developments is logical. NOCs from producing countries have different options, apart from investing in the domestic integrated energy sectors, to also use their capabilities abroad. In the 1980s and 1990s, forward vertical integration was important to gain access to the main consumer markets. Today a similar strategy applies to gain access to the markets of emerging countries.

When looking at the Ultimate Beneficial Owner (UBO) of companies operating in the energy and mineral markets, it is clear that the value drivers of the respective UBO's are not the same. Not all shareholders automatically view corporate performance or investment rationale in new projects from a similar perspective. For instance, privately owned enterprises (POEs) on the one hand are ultimately responsible to provide their private shareholders, and often financial markets as the main proxy, with a maximum of economic rent, or positive project-NPV through a Discounted Cash Flow method. On the other hand, state owned enterprises (SOEs) with the state as its UBO are often presumed to achieve multiple goals aside from wealth or profit maximization, such as energy independence, strengthening a nation's overall industrial core, job creation, other social and political goals and possibly even relative advantages over other state actors.<sup>56</sup>

It is clear that the variation of value drivers is very large indeed, depending on the timeframe of the performance and strategy of the management of the company and the shareholders. Publicly traded companies must mix short-term performance with a longer-term strategy. Although they are privately owned they still need to take governments into account, as regulators and as recipients of tax and royalty income, but also as providers of new licenses. In Figure 8, various value drivers have been

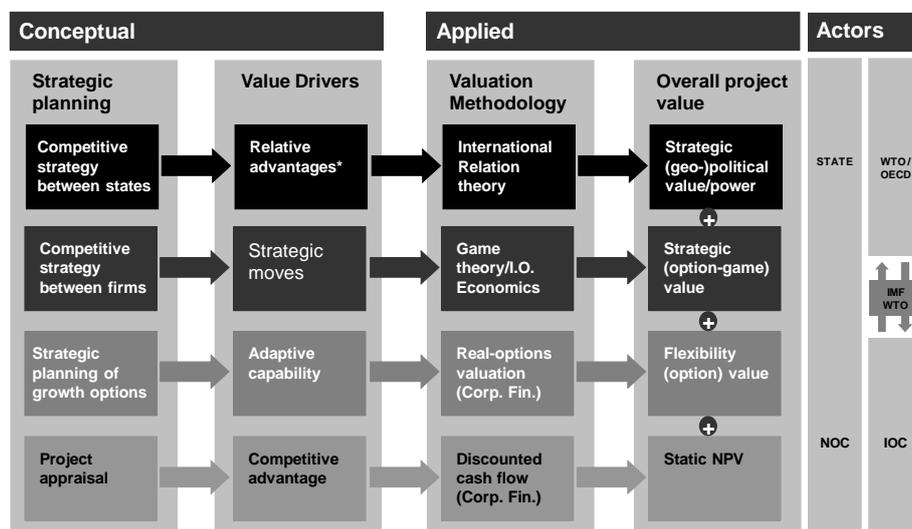
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<sup>55</sup> See POLINARES WP3 Case study 3 by Rungi, A. (FEEM), 'Global value chains, state ownership and natural resources' (2012).

<sup>56</sup> As a reference of 'measuring' relative advantages we use the principles of Susan Strange, who argues that aside from security prowess, also finance, production and knowledge contributes to a nation's strength.

brought together. For publicly traded international energy or mineral companies, the value drivers they are most concerned with are the ones from the bottom row to the last before the top row. National energy or mineral companies must also contend with the top row, representing the interests of their shareholder, sometimes at the detriment of the commercial short-term performance indicators. The entry costs of certain parts of the value chain (or of international forward and backward integration) can be very high but in the long-term interest of company and shareholder. For instance when these strategic investments improve security of demand or supply, which is a typical long-term problem for governments. The national energy or mineral companies can be effective tools of government policy. Publicly traded companies can also contribute to security of supply or demand of governments, but their portfolio decisions are made within the logic of the company and not the countries they are active in. It is up to the governments to construe policies that make their sectors function within the confines of their priorities.

**Figure 8: From commercial to geopolitical value drivers for energy and mineral companies**



Source: adapted from Smit & Trigeorgis (2004), Strange (1996), Waltz (1959).  
 \* Strange (1996): Structural power: finance, production, knowledge and security.

In the last decade, when national energy and mineral companies internationalised and at times partnered with publicly traded international companies, government of OECD countries questioned the motives of the national companies. They felt uncertain about allowing foreign governments through the national companies to gain a stake in their industries. This discussion had also surfaced in the 1970s when some OPEC countries invested in equity shares in western companies. In the 2000s, the discussion centred mainly on reciprocity, access to markets in exchange for access to resources. In the European-Russian energy relationship this was a difficult issue, although this did not apply to the same extent to the mineral sector.<sup>57</sup>

<sup>57</sup> See POLINARES WP3 Case study 1 by Locatelli, C. & Rossiaud, S. (CNRS), 'Russia, institutionalism and the effect on oil and gas investments' (2012).

**Diverging challenges: Security of supply vs. security of demand**

Although the geographic distribution of economically exploitable resources may change as a result of the developments in unconventional production and renewable energies, the current distribution of proven fossil energy reserves is still important. Not only because the new fossil and renewable resources are more costly<sup>58</sup>, but also because the size of the conventional resources is substantial and these conventional flows are important for world markets.<sup>59</sup> The world energy mix will only slowly change to include other resources.

Another important issue is that the availability of resources and the actual intensity of exploitation are linked to economic and political circumstances, such as the distance to market, transportation, environmental regulations and political stability to name a few.<sup>60</sup> These factors impact the distribution of exploited resources, energy and mineral trade flows and also the security of demand and supply.

In the Figures 9 to 12, generated by Work Package 2, the overview of resources, production, consumption and cumulative production are an important indication for current and future availability, past investment intensity and future investment potential, and import dependencies for countries with insufficient resources to satisfy demand. Access to resources is often not a physical problem but an economic, technical or political problem. The latter are above ground issues rather than subsurface issues. Also the definition of reserves varies among countries, which can obfuscate debates about security of supply and demand when resources are declared to be nearing their geological end. The above ground issues determine the level of availability. The availability of shale oil and gas are a reminder of the dynamics of above ground issues and subsurface potential.<sup>61</sup>

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<sup>58</sup> ExxonMobil Outlook 2040, fall 2011 and Work Package 2.

<sup>59</sup> BP Outlook 2030, 2011.

<sup>60</sup> See POLINARES WP3 Case study 4 by Humphreys, D. 'The causes and consequences of capacity 'overshoot' in mining' (2012).

<sup>61</sup> R. Newell, presentation Energy Outlook 2011, EIA June 2011.

Figure 9: Crude oil map of the world (POLINARES / BGR)

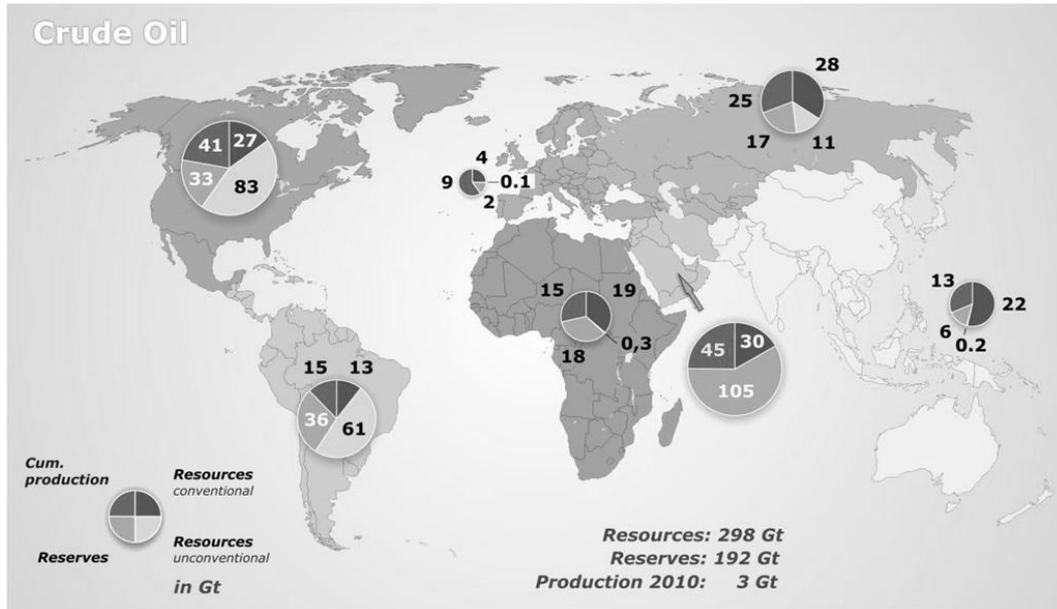
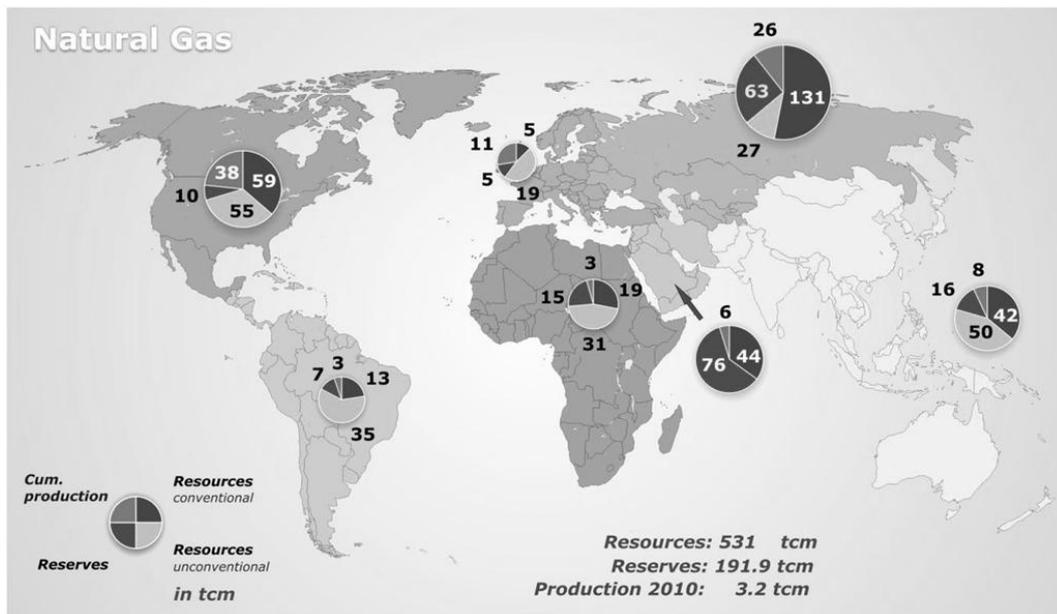


Figure 10: Natural Gas map of the world (POLINARES / BGR 2010-2012)



Another example is the discussion about rare earths, which is well documented in Work Package 2<sup>62</sup>, and shows that the current debate about China’s role in this market is in part due to closures of traditional production sites in the US where the environmental cost and market for these resources did

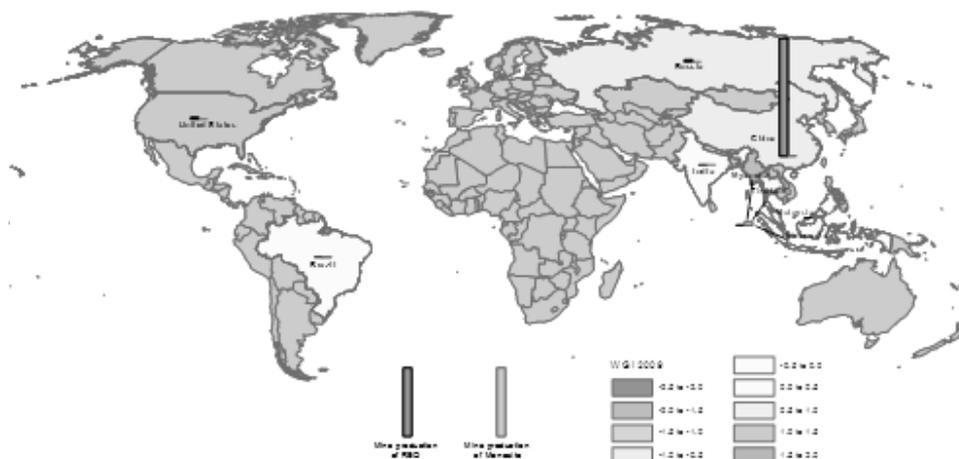
<sup>62</sup> See POLINARES D2.1 report (2012) for further details,

not measure up at the time. The resource base is not reflected in the distribution of production (see Figures 11 and 12). Since demand for rare earths increased as a result of renewable technologies in which rare earths are crucial and prices increased, investments outside China have increased (in the US and Australia) and should reduce the dominant position of China in the future. Nevertheless, a complaint against the trade practises of China was filed in the WTO by the main importers.

Figure 11: Rare Earth resources (February 2011), by BGR (2012)



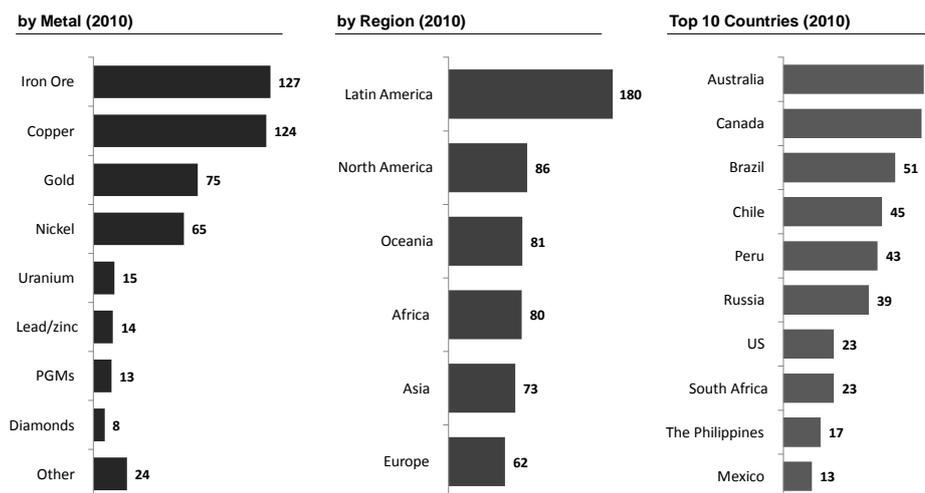
Figure 12: Rare earth production (2009), by BGR (2012)



Despite the policy-makers interest in Rare Earths, other minerals are more important in terms of investments. In the mineral sector, open market economies are among the top investment countries (see Figure 13). Particularly Australia is going through an investment boom, also in energy, for a large part driven by buoyant demand in Asia. Also Canada is experiencing a boom in investments in the energy and mineral sector. Iron ore and copper are by far the largest investment sectors. Investments in

Latin America indicate the expansionary developments on the continent. Again Brazil and Peru share with the other booming countries that investments in both energy and minerals are attractive for investors, indicating the positive investment climate and the opportunities that arise from Asian demand.

**Figure 13: Investments per Metal, Region and Country for 2010 (in Billion US Dollars)**



Source: Raw Material Group (2011)

Not very many countries, including some OECD countries, have opened their energy and mineral resource sectors completely. Even in countries that are known for their openness to investors, incumbent domestic company interests prevail or rules exist for some domestic participation. Moreover, the barriers to entry and exit tend to be very high. Restricting the access of companies to the prized upstream resources by dubbing reserves as 'strategic' or through outright or creeping (by for instance changing the tax regime of the resource) nationalization has been a well-established and described practice.<sup>63</sup>

With private companies having open access to about 29% of the world's oil reserves, and limited access to SOE resources, it is clear that state companies have wider access. Their access to reserves depends on the size of the domestic reserves and both the limited access and open access reserves for which all other companies are competing as well (as was shown by Figure 1 in theme 2). It is clear that in terms of reserves and production the producing country SOEs have become by far the largest in the world (see also Figure 14). They are however not the largest in terms of revenues (see Figure 15). In terms of reserves also China's, Russia's and Malaysia's SOEs stand out as significant resource holders.

<sup>63</sup> Coby van der Linde, *The State and the International Oil Market, Competition and the Changing Ownership of Crude Oil Assets*, Studies in Industrial Organization, Kluwer Academic Publishers, Dordrecht/Boston, (1999).

Figure 14: Oil and Gas companies by daily production

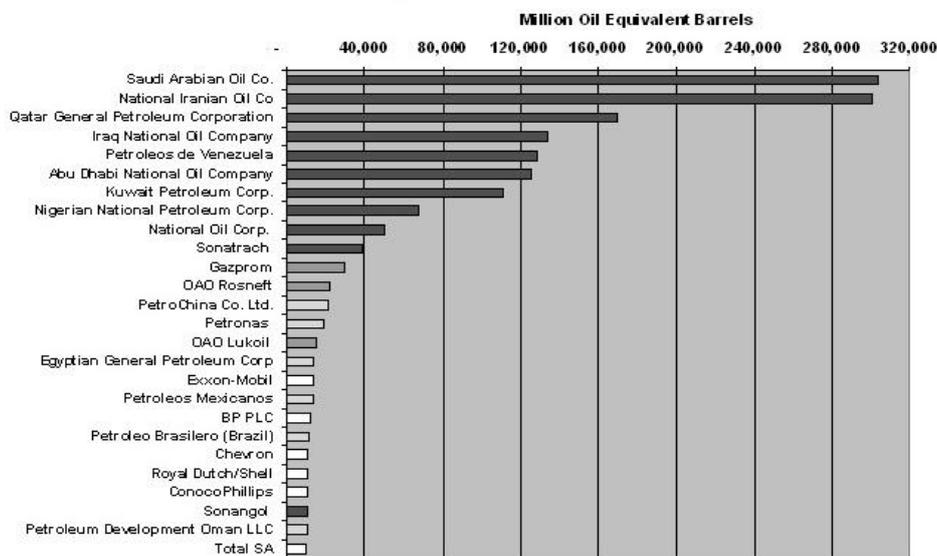
Source: EIA, *Performance Profiles of Major Energy Producers* (2011)

Figure 15: Market capitalisation and revenues of largest (energy) Companies (2011)

	Capitalis. Mds dollar	PER actual	CA 2008 Mds dollars		Revenues 2009		
1	EXXON MOBIL	346.70	8.31	425.07	1	Wal-Mart Stores	408,2
2	PETROCHINA	291.87	9.17	154.10	2	Royal Dutch Shell	285,1
3	ROYAL DUTCH	145.12	5.53	458.36	3	Exxon Mobil	284,7
4	CHEVRON	139.72	6.13	255.11	4	BP	246,1
5	PETROBAS	136.96	7.87	128.38	5	Toyota Motor	204,1
6	BP	129.67	6.16	354.62	6	Japan Post Holdings	202,2
7	TOTAL	125.08	8.22	237.26	7	Sinopec	187,5
8	CHINA PETROLEUM	100.33	12.39	185.01	8	State Grid	184,5
9	GAZPROM	97.08	3.46	136.66	9	AXA	175,3
10	ENI	82.71	6.28	159.63	10	China National Petrole	165,5
	GDF-SUEZ	78			11	Chevron	163,5
11	STATOILHYDRO	61.08	9.22	117.71	12	ING Group	163,2
12	CONOCOPHILLIPS	58.77	3.67	225.42	13	General Electric	156,8
13	BG GROUP	52.73	11.58	23.34	14	Total	155,9
14	OCCIDENTAL PETROL	47.61	6.59	24.34	15	Bank of America Corp.	150,5
15	RELIANCE	47.51	11.38	34.08	16	Volkswagen	146,2
16	CNOOC	45.99	7.03	16.26	17	ConocoPhillips	139,5
17	ECOPETROL	35.90	7.45	17.41	18	BNP Paribas	130,7
18	ENCANA CORP	32.37	5.21	27.07	19	Assicurazioni General	126,0
19	OIL & NATURAL GAS	32.19	8.22	24.05	20	Allianz	126,0
20	IMPERIAL OIL	30.94	10.75	29.73	21	AT&T	123,0
21	SURGUTNEFTEGAZ	23.92	9.20	23.32	22	Carrefour	121,5
22	CAN NATURAL	22.82	4.97	13.55	23	Ford Motor	118,3
23	APACHE CORP	22.63	33.30	12.33	24	ENI	117,2
24	REPSOL	21.96	5.97	90.36	25	J.P. Morgan Chase & C	115,6
25	DEVON ENERGY	21.95	5.53	15.36			
	source: Bloomberg					source: Fortune	

If we look at the capitalisation a different picture emerges. The POEs are by far the largest companies, while none of the SOEs in the top-10 list based on reserves appears in the top list 25 by capitalisation or revenues. This is different for the Chinese and some other consumer country SOEs, who have rapidly climbed up the ladder of largest companies. Despite the efforts to engage in vertical integration, the SOEs from producing countries have not yet been able to translate their crude and/or gas-rich position into a global position for their SOEs.

Traditionally the interaction between SOEs from producing countries and POEs from net-consuming countries has been central in the energy and mineral markets, with SOEs owning the resource and POEs providing financial and technological capabilities to execute a project. In recent years, with the increasing market power of emerging markets and technological advancements by independents, SOEs from emerging net-consuming countries, in particular from China, India and Brazil, and service companies, like Schlumberger, Halliburton Bechtel, have changed this relationship. SOEs from emerging markets with financial prowess and service companies with technological excellence have changed the IOC incumbents' strategic options to continue their business.<sup>64</sup> With the changing dynamic in oil product markets, the downstream asset base must adapt accordingly. With limited growth potential in emerging economies and producing countries in the downstream, they have turned to frontier oil and gas upstream developments.

### ***State company vertical integration***

The central question then is how corporate and state company strategies influence security of supply and demand.

Under pressure from private investors and financial markets to maximize rents and the stagnating traditional product markets and lack of investment opportunities in expanding emerging countries, POEs are increasingly concentrating their financial and technical capabilities on the upstream part of the value chain and in particular in 'safe' countries, for instance deep offshore oil production in the Gulf of Mexico, Brazil and West Africa and in unconventional accumulations in North America.

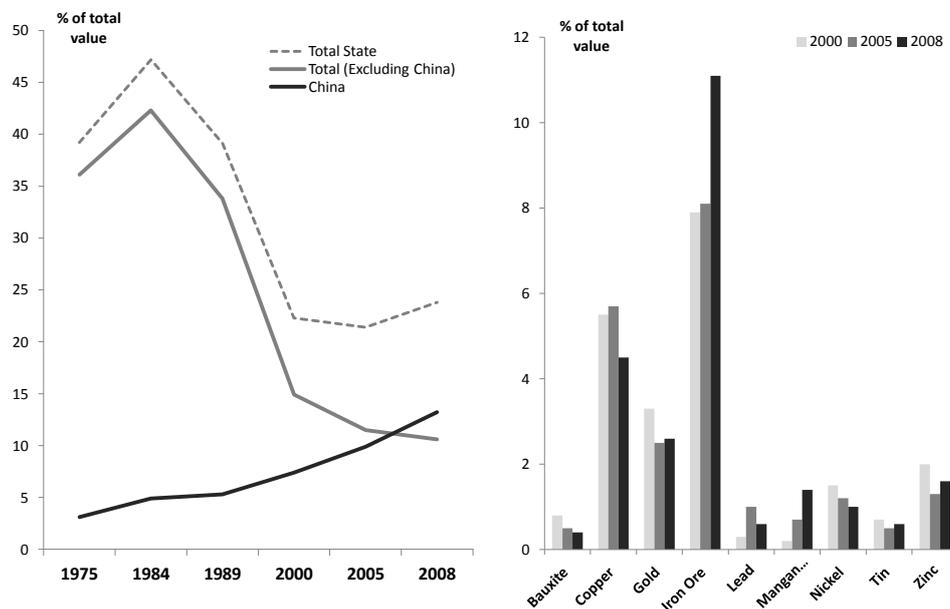
Under pressure of managing security of demand (for SOEs from producing countries) and security of supply (for SOEs from importing countries) we see an increasing push for vertical integration in which the resources are produced exclusively for internal company activities (from exploration to distribution), not unlike the 1950s and 1960s when the largest POEs (the so called seven sisters) employed a similar strategy of vertical integration.

A well-documented example of a net importing country positioning itself on various stages of the energy and mineral value chains is of course China.<sup>65</sup> There are numerous markets in which Chinese SOEs are establishing themselves as key resource producers, including African oil reserves, Rare earth metals, European oil refining, etc. Research by Raw Materials Group (2011) showed that state participation in the mineral sector is still relatively high despite a period of privatizations in the late 1990s and 2000s. To be sure, higher state control in these sectors is primarily the result of the growth of state-owned mining in China and the activities of Chinese SOEs abroad. When controlling for Chinese activities we even see that state-participation is declining across markets, as can be seen in Figure 16.

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<sup>64</sup> See POLINARES WP3 Case study 3 by Rungi, A. (FEEM), 'Global value chains, state ownership and natural resources' (2012).

<sup>65</sup> David Zweig and Bi Jianhai, China's Global Hunt for Energy, in: *Foreign Affairs*, vol. 84, no. 5 (2005); Ian Taylor, China's Oil Diplomacy in Africa, in: *International Affairs*, 82: 5 (2006); and Xin Ma and Philip Andrews-Speed, The Overseas Activities of China's National Oil Companies: Rationale and Outlook, in: *Minerals & Energy*, vol. 21, no. 1, (2006).

**Figure 16: Total State Value at the Mine (% of total value) and per sector**

Source: Raw Materials Group (2011)

The priority of the Chinese government, providing subsidies to its companies to venture abroad, is to both guarantee supply for its growing economy and also, as a politically important power, make sure that Chinese interests are taken into account. Without a substantial presence in the international energy and mining sectors, China would be too much at the whims of international markets and its periodic political and economic quirks. Although, currently Chinese companies also sell in international markets, the fear of other consuming countries, which cannot resort to their own SOE supplies, that China has developed the power to influence oil flows itself.

With increased vertical integration of SOEs in various energy and mineral markets, albeit under exclusive or non-exclusive terms, net-importing countries without SOEs and depending on open markets to meet their import needs are increasingly worried that in the future, this market will become too thin during extreme tight market conditions.

## Theme 4: Technology for development?

Technological advances have the power to fundamentally change the balance in global resource markets: rapidly reducing or increasing supply of certain resources.

Technological progress is one of the factors that is the most difficult to predict and that nevertheless can have a large impact on the future development of energy and mineral resource markets. This holds for technology development in all stages of energy and mineral resource production and consumption. Key in this respect is the pace of technology diffusion and therefore the impact it has for instance on production costs or substitutes.

In the last decade, partly as a result of tight energy and mineral markets and corresponding high commodity prices, incentives for improvements in efficiency were high, while environmental policies and security of supply concerns have incentivised the search for new energy technologies. While technologies usually take a long time to mature, once they do, they can have a major impact on the sector. The shale gas developments are a good example. The technologies employed have been around for quite some time, but the combination of the technologies into one production method and a period of relatively high prices was enough to establish itself in the market.<sup>66</sup> Also wind and solar energy have been around for quite some time, but it was policy driven demand in countries such as Germany that accelerated the development of the technology, increasing the efficiency of both solar panels and windmills. The ability of China to reduce production costs restructured this relatively new market.<sup>67</sup> In general, investments in technology in the energy and mineral sector mainly focused on (1) new energy technologies such as wind, solar and electric vehicles, (2) providing low cost solutions for advanced energy and mineral production and (3) energy efficiency from a consumer perspective.

### *Towards a low-carbon economy or efficient fossil future?*

In the extraction and production part of the mining sector, improvements in technology have made mining of increasingly lower grade ores possible and profitable – a key element making the global expansion of production of practically all minerals in the past decades possible. In the natural gas sector, it was first the ability to transport liquefied natural gas (LNG) over longer distances in a cost efficient manner that changed the structure of the natural gas market, unlocking the vast gas reserves of the Middle East. The next development was the shale gas revolution, which has drastically changed the outlook of the future U.S. import dependency (see Figure 23), with the potential of becoming a net natural gas exporter. Technology developments for oil has included advances in the field of exploration, seismic imaging, 3D and horizontal drilling, as well as broadening the frontier of extractable reserves, e.g. deep-sea drilling and developing unconventional reserves such as oil sands.

Also technological advances that receive less publicity can have a major impact on the future supply of energy and mineral resources. Taking oil as an example, increasing the average recovery rates for oil fields even by a few percentage points will have a major effect on overall total reserves supply, due to the fact that there are a huge number of oil fields currently in production that could potentially benefit from such advances in Enhanced Oil Recovery techniques.

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<sup>66</sup> Paul Stevens, 'The 'Shale Gas Revolution': Hype and Reality', in: *Chatham House Report* (2010),

<sup>67</sup> Bram Buijs, 'China and the Future of New Energy Technologies', *Clingendael International Energy Programme Energy Paper* (March 2012).

Energy security concerns and high oil prices have been a driver for the development of non-petroleum based types of transportation, such as electric vehicles but also hydrogen or fuel-cell vehicles. Fuel efficiency has been achieved in hybrid cars and improved engine designs. The goal to reduce carbon emissions and to improve the local environment has led to more use of CNG in vehicles. The newest development could be to use LNG for trucks and smaller vessels (river barges). In the power sector, carbon capture and storage technologies are being developed, while co-firing with biomass is also deployed. Wind and solar have already been mentioned. Until March 2011, the nuclear industry was experiencing a renaissance. Many countries were contemplating expanding their nuclear power sector with new generation plants. The Fukushima disaster has reversed many of these plans. In Germany, an earlier decision to expand the life of the old plants was reversed and the termination of the nuclear power sector announced for 2022. In the Netherlands, plans for a new nuclear plant were put on hold, also because the prospective owners had a hard time finding financing in the current economic circumstances. In the U.S., the combination of Fukushima and the shale gas revolution has also cooled the enthusiasm for new nuclear investments. In the mineral sector, concerns over the supply of rare earths from China have led to both investments in mines outside China and in a major effort to develop substitutes and decrease the relative demand for them.

### China's push for new energy technologies

A lot of attention has been devoted recently to the development of low-carbon technologies, such as wind, solar, hydro and biofuels, as they play a key role in achieving the emissions reduction goals and addressing climate change. Global markets have sprung up and the technologies for wind power and solar power, as two major new sources of renewable energy supply, has improved very significantly. These technological developments have spread globally as both deployment and establishment of production facilities have been pushed forward by a number of countries.

New energy technologies have become an integral part of China's energy mix as China faces the enormous challenge to accommodate its rapid growth in energy demand, also new energy technologies have become an integral part of China's energy mix.<sup>68</sup> A few observations are illustrative:

- In 2009 and 2010, China ranked as the country investing the most in renewable energy, with investment totalling US\$48.9 billion in 2010, ahead of Europe and North America with US\$ 35.2 billion and US\$ 30.1 billion respectively.
- China has become the largest market for wind energy and installed more wind power capacity than the United States and Europe combined in 2010.<sup>69</sup>
- China has become the leading producer of solar photovoltaic modules with a global market share of more than 50 percent and four Chinese wind turbine manufacturers now rank in the top-ten of global manufacturers.<sup>70</sup>

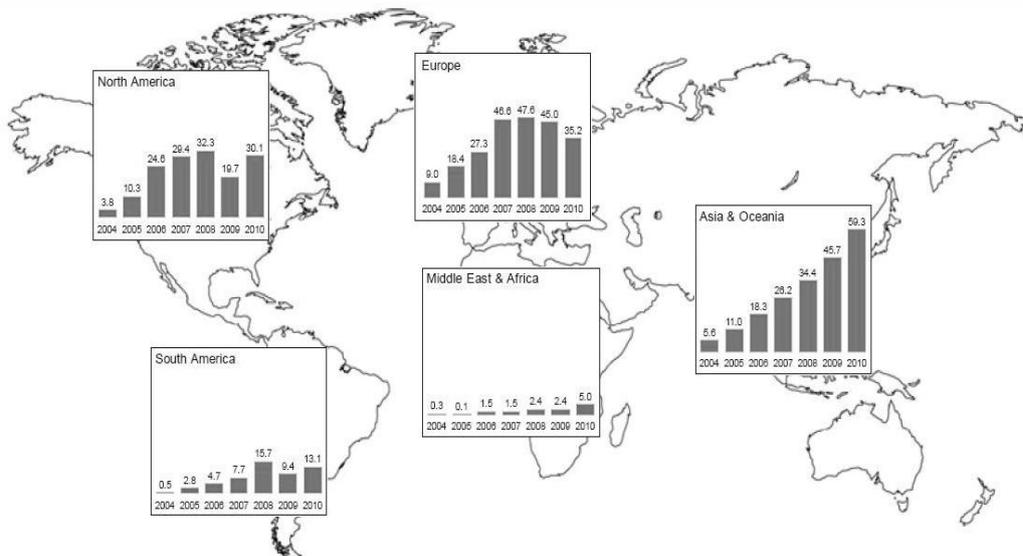
Figure 17 presents a regional overview of investments in renewable energy in the period 2004-2010.

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<sup>68</sup> For more details on China's investments in new energy technology, see among others: Bram Buijs, 'China and the Future of New Energy Technologies', in: *Clingendael International Energy Programme Energy Paper* (March 2012), Bloomberg New Energy Finance, *Global Trends in Renewable Energy Investment 2011* (2011),

<sup>69</sup> Global Wind Energy Council (GWEC), *Global Wind Report 2010*, April 2011.

<sup>70</sup> European Photovoltaic Industry Association, *Global Market Outlook for Photovoltaics until 2015*, May 2011, p.36; BTM Consult, 2011.

**Figure 17: Investment in Renewable Energy by Region, 2004-2010, in US\$ billion.**

Source: Bloomberg New Energy Finance, *Global Trends in Renewable Energy Investment 2011*, 2011,

The main driver for the Chinese push for new energy technology comes from, as mentioned, the necessity to provide for energy production in order to meet growing domestic demand for resources, and a broader Chinese effort to develop a series of industries that are considered strategically important for the longer term. The latter point relates to a key policy objective of the Chinese government: shifting from a low-cost manufacturing-based economy towards a more high-tech, high value-added, innovative economy. Since new energy technologies are characterized by the fact that they are not yet commercially competitive with other, predominantly fossil based energy sources, government support for their development is crucial. Interestingly, we see that China has made its climate and renewable energy policies, which includes its investments in new energy technologies, independent from the international climate treaty negotiations and UNFCCC process.<sup>71</sup>

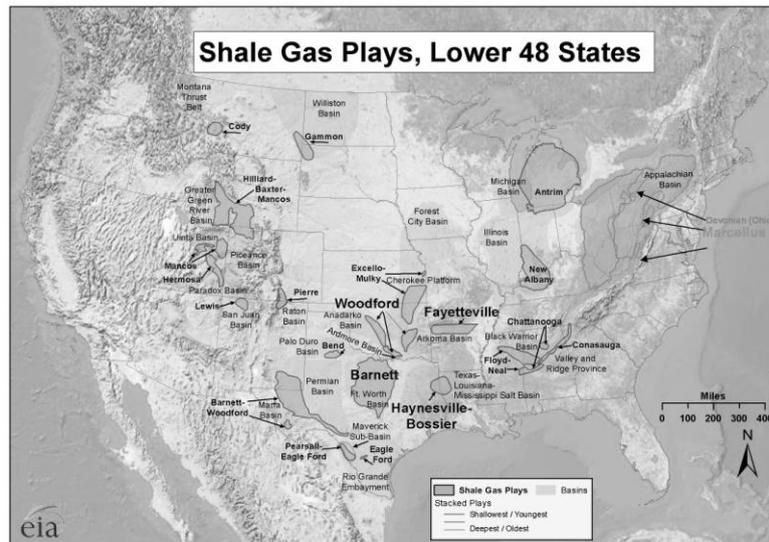
As a result, we see that technology can be steered towards providing pathways towards a more long-run sustainable energy mix, for instance in developing new energy technologies in China. Additionally, because of the high cost nature of new energy technologies we see that a strong agent, like the Chinese government, can provide for a secure investment climate in which these technologies can mature and grow into low cost competitors of incumbent fossil based energy sources, such as oil, gas and coal.

<sup>71</sup> National Development and Research Commission, Medium and Long Term Development Plan for Renewable Energy in China, September 2007; Eric Martinot and Li Junfeng, 'China's Latest Leap: An Update on Renewables Policy', July 21, 2010; The Climate Group, 'China Amps Up Renewables Targets', 1 September 2011.

## The US unconventional gas revolution

The US unconventional gas revolution shows that technology can also play another role by providing new production methods at a low cost for fossil resources thereby freeing up previously non-commercial reserves. A prime example in recent years has been the US unconventional gas revolution.<sup>72</sup>

Figure 18: US Shale Gas Plays in the lower 48 states (2010)



Source: EIA, *Various Studies* (2010),

The combination of high gas prices, maturing hydraulic fracturing technology combined with earlier improvements in exploration technology, resulted in a steep drop in exploration and production costs for unconventional gas deposits.<sup>73</sup> As a result, unconventional gas ‘plays’ became commercially viable to develop.<sup>74</sup> In 2009, the IEA estimated that the cost of Barnett Shale gas was US\$3 per million British thermal units (BTUs) and could be optimized to US\$2.50.<sup>75</sup> This made unconventional gas competitive with conventional gas at prevailing US gas prices of around US\$ 6-8 \$/MBtu from 2005 to 2009.<sup>76</sup> In the US, the main plays are the Barnett play in Texas (the largest), Eagle Ford in Texas, Haynesville straddling Texas and Louisiana, Fayetteville in Arkansas and Oklahoma and Marcellus in the Appalachians (see Figure 18).

Due to the commercial availability of unconventional gas resources, the IEA, in its latest World Energy Outlook (2011), estimates in its New Energy Policies scenario that until 2035, unconventional

<sup>72</sup> For further information on the US shale gas revolution, see among others: Paul Stevens, ‘The ‘Shale Gas Revolution’: Hype and Reality’, in: *Chatham House Report* (2010),

<sup>73</sup> Hydraulic fracturing is the high-pressure injection of mainly water, and some chemicals and sand to break up the rock structure and allow the gas (or oil) to flow.

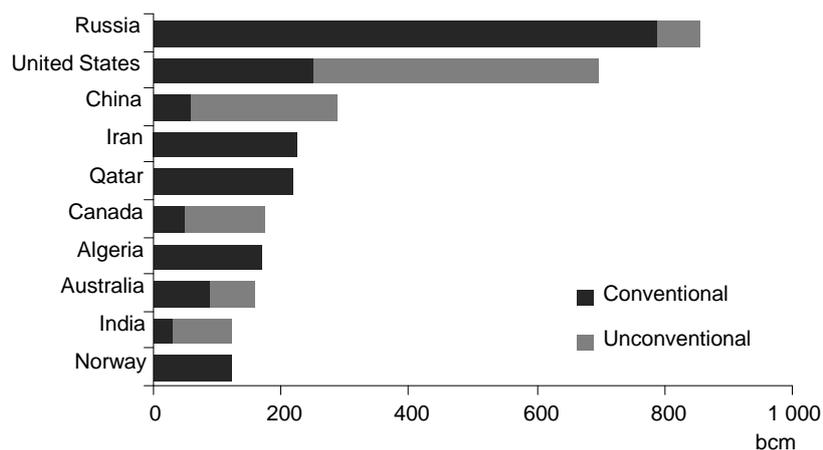
<sup>74</sup> Shale gas resources are called ‘plays’ rather than fields, reflecting the fact that they generally cover very large geographic areas.

<sup>75</sup> IEA, *World Energy Outlook* (2010),

<sup>76</sup> Paul Stevens, ‘The ‘Shale Gas Revolution’: Hype and Reality’, in: *Chatham House Report* (2010) 29,

gas supplies will accommodate 40% of the 1.7 trillion cubic meters (tcm) increase in global gas supply to the year 2035.<sup>77</sup> As a result, unconventional gas (including shale gas deposits) are projected to provide a substantial share of gas production in key gas consuming countries like the US and China, (see also Figure 19). It is no wonder that the IEA projected that there will be a ‘golden age of gas’.<sup>78</sup>

**Figure 19: Largest natural gas producers in 2035 in the New Policies Scenario**



Source: International Energy Outlook (2011)

As a consequence gas is making a comeback with regards to its future position in the global energy mix. Previously framed as an expensive (tight markets) and political risky (think Ukraine) fossil fuel, (unconventional) gas has now been adopted by the US as one of the instruments to realize the much sought after US energy independence.<sup>79</sup> Projects to export US unconventional gas as LNG to overseas markets are now being challenged on the grounds that “domestic natural gas belongs to all Americans, not just a few privileged drilling companies”.<sup>80</sup> For instance, the "North America Natural Gas Security and Consumer Protection Act" would ban the US natural gas grid regulator, FERC, from approving any natural gas export terminal in the United States until 2025. At the current natural gas price level, many producers have difficulty covering the operational costs, let alone their capital costs. They therefore favour the possibility to liquefy the natural gas and export it to markets with much higher prices, such as the Asian and European markets. In a report by the Energy Information Agency (EIA), scenarios were developed to show the price impact of a decision to allow natural gas exports to world markets; it was shown that prices (and CO<sub>2</sub> emissions) would indeed increase.<sup>81</sup>

<sup>77</sup> IEA, *World Energy Outlook* (2011),

<sup>78</sup> IEA, *Special report World Energy Outlook 2011: Are we entering a golden age of gas?* (2011),

<sup>79</sup> See for instance the proposed bills "Keep American Natural Gas Here Act" (which would require the Department of Interior to only accept bids to extract the fuel on taxpayer-owned land from natural gas drilling) and "North America Natural Gas Security and Consumer Protection Act" (which would forbid FERC from approving any natural gas export terminal in the United States until 2025),

<sup>80</sup> House of representatives Natural Resources Committee, 'Markey Introduces Legislation to Keep American Natural Gas in America', in: *Press Release* (February 2012),

<sup>81</sup> EIA, *Effect of increased natural gas exports on domestic markets*, retrieved on 26 February 2012 at [http://205.254.135.7/analysis/requests/fe/pdf/fe\\_lng.pdf](http://205.254.135.7/analysis/requests/fe/pdf/fe_lng.pdf)

Support for this position is coming from unexpected quarters. Although, the bills, when accepted, would introduce 'resource nationalism' to the U.S.<sup>82</sup>, energy intense industries are falling behind the plan to restrict exports in an attempt to maintain their competitive advantage.

While the long term potential of unconventional natural gas is still unclear due to some uncertainties concerning the quantity of recoverable gas resources, the depletion rates of unconventional gas production and the environmental questions surrounding hydraulic fracking still unclear, it is obvious that technology has had a transformative effect on the natural gas markets.

Despite the optimism about new technologies and their impact on the energy mix and energy policies of countries, one always has to remember that the breakthrough of technologies always remains uncertain. This is not only true for natural gas, where many obstacles may appear outside the US, but also for the renewable energy sector. The competition for land and water can be an obstacle for developing into true replacement of oil, gas and coal in the energy mix, and may imply much smaller shares in the world energy mix. The expectation about the role of nuclear in the energy is a case in point. In the 1960s and 1970s, many countries expected that the fossil fuels would become replaced by nuclear power. Risk management and the acceptance of a technology play an important role in making such a breakthrough. This aspect of the energy and mineral sector is often under represented in assessments. The energy mix will become more diverse as a result of new technologies but whether traditional fuels will be replaced or only see their share stabilise or decline, particularly against the backdrop of growing demand, remains unclear. Lessons from earlier technology changes should admit a certain amount of caution.

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<sup>82</sup> Financial Times, *Let the gas flow* (26 March 2012).

## **Theme 5: Recent developments in the aftermath of the financial and economic crisis of 2008/2009**

The surge in resource demand in the last decade stretched existing capacities, prices increased and investments expanded. Yet, the long lead times of resource investments could not immediately alleviate the price pressures. The growth of demand from emerging countries was often referred to as a demand shock. Only when in 2008 the world turned into recession as a result of financial sector problems, did the pressure on resource markets decline. The financial and economic crisis impacted both Europe and the US more severely than the emerging markets, although the loss of consumption in these two mature markets is also posing problems for them to fill the demand gap.

The fact that emerging markets had been driving forces behind the resource (and other) markets in the past 10 years has raised questions about if and how the past trends described in earlier themes will continue. The sheer volumes involved when extrapolation the trends of the past decade to the future are enormous and have raised serious doubts in policy-making circles about impending scarcities when supply failed to catch up with demand. From the perspective of resources and reserves and the functioning of markets, most of these concerns were calmed in the analyses of Work Package 2.<sup>83</sup>

Yet, the impact on the international economic and political relations of the emergence of these new powers should also be examined.<sup>84</sup> The idea that the political gravity in the world is shifting towards the emerging countries has been widely discussed. Given the different organisation of these economies, particularly with regard to the place of state companies in their political economic system, OECD countries are forced to reflect on how this will impact their idea of the international system. Will there be more market or less? Or will there be more government? It is with these questions that the future world images, later in this work, will play in order to develop more sensitivity for potential stresses and strains in the international system and also to understand the opportunities for cooperation. The way in which the international political and economic system functions also has a strong bearing on the international mineral and energy markets.

In Work Package 1, the financial and economic crisis of 2008/2009 was chosen as the event that ended the regime of liberal capitalism. The economic success of the state capitalist countries in the last decade was seen as the onset of a new regime, assuming that the liberal market economy as a model would be in retreat.<sup>85</sup> This conclusion suggests that the world is now a few years into its new state capitalist regime. With the benefit of hindsight, it is not altogether clear when the regime will change and how it will change. The likelihood that it will be unclear what the regime will become is large. Yet, from the themes and the cases, which present an image of the current developments and trends, it is clear that the way the financial and economic crisis can be absorbed by the most important players will be important for the future regime. The world has been lurching off its previous development path and the impact is still unclear. Most of the trends described in earlier themes do not fully absorb the

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<sup>83</sup> POLINARES D2.1 report (2012), with an emphasis on the chapters on future availability of energy and mineral resources and resource criticality.

<sup>84</sup> Charles Glaser, Will China's Rise Lead to War, in: *Foreign Affairs*, March/April 2011; Colombia University, *The Rise of BRIC: Impact on global policy making*, Inaugural BricLab Conference, 2 December 2011 (2011).

<sup>85</sup> Nancy Birdsall and Francis Fukuyama, The Post-Washington Consensus, in: *Foreign Affairs*, March/April 2011.

consequences of the financial and economic crisis on the international institutional framework, the investment climate and the new opportunities and caveats that arise as a result of the crisis in the various major powers.

That is why this work includes an attempt to understand the policy response to the crisis and its still on-going aftermath. This understanding is developed, by looking closer at the 1970s, in which major political and economic changes took place. From the papers on criticality<sup>86</sup> we have seen that energy and mineral market developments played an important role in the discussions about the strategic consequences of the international economic and political changes. The response to larger state ownership in resource markets was to push for open markets, rather than to fight the ownership battle. The tools to wedge open the national doors included debt-restructuring programmes in developing countries, trade negotiations, and developing countervailing market powers to reduce the power of individual states or groups of states on certain sectors. Technology played a major role in this process, reducing the costs of alternatives.

The scenarios that are presented in part II of this study can help to understand the directions in which the current developments may evolve. Nevertheless, four years after the start of the financial and economic crisis an assessment of the impact on international economic relations must be made. Economic growth in the US and Europe has been disappointing in this period. Demand for energy and minerals in these economies have been subdued. While demand for energy and minerals continues to grow in emerging countries, further emphasising their importance for resource producers. For a long time, OECD countries were the main markets and counterparts for resource producing countries. This relationship will change when other countries or groups of countries replace them in this role. This will inevitably also change the governance too. At the same time, renewable energy and developments such as shale gas and oil can be seen as the countervailing market powers of the future. In that future, the role of nuclear remains uncertain, although capacities are developed in emerging economies, and oil producing countries, such as the United Arab Emirates, Iran and also Saudi Arabia is showing interest to balance its domestic energy needs and energy export capacity. Interestingly, renewable energy also ties in with developments in mineral markets, as the debate about rare earths has shown<sup>87</sup>, and agricultural markets, with regard to biofuels and biomass, which could create new above ground dynamics with its wider deployment. Despite the period of deeper international economic integration, also known as globalisation, the post-crisis balance of payments and domestic constraints has elevated the management of imports and exports on the policy agenda of many countries.

### ***From Washington consensus to where?***

Earlier periods of change in political and economic regimes have shown that the way these changing international economic and political relations play out is uncertain.<sup>88</sup> This is due to the complexity and

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<sup>86</sup> Bram Buijs and Henrike Sievers, 'Critical Thinking about Critical Minerals', in: *Clingendael International Energy Programme (CIEP) Briefing Paper* (November 2011); Bram Buijs and Henrike Sievers, 'Resource Security Risks in Perspective, in: *Clingendael International Energy Programme (CIEP) Briefing Paper* (November 2011).

<sup>87</sup> See for a discussion on facts and fiction of this discussion: Bram Buijs and Henrike Sievers, 'Critical Thinking about Critical Minerals', in: *Clingendael International Energy Programme (CIEP) Briefing Paper* (November 2011); Bram Buijs and Henrike Sievers, 'Resource Security Risks in Perspective, in: *Clingendael International Energy Programme (CIEP) Briefing Paper* (November 2011).

<sup>88</sup> See theme 1.

dynamics of the international system in which balancing and re-balancing between major powers and others takes place continuously.<sup>89</sup> The recent large change to international relations is the emergence of new economic powers, such as China, and to a lesser extent India, Brazil, some Gulf oil producers, South Africa, Malaysia, Indonesia and others. These countries experienced a period of accelerated growth and restructuring of which the impact was only truly felt in the period after 2000. They were to a large extent responsible for the growth of resource markets, driving the upsurge in demand in that period. With the rise of the emerging consumer economies in economic importance, in particular China, new state companies entered the international market. Their entry into the international market changed the playing field. Moreover, the entry of new SOEs from emerging consuming countries also impacted on international relations, revamping the discussion about resource nationalism.

### Post-war Regimes

The establishment of the Bretton Woods institutions in 1944 was important because they were the building blocks for the economic mores of the period there after. The first period was characterised by trade liberalisation and growth, which boosted West Europe's and later Japan's economic recovery. The concurrent process of de-colonisation in that period, part of creating a new world order, failed to quickly elevate developing countries to higher welfare levels. This led to increasingly louder demands for a revision of the international economic order to include a transfer of wealth to these countries. Geopolitically there was pressure from the centrally planned economies, which promised alternative principles. The demise of the Bretton Woods steady exchange rate regime, two oil price shocks and monetary instability that ultimately lead to developing countries debt crises in the 1980s, finally resulted, after the debt crisis had been made manageable, in the Washington consensus regime in the latter part of that decade.<sup>90</sup> The new principles shaped a new period of growth for many countries, and, eventually, the emergence of new powers on the international scene. Regimes and regime changes mirror the stage of globalisation and the crises that went along with them.

The internationalisation of the economy which really took off in the second part of the 19<sup>th</sup> century, has experienced both periods of rapid opening, with large capital flows from the UK and later other developed countries to other parts of the world; and periods of retreat to more national approaches, when a major rebalancing took place in the Great Depression and later periods of crisis. The relative stability of controlled capital flows during the exchange rate regime of Bretton Woods, gave way, in the 1970s, to greater internal and external financial freedom in the period thereafter. For this freedom to work, it was necessary to have strong institutions<sup>91</sup>, which many countries lacked to withstand the forces of ultra short capital movements. The financial crises in the 1990s in emerging markets such as Mexico, Indonesia, Thailand, South Korea and Brazil, and the subsequent IMF-led restructuring of some of these countries, inspired other emerging economies, such as China, to create larger national buffers to fend off a future calamity rather than rely on the IMF. Both government reserves and

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<sup>89</sup> K.N. Waltz, Structural realism after the Cold war, in: *International Security*, vol. 25, no. 1, (2000); A. Wendt, *Social Theory of International Politics*, Cambridge, Cambridge University Press, (1999); Niall Ferguson, Complexity and Collapse, Empires on the Edge of Chaos, in: *Foreign Affairs*, March/April 2010.

<sup>90</sup> Paul Krugman, *Currencies and Crisis*, The MIT Press, Cambridge Mass., (1993); Barry Eichengreen and Peter Kenen, Managing the World Economy under the Bretton Woods System: an overview, in: Peter Kenen, *Managing the World Economy, Fifty Years after Bretton Woods*, Institute for International Economics, Washington D.C., (1994).

<sup>91</sup> Kenneth Dam, *The Rules of the Game, Reform and Evolution in the International Monetary System*, The University of Chicago Press, Chicago, Ill., (1982).

sovereign wealth funds expanded rapidly in China and other countries. The hoarding of savings led to large global financial imbalances in the late 1990s and early 2000s. A process of re-balancing is now underway, although this process will be far from smooth.<sup>92</sup>

The level of cooperation and the ability to share a vision on where to go next with the international system play an important role in how and what will be the new stage in globalisation.

### **A bump or a transformation?**

The Washington consensus, as this wave of liberalisation was coined, implied a large and widespread opening of the balance of payments of many developing countries. This was not without obstacles as the monetary problems of the 1990s (Tequila crisis and Asian crisis) proved. The crises were caused by imbalances between the international capital markets and the domestic economies and their institutions, which required restructuring in order to accommodate the fast moving capital flows.<sup>93</sup> The management of short-term capital flows and the exchange rate arrangements was crucial for these countries recovery.

The decades after the 1970s have been interesting. For many countries it has also been a period of hardship and fundamental restructuring, for the US and Europe in the 1970s and early 1980s, adjusting to the new relative prices of production factors and restructuring the economy towards more services, for the developing countries to restructure their debts, while grappling with poverty, and for the centrally planned economies to change to a more market based economic system. Every decade has had its monetary and financial crisis, and its recoveries, indicating that the perception of stability of the system very much depends on the vantage point from where you look. African economies have been troubled for a long time and the upsurge in economic activity is a fairly recent phenomenon, mainly powered by the investments in resource sectors. Declaring the current crisis as transformative for the international political and economic system based on the relative strength of the state capitalist countries, as indicated in WP1, thus requires some more explanation. For one thing, if the 1970s have any lessons in store, it is that countries are affected in different manners and not all at the same time. Japan and some other Asian economies were flourishing at a time when Europe and the US were struggling to adapt their economies, only to run into difficulties in the 1990s. The aftermath of the crisis can take many years to unfold. The fact that Europe's difficulties now take centre stage does not imply that others will be unaffected.

### ***The crisis and its European aftermath***

The current international economic, financial and fiscal problems, in which mainly the US and EU countries are involved, is a challenge to their position as prime definers of world political and economic governance. Nevertheless, the change of the world governance system towards a state capitalist system, as suggested in Work Package 1, and away from a liberal world order is not a certain at all. To be sure, the impact of the financial and economic crisis started in 2008/2009 is large. The large fiscal problems in the US and the euro-crisis in Europe demonstrate the immediate and also the longer-term impact on economic policy-making. Yet, the demographic distribution of the US and the

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<sup>92</sup> See the POLINARES Work Package 1 contribution on [www.polinares.eu](http://www.polinares.eu),

<sup>93</sup> Nouriel Roubini and Brad Stetser, *Bailouts or Bail-ins? Responding to Financial Crisis in Emerging Economies*, Petersen Institute for International Economics, Washington D.C., (2004).

availability of cheaper energy suggest that the US is by no means at the end of its structural economic strength. It could remain a strong driver of the global liberal economy or, if the debate on natural gas exports is an indication of future approaches, resort to crypto-isolationism.<sup>94</sup> Europe, Japan and China face aging populations and as large energy importers do not have access to cheap energy at home but rely on international markets.<sup>95</sup> The capability of China to become a leading mores setter with its state capitalist model is therefore uncertain and will depend on its ability to manage its structural resource import dependencies, domestic growth and geopolitical interests.

China's position as 'factory of the world' depends on international consumers being able to purchase its products, as long as domestic demand cannot absorb the potential shortfall. With its main markets in recession, exporters in China are reorienting themselves on the domestic market.

In response to the financial and economic crisis, countries have responded differently with regard to policy-making. Countries such as Germany favoured fiscal austerity, while others preferred expansionary policies despite the already large fiscal deficits. The divide over policies and instruments has to do with the analysis of what is causing this crisis. There seems to be a difference of opinion on what would be the best collective action, and what the individual country cost (and risk) will be when pursuing it. In the Euro-crisis, proponents of a Keynesian policy approach clashed with those in favour of a (strict) monetary policy. The first group wishes to stimulate demand, while the latter prefer to enforce internal Eurozone economic reforms to restore competitiveness.<sup>96</sup> The risk for the stronger Eurozone economies with a Keynesian approach is that their fiscal deficits will (have to) grow and that the cost of borrowing will increase, without guarantees that the weaker economies will reform their economies. The risk of the strict monetarist approach is that the recession will deepen further and include also the stronger economies.

In 2011/2012, the discussion about the role that capital surplus countries, such as China and some of the oil producing countries, were willing to play, the conditions of such a deal and the preferred institutional arrangement, heated up around the US fiscal difficulties and the European debt crisis. After the US debt ceiling was increased and discussions about expenditures caps had started, capital continued to flow to the US, perhaps also because a sound alternative was lacking. The European crisis in the meantime struggled from one important meeting to the next to handle the Greek debt crisis within the Eurozone, and wrestling with the danger of contagion to other economies. A debate about the distribution of the risks and benefits of the governance system, international markets hold a dim view of politicians' ability to come up with a plausible joint coherent strategy, challenging their solutions time and again.

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<sup>94</sup> On 14 February 2012 Rep. Edward Markey (D) proposed two to prevent natural gas exports to US non-free trade countries; one bills to prevent building or re-building gas export capacity until (North American Natural Gas Security and Consumer Protection Act) and another one to preserve natural gas produced or transported over federal lands for the American market (Keep American Natural Gas here Act). The first bill was redirected to the Committee for Natural Resources and the second to the Committee for Energy and Commerce. With the statement 'drill here, sell there, pay more' Markey took a forceful position against natural gas exports. Democrats do not have a majority in the Senate and in this election years this discussion should also be seen in that perspective. Nevertheless, he has received support from some energy-intense American industries.

<sup>95</sup> See POLINARES D2.1 report Section 18 on growth and demography.

<sup>96</sup> Quantitative Easing, or QE, was nevertheless an important instrument to manage the crisis, but at the same time, fiscal reforms were a crucial part of the strategy.

The diversity of developments among the OECD countries is one reason for the divide, but also their view on how best to position themselves for the future. The economic crisis is a period where countries must position themselves for the future growth. Because the stronger economies in the Eurozone are keen to stay competitive in the global market, the incomplete governance in the Eurozone made solidarity with the weaker member without guarantees on reforms far too risky. They therefore attempted to include others in participating in the financial effort and to manage polarization within the EU institutions. The IMF became involved as an outside “arbiter”, but polarization was unavoidable. A prolonged process of gaining control over the restructuring agenda of the weaker Eurozone countries in exchange for help ensued. The discussions about the restructuring agenda of mainly the southern European countries was further complicated by the weakness of the EU banking sector. The European Central Bank ‘bought’ the banks time to strengthen their balance sheets in late December 2011 by offering very cheap capital for three years, freeing up the possibility to restructure Greek debts, and to lower borrowing costs for Italy and Spain. While the financial market tension over the Greek package may have abated, the next challenge will come from the austerity policies in the individual member states, including the stronger economies. With a stricter stability pact in place, substantially narrowing the policy options of all EU governments, they must find political support for deep reforms of the economy.

The outlook of Europe is in stark contrast with some of the other OECD countries, although Japan with its anaemic growth and large fiscal deficit and aftermath of the March 2011 earthquake and tsunami is also struggling. The expansion of Australia as a major energy exporter to Asian markets is one example of diversity, while the US economy is showing some signs of recovery. This diversity perhaps ends, for the moment at least, the long period of coherent economic strategies of OECD countries.

### ***Recent trends in energy markets***

The troubled economies of the OECD, but also emerging countries are struggling with several problems at the same time. With demand weak in several large markets, high energy prices in Europe and Asia are posing an additional problem for recovery of domestic demand. In the oil market, the drop in demand in the US and Europe in the first years after the crisis was compensated by the growth of demand in emerging countries. China’s oil demand continued to grow. After the 2008/2009 drop in demand, total demand for oil surpassed in 2010 its pre-crisis 2007 peak of 86.6 Mb/d.<sup>97</sup> Current demand is around 89 Mb/d. The recovery of demand was mainly due to China. In 2007 Chinese demand was 7.6 Mb/d, and increased to 9.4 Mb/d in 2010. In 2008, oil prices peaked at about \$140 a barrel and collapsed to the mid-30s in the midst of the financial crisis, and slowly recovered in 2009 as a result of OPEC production policies to about \$70 a barrel. In 2010 oil prices began to increase again. American oil prices remained below Brent prices for most of 2010 and 2011, due to weak demand and increasing domestic supplies.<sup>98</sup> The increasing political tensions over the nuclear programme in Iran, and the subsequent embargo of oil imports, have created nervous oil markets. Despite assurances that every demand in the international can be met, prices have increased substantially in the past three months.<sup>99</sup> For Europe, the weakness of the Euro has translated in higher current oil prices in Euro

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<sup>97</sup> IEA, *Monthly Oil Review*, March 2012.

<sup>98</sup> EIA, energy briefs oil.

<sup>99</sup> *Financial Times*, 29 March 2012, interview with Oil Minister Al-Naimi of Saudi Arabia.

terms than in July 2008, when oil prices were high but the Euro-dollar exchange rate strong (see Figure 20). This will complicate economic recovery.

**Figure 20: Brent crude oil spot price<sup>100</sup>**

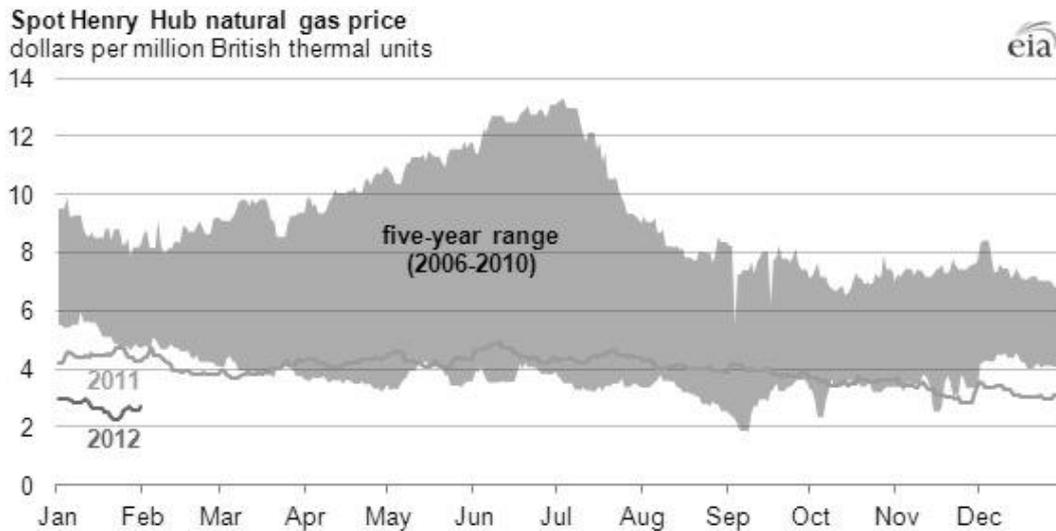


Source: EIA, *Today in energy* (March 2012)

The US price of natural gas has, as a result of the expansion of the unconventional gas supply, decreased to levels below \$3 per Mbtu (see Figure 21), compared to prices in Europe of around \$7-8 per Mbtu and above \$10 per Mbtu in Asia in early 2012.<sup>101</sup> Although it could turn out that shale gas has a part to play in these other regions too of course, the expectations are that the cost of shale gas is higher than in the US. The relatively low prices for natural gas is in contrast with the price of oil, which has been increasing substantially lately.

<sup>100</sup> “On a euro basis, the spot price for Brent crude oil, a global benchmark, has surpassed its prior record high and set a new record high of 96.53 euros per barrel on March 13, 2012, as the currency exchange rate has declined (see chart above). The prior record of 92.76 euros per barrel was set on July 3, 2008. However, on a U.S. dollar basis, the spot price for Brent crude oil remains under the prior record high of \$145.66 per barrel, which was set on July 3, 2008. On March 13, 2012, the Brent crude oil spot price was \$126.30 per barrel.” EIA, *Energy Today*, accessed on 28 March 2012.

<sup>101</sup> EIA, *Today in energy* (March 2012).

**Figure 21: US Natural Gas prices**

Source: EIA, *Today in energy* (March 2012)

The shale gas revolution in the US the emerging competitive advantage of cheap energy for the US economy also contrasts sharply with the outlook for Europe, Russia and China (see Figure 22), who are predicted to see energy costs as a percentage share of GDP increase more than the US. This is not only due to price levels but also to energy efficiencies or the lack thereof in some of the economies.

### ***Energy policy***

Also in energy matters the EU is an outlier with its strong emphasis on sustainable energy in policy-making, although differences remain among member states. While the rest of the world is embracing the recent reserve and supply expansion in natural gas and crude oil as an opportunity to both reduce carbon emissions when they replace coal and improve the local environment, the EU is more hesitant with regard to this fuel for mainly political reasons. Proponents of sustainable energies fear the potential competitiveness of natural gas will delay the introduction of wind, solar and bio-energies, while dependency on Russian natural gas imports has coloured the energy debates at the EU level. While the technology push for sustainable energy is an attempt to position the EU at the front of the new energy industry business, it is China that is making major strides in terms of reducing the unit costs in solar panels resulting in rising exports and installed wind capacity (see theme 4). Labour and capital in China are simply cheaper than in the EU, while the current fiscal problems add uncertainty for investors in both fossil and sustainable energies. Again the EU sees an industry where a leading position in research is not translated in jobs for the manufacturing industry.

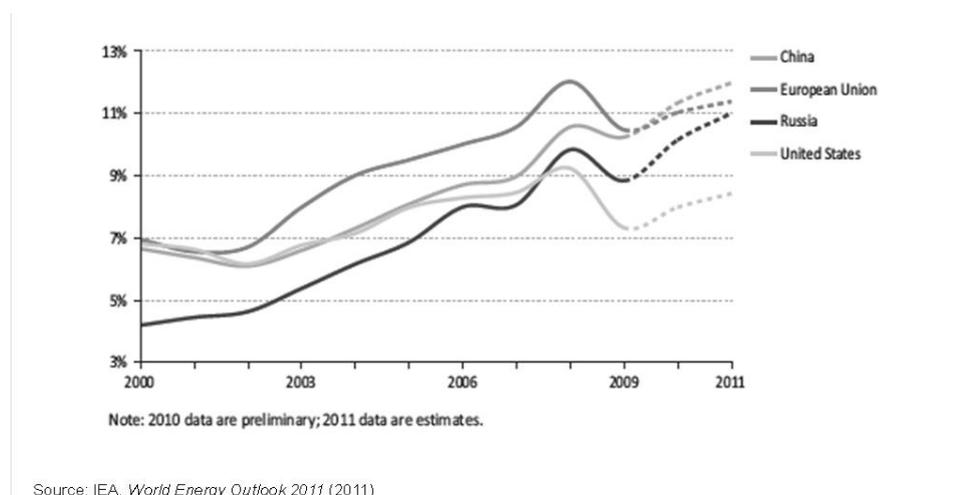
Pursuing a sustainable energy economy always was based on the assumption that the EU would have to, like Germany, pursue global competition based on quality rather than price. The management of the Euro-crisis is reflecting this competitive push, despite the fact that pursuing a relatively cheap energy strategy seems not to be part of this attempt. With many EU economies uncompetitive already, the restructuring towards such a model of competition must be indeed fundamental to stay in the game with the US and China.

### *US Competitive trump card*

In the US the debate about curbing the large fiscal deficit resulted in a harsh political debate on spending and taxation. Although the government was allowed to expand the ceiling for government borrowing, the ensuing (election) debate has been centred on the skewed distribution of income and taxation. The erosion of middle class incomes compared to the highest incomes, which had been going on since the 1970s, and the taxation of the country's top income earners unveiled serious socioeconomic inequalities. The role of the government in addressing these inequalities was contested by part of the country's elites. While 'Washington' had been instrumental in securing continuity for the US banking (and automotive) sector in the midst of the crisis, others in society were not offered such a lifeline. While the fiscal deficit is narrowing policy options for supporting the lower and middle classes, international capital markets maintained (relative) confidence in the dollar and T-bills, in part because not very many alternative options were available to investors. The US government can therefore still borrow at reasonable rates from international capital markets. It is clear, however, that US government spending will have to be restructured. This restructuring will require the US to decide how to manage the socioeconomic fabric of the country and what is needed to project its (hard) power abroad. In the last couple of years, coalition partners have been pressed harder to contribute to the US engagements in Iraq and Afghanistan to share the burden of governance costs. The fiscal austerity in these mainly European countries undermines their ability to continue sharing governance costs sharing at the proposed level.

With regard to the economy of the US, the positive development in the energy balance of the US in the coming years, due to the shale oil and gas revolutions, can generate a substantial competitive advantage for the US economy in energy intense sectors in comparison with both Europe and Asia, which are net energy importers. Already in the International Energy Agency's *World Energy Outlook 2011* it was brought to the fore that the share of total energy cost in GDP was substantially lower in the US than in Europe, Russia and China (see Figure 22).

**Figure 22: Energy costs as a % of GDP (2000 – 2011)**

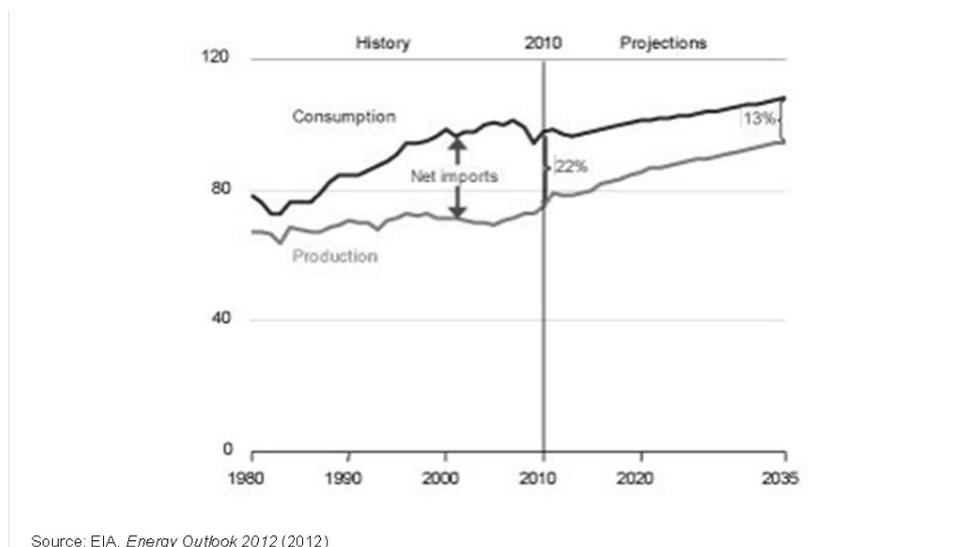


The importance of energy in the political debate is illustrated by the importance of gasoline prices in

election years. This was the case in 2008 and is repeated in 2012. The organisation of the international market and the fact that in oil the US is largely a price taker does not always matter. Some politicians believe that the US can achieve more energy sovereignty by stimulating fossil fuel exploitation, while others would like to see the renewable energies stimulated. The recent debate in Congress about allowing US natural gas to be exported to non-free trade partners or not (i.e. the global natural gas market) to protect American consumers from rising natural gas prices is a good example of the politics surrounding energy.<sup>102</sup> Although these two bills must be seen as part of the political posturing in an election year, the fact that Democrats are voicing the national advantages of not exporting to global markets for American consumers (and are chagrined that renewable energy subsidies have been cut as part of the fiscal policies) is a telling sign that energy is important in the presidential elections. Whatever the outcome of this politicised debate, the energy balance of the US has substantially improved as a result of unconventional oil and natural gas production. Already jobs in energy intense industries are returning to the US to benefit from the energy economies.

Figure 23 and 24 show the US total energy and oil balances. They clearly show the decline in US import dependency due to increased shale oil and gas production and changing demand patterns. The natural gas balance has changed in the course of three years from an outlook of 18% imports in 2030 to self-sufficiency and perhaps exports until that time.<sup>103</sup> Such a radical change in the energy outlook could impact the role of the US in securing energy flows around the world. Moreover, its reduced import dependency in oil implies that the US can be sourced from mainly Atlantic sources and that dependency on the Middle East flows could become an Asian and European affair. The geopolitical implications of such a shift will be explored in the scenarios.

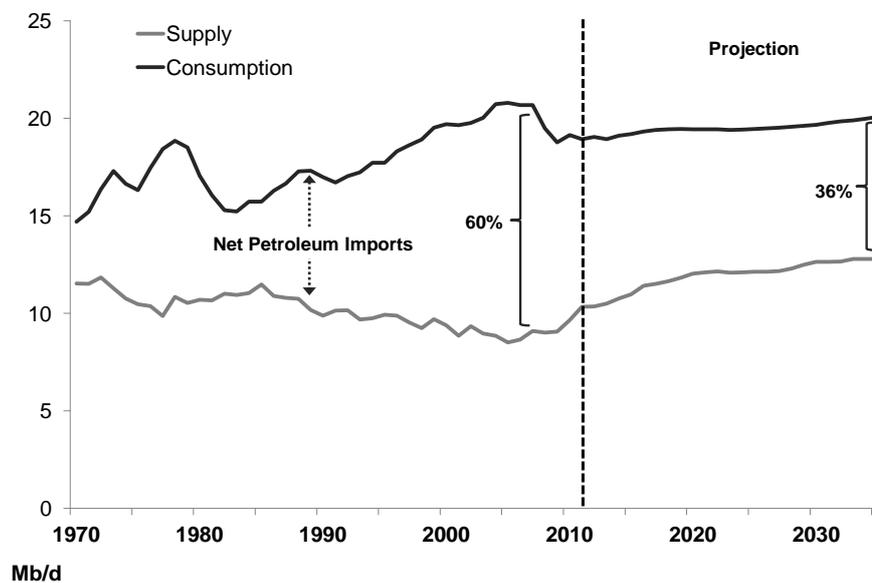
**Figure 23: Total US energy production and consumption balance 1970 - 2035**



<sup>102</sup> See Theme 4 for further details on the possible regulatory reactions to the possible export of US natural gas.

<sup>103</sup> See modeling of future energy and mineral balances (until 2040) by ENERDATA in POLINARES D2.1 report (2012).

Figure 24: US liquid fuels supply 1970 - 2035



Source: EIA, *Energy Outlook 2012* (2012)

Liquid fuels (including crude, shale oil, bio fuels) also show a remarkable improvement in the coming years due to slow growth of consumption and an increase in domestic US production.

### *From here to where?*

From the discussion of the US energy situation it is clear that the relationships in energy will change, not only as a result of the financial and economic crisis, but also because of the developments in the energy sector themselves. The issue here is whether the US economy can grow itself out of the crisis. The fiscal problems have not been resolved, and although unemployment is declining, it is still fairly high, raising questions about the ability of the US to grow out of the crisis. In Europe the conclusion has been that a restoration of growth is not enough to resolve the issues, but that fundamental reforms are necessary to tackle the problem of an aging workforce and substantial fiscal deficits. The aging of the workforce is also an issue in China and Russia, posing policy challenges on these economies too, while other emerging countries such as India and the Middle Eastern countries have young populations.

The financial and economic crisis has thus also affected other economies. Although economic growth in emerging economies continued, apart from Brazil, also these economies are experiencing stresses and strains in their economies. Russia had to devote a large part of its Oil fund in 2008/2009 to defend the value of the Ruble and rescue several large resource companies from bankruptcy. The government on Russia relies for its ability to invest in the economy substantially on high oil prices, which it cannot influence. Although the Russian presidential elections held little surprises with regard to its outcome, the discussion in the country on the functioning of the political system and the best economic policies is far from over. Meanwhile, its energy and resource industry needs to invest substantially to both improve energy efficiency in the economy, and to develop new resources. Until now, Russia relied on

its production capacity developed in an earlier period. With the maturity of these fields it needs to generate sufficient investments to realise this move away from mature fields. The debate about attracting new investments and partners will be rekindled. Already Rosneft has aligned itself with ExxonMobil to develop the Russian Arctic offshore, while Gazprom is partnering with Total and Statoil for the Shtokman development. The level of foreign direct investments involved in the modernisation of the Russian energy sector will depend on the ability to generate sufficient domestic capital, which to some extent depends on oil and gas price developments in the near future.

Also China has its difficulties. Economic growth is slowing down, implying that the demand gap, resulting from the recession in the US and Europe, cannot easily be replaced by domestic consumers. The large stimulation package has delayed the impact of the financial and economic crisis, but has also created new domestic problems in the housing and local banking sectors. Local government debt has escalated and is now about 25% of Chinese GDP. At the same time, wages are increasing. This is reducing the competitive advantage of the country. Some industries move to inland China, others are looking at the circumstances in other Asian countries, where the cost structure is more competitive.

### ***Back to the future***

The outcome of the political and economic restructuring in world is as yet uncertain, but it will determine the course of developments in the next few years, a period which we called the Pathway. This period forms the point of departure for the four future storylines in Part II of this work. With economic growth developments uncertain in important parts of the world economy, not only the course of the energy and mineral markets will be affected, but also the international relations among countries. Recent and current trends in developments of markets and strategies of important players only gives some insight into future trends, depending on how politically and economically powerful they can emerge in this period of profound change. This in turn will determine the rule of the future game.