Basic chemicals production 2030

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Core Statements

- The production of basic chemicals lays the foundation for the chemical industry and subsequent industrial value creation.

- Basic and downstream chemicals are inseparably linked with each other in production. For this reason, Germany – as a location of chemical industry and industry in general – will continue to remain dependent on regionally available basic chemicals. Decisive contributions for solutions to forthcoming megatrends originate from basic chemicals. The close intertwining of basic and downstream chemicals production is a prime example for resource efficiency.

- In view of the worldwide market developments for basic chemicals and the developments of customer industries, moderate growth is expected for basic chemicals production in Germany in the next 20 years.

- In order to safeguard and maintain competitive production structures for basic chemicals, considerable reinvestments in industrial plants and infrastructure will be necessary over the coming decades. Otherwise, closures of outdated plants would lead to production shutdowns also for downstream products, triggering domino effects in further production chains based on by-products and harming the customer industries.

- Investments in basic chemistry invariably have a long-term orientation. Long-term planning security presupposes societal consensus on industry-friendly framework conditions – more concretely and in particular, in the form of secure and competitive supplies of energy and raw materials.

- With sufficient investments and adequate framework conditions, basic chemicals production in Germany can remain competitive globally and thus make major contributions to preserving and strengthening the integrated industrial structures in Germany, also in 2030.
BACKGROUND
In the financial and economic crisis, the strong industrial base in Germany proved to be a stabilizing factor. Not too long ago called an “old economy” with a somewhat derogatory overtone, industry has significantly helped Germany overcome in record time the economic crisis year 2009. Today’s strength of industry should not be taken for granted: It is the result of joint efforts of companies, managers and staff not only to hold their own in international competition but to achieve top positions – and it is the result of an industrial policy which used to keep framework conditions for industrial production in Germany competitive in many respects.

At present, raw material- and energy-intensive basic industries – such as basic chemicals production – are faced with numerous challenges in Germany. A current example is the implementation of the energy transition (Energiewende): As a large energy consumer, basic chemistry depends on reliable electricity supplies at competitive prices and is directly impacted by potential supply uncertainties and future cost increases. But at the same time, energy-intensive processes – e.g. chlorine-alkali-electrolysis – form the starting points for materials which are elementary for implementing the energy transition: For example, epoxy resin – an essential component of efficient rotor blades in wind power plants – is based on the basic chemical chlorine, through the intermediate step of epichlorohydrin.

MEGATRENDS
Shaping prosperity for a growing world population in an environmentally sound manner: This is the central challenge for a sustainable development. Chemistry provides the decisive contributions for solutions to the global challenges – also called megatrends. These contributions originate from basic chemicals:
INTEGRATED PRODUCTION (VERBUNDPRODUKTION)

As a particular feature of chemical production, specialty products are not manufactured “alongside” large-volume basic chemicals: They are inseparably linked with them in production where specialty chemicals emerge from basic chemicals. This means that there is no conflict between innovative specialty products on the one side and standard products, which have been largely unchanged for decades, on the other. Quite the contrary, the trend towards higher-quality products/substances also strengthens the need for basic chemicals and, moreover, brings a competitive capacity utilisation of production plants. In Germany, the production of basic petrochemicals has increased by some 30 percent over the past 20 years, remaining at a constantly high level since the year 2000. The expected flood of cheap imports of basic chemicals into Europe has turned out only a small wave so far, because Asia with its high growth rates has absorbed large quantities from new production plants close to raw material sources in the Middle East.

VALUE CHAINS

Multi-stage and frequently interconnected value chains, in which over 30,000 products are manufactured in a very wide range of complex processes, are characteristic of the chemical industry’s production philosophy. In almost all cases, these products stem from substance streams of a small number of basic chemicals and basic processes: Petrochemical production begins in so-called crackers with the cracking of crude oil into a small number of basic products, which become the starting point for the subsequent complex value chains. Comparable chains are found in inorganic chemistry, where chlorine is an important basic product. However, in inorganic chemistry there are multitudes of different raw materials; this renders an overall perspective more difficult. For this reason, the following part of this paper focuses on organic chemistry and, in particular, on petrochemistry as its major foundation.

In the mid-1960s, mineral oil replaced coal as the most important organic raw material in West Germany. The advantages were obvious: Unlike coal, which initially needs to be liquefied or gasified elaborately, crude oil (naphtha) is a by-product of fuel production in refineries. With its properties, naphtha makes an ideal raw material for the manufacture of organic basic chemicals, by way of cracking the starting material into hydrocarbons of different carbon (C) chain lengths: As cracker products, ethylene (C2), propylene (C3), butadiene (C4), benzene (C6) etc. form the basis for an essential part of chemical production. Some of the value chains building on this are depicted—in a highly simplified manner—in the following graph. Further details are provided in an interactive flowchart by the Association of Petrochemicals Producers in Europe (Appe).
RAW MATERIALS BASE

In principle, those raw materials which serve as carbon sources for chemistry are interchangeable: For example, ethylene and its downstream products can be obtained also from the renewable raw material of sugar – through the intermediate step of ethanol. As the products are chemically identical, the price decides on which raw material is used\(^1\) – presupposing technical feasibility. This is an important implication for the relative advantages of the respective raw materials: With the increasing scarcity of petroleum and correspondingly rising prices, alternative raw materials – e.g. natural gas, biomass or coal – will become more attractive in the long run. However, the extent to which the mineral oil derivatives, which are currently dominant in Europe, can be supplemented or substituted by such alternative raw materials will depend on a whole number of factors. Next, these factors are analysed for the individual raw materials:

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\(^1\) This does not apply where customers are willing to pay a higher price for an (identical) product based on renewables.
obtained in mineral oil production and has been used to build huge petrochemical capacities. In the USA, ethane from natural gas is the dominant raw material in crackers, and with the so-called "shale gas", a low-price raw material has become available recently.

Lower-cost natural gas in other world regions impacts production in Europe at product level, through increased import pressure in the C2 value chain. Secondly, it has an indirect price-lowering effect worldwide. In Germany, too, significant shale gas deposits exist, which can open up chances not only for energy production but also as a raw material for the C1 chain. A major prerequisite for this is to bring about acceptance in the general public for shale gas production. At present, natural gas as a raw material mainly serves for the C1 and C2 value chains; new processes will enable use also for the C3 chain in the future.

**COAL**

Today, hard coal and lignite are used only in a small number of special applications in Germany. Being a domestic raw material, coal is important mainly in terms of supply security. High investments in gasification/liquefaction plants, which do not seem economically viable in the present framework conditions (i.e. European emission trading), are arguments against a renaissance of coal chemistry.

**BIOMASS**

Renewable raw materials – such as vegetable oils and animal fats, cellulose, starch and sugar – are mainly used in special applications, i.e. where industry can benefit from the synthesis of nature or where new routes of synthesis can be taken, for example in biotechnology. At present, renewables are not used in Germany for the production of basic chemicals. Additionally to their disadvantages regarding costs and physical properties, especially their regionally limited availability – in large volumes – is problematic. Already now, there is competition between uses for the various fields of application of biomass: foods or feedstuffs, energy or fuels and, as the smallest sector, use as a material. Perspectively, it has to be taken in account that the potentials for cultivating more biomass are comparatively low in Europe. In addition, high transport costs for biomass of low energy density rather speak against importing large volumes of renewables into Europe for producing commodities. Against this backdrop, local processing – which could lead to the emergence of new chemical regions – seems more likely.

For the period of some 20 years as examined here, it can be assumed that petroleum derivatives and increasingly also natural gas will remain the raw materials of choice in organic basic chemicals production – given their technical advantages in processing and good transport properties for processing close to markets in well-established infra-and production structures. Moreover, naphtha crackers offer a broader product range than gas crackers and – especially for C3, C4 and aromatics – they provide products...
that would be less readily available in a more gas-based production. This holds true in particular for butadiene. While the above-mentioned products can also be manufactured in dedicated, separate processes, economies of scale are advantageous in naphtha crackers.

Broadening the raw material base is an important research and development goal of the chemical industry. Here, the focus for chemistry is on developing optimal solutions in the various situations and on using the different raw materials as efficiently and economically as possible. Furthermore, it is worth noting that only around 10 percent of petroleum consumption falls to the share of use as a material in the chemical industry, whereas 90 percent is used as fuel. In theory, value creation petroleum could thus continue much beyond the currently forecasted date for its depletion.

“VERBUND” SITES AND CHEMICAL PARKS: INTEGLINKAGE AS KEY FACTOR

Major success factors for locations of basic chemicals production are interlinkage and the industrial “hinterland”. Integrated production sites (Verbundstandorte) are exemplary of the large number of different but interlinked production processes, where – building on basic chemicals production – products are used across several stages as starting materials for further productions. By-products from these processes are processed on site into further utilizable products. This improves the economy of scale in production and is also an excellent example of resource efficiency. Site-internal pipeline systems enable highly efficient logistics. Today, there are over 60 chemical parks in Germany which have passed on this successful integration concept also to smaller chemical sites: Newly locating companies benefit from various possibilities for integration at the site, e.g. substance streams, energy, infrastructure, services for industry etc. The resulting synergies benefit existing productions too.

Basic chemicals production in Germany has an important role for downstream processing: it supplies a wide range of sectors within the chemical industry and beyond with the inputs they need for their productions – in geographic proximity. Pipelines between different sites enable the exchange of liquid and gaseous basic chemicals, improving security of supply. For example, value chains do not need to be put on hold when crackers are shut down temporarily for maintenance. Moreover, pipelines are independent of other disruptive factors (e.g. restrictions for inland navigation) and they are the safest means of transport. A sophisticated pipeline network makes investments attractive for the chemical value chain. Earmarking stretches of land for expanding pipeline systems – together with a faster realisation of new pipeline links – can constitute an important strategic measure for securing the integrated structures of the chemical industry.

Little interlinkage and lack of an industrial hinterland can cause production sites to find themselves in an awkward position when individual plants are closed down, because the remaining fixed costs are too high for the production sites. A strong interlinkage – as it exists at the industry location Germany, both as a whole (strong integration of the various sectors, large depth of value creation) and inside the chemical industry –
mitigates this. But obviously, even strong interlinkage is no guarantee for the survival of value chains when major links of the value chains collapse.

ASPECTS OF TRANSPORT AND LOGISTICS

The fact that the decisive value creation steps in basic chemicals production take place in an integrated manner is also attributable to many basic chemicals (ammonia, olefins, EO ...) being gaseous and, therefore, difficult or costly to transport. By contrast, both raw materials (crude oil/naphtha) and many end products from the chemical industry (liquids or polymer granules) can be transported easily and at favourable cost. As rising transport costs are rather likely for the future, the trends towards production clusters should intensify – both in the markets and at the location of raw materials. However, productions far from sales markets involve high transport costs and efforts (cp. also the location of refineries near customers and not near raw materials). For the time being, substituting basic chemicals production in Germany/Western Europe by imports from outside Europe is difficult to imagine. Already now, the utilisation of transport capacities (pipelines, ports, logistics facilities, tank wagons etc.) is so high that these capacities would need to be expanded significantly and at high investments before additional import volumes of various basic chemicals could be shipped. Infrastructure expansions and also new pipeline projects are increasingly encountering acceptance problems in the general public.

In a risk scenario involving a discontinuation of basic chemicals production it is, therefore, more likely that the industrial value chain collapses at this place, followed by a domino effect triggered by relocations of downstream chemical production and its customer industries. That domino effect would impact and weaken the industrial base in Germany in its entirety.

MARKET DEVELOPMENTS FOR BASIC CHEMICALS

In a basic scenario, the demand for chemical industry products determines the production of basic chemicals in Germany/Western Europe. Globally, the production volume of the chemical industry will grow somewhat more strongly than the manufacturing industry on average and clearly more significantly than the gross domestic product. There is a clear distinction between very strong growth in Asia and the Middle East and moderate growth in North and Latin America and Europe. Volume growth in basic chemicals largely follows the overall growth of the chemical industry because there is a direct link by the mass balance of the reaction between a downstream product and the basic chemical from which it is produced. The world market for basic chemicals can be derived from the value chains:
Value chains in basic chemicals

CHLORINE

Chlorine ranks among the major basic chemicals. It is manufactured in an electrochemical process from salt, water and electrical current (chlorine-alkali electrolysis). With one third, PVC has the largest share in the further processing of chlorine (cp. the vinyl chain described under Ethylene). There is a wide range of other fields of application for chlorine: Being one of the most reactive elements, chlorine has a key role in the production of numerous important intermediates. This holds true especially regarding the rather inert carbon-containing basic chemicals (cp. the C-value chains described hereinafter). Some 70% of chlorine-containing intermediates result in chlorine-free end products. A detailed description is provided in the Chlorine Tree.

Caustic soda is a co-product in chlorine production. Caustic soda is used in a multitude of chemical processes and in other industries where it has an important role as an auxiliary, even though in small volumes.

METHANOL – C1-CHEMISTRY

The production is based on synthesis gas which, in turn, can be obtained from natural gas (68%), coal (30%; mostly from China) and from refinery residues or biomass. The major downstream products of methanol are formaldehyde, acetic acid and its derivatives, methanolamine, acrylates and various specialty plastics.

Preserving methanol installations in Germany is closely connected with the competitiveness of refineries as raw material suppliers and the realisation of coal gasification plants. For the future, it must be expected that methanol-based products will increasingly come onto the markets from regions with access to shale gas.
Ethylene is the most important basic chemical in terms of volume. Growth impulses are positive for ethylene, as opposed to lower growth trends for basic chemistry as a whole. This is because ethylene is increasingly produced in raw material countries from gas which is becoming cheaper relative to oil. This leads to cost advantages and to ethylene downstream products crowding out other products, e.g. polyethylene over polypropylene, polyester fibres over cotton, or PET packaging over glass bottles. All in all, the announced new capacities continue to exceed the real need for growth as clearly as in the past. Just like in the past, however, many of the announced capacities are not built at all or only with delay. Therefore, it can be assumed that the global market will be more or less balanced. The opening up of new and cheap gas sources (shale gas, mainly in America, after 2020 also in China) will enable new capacities at the raw material sources which, however, will be absorbed by the market. But strong capacity increases could result in temporary overcapacities. The construction of new installations in China even at a moderate level could cause overcapacities, generate market pressure and provoke the closure of existing installations in Europe.

VINYL CHAIN / PVC
With 37 million tonnes, PVC is the third important thermoplastic polymer globally in terms of volume – after polyethylene and polypropylene. The so-called vinyl chain starts with the basic chemicals ethylene and chlorine, leading to the preliminary product ethylene dichloride (EDC) and then to the vinyl chloride monomer (VCM), which is finally processed into polyvinyl chloride (PVC). The VCM consists of chlorine (57%) and ethylene (43%). Even though the vinyl industry can be seen as rather mature globally, considerable potentials remain for growth. When observed over an extended period of time, experience shows that the worldwide growth for VCM / PVC slightly exceeds the growth rates of the global GDP of ca. 3 percent per annum. Worldwide growth is likely to be distributed quite unevenly in the years to come: Strong growth in Asia as opposed to lower growth rates in North America, Japan and Western Europe.
Propylene ranks second in terms of volume. Its global growth rate of + 4 % p.a. roughly corresponds to that of chemistry as a whole, reflecting the demand in the C3 value chain: Due to the limited availability of propane, production largely remains oil-based (steam cracking 55 %, refinery by-product 35 %, propane dehydration 5 %, others 5 %). Further rising oil prices and the increasing competition of gas-based products from the C2 value chain have a dampening effect on growth. Better product properties (PP vs. PE, SAP …) drive up growth rates in developed economies. All in all, the announced new capacities continue to exceed the real need for growth as clearly as in the past. But a more or less balanced market can still be assumed, because the announced projects are not realised at all or only with delay. However, the formation of a rather narrow market cannot be ruled out if gas-based ethylene cracking grows more strongly than forecasted and the by-product yield drops for propylene.

Butadiene – C4-Chemistry

The C4-based value chains rely either exclusively (butadiene) or quite predominantly on naphtha cracking. Butadiene – with a production volume of ca. 11 million tonnes globally in 2011 – is mainly processed into synthetic rubber and difficult to substitute. Well over 50 % go to the automobile industry (tyres, interior panelling, gaskets). Global growth for butadiene is largely determined by growth in the automobile industry, amounting to around 4 % p.a. At the end of the period under consideration, alternative mobility concepts (e.g. car sharing) might dampen the growth rate if such concepts have a sufficient market penetration. There are obvious overcapacities for butadiene especially in Europe and North America, but these can be used only to a limited extent due to the lack of raw materials from naphtha cracking. If gas-based ethylene cracking grows stronger than projected, an even more marked scarcity of butadiene must be expected. New dehydration processes – as an alternative to butadiene – are currently being developed and will have a price-limiting effect in the second half of the forecast period.
BENZENE

Crude oil is the basis for some 94 % of the global benzene production, with benzene extraction from reformate and pyrolysis gasoline (from naphtha crackers) being the most important source. Furthermore, targeted benzene production by way of toluene hydrodealkylation has a certain role. The prerequisite is a sufficiently marked price difference between benzene and toluene. With strongly rising crude oil prices in the past years, processes for the targeted production of benzene became less and less economically viable.

CYCLOHEXANE

At present, the demand for cyclohexane totals ca. 5.3 million tonnes p.a.; the worldwide growth in the demand for cyclohexane amounts to roughly 3 % p.a. Almost the entire production of cyclohexane is used for manufacturing cyclohexanone and cyclohexanol, both pre-products for nylon. Consequently, there is a strong dependence between the consumption of cyclohexane and the demand from the automobile, construction and textile industries. 95 % of the global cyclohexane production is generated by benzene hydration.

TOLUENE

Toluene is obtained by extraction from reformate or pyrolysis gasoline. It is worth noting that significant volumes of available toluene remain in various refinery streams and are added to petrol for improving the octane number. Around 19 million tonnes p.a. of pure toluene are produced. Out of this total, 11 million tonnes p.a. are used for benzene/xylene production (status 2009). 2.5 million tonnes p.a. go to the solvent market and 1 million tonnes p.a. serve for the manufacture of toluene diisocyanate (TDI, a pre-product for polyurethane). The worldwide demand for toluene is forecasted to grow by 5.5 % p.a. A particularly strong demand growth of 8 % p.a. on global average is expected for the TDI sector. This figure includes two-digit growth rates in China, India and Taiwan.

XYLENES

The global xylene production totals 43 million tonnes p.a., with Asia accounting for the lion’s share. The global demand is expected to grow by 6 % p.a. Unchanged or slightly negative demand developments are likely for Western Europe. The three xylene isomers are ortho-, meta- and para-xylene. With a volume share of 90 %, para-xylene has the greatest commercial importance. Ortho-xylene and meta-xylene contribute 9 % and 1 %, respectively. Most of the isomers isolated as pure substance are converted into the pertinent dicarboxylic acids (terephthalic acid, isophthalic acid and phthalic acid).
In Germany in the year 2010, considerably more basic chemicals were consumed than produced. This holds true especially for ethylene, propylene and benzene. Imports came primarily from Belgium and the Netherlands. As these countries are net importers too, the real sources stretch from Europe’s periphery (ethylene) to China (benzene).

MARKET DEVELOPMENT FOR BASIC CHEMICALS: SCENARIOS TO 2030
The future demand for basic chemicals in Germany / Western Europe largely reflects the expected growth of the chemical industry and its customer industries. In cooperation with the reputable economic research institute Prognos, the VCI carried out a comprehensive analysis of the chemical industry’s development to the year 2030. The study “The German chemical industry 2030” provides a sound long-term projection for the global economy, for developments in Germany and Europe, and the structural change in the industry – going as deep as the individual chemical sectors. Various scenarios were examined in this approach. The so-called basic scenario shows the most likely development.

BASIC SCENARIO
During the forecast period, the global demand for chemical products will increase at an annual average rate of 4.5 percent, i.e. more strongly than in the last decade (3.9 percent). The demand is driven up by two trends: Firstly, the rising demand from emerging economies – especially in Asia, where the growing population and the more prosperous middle class are growth drivers. Secondly, the demand for chemicals is getting stronger in industrial countries too. Here, there is not so much volume growth but rather a shift in demand towards high-quality and high-priced innovative chemicals. Moreover, the chemical intensity is rising in some customer industries, because more specialty chemicals are needed for innovative products. Production largely follows demand. Also in the future, new production capacities will be built in regions with strong demand growth.

Up until 2030, the chemical production in Germany will grow annually by 1.8 percent. This means more dynamic growth for chemistry than for German industry or the economy as a whole – but without keeping up with the high global chemical growth. All the same, Germany will remain the fourth largest chemical manufacturer worldwide. With rising exports, German chemical companies will continue to benefit from the marked growth in global demand. In this scenario, research-intensive and high-quality specialty chemicals will achieve an above-average growth rate of 2.2 percent per annum.

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2 Growth rates of production value
At 1.3 percent, growth will be lower in basic chemicals but – because of the close integration between the chemical sectors – basic chemicals will benefit from the rising importance of specialty chemicals. This is a feature specific to Germany and should be seen as a central competitive advantage. Up until 2030, Germany will remain among the few countries which have both a strong basic chemicals and a large specialty chemicals production.

**ALTERNATIVE DEVELOPMENTS**

Additionally to the above basic forecast, two alternative scenarios were simulated, examining the influence of different industrial policies on future developments. The scenario “Broken value chains” highlights the impacts of a policy which puts an excessive strain on the energy-intensive process industry (e.g. by ending the hardship rules for energy-intensive installations). A relocation of energy-intensive production would break the value chains and harm Germany’s industrial core. The energy-intensive chemical industry would be significantly affected by lower competitiveness in international markets and by major domestic customer industries moving away from Germany.

In the second alternative scenario, extra growth forces were identified in innovation-friendly and unbureaucratic surroundings. The scenario “Innovation-friendly environment” assumes that additional growth potentials can be activated in the German economy: with more research support and a better qualification of staff. Another element is an improved acceptance of technology. German industry can generate additional growth potentials in the described innovation-friendly environment.
INVESTMENTS AS A PREREQUISITE
In the next years and decades, considerable replacement investments in important supply/production infrastructures (e.g. crackers) will become necessary, in order to maintain a modern, competitive and interlinked basic chemicals production basis. Without such investments, existing installations are at risk of becoming outdated. As many installations have the same age level regarding their dimensions and “technology age”, the danger is growing of a large-scale and simultaneous shutdown – due to disruptive effects like cost competition in times of recession, extra burdens imposed by the public administration etc. Such induced, sudden changes would lastingy weaken the production chains and trigger further production closures at downstream processors. In this setting, it would also be problematic if low-volume but important side streams ceased to be available. One concrete example is butadiene which is very difficult to substitute. Butadiene comes exclusively from naphtha cracking and is processed into highly specialised products, e.g. sealing agents and impact-resistant modified plastics.

STRATEGIC IMPORTANCE OF BASIC CHEMICALS PRODUCTION
Basic chemicals are strategic inputs in downstream industrial production. It is true that companies also benefit from imports (e.g. of favourably priced raw materials) to optimise corporate purchasing. All the same, for reasons of supply security they wish to source basic supplies of most of their raw materials in their geographic proximity. Inside the chemical industry, chemical parks are a visible expression of this close cooperation and of the interdependence between companies along the value chain. The growing demand for basic chemicals needs to be met reliably to keep value chains secure. The dependence on imports must not further increase for supplies of basic chemicals.

FRAMEWORK CONDITIONS
Centrally located in Europe and with well-integrated structures, Germany has uncontested advantages as an investment location. On the downside, there are disadvantages due to politically motivated costs which do not exist in other regions of the world. Consequently, favourable framework conditions are essential for the future of basic chemicals production – and, in a wider sense, for the future of Germany as an industry location. Such framework conditions must enable companies to make the necessary replacement investments in their installations for basic chemicals.

In concrete terms, today the companies are faced with numerous legal provisions which increase the cost of operating their installations: European emission trading – with strict benchmarks for installations and emission reduction requirements from 2013 – is only one example of burdens ensuing from energy and climate policy measures, which are limited to Germany or the EU. Therefore, these burdens distort competition to the detriment of companies manufacturing domestically; their competitors in other regions of the world do not need to cope with any comparable strains (and might possibly enjoy further advantages such as favourably priced or
subsidised energy or raw materials). As long as there are no comparable efforts worldwide in energy and climate policies, the existing burden easing and exemption rules need to be fully maintained – to make up for politically motivated costs arising for companies engaged in international competition. This is not about improving the position of German basic chemicals as compared with international competitors and creating “artificial” competitive advantages; it is up to the companies themselves to success in international markets. Rather, this is about reducing the existing competitive disadvantages, at least partly.

Industry in Germany needs room for growth, also in the future. With the anticipated moderate growth, at least the present volumes of raw materials and energy will continue to be required for basic chemicals production – because after decades of optimisation, further improvement in conversion efficiency is very limited. Therefore, ensuring reliable and competitive energy supplies and access to raw materials will remain essential for basic chemicals production.

Investments in basic chemicals production are of a long-term nature. Societal consensus is needed on the future of Germany as an industry location, in order to bring about long-term planning security for long-term investments. This applies in particular for the long-term securing of reliable and competitive energy and raw material supplies. Only the right balance between environmental and economic policy goals can ensure sustainable growth and thus – beyond social and environmental aspects – also safeguard the third pillar of sustainability: preserving our prosperity which needs to be worked for time and again. In Germany, prosperity relies not least on a strong industry. A sustainable industrial policy needs to create and maintain framework conditions which allow basic chemicals production to hold its own in global competition and, consequently, to make major contributions to preserving and strengthening the integrated industrial structures in Germany.
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