

# The German Chemical Industry 2030

VCI-Prognos Study – Update 2015/2016 – Alternative scenarios



VERBAND DER  
CHEMISCHEN INDUSTRIE e.V.  
WIR GESTALTEN ZUKUNFT.



VCI



Conducted by Verband der Chemischen Industrie e. V. in collaboration with PROGNOSE AG.

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# Alternative scenarios: Things can turn out the other way

The basic forecast of the study “The German Chemical Industry 2030 – Update 2015/2016” generally shows positive future perspectives for the German chemical and pharma industry. In the global picture, chemical business remains a dynamic growth market that offers good development potentials also for German chemical companies. However, success does not come without effort. The industry location Germany – and thus also the chemical and pharma location – is faced with immense strategic and structural challenges.

Firstly, the competition environment is changing for chemistry in Germany. Demand growth for chemical products in Western Europe will be only moderate in the future. Growth chances are greater in the emerging markets of Asia, South America and, in the longer term, also in Africa. German companies and international competitors are investing in these markets, replacing exports by local productions. But local producers are expanding their production capacities too. Moreover, new petrochemical plants are built in the USA or in the Middle East because of favourable energy and raw material costs. This brings a huge offer of basic chemistry products at comparatively low prices on the world market, involving the risk of overcapacities in basic chemistry.

Furthermore, demand structures and societal objectives are changing fundamentally. A sustainable management style and sustainable consumption increasingly gain in importance. This is reflected e.g. in the pursuit of higher resource efficiency, greenhouse gas-neutral production, a further expansion of renewable energies or a stronger use of renewable raw materials.

## THE CHEMICAL INDUSTRY IS FACED WITH FUNDAMENTAL CHANGE

The intensification of global competition and the changes in demand structures and customer preferences have far-reaching consequences for product portfolios, process technologies and value chain structures of the chemical industry. Consequently, the industry is faced with fundamental change. In order to be successful in the future, the companies need to review existing business models and develop new ones; where necessary, they might have to adopt a new strategic orientation. Here the components of a promising strategy for the German chemical industry: use the chances of globalisation, focus on specialty chemicals and pharmaceuticals, launch an investment offensive, increase resource efficiency, diversify the raw materials base, improve productivity, and drive forward digitalisation and networks.

Good politico-economic framework conditions in Germany and in the European Union are an important prerequisite for the German chemical industry and its products holding their own on global markets also in the future. It is true that positive starting points are discernible in Brussels and Berlin with the initiative “Better Regulation” or the alliance “Future of Industry”. All the same, up until now the politico-economic framework conditions have barely improved for industrial production. Innovation promotion progressed only selectively and in small steps. Research promotion is still

lacking in such a form that is open to all technologies and all companies, even though meanwhile many political parties advocate this approach.

At the same time, the competitive position is deteriorating for German industry where energy prices are concerned. Energy costs are an important factor in the global competition of locations. The USA, the Middle East and also many emerging markets are tempting with their low prices for oil, gas and electricity – while German industry is burdened with higher energy costs than many competitors due to the energy transition (Energiewende), the European emission trading system (ETS) and national energy taxation.

Like hardly any other country globally, Germany owes its prosperity to a strong, diversified and competitive industry. In Germany, the share of industrial value added in GDP is nearly twice as high as in the USA, Great Britain or France. This wrongly induces to overestimate industry’s ability to perform. The redirecting abroad of new investments by energy-intensive sectors shows that meanwhile the energy cost issue is at breaking point. Moreover, certain hostility to industry is noted at the level of municipal administrations or some German federal states. So far, this attitude becomes manifest mainly in building and planning regulations. This has prevented or delayed investments, particularly by SMEs.<sup>1</sup>

Over the past years, growth of industrial production in Germany was weaker than overall economic growth. From 2012 to 2016 annual GDP growth averaged 1.4 percent, while industrial production increased by 1.0 percent. In the period under review, chemical and pharma production also rose by only 1.0 annually.<sup>2</sup> Chemical production even declined when excluding the pharma business. If this trend persists, the “stability anchor” industry will gradually lose in importance.

A correction of the politico-economic course is needed. The urgent question arises how to bring politico-economic framework conditions in a better shape, so that the chemical industry can remain the innovation and growth driver of the industry location Germany also in the future, making an essential contribution to prosperity in our country.

Wishing to look into the industrial policy scope and to highlight interconnections and, most importantly, for creating a fact base for the political discussion, the VCI and Prognos jointly appraised and assessed the industrial policy alternatives to the “business-as-usual scenario” (basic scenario). A “scenario of chances” describes future development paths in an investment- and innovation-friendly environment, with expansion of innovation promotion by the public administration and in an efficient regulatory framework that strengthens

<sup>1</sup> VCI Investment Report 2016, <https://www.vci.de/die-branche/zahlen-berichte/vci-statistik-grafiken-bericht-investitionen-chemische-industrie-gesamtwirtschaft.jsp>

<sup>2</sup> Different source Destatis. The growth rates cannot be directly compared with the data from the Prognos model. The Prognos model uses data from national accounting, with real prices and exchange rates of 2010.

price competitiveness. Next, a “scenario of risks” examines the impacts of a less favourable industrial policy environment, compared with the basic scenario. Inter alia due to an interventionist energy and climate policy, the “scenario of risks” brings rising regulatory costs and more uncertainty for companies in corporate planning.

### Chance scenario

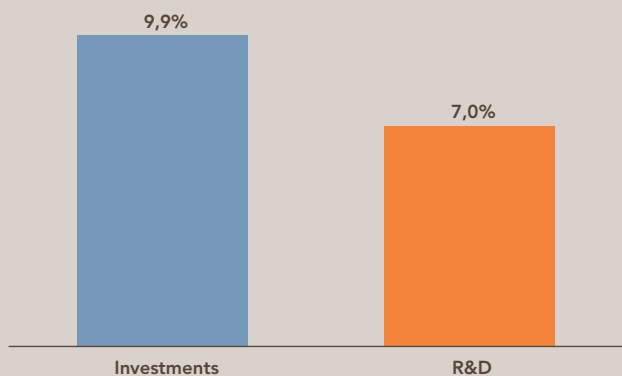
The chance scenario describes future development paths of the chemical-pharmaceutical industry in an investment- and innovation-friendly environment. In Europe, and particularly in Germany, investment-related public spending for improving infrastructures and promoting/funding research and education is gaining in weight – as compared with consumption-related spending. Fiscal incentives available to all companies, promotion of networks and cooperations, easier access to venture capital and private-public partnerships for pilot projects stimulate investment.

The political side tries to avoid preventive over-regulation; instead, it primarily lets the market forces act and puts trust in industry. Supporting legislation is oriented equally to the precautionary principle and the innovation principle. Existing regulation is examined as to whether it impairs investment and drives forward innovation. Regarding future regulatory plans, it is ensured that they do not stand in contradiction to other regulation. The political side strives to create a consistent and reliable regulatory framework, to harmonise laws and regulations across Europe, and to reduce duplicate regulation.

In the field of climate and energy policy, consideration is given to the industry – which is engaged in international competition – also in the future. The emission trading system and the expansion of renewable energies are further developed in a cost-efficient way, and inevitable burdens are shared with a stronger orientation to the economic performance principle.

**FIG. 34: HIGHER INVESTMENTS AND MORE RESEARCH & DEVELOPMENT**

Differences in investments and R&D expenditure of the German chemical and pharma industry in 2030, compared with the basic scenario



Changed framework conditions are directly reflected in higher fixed asset and R&D investments. The chemical industry location Germany is becoming more attractive; competitiveness increases.

### Chance scenario – Overview of assumptions

- Energy policy: The energy transition (Energiewende) and the expansion of renewable energies become more efficient. Competitiveness is maintained; no additional burdens due to the Energiewende (e.g. cap of EEG charge or funding from the budget). Grid expansion is successful; the status quo is kept up for existing plants.
- Industrial policy: Investment- and innovation-friendly environment, less but more efficient regulation, reduction of innovation obstacles, planning security, introduction of fiscal incentives for research, project funding with openness for topics. Focus: wide range of promotion/funding, no limitation to SMEs.
- Public investment in infrastructures/schools/education is gaining in weight, compared with consumption-related spending.
- More investments in Europe, expansion and broad application of the European investment programme EFSI (European Fund for Strategic Investments, also the Juncker Plan), reliable planning in the energy sector.

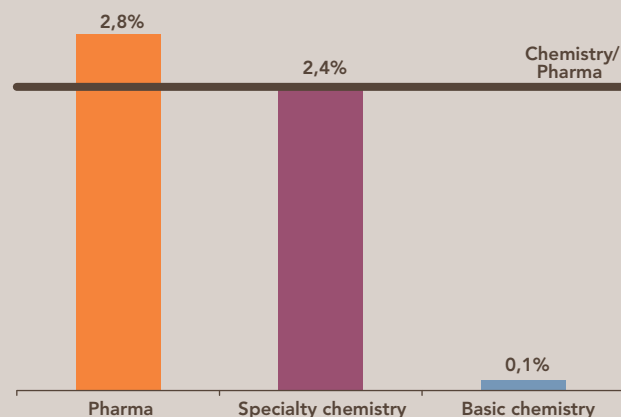
This enables reliable investment planning by the corporate sector.

The change of industrial policy framework conditions in Brussels and Berlin – towards an altogether more innovation- and investment-friendly environment – benefits, in particular, the chemical and pharma industry. Production conditions improve, as competitiveness is strengthened. At the same time, faster economic growth brings a stronger demand for chemicals, and companies benefit from better market conditions in Germany and in the EU.

As an industry with strong innovation, chemistry benefits from the new research policy. The broader approach of promoting/funding measures – concerning both the absolute

**FIG. 35: BENEFITS – PARTICULARLY FOR PHARMACEUTICALS AND SPECIALTIES**

R&D expenditure of the German chemical and pharma industry, CAGR 2013-2030



Particularly pharmaceuticals and specialty chemistry benefit from the changed framework conditions. R&D budgets clearly increase in these sectors.

upper limit for funding and the funding eligibility of research projects – brings a strong increase in the industry's R&D spending. This development particularly benefits specialty chemistry.

#### FISCAL INCENTIVES FOR RESEARCH STRENGTHEN SMES

Research & development generally has a more significant role in specialty chemistry than in basic chemistry. It is important to constantly develop new and innovative solutions for customers. At the same time, specialty chemistry is strongly characterised by SMEs where project funding in its conventional form frequently did not take effect. Now, the introduction of fiscal incentives makes it easier for SMEs of specialty chemistry to invest more in R&D. In the pharma industry, too, the heavy focus is on research and development. Developing new medicines tends to become ever more work and cost-intensive. More efficient regulation in the pharma sector – e.g. faster approval procedures and sufficient remuneration for innovative drugs – drives forward research activities. As there is no limitation of funding measures to SMEs, these measures now benefit all companies alike. This enhances the incentives for more R&D not only among SMEs but also for large businesses. Overall, R&D budgets are increasing visibly and R&D intensities are rising too.

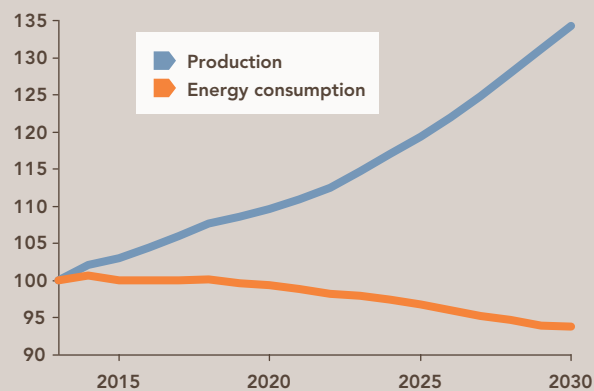
This changing environment is also reflected in fixed asset investment. Improved production conditions thanks to reliable energy costs, more reliable planning and the reduction of regulation allow companies to make investment decisions for the location Germany. At the same time, location conditions in Germany further improve through more public investment in infrastructures, schools and education. As an industry with strong exports, the chemical industry depends on functioning infrastructures. The availability of qualified staff also has a role in location decisions, especially in view of the challenges from digitalisation. Now, public investment improves both the transport situation and the skills of qualified staff. Thus, corporate investments at the location Germany become investments in the future. Investments by the chemical and pharma industry will expand by 2030. The investment attitude will become much less reserved in basic chemistry. Investments in specialty chemistry and pharmaceuticals are rising significantly.

But higher investments and more innovations can be realised only if the demand goes up too: the changed industrial policy influences not only chemistry but also the customer industries. In total, annual growth in the industry is on average 1.6 percent higher than in the basic scenario. Generally, the importance of the industry to the German economy remains high. Now, the industry has a permanent share of 23 percent in value creation. Leading industries with strong research benefit even more from this favourable environment than the rest of industry. This also increases the demand for chemical products.

The production value in the chemical and pharma industry increases with the higher demand on the one side and improved production possibilities on the other. The industry's growth rises to 1.7 percent p.a. Growth is particularly dynamic for specialty chemicals (+2.1 percent p.a.), while basic chemistry growth is clearly lower (+0.4 percent). Structural change accelerates – away from basic chemistry towards

#### FIG. 36: CONTINUOUS EFFICIENCY INCREASES IN PRODUCTION OF THE GERMAN CHEMICAL INDUSTRY

Real production value and energy consumption in the German chemical and pharma industry; index 2013=100



With rising real production value, energy consumption is falling in the German chemical industry. This is possible through, firstly, investments in new plants and, secondly, faster structural change away from energy-intensive basic chemicals towards specialty chemistry.

specialty chemistry. The pharmaceutical production value continues to grow dynamically (2.6 percent p.a.).

Innovative products also improve the competitiveness of the industry vis-à-vis competitors from outside Europe. This is reflected in trade. Chemical and pharma products "made in Germany" remain in good demand. Exports grow by 1.8 percent p.a. The stronger demand in Germany also brings higher imports (+1.7 percent p.a.). In consequence, the already high foreign trade balance rises from currently 51 billion euros to ca. 70 billion euros in 2030 (+1.9 percent p.a.). In this setting, the strong export activity is largely limited to specialty chemicals and pharmaceuticals. Basic chemistry continues to produce mainly for the domestic market. Exports of basic chemicals are near stagnation. Import pressure remains high, irrespective of improved production conditions (lower costs than in the basic scenario). The foreign trade balance in basic chemistry is slightly negative.

Real term increases of the production value might not be enormous when compared with the basic scenario. But additionally, the type of growth changes towards more qualitative growth. With its innovative products, the German chemical industry is well-prepared for the challenges of the future, and growth becomes more sustainable. The chemical industry location Germany is secured in the long term.

Furthermore, the investment climate improves energy efficiency – not only in specialty chemistry. Investments in new, state-of-the-art plants and the rising R&D spending enable more efficient production. With the real production value rising by 2.1 percent p.a., energy consumption falls by 0.3 percent annually.

Energy-intensive basic chemistry becomes more efficient too. The production value in basic chemistry increases somewhat by 2030 because of industry-friendly framework conditions. But growth remains so low that it does not bring high

investments in new plants. However, the investment-friendly climate constantly leads to improvements in existing plants. This also allows improvements in energy efficiency but – unlike in specialty chemistry – there are no major leaps.

#### ENERGY CONSUMPTION DROPS THANKS TO MORE EFFICIENT PLANTS

Overall, energy consumption in the industry drops slightly by 2030. Falling energy consumption is also attributable to faster structural change – away from basic chemistry towards more specialty chemistry. Basic chemistry grows slightly, but the shift in shares intensifies towards specialty chemistry.

Irrespective of stronger production value growth, the consumption of fossil and renewable raw materials remains almost constant to 2030. This is mainly because of the rising share of specialty chemistry, which requires fewer fossil raw materials – while the raw materials input is barely variable in basic chemistry. But the share of renewables in production increases by 2030. This is enabled particularly by specialty chemistry where investments are made in new plants and new products are developed.

The positive impacts of the changed industrial policy are not limited to the chemical and pharma industry. Industry overall benefits, so that growth of the manufacturing sector increases to 1.6 percent p.a. and German industry in its entirety grows by 1.5 percent p.a. Investments and the foreign contribution somewhat gain in weight as compared with the basic scenario. But private consumption remains the main driver.

The growth of industry also increases the public revenue. This can secure the refinancing of the higher public spending on measures regarding infrastructures, schools and education. Furthermore, the extra growth even allows to reduce public debt. The debt-GDP ratio of the state drops, as compared with the basic scenario.

The positive effects of the changed industrial policy in Brussels and Berlin are not limited to Germany alone. The assumed measures from Brussels for more investment in Europe and more reliable planning also benefit the other European Member States. GDP development becomes more dynamic in almost all countries. The changed industrial policy – as compared with the basic scenario – improves the price competitiveness of the chemical and pharma industry in the European countries. Consequently, also their production value growth turns out more dynamic than in the basic scenario.<sup>3</sup>

#### Risk scenario

But things can turn out the other way if the course is not set in an industry-friendly manner in essential points. The risk scenario looks into the economic impacts of a relative worsening of regulatory framework conditions, as compared with the basic scenario.

The companies need reliable framework conditions especially in the field of energy and climate policy. In the risk scenario, we allege that the ambitious climate goals will be implemented with the same instruments like so far. Consequently, energy costs keep rising for industry. Moreover, burden-easing provisions increasingly come under pressure; they are important for energy-intensive companies. Cost for grid

expansion, the necessary reserve power plants and the further expansion of renewable energies are passed on to electricity consumers. The German renewable energy sources act (EEG) is reformed in regular intervals. But promotion under this act is still not open to all technologies. Moreover, it is assumed that wrong incentives and inefficiencies in this set of rules are eliminated only insufficiently. At the European level, this scenario alleges a growing tightening of the emission trading system. The introduction of further instruments to increase CO<sub>2</sub> prices make climate protection even more expensive and reduce planning certainty among chemical companies.

#### MORE UNCERTAINTY IN PLANNING

Industrial policy overall becomes more interventionist, more selective and thus more difficult to predict. Increasingly, only individual companies, sectors and technologies are driven forward with specific regulations or subsidies. This reduces reliable planning for companies. But most eminently, the rise in regulatory costs – that comes with that regulatory approach – puts at risk the price competitiveness of individual processes. In consequence of these developments, energy-intensive companies shut down production plants. This impacts the value creation structures of German industry.

Most recently, the EU Commission finds in a study<sup>4</sup> that meanwhile the costs stemming from chemical industry-relevant regulation not only eat up a considerable part of value creation by European chemical companies; the study also notes that regulatory costs have doubled over the past years. In the risk scenario, the regulatory costs increase clearly in Germany and in the other EU Member States. Contradictory sets of regulation, ever new requirements in approval procedures and changing rules make reliable planning impossible for companies and drive up the costs at the production location Germany. Consequently, companies are taking a more reserved attitude in their domestic investments. This also adversely affects the spending on research & development, stifling technological progress.

The impacts of this selective industrial policy are clearly felt in the chemical industry. Not only the rising costs of the energy transition (Energiewende) but also uncertain planning due to “slimmed down” burden-easing provisions brings problems for the companies. In combination with rising energy costs, this causes a drop in domestic investments. As it also affects investments in modernisation and replacement investments, the reserved investment attitude leads to reduced production capacities and thus to higher production costs. This adversely impacts price competitiveness, and local producers lose market shares. Without adequate burden-easing provisions, individual production plants are shut down. This has far-reaching consequences for the value crea-

<sup>3</sup> Impacts of the Brexit were not considered in the development of the alternative scenarios, in order to ensure comparability with the basic scenario. It was too early to foresee the Brexit at the time when the basic scenario was prepared.

<sup>4</sup> Cumulative Cost Assessment for the EU Chemical Industry – Final Report: <http://ec.europa.eu/docsroom/documents/17784/attachments/1/translations/en/renditions/native>

tion structures in their entirety, with domestic producers additionally losing market shares to foreign competitors.

Particularly in basic chemistry, where competitiveness decisively depends on energy and raw material costs, sites are shut down in the described environment. In this scenario, the production value of basic chemicals "made in Germany" declines by 1 percent annually. The remaining production is only for the domestic market. Exports fall every year. Basic chemicals are increasingly imported. For many basic chemicals, the import pressure rises strongly. Germany becomes a net importer of basic chemicals.

#### SUPPLY SHORTAGES IN BASIC CHEMISTRY

The production decrease in basic chemistry also dampens production growth in specialty chemistry, where inputs become more expensive due to lower production capacities for basic chemicals in Europe and because of additional transaction costs when buying from overseas. Even supply shortages cannot be ruled out for some individual basic chemicals. These developments impair the price competitiveness of German and European specialty chemistry.

The chemical industry is not only characterised by large business groups with plants worth billions. In Germany, there are around 2,000 SMEs. Many of them are highly specialised manufacturers of specialty chemicals. They offer secure jobs, and they have good perspectives for the future in their niche markets. But in the risk scenario, these perspectives are impaired for chemical SMEs – because the market withdrawal of some important basic chemicals suppliers adversely affects the profitable relations between large businesses from basic chemistry on the one hand and specialty chemistry manufacturers in Germany on the other, with SMEs being characteristic of the latter.

At the same time, foreign locations not just expand their basic chemistry activities. They also intensively drive forward the production of specialty chemicals, as the necessary basic

#### Risk scenario – Overview of assumptions

- Energy policy: The EEG remains inefficient, the EEG charge rises, burden-easing provisions come under pressure, costs for grid expansion and reserve power plants are passed on to consumers.
- Industrial policy: No additional incentives for research; the regulation density increases. Obstacles to innovation due to uncertain planning and rising costs.
- Hardly any additional public investments in infrastructures/schools/education.
- No efficient investment incentives in Europe. The European investment programme EFSI ("Juncker Plan") fails; unreliable planning due to ETS.

chemical inputs are available locally in near-unlimited volumes and at favourable cost. This considerably increases the import pressure in specialty chemistry, too. Overall, the dependence of SMEs on foreign suppliers becomes stronger. This is a threat to the stability of the supply chain in the coming years.

Potential growth of specialty chemistry in Germany is lower, as compared with the basic scenario. In the risk scenario, the production value of German specialty chemistry only rises by 1.2 percent per annum – against 1.8 percent in the basic scenario.

The negative effects of this scenario are not limited to the chemical industry alone. Firstly, problems in chemistry also impair downstream industrial customers. In the future, they need to cope with rising prices for inputs. Moreover, supply shortages cannot be ruled out here, too. Secondly, competitive pressure increases for industry overall; for many sectors, real competitors from emerging markets are entering the stage. Germany also falls behind other industrial nations. The consequence: More and more products from industrial customers of German chemical businesses are manufactured abroad. This means that Germany's success formula – a tight intertwining of industries and industrial sectors – is at stake. Value chains tear, and the integrated structures (Verbund) of industry in Germany are weakened.

The example of plastic materials highlights these correlations. The oil and gas industry stands at the beginning of the value chain. Basic chemistry provides petrochemical inputs obtained from gas or naphtha. In a downstream step, plastics are produced from these inputs by way of polymerisation. Next, the plastics processing industry manufactures beverage bottles, window profiles or dashboards for vehicles. Other industries need plastic products for manufacturing their own articles. This strong "Verbund" within the plastics sector in Germany is increasingly coming under pressure.

Regarding petrochemicals, Germany has a clear competitive disadvantage in energy and raw material prices – compared with the raw material-rich regions of the Middle East or countries like the USA with shale gas. Because of favourable energy and raw material costs, investments in new petrochemical production plants are rising in those regions and countries. Quite often, basic chemicals are processed locally into plastics. So far, plastics from the Middle East are exported mainly to Asia. As growth will weaken in Asia, these plastics will increasingly enter the European market in the

**FIG. 37: LOSS IN COMPETITIVENESS IN BASIC CHEMISTRY**

Exports, imports and foreign trade balance of German basic chemistry, in billion euros. CAGR 2013-2030 in percent



The unfriendly environment for industry causes major problems particularly for basic chemistry in Germany, with decreasing competitiveness. Import pressure rises rapidly, and the foreign trade balance turns negative.

future. Without new plants, the domestic plastics industry has little chance of coping with such competitive pressure. Domestic basic and polymer chemistry loses market shares. The consequences are the shut-down of individual plants, production relocations abroad and narrower product portfolios.

This means for plastics processing companies that they have higher expenses for inputs than their competitors abroad. Some inputs are no longer produced in Europe; they need to be imported at great cost and effort. Moreover, plastics processors increasingly set up business in raw material-rich regions and countries with their good competitive position for plastic materials. In the USA this effect is clearly visible already today: Because of shale gas, the US has a considerable cost advantage for raw materials over Europe; this advantage will last up until 2030.

**INDUSTRIAL PRODUCTION “VERBUND” IS AT RISK**

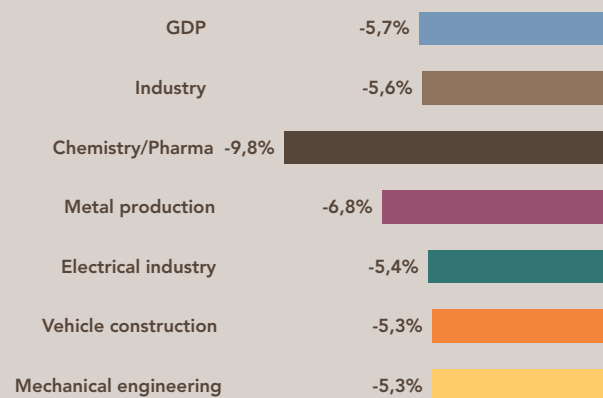
Developments are not limited to the plastics industry: All industries and sectors are adversely affected in the risk scenario. Total growth of the German manufacturing industry is merely 1.1 percent annually. The chemical and pharma industry is hit particularly hard by the less favourable framework conditions. The production value of the industry only rises by 0.9 percent per annum – 0.6 percentage points slower than in the basic scenario.

But in an environment with weaker growth and high competitive pressure, Germany can only hold its own if the industrial production “Verbund” is kept up. This is no longer safeguarded in the described scenario.

The regulatory uncertainty assumed in the risk scenario affects, in particular, small and medium-sized enterprises. Already now, many SMEs are complaining about long and tedious approval procedures and ever more complex building regulations. The negative attitude towards industrial plants, as is already felt in practice, should further intensify in the

**FIG. 38: ALL INDUSTRIES AND SECTORS ARE ADVERSELY AFFECTED**

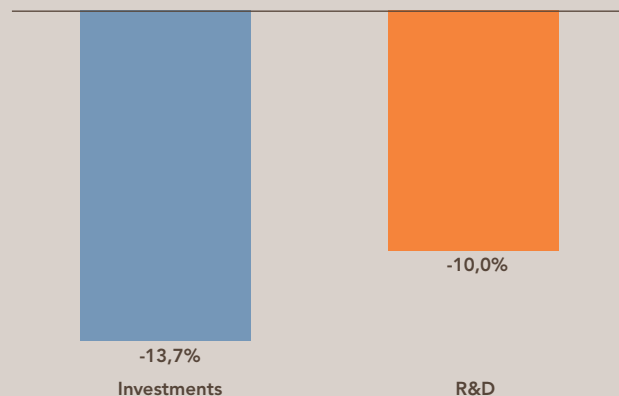
Differences in GDP and production figures for selected industries in 2030, compared with the basic scenario; in percent



All industries and sectors are impacted by less favourable framework conditions. Growth is clearly lower in many industries/sectors, compared with the basic scenario.

**FIG. 39: LOWER INVESTMENTS IN THE FUTURE**

Differences in investments and R&D spending in the German chemical and pharma industry in 2030, compared with the basic scenario



Compared with the basic scenario, investments will turn out lower in the future – both in fixed assets and R&D. The chemical industry location Germany will become much less attractive, with decreasing competitiveness.

future. This renders investments at the location Germany even more difficult. Many SMEs do not have the financial and staff resources for complying with more and more new requirements and regulations, coping with day-to-day business and getting the company fit for the future with digital transformation.

Therefore, in the risk scenario the industry not only grows slower. Moreover, high regulatory costs and uncertain planning lead to reduced fixed asset investments. The R&D spending, too, does not expand to the extent that would be necessary to face the manifold challenges of the coming years.

In order to get fit for the future and to keep on employees, novelty products are not enough: perfectly new business ideas are called for. For this, the companies need scope and capital. But against the backdrop of a hardly future-oriented industrial policy, the R&D spending drops at all levels compared with the basic scenario. Thus, the industrial policy reduces the companies’ ability to adapt. In consequence, the trends of the future become a threat for companies – even though these trends basically hold out chances for growth.

Lower R&D budgets and the bad investment climate have negative impacts on energy efficiency, too. Unlike in the basic scenario or in the “scenario of chances”, the industry can make clearly less progress in efficiency. In many plants there are barely any efficiency increases due to the investment weakness. In absolute terms, energy consumption of the industry will fall to 2030. But this is almost entirely due to the weaker production development and the shutdown of basic chemical plants.

Globally, the energy consumption of industry will further rise also in basic chemistry. The production drop for basic chemicals in Germany is set off abroad. Therefore, a national energy policy that reduces exemptions for energy-intensive



industries does not bring about a reduction of energy consumption in the chemical industry worldwide.

In total, the selective and interventionist industrial policy causes considerable welfare losses. Industry as a whole grows more slowly, and GDP growth will become much less dynamic than in the basic scenario. This threatens jobs in industry overall. Rising energy costs and more stringent regulation make the companies inflexible.

#### NEED FOR INDUSTRIAL POLICY ACTION

Primarily, the companies are called upon. They need to face up to ever more intensive global competition and set the course for a successful future: by way of innovations in products, processes and business models. But most importantly, they should see and use the chances of digitalisation and networks. The same applies for the circular economy with its potentials for innovation and growth.

But a successful future also needs good industrial policy framework conditions. The various scenarios, as jointly calculated by Prognos and VCI, show that speed and structural change and also the competitiveness of the German chemical and pharma industry strongly depend on economic and industrial policy framework conditions.

In the *risk scenario*, growing uncertainty in planning – as a result of an interventionist energy and climate policy com-

binated with excessive strains on the energy-intensive industry – is harmful to the industry's network and slows down growth of the overall economy. In particular, this impacts the energy-intensive chemical industry. Growth of the industry is only 0.9 percent annually. There is even shrinkage in basic chemistry, because the production of certain basic chemicals is no longer profitable and individual plants are shut down. This is not without consequence for the value chains; the production "Verbund" in chemistry threatens to fall apart. Weaker competitiveness of the German chemical-pharmaceutical industry impacts other industries, too. The chemical-pharmaceutical industry can no longer fulfil its role as innovation driver in the usual manner. Funds are lacking to sufficiently increase the industry's R&D spending to the necessary extent: It only rises by 0.5 percent per annum. This also impairs the ability of other industries to launch new products. But not only long-term growth of the manufacturing industry turns out clearly lower at 1.1 percent annually. Growth of the overall economy weakens significantly to just 1 percent p.a. Welfare losses are considerable for Germany. Beside the need for ever more borrowing, in the year 2030 the per capita GDP is ca. 2,400 euros lower than in the basic scenario. Moreover, there are around 1 million fewer persons in employment.

By contrast, an innovation-friendly environment – with efficient regulation and an energy and climate policy with the

TABLE 1: SELECTED INDICATORS FOR GERMANY IN THE 3 SCENARIOS

	Basic scenario	Scenario of chances	Risk scenario
Growth gross domestic product (GDP), 2013-2030, percent per annum	+ 1.3	+ 1.5	+ 1.0
Per capita GDP in the year 2030, in €	42,189	43,272	39,799
Persons in employment in Germany in the year 2030, in million	41.0	41.1	40.0
Debt-GDP ratio in the year 2030, in percent	55.5	53.3	65.5
Production growth in the manufacturing industry (production value), 2013-2030, percent per annum	+ 1.4	+ 1.6	+ 1.1
Production growth in the chemical-pharmaceutical industry (production value), 2013-2030, percent per annum	+ 1.5	+ 1.7	+ 0.9
Exports of the chemical-pharmaceutical industry, 2013-2030, percent per annum	+ 1.7	+ 1.8	+ 1.4
Imports of the chemical-pharmaceutical industry, 2013-2030, percent per annum	+ 1.7	+ 1.7	+ 1.8
Foreign trade balance of the chemical-pharmaceutical industry in the year 2030, in billion €, in real terms	68.3	71.3	54.5
Growth of R&D investments by the chemical-pharmaceutical industry, 2013-2030, percent per annum	+ 2.0	+ 2.4	+ 1.4
Growth of fixed asset investments by the chemical-pharmaceutical industry, 2013-2030, percent per annum	- 0.5	+ 0.1	- 1.4
Energy consumption growth in the chemical-pharmaceutical industry, 2013-2030, percent per annum	- 0.1	- 0.4	- 0.7

right sense of proportion – could release additional forces for growth: with major gains not only for the industry but for the overall economy. Economic dynamics accelerate in the “scenario of chances”. Up to the year 2030, the GDP grows by ca. 1.6 percent annually. This directly benefits the population. In 2030, the per capita GDP (more than 43,000 euros) is around 3,500 euros higher than in the risk scenario. Improvements in the innovation environment result from a changed research policy. These improvements release innovation impulses in chemistry, with positive effects for all industries in this country. Industrial production grows faster; improved location conditions help not only industry. Germany can enhance its attractiveness as an innovation location. Rising tax revenues give a solid basis to the federal budget, enable stronger debt reduction and allow additional spending in the fields of infrastructures, schools and education. The positive effects of a changed industrial policy in Brussels and Berlin are not limited to Germany alone. More investments combined with more efficient – and thus better – regulation also benefit the other EU Member States.

The chemical industry has the potential for contributing to a sustainable development in Germany, supporting Germany’s long-term economic success and safeguarding jobs. But this perspective needs to be prepared strategically: This means strengthening the innovation ability of the industry, using the chances of globalisation and digitalisation and working for sustainability.

The industrial policy scenarios highlight starting points for political action. The economic policy framework conditions are the basis for the German chemical industry with its products holding its own on global markets. The scenarios clearly show that it is possible to shape the future. Today’s political decisions influence the growth potential of the German national economy and of industry and chemistry.

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