

NATIONAL REPORT ON EXISTING STRUCTURES FOR SUPPORT OF ECO- INNOVATION – GERMANY



WP3	Strategy for eco-knowledge
ACTIVITY 3.2	Analysing the environment for ecoinnovation in partner countries
DELIVERABLE 3.2.3	National report on existing structures for support of Ecoinnovation

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1 Abstract

According to the European Innovation Scoreboard, Germany belongs to the Innovation Leaders. The country is highly export-oriented with a strong manufacturing industry and well established eco-innovation areas and markets. The GDP per capita is high and so is the number of innovative enterprises. In 2016 there were 378.000 commercial, freelance and agricultural start-ups. According to IfM Bonn, in 2016 there were around 282,000 commercial start-ups - around 16,200 or 5,4% less than in the previous year. This represents the sixth decline since 2011. The approximately 282,000 foundations have to be compared with 311,000 liquidations. This results in a negative start-up balance of 29,000. The decline in the number of start-ups results especially from the stable employment situation (with the national unemployment rate under 4%), as a counterbalance fewer start-ups are instead created out of unemployment. The KfW start-up monitor¹ of 2016 shows a founding rate of 1.5%. This corresponds to 763,000 people who became self-employed in 2015 - that is 152,000 fewer people than in 2014. On average, each founder contributed EUR 9,900 in 2014, with external investors contributing EUR 5,300. The share of start-ups with financing difficulties has fallen by a quarter to 15%. Start-ups are more often affected by financing difficulties because they often lack confidence-building elements such as an entrepreneur's history. In 2015, only 4% of founders were denied bank credit.

From the EcoInnovation point of view, nowadays the Green Economy is considered in Germany a very promising future market that will double in the next ten years. Startups play in this framework a crucial role as with their products and services they contribute to the development and innovativeness of the field, thus been one of the motor of the green transformation of the economy.

Nonetheless, the requirements and potentials of the environmental sustainability are still not much integrated in the German startups support system.² Till 2014 there were not specific funding programmes for startups in the Green Economy and only a few startups competitions targeting specifically green startups. Also the number of incubators specifically dedicated to green startups are still a niche considering the great amount of incubators and accelerators program which has seen a great raise in the last years in Germany. The link to green economy and sustainability is in most of the cases also missing in all professorial chairs for entrepreneurship, with some exception as the inter-university networks Climate KIC and Innoenergy as well as, amongst others, the universities of Oldenburg («Eco-Venturing»), Lüneburg, Kiel, Hamburg-Harburg and the Flensburg University of Applied Sciences.

It seems therefore that – even if the Sustainability Strategy of the German Federal Government is quite advanced – many of the objectives and indicators mentioned there, are still not concretely integrated in the German startups support system.

Nonetheless, the number of companies' foundation in the green sector has kept on growing in Germany in the last years, a factor which is even more encouraging considering that the overall number of companies' foundation in all sectors has instead decreased constantly. In particular, most of the companies in the green sectors that were founded between the 2006 and 2014 have specific focus on

¹ KfW-Gründungsmonitor 2016, Arbeitsmarkt trübt Gründungslust deutlich – Innovative Gründer behaupten sich, KfW Bankengruppe, 2016

² The support system for green start-up companies in Germany - Strategies and recommendations for strengthening the start-up sector of the Green Economy, Oldenburg University, Borderstep Institute, 2014

renewable energies and energy efficiency³. In this sense, it is possible to recognize a green transformation of many sectors. Especially in the energy sector and construction green foundations already an important engine of transformation. In a European comparison, start-up activities in Germany are leaders in the area of energy transition and climate protection and close overall to leading European cleantech countries such as Sweden.

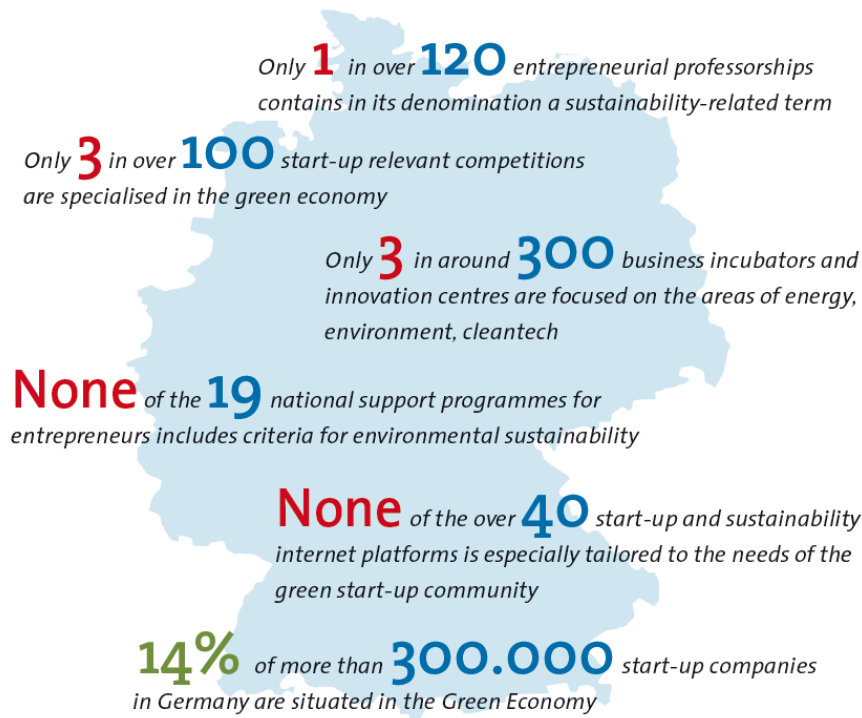


Figure 1 Integration of environmental sustainability in the German start-up support system⁴

2 Support structures and sources for facilitating eco-innovation

2.1 Government support

The Country Report Germany of the Global Entrepreneurship Monitor (GEM) states that Germany performs extremely well in the following framework conditions for start-ups⁵:

- physical infrastructure
- appreciation of new products / services from the consumer's point of view
- public funding programs

³ Fichter; Weiß, Green Economy Gründungsmonitor 2015, Berlin, Oldenburg: Borderstep, Universität Oldenburg, 2016

⁴ Source: The support system for green start-up companies in Germany - Strategies and recommendations for strengthening the start-up sector of the Green Economy, Oldenburg University, Borderstep Institute, 2014

⁵ Sternberg, von Bloh, GEM - Global Entrepreneurship Monitor, Länderbericht Deutschland 2016

- protection of intellectual property (e.g. patents)
- consultants and suppliers for companies

The main challenges are the improvement of school and extracurricular start-up training, the commitment of politicians and a reduction in regulation and taxes.

According to the result of a survey commissioned by digital association Bitkom among more than 200 start-up founders, a majority of start-up founders had bureaucratic hurdles while starting a business, they had furthermore difficulties in finding financing and staff⁶.

Nevertheless, almost everyone would take the step into self-employment again. 96% of them claim that they would start a start-up in retrospect.

In retrospect, six out of ten founders (59%) state that the bureaucracy involved in setting up the start-up was very high. Almost two thirds (64%) of the founders in Berlin complain about the bureaucracy, in Hamburg it is only about one in two (54%) and in Munich it is just 40%. It was similarly difficult for most start-ups (58 %) to find suitable staff. Here, the founders in Munich (68%) had the most problems, followed by the Berliners (61%) and the start-ups from Hamburg (54%). Around every second founder (53%) found the search for an investor difficult or very difficult. In Berlin (57%), the difficulties were greater than in Hamburg (54%) and Munich (40%).

Considering the particular case of green startups, the amount invested so far in the Green Economy in Germany is still rather small. The money invested according to environmental and social sustainability criteria still only makes up around 10% of risk investments and direct investments.

In general, climate protection and sustainability requirements are still very marginally integrated in the German startups support system. In this respect, it is possible to notice a discrepancy between the sustainability strategy of the German Federal Government and the actions concretely undertaken to support the foundation of sustainable and ecoinnovative startups.

Finally, in regards to the education and universities system, the professorial chairs for entrepreneurship have extremely increased in the last years. Nonetheless, very few of them have integrated sustainability criteria in their teaching.

2.2 Domestic support funds

The "promotion of entrepreneurial know-how through management consultancy" is the name of a funding program that has existed since January 1, 2016 in Germany for founders and entrepreneurs. The program is implemented by the Federal Office of Economics Export Control (BAFA). The "promotion of entrepreneurial know-how through management consultancy" is financed by the ESF and the federal budget. The aim of the funding is to help freelancers and tradespeople increase their performance and competitiveness with the help of external advice and thus safeguard jobs. In Baden-Württemberg there are over 300 funding programs. Some examples are:

⁶ Bitkom Research 2016 <https://www.bitkom.org/Presse/Presseinformation/Sechs-von-zehn-Gruendern-klagen-ueber-Buerokratie-Huerden.html>

- Advance start-up advice for management consultancy: The state of Baden-Württemberg supports free and commercial start-up entrepreneurs with the help of the EXI start-up voucher, with which founders receive subsidized start-up advice. Up to 80% of the consulting fees are paid, the remaining 20% must be borne by the founder himself.
- BAFA funding Germany: BAFA's "Promotion of Entrepreneurial Know-How" is a funding program for qualified advice. BAFA contains funds from the European Social Fund (ESF) of the EU. Young companies are supported up to 2 years after the foundation, existing companies from the 3rd year after foundation.
- Innovation financing: Companies that develop a new product or production process receive from L-Bank, in cooperation with KfW's ERP Innovation Program, a promotional loan for small businesses and innovative business start-ups. Innovation vouchers are available for scientific activities in the pre-start-up phase, for implementation-oriented research and development activities, and for start-up entrepreneurs in the high-tech sector.
- The start-up financing is offered by L-Bank in cooperation with KfW and is aimed at companies up to 5 years after start-up and that fulfil the SME definition. The maximum loan amount is 5 million euros⁷.

Nationwide programs are:

- German Accelerator: Review of the business plan for suitability for the US market and further internationalization (global benchmarking). Improved access to the technological and financial resources of the world's leading IT and life science clusters. Contacts with know-how carriers and potential customers in the world's leading IT and life sciences market. Targeted mentoring by experienced entrepreneurs and investors,
- High-Tech Gründerfonds: Risk capital for young, promising technology companies in all sectors. Care and support by the management of the HTGF. Accompanying the technology companies until the creation of a prototype or proof of concept or until the market launch. First round of financing up to 600,000 euros and possible follow-up financing up to 1.4 million euros. From 2005 - 2016 577 companies were financed and 4,842 jobs were created.
- INVEST: INVEST supports and motivates private investors - especially business angels - to get involved even more than before in young, innovative companies. Investor gets 20% of the investment sum, with which he participates in a start-up, refunded tax-free. Risk of equity participation for the investor is thus reduced. From 2013 to 2016, there were 2.741 applications approved by companies, 2.777 applications approved by investors, a total grants of EUR 42,10 million approved, and 210,50 million Euro of venture capital mobilized for young, innovative companies
- Others programs are: WIPANO, coparion and EXIST⁸

Furthermore, the KfW Bankengruppe, the nationally operating development bank of the Federal Republic of Germany, makes available a number of different financing tools such as promotional **loan programs**, mezzanine financing, and private equity to all privately owned commercial enterprises. In

⁷ Förderprogramme in Baden-Württemberg <https://www.deutschland-startet.de/foerderprogramme-baden-wuerttemberg/>

⁸ Unternehmensgründungen und Gründergeist in Deutschland, Bundesministerium für Wirtschaft und Energie, 2017

addition to the KfW, each German state has its own development bank financing projects within the respective state. They offer own loan programs largely targeted at start-ups and growing companies⁹.

Another tool provided by the German Federal Government are **Public Guarantees**: this is a financial instrument that encourages financial institution to offer loans to new companies. They do not directly provide credit but act indeed as a “guarantee” for the lender that in the event that the borrower defaults on payment, the guarantor will repay the lender.

Another instrument to support new companies are the **labour-related incentives** offered by Germany’s Federal Employment Agency (Bundesagentur für Arbeit) and the German states. There are mainly four programs offered:

- programs focusing on recruitment
- support, training support, wage
- subsidies, and on-the-job training

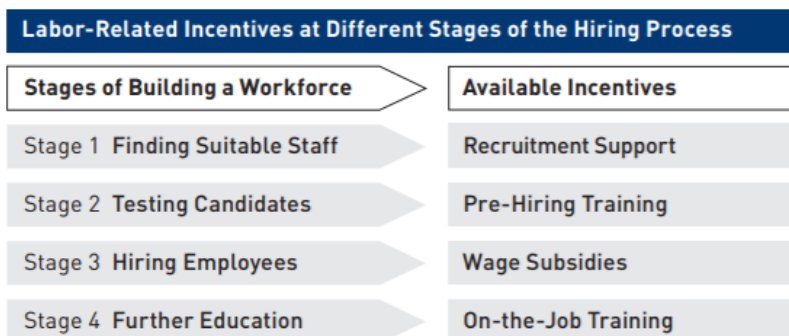


Figure 2 Labour related incentives in Germany¹⁰

Another field where the German Federal Government provides support are **R&D grants**. All research program have been concentrated within the federal High-Tech Strategy which defines specific lead markets and priorities as well as key technologies. Annually 5 billion Euro are dedicated to R&D project in the form of non-repayable project grants. The co-funding rate is up to 50% of eligible project costs, whereas SMEs can have higher rates. For SMEs there are furthermore additional programs without a specific technological focus. One of the most famous is the Central Innovation Program for SMEs (ZIM). While the government financial support is already quite developed in Germany, there is instead a lack of venture and risk capital, especially for startups in later stages of growth. This is partly due to the small number of domestic investors. If compare to the US market where major pension and insurance funds are allowed to invest in high-risk business such startups, this is instead not allowed in Germany. Also, in the country there is no exchange segment for the share of young high companies.

⁹ Incentives in Germany – Supporting Your Investment Project, Germany Trade & Invest <https://www.invest-in-hessen.com/mm/facts-figures-incentives-in-germany-2014-en.pdf>

¹⁰ Incentives in Germany – Supporting Your Investment Project, Germany Trade & Invest <https://www.invest-in-hessen.com/mm/facts-figures-incentives-in-germany-2014-en.pdf>

2.3 Transnational support funds¹¹

The German Federal Government regards research and development (R&D) as one of the most important area for the development of the economy. Overall, the industry and the public sector have made a commitment to spend around 3% of national GDP per year on R&D activities.

In the current funding period, Germany is to receive around 11 billion Euro from the European Regional Development Funds (ERDF) and around 7,5 billion Euro from the European Social Funds (ESF).

There are several funding programmes provided at European level. In regards to EcoInnovation the most relevant programmes are:

LIFE

The LIFE funding instrument provides specific support for the development and implementation of Union environmental and climate policy and legislation.

The Programme is split in two sub-programmes: one for Environment and one for Climate Action. The main areas of funding under the Environment sub-programme are Environment and Resource Efficiency, Nature and Biodiversity as well as Environmental Governance and Information. Key areas of funding under the Climate Action sub-programme are climate change mitigation and adaptation as well as Climate Governance and Information.

The LIFE Programme aims to contribute to the shift towards a resource-efficient, low-carbon and climate-resilient economy. Activities supported under the LIFE programme are for instance the development, testing and demonstration of policy approaches or innovative technologies that could potentially be replicated also in other countries.

HORIZON 2020

Horizon 2020 is the biggest EU Research and Innovation programme ever with nearly €80 billion of funding available over 7 years (2014 to 2020).

Many strands of Horizon 2020 are directly related to EcoInnovation, one example are the call for proposal under the pillar “Societal Challenge – Climate action, environment, resource efficiency and raw materials”. Aims of many topics under this strand is the transition towards a green economy through eco-innovation.

In addition, as a horizontal approach fully integrated in all Horizon 2020 priorities, activities are encouraged and supported to exploit Europe's leadership in the race to develop new processes and technologies promoting sustainable development and combating climate change.

European Structural and Investment Funds

The cohesion policy focuses on the economic and social pillars of sustainable development by strengthening growth, competitiveness, employment and social inclusion. Some of the priorities of the regional policy contribute to the promotion of environmental technologies (including eco-innovations),

¹¹ Cfr. European Commission – Environment, EcoInnovation Action Plan https://ec.europa.eu/environment/ecoap/about-action-plan/union-funding-programmes_en

of sustainable transport and energy systems, and of also investments improving water, air and soil quality and addressing climate change problems.

COSME

COSME is the EU programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (SMEs), running from 2014 to 2020 with a budget of €2,3bn. COSME's objective is to support SMEs with a series of horizontal measures aimed at improving access to finance for SMEs

Thus not being specifically focused on EcoInnovation, the programme could support companies that, for example, want to find partners abroad to work on eco-innovative products, or to obtain support for innovation and technology transfer.

Investment Plan

The Investment Plan focuses on removing obstacles to investment, providing visibility and technical assistance to investment projects, and making smarter use of new and existing financial resources.

EFSI is the main channel to mobilise at least €315 billion in additional investment in the real economy over the next three years. Also Environmentally sustainable projects are target of this programme.



EU FUNDING FOR ECO-INNOVATION

HORIZON 2020

EU Framework Programme for Research and Innovation (2014-2020)

-  nearly €80 billion
-  resource efficiency
 - water
 - waste
 - key enabling technologies
 - SMEs
-  innovation action
 - SME instrument
 - public procurement of innovation
 - pre-commercial procurement

 <https://ec.europa.eu/programmes/horizon2020>



Figure 3 European funds for EcoInnovation¹²

¹² Source: Infographic from Website European Commission – Environment, EcoInnovation Action Plan https://ec.europa.eu/environment/ecoap/about-action-plan/union-funding-programmes_en

2.4 Business incubators

In Germany, more and more incubators or similar programs are operated or supported by large corporations. They are very much interested in making startup a success in their favor - in order to create products or services for their own customers or to create a lucrative takeover candidate. The individual funding programs of the "Corporates" therefore differ enormously in type and design. This is a list of the main incubators in Germany:

1st MOVER from Düsseldorf helps founding teams in the areas of publishing, marketing and productivity. The startups receive up to 100,000 euros financing, plus advice, operational support and a reduced-rate infrastructure.

Das GREENHOUSE Innovation Lab von Gruner + Jahr promotes internal and external ideas around new media formats, ecommerce models, apps and social media tools. It offers office space, coaching, a start-up budget and "access to the G + J brands and network".

Telekom's incubator "hub: raum" focuses on telecommunications and connectivity, video and multi-screen, cloud solutions, e-commerce, big data, cyber security, health, and the Internet of Things. Up to 300,000 euros in subsidies are possible.

The Frankfurt FinTech incubator "main incubator" of the Commerzbank mainly supports startups in the seed stage. In addition to consulting and infrastructure, they will also have access to the business and corporate customers of Commerzbank. The average amount starts at 25,000 euros.

The Media Lab Bayern supports startups who are involved in the digitization of the media landscape. Through a scholarship program founders receive between 600 and 1200 euros per month to devote themselves to their startup idea full time. In addition, they receive workshops and coaching and a coworking space.

Behind the Berlin incubator Project Flying Elephant is the early-stage investor WestTech Ventures. In a technology / deep tech and media / media tech division, WestTech supports startups with mentoring, infrastructure and up to € 50,000 seed capital.

The Rheingau Founders promote Berlin's marketplace, fintech and e-health startups from as early as possible. In addition to mentoring and infrastructure up to 250,000 euros in capital are possible, as well as later engagement as a co-investor. ¹³

¹³ Die große Übersicht: Inkubatoren und Accelerator für Startups in Deutschland, t3n Digital pioneers
<https://t3n.de/news/inkubatoren-accelerator-startups-deutschland-655475/>

Programme	Website	Ort	Typ
Allianz Digital Accelerator	http://digital-accelerator.com/	München	Accelerator
Axel Springer Plug & Play Accelerator	http://www.axelspringerplugandplay.com/	Berlin	Accelerator
Berlin Hardware Accelerator	http://hardware.co/	Berlin	Accelerator
Berlin Startup Academy	http://berlinstartupacademy.com/	Berlin	Accelerator
Black Forrest Accelerator	http://team-e-accelerator.com/web/	Lahr	Accelerator
hub:raum Accelerator	https://www.hubraum.com	Berlin	Accelerator
Microsoft Ventures Accelerator Berlin	https://www.microsoftventures.com/accelerators/berlin.aspx	Berlin	Accelerator
ProSiebenSat1. Accelerator	https://www.p7s1accelerator.com/	Unterföhring/ München	Accelerator
Startupbootcamp Berlin	http://www.startupbootcamp.org/accelerator/berlin.html	Berlin	Accelerator
Wayra Deutschland	http://de.wayra.org/	München	Accelerator
YOU IS NOW Accelerator	http://accelerator.youisnow.com/	Berlin	Accelerator
M Cube	http://www.m-cube.de/	Berlin	Company Builder
Project A Ventures	https://www.project-a.com/	Berlin	Company Builder
Rheingau Founders	http://rheingau-founders.com/	Berlin	Company Builder
Rocket Internet	http://www.rocket-internet.de/	Berlin/weltweit	Company Builder
hub:raum Incubator	https://www.hubraum.com	Berlin	Inkubator
main incubator (Commerzbank)	https://www.main-incubator.com/	Frankfurt	Inkubator
Project Flying Elephant	http://projectflyingelephant.com/	Berlin	Inkubator
XLHEALTH Inkubator	http://xlhealth.de/inkubator/	Berlin	Inkubator
YOU IS NOW Inkubator	http://youisnow.com/	Berlin/München	Inkubator

Figure 4 Overview of some of the most famous incubators and accelerator in Germany

There are nearly 50 Fab Labs in Germany. They use modern industrial production methods for individual pieces. Typical devices are 3D printers, laser cutters, CNC machines, presses for deep drawing or milling to be able to process a large number of different materials and workpieces.

2.5 Support by companies (internal and external)

Germany has a very strong vocational education and training system, also known as the dual training system, which is highly appreciated by the students and the industry and recognized worldwide. This system consists of a combination of theory and training embedded in a real-life work environment. Core of this system is the cooperation between mainly SMEs and publicly funded vocational school which is regulated by law¹⁴.

The dual training usually last two to three and a half years: within this model trainees spend part of their time at vocational school and part in a hosting company where they profit of a learning-on-the-job approach. The system is extremely appreciated by companies as a way of early recruiting skilled employee who in addition can be ad hoc trained for a specific position. In this way companies can save recruitment costs and make sure to hire the right employee at the end of the program. Also school-leavers highly appreciate the dual training system: 50% of them select in fact this training path as this

¹⁴ The German Vocational Training System, Federal Ministry of Education and Research <https://www.bmbf.de/en/the-german-vocational-training-system-2129.html>

allow to get market-relevant skills which are constantly updating, thus increasing their chances on the labour market at the end of the training period.

The dual training system in Germany has all in all contributed to low youth unemployment rate and to the delivery of market relevant skills.

Another field where companies are increasingly active is the constitution of so-called company builders and corporate accelerator programs.

Companies like Hitfox, Project A Ventures or Rocket Internet are "company builders" and rely on their own capital to found ideas and put together teams in order to turn them into successful startups. Sometimes they also hire founders "from outside" to benefit from their operational expertise. As companies dictate the design of the funding program, the benefits for startups vary.

- With its Google for Entrepreneurs program, the company is helping startup founders worldwide. Although there is no official Gründercampus in Berlin at the moment, Google works together with the Startup Factory Berlin and shares many resources. For example, the Google Launchpad: a course that provide insights to UX, UI, marketing and Google's developer tools.
- Microsoft BizSpark (Provisions Link) promises "three years of free stuff" - including access to the Azure cloud platform, development and trial software, Windows, Office 365 and free training.
- AWS Activate gives startups free resources and starter usage quota for Amazon Web Services.
- SAP Startup Focus: Provides start-up support for startups based on its own technologies. The program SAP Startup Focus helps to create the minimum viable product (MVP), to scale and sell startups idea.

Many corporate as Mercedes, BWM and Bosch have created their own accelerator programs to support the creation of startups in their field. This represents for many corporate with a high number of employees and heavy structure a fast track to innovation: startups are in fact more agile and thus are more inclined to innovate. This program usually offers to startups spaces, equity and corporate's technology and contacts. Corporate use them as a way to acquire and integrate innovation from the outside.

Another much diffused form of open innovation for companies are Hackathons. Alone in the year 2017 there were more than 130 Hackathon events in Germany according to [hackathon.com](https://www.hackathon.com/country/germany/2017)¹⁵. They are organized by private networks, companies, universities and municipal initiatives and have the double aim to get in touched with talents and skilled workforce and to acquire insights and inspiration from the outside exploiting the creative power of the crowd attending these events.

2.6 Crowdfunding¹⁶

The German crowdfunding market has developed even more dynamically in recent years than the European market as a whole. After 1.2 million euros in the first quarter, 2.8 million euros were raised by crowdfunding in the second quarter of 2014. In the German crowdfunding market, the platform Startnext

¹⁵ <https://www.hackathon.com/country/germany/2017>

¹⁶ Crowdfunding, Deutsches Institut für Bankwirtschaft <https://deutsches-institut-bankwirtschaft.de/publikationen/Ronsdorf%20Crowdfunding.pdf>

has developed a nearly dominant position. Since 2012, 82% of the total German market volume has been collected there. In addition, the platform is the first choice for larger projects, so the average campaign volume in the first quarter of 2014 was significantly higher than that of Visionbakery and other platforms. With regard to the success rate, there are no significant differences in the German market. For 2015 "Für Gründer" reports the following volumes in 2015: Reward based crowdfunding: €9,8 million, P2P consumer&business lending: €66,8 million, Equity based crowdfunding: €37,3 million.¹⁷

International crowdfunding: In 2012 alone, more than one million projects worldwide were successfully financed via crowdfunding platforms. This shows the enormous economic contribution that crowdfunding makes as a way of financing. The common volumes of the different models are different. Campaigns based on the reward model come to a mean volume of \$ 2,300 and those based on the pre-purchase model to \$ 4,300. This underlines that crowdfunding is not only suitable for projects that start in the larger five-digit range. Even today, creative projects such as photographers or journalists are often financed with sums in the four-digit range. With the donation model, the average campaign volume is \$ 1,400 and the highest median volume is the crowdfunding category with \$ 190,000 per campaign.

2.7 Events and networking

The amount of workshop, seminar and networking events in Germany is extremely high and cannot be easily summarized in a simple overview. The country has recognized since many years the importance of lifelong learning, professional development and companies exchange in clusters, network and further events.

Considering the specific case of ecoinnovation, the amount of events in this field is also constantly growing. To bring a few example, the Boarder Step Institute for Innovation and Sustainability promotes High-Level-Matching for green startups and business angel and VC investors, as part of their GreenUpInvest project. German-based green startups which are no older than seven years, receive the opportunity of qualifying for a capital requirement of 50.000€ to 2.000.000€. They also organize the Boarderstep Impact Forum. Another initiative in this filed is the Green Start-Up Investment Alliance, funded by the German National Climate Protection Initiative which aim is to strengthen and advance start-up financing in Germany. To this end, the project compiles best practice in the field of green start-up investment and at the same time provides support for representing the interests of new green businesses. GreenUpInvest also wants to get Business Angels and other early investors involved in the field of green enterprises.

2.8 Promotion and marketing¹⁸

In the 2016 competition year, over 20,000 applications have been received in 163 competitions. For start-ups, which initially focus on the development of the business model, competitions with a focus on

¹⁷ The current state of Crowdfunding in Germany, Crowdfunding Hub <http://www.crowdfundinghub.eu/current-state-crowdfunding-germany/>

¹⁸ 190 Wettbewerbe für euer Start-up, 2017

https://www.fuer-gruender.de/fileadmin/mediapool/Publikation/Gruenderwettbewerbe_in_Deutschland_2017.pdf

the idea phase are important. In total there were more than 70 competitions in 2016 focused on developing ideas. E.g:

- futureSax Ideenwettbewerb
- Kultur- und Kreativpiloten
- StartUp-Impuls
- YOOWEEDOO IDEENWETTBEWERB

Slightly more than 40 of the competitions focus on the business plan phase. In particular, these competitions are about helping founders get a better business plan through quality feedback, workshops and seminars. e.g:

- Businessplanwettbewerb Berlin-Brandenburg
- Science4Life
- start2grow

Regardless of the specific business phase, the numerous innovation awards place products, processes and services at the centre of the evaluation in terms of their innovative content. Although innovation competitions are often open to companies of all ages and sizes, there is usually a separate start-up category. e.g.:

- Der Deutsche Innovationspreis
- Innovationspreis der Deutschen Wirtschaft
- Innovationspreis Thüringen

Most competitions in Germany are aimed at already established start-ups. Altogether there were more than 100 start-up competitions. The application not only focuses on the business model, but also on its successful implementation. A large media presence and marketing effects as well as access to exclusive networks, for example strategic partners are possible. Some examples are:

- CODE_n Award
- Deutscher Gründerpreis
- STEP AWARD

In the specific case of the Green Economy, there are to date only a few specialised start-up competitions. Among the most famous there are the Start Green Award, the Karma Konsum, the InnoWASTEon and the sector-specific start-up competition KUER. The number of this competition is however still limited considering the great amount of startups competition and the one of competition in specific field as for instance biotechnology-

3 Support structures and sources for energy efficiency, renewable energy and environment conservation

Right after the Fukushima nuclear disaster in 2011, Germany started an energy transition program with the aim of reaching a sustainable energy supply, reducing fossil- and nuclear fuels to adopt instead renewable sources, all of this combined with a more efficient energy use and a reduction of energy consumption.

Nowadays in Germany there are already several support structure in place to promote energy efficiency and the adoption of renewable energies.

Since 2000, the share of renewable energy in electricity generation has risen, in particular due to the increased use of wind energy, biomass as well as photovoltaics.¹⁹ Also the share of renewable energy in electricity consumption increased from 1990 to 2015 from 3.4 % to 31.6 %.

This trend has been driven by legal measures, such as the Renewable Energy Sources Act (EEG). The EEG requires producers of electricity to give priority to renewable energy sources when buying and distributing electricity.²⁰

The Renewable Energy Sources Act (EEG) of 2014 regulates also that the amount of support provided to renewable energy systems is to be determined via competitive tendering processes starting from 2017.

Another significant policy driving this sector is the National Climate and Energy policies. This is guided by the principle of completely decarbonising the energy system with renewable energy and achieving the greatest possible energy efficiency by 2050.

The Federal Government has identified four main fields of activity for energy efficiency policy: stepping up energy efficiency in buildings; energy efficiency as an investment and business model; individual responsibility for energy efficiency; and transport.²¹

Energy efficiency is the twin pillar of the energy transition and constitute a major component of the investment strategy for Germany. The Federal Government has therefore elaborated the National Action Plan on Energy Efficiency (NAPE) which defined the Energy Efficiency Strategy for the 18th legislative term²². The aim of NAPE is to show the benefit of energy efficiency thus convincing all stakeholders to commit in achieving this goal. NAPE contains in fact a set of instruments designed to motivate companies and consumers to raise energy efficiency: from consultancy, to communication and information about lucrative efficiency measures, up to funding facilities and standards for new installation. The National Action Plan on Energy and Efficiency defines a mix of short-terms and long-term measures. The central short-term measures of NAPE include²³:

- Introducing new competitive tendering for energy efficiency;
- Raising funding for building renovation (CO2 Building Renovation Programme) and introducing tax incentives for efficiency measures in the building sector supported by the Federal Government and state governments
- Setting up energy efficiency networks together with business and industry.

The long-term measures includes among others²⁴:

- **Energy efficiency strategy for building**²⁵: this strategy targets a reduction of 80% in primary energy demand in buildings compared with 2008 through a combination of energy savings and renewable energy use by 2050.
- **Energy saving legislation**: In 2016 it has introduced a measure for nearly-zero energy building standard that will be extended to private buildings as of 2021 and to public ones as of 2019.

¹⁹ Cfr. German Sustainable Development Strategy, the Federal Government, 2016, page 117

²⁰ ibidem

²¹ Cfr. Making more out of the future, National Action Plan on Energy Efficiency, Federal Ministry for Economic Affairs and Energy 2004, page 20

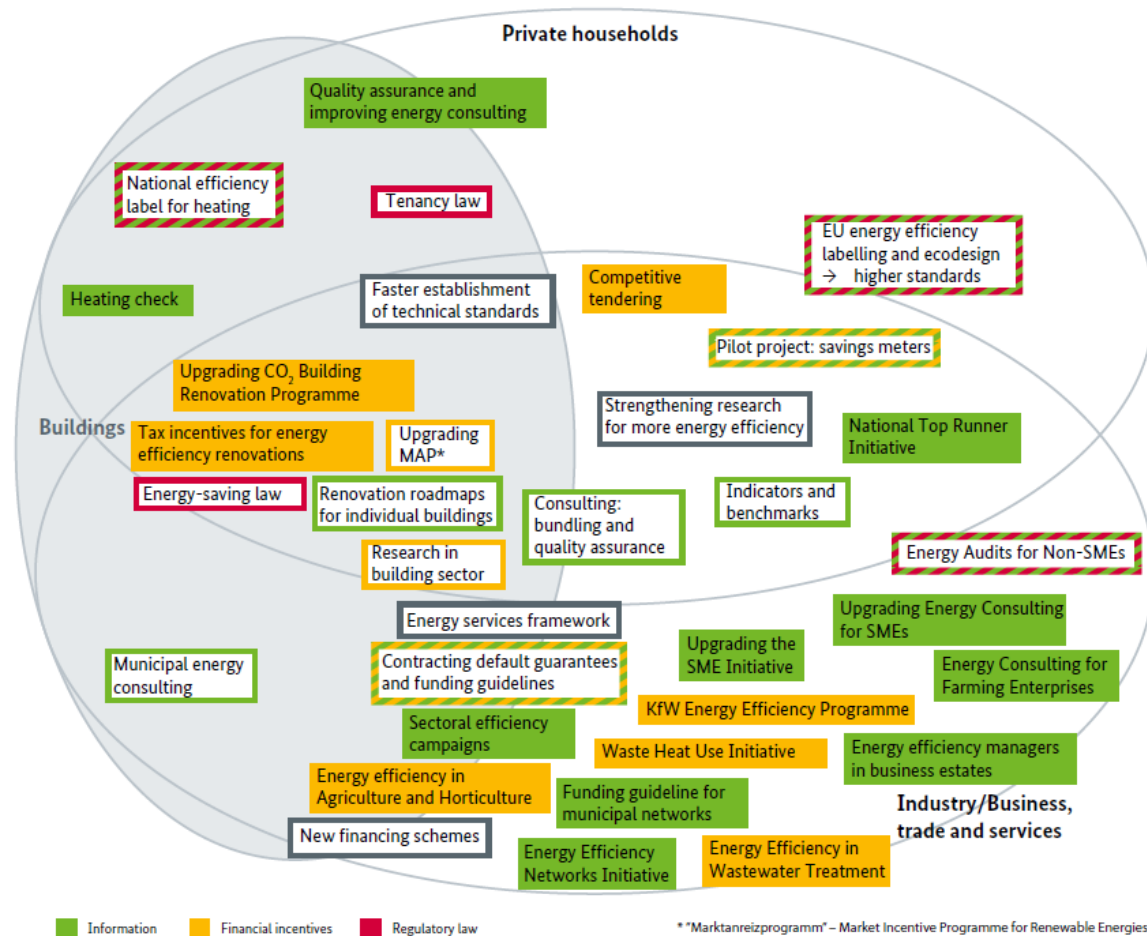
²² ibidem

²³ Cfr. Making more out of the future, National Action Plan on Energy Efficiency, Federal Ministry for Economic Affairs and Energy 2004, page 4

²⁴ Ibidem, page 26

²⁵ Energy Efficiency Strategies for Building, Federal Ministry for Economic Affairs and Energy, 2015

- **Tenancy law:** Energy-efficient modernisation measures in existing rental buildings are encouraged in the tenancy law through the possibility of rent increased after energy-related modernisation



Source: Federal Ministry for Economic Affairs and Energy

Figure 5 Long-term and short term measures set in the National Action Plan on Energy Efficiency (NAPE)

All measures defined in NAPE stress the fact that raising energy efficiency can also imply market and profit opportunities for companies: these in fact can reduce their production costs by saving energy costs, thus increasing their competitiveness. Furthermore, higher energy efficiency is expected to increase the investment in Germany as a business location.

This is why energy saving as an investment and business model is a key element in the Federal Government's Energy Efficiency Strategy.²⁶ NAPE aims at promoting the development of business models for energy saving.

Having a closer look to the mix of instruments designed to raise energy efficiency in Germany, these include:

Information and consultancy²⁷

²⁶ Cfr. Making more out of the future, National Action Plan on Energy Efficiency, Federal Ministry for Economic Affairs and Energy 2004, page 29

²⁷ ibidem, page 13

Clear and exhaustive information for end consumers and companies is considered a key element to achieve energy efficiency in Germany. Data can in fact help better understand the level of energy consumption and the measures that can be undertaken to save energy not just for private households but also for companies and government. Among the measures introduced by the German Federal Government in this field, a few examples are:

- **Stromspar-Check PLUS:** the campaign provides energy advice to private households. Additionally, up to the end of 2015 Stromspar-Check PLUS provides simple energy-saving devices for low-income households free of charge and under certain conditions grants a subsidy for the purchase of a high energy efficiency refrigerator
- **On-site Energy Consulting:** through this program run by the Federal Office for Economic Affairs and Export Control (BAFA), home owners can obtain an individualised refurbishment plan
- **Energy Consulting for SMEs** and the **SME Initiative for the Energy Transition and Climate Protection:** these programme supported by the Federal Government together with the German Association of Chambers of Industry and Commerce (DIHK) and the German Confederation of Skilled Crafts (ZDH) specifically target businesses. Moreover, the Federal Government finances the comprehensive energy efficiency campaigns of the German Energy Agency (dena), which provide additional information for diverse target groups (such as the Energy Efficiency Campaign, Future House and Building Transition).

Incentive through funding programmes²⁸

To ensure the successful implementation of energy efficiency measures, advisory services are complemented with financial incentives, in order to enable the end consumer to adopt the suggested measures. Also in this case, Germany has already set up several programs in various field of applications:

- In the construction sector, the largest funding instrument for energy-efficient construction and renovation is the **federal CO2 Building Renovation Programme**. Energy efficiency measures in buildings are supported with low-interest loans and in part repayment or alternatively investment grants.
- Under the **KfW Energy Efficiency Programme**, small and medium-sized enterprises (SMEs) can obtain low-interest loans to finance energy efficiency measures (e.g. in building services and energy technology, building envelopes, machinery, process cooling and heat, heat recovery/waste heat use, metrology and control engineering and information and communications technology).
- The **Promotion of Mini-block-type Thermal Power Stations** up to 20 kW supports installations that provide particularly efficient energy in residential and non-residential buildings.
- There are furthermore programmes specially tailored for companies:
 - The federal programme **Promotion of High-efficiency Cross-cutting Technologies** promotes the replacement of inefficient electromotors, pumps, pressurised air systems, etc. with high-efficiency installations and systems optimisation;
 - The programme, **Promotion of Energy-efficient and Climate-friendly Production Processes**, helps enterprises select the most energy-efficient and environment-friendly investments when planning their production processes. Support is also given for the introduction of energy management systems.

Regulatory law

Another measure adopted in the policies that pursue energy efficiency is the definition of standards in new products and investments.

The Energy Saving Ordinance (EnEV) sets minimum requirements for the quality of energy performance in the envelopes and technical installations of new buildings and larger-scale renovations of existing buildings. Another examples are the EU provision on the energy labelling of products. This ensure that the end consumers is aware

²⁸ ibidem, page 14

of energy used to produce a certain product and can use this information in his buying decision. Furthermore, this gives in turn an incentive to the producers to design more energy-efficient products. These measures have a direct impact on energy efficiency and additionally represents an economic advantage also for the industry: by saving energy, companies are in fact able to reduce costs in the production process.

Price signals and incentives mechanism²⁹

Another measure adopted to encourage energy efficient behaviour is the use of price signals as for instance the energy use tax. By taxing energy, consumers should be made aware of their energy consumption and eventually switch to more sustainable behaviour.

Furthermore, financial incentives have been used in Germany to encourage electromobility. Already in 2011 the Federal Government has adopted an Electromobility programme: among the measure adopted in this program, there is a tax exemption for the purchasing of all-electric-powered vehicles.

²⁹ Cfr. Making more out of the future, National Action Plan on Energy Efficiency, Federal Ministry for Economic Affairs and Energy 2004, page 15

Table 1: Central measures in NAPE

Measure	Forecast savings by 2020	
	PEC in PJ	Greenhouse gases in million tonnes of CO ₂ -equivalent
Short-term NAPE measures		
Quality assurance and optimising existing energy consulting	4.0	0.2
Granting tax incentives for energy efficiency renovations	40.0	2.1
Upgrading the CO ₂ Building Renovation Programme	12.5	0.7
Introduction of a competitive*tendering scheme	26–51.5	1.5–3.1
Funding for energy performance contracting (including default guarantees)	5.5–10	0.3–0.5
Upgrading KfW energy efficiency programmes	29.5	2.0
Energy Efficiency Networks Initiative	74.5	5.0
Top Runner Strategy – at national and EU level	85.0	5.1
Energy audit obligation for non-SMEs	50.5	3.4
National energy efficiency label for old heating installations	10.0	0.7
Additional short-term measures in NAPE	about 10	about 0.5
Total for short-term measures	350–380	21.5–23.3
Other measures		
Measures as of October 2012	43.0	2.5
Provisional estimate of effects of long-term work processes	up to 40	up to 4
Total	390–460	approx. 25–30
<i>Transport measures (see Climate Action Programme 2020)</i>	110–162	7–10

Sources: Fraunhofer ISI/IFAM, Prognos, Ifeu, Ringel, 2014.

Figure 6 Figure 6 Short terms measures in the National Action Plan on Energy Efficiency (NAPE)

As previously outlined, sectors specific legislation and incentives are also already in place.

Building Sector

In the building sector, the Renewable Energies Heat Act (EEWärmeG)³⁰ established that a percentage of the heating

³⁰ Cfr. German Sustainable Development Strategy, the Federal Government, 2016, page 118

and cooling requirements of new building must be provided from renewable energy sources. In addition, the Market Incentive Programme promotes investments in the use of renewable energies, predominantly in the building stock. Furthermore, the Energy Efficiency Strategy for Buildings has already foreseen additional measures that can be used to accelerate the expansion of renewable energies in the buildings sector. One of this measure requires a stronger combination of efficiency and renewable energies in the context of the energy-related rehabilitation of buildings. This should be reached by a closer integration of the existing funding instruments and increasing the coupling of the heat/electricity sectors.

Finally, tax incentives for efficiency measures in the context of the rehabilitation of buildings have been introduced. These are expected to animate home owners to look for specific efficiency potential for their own benefit; in turn, they will also reduce the energy costs for tenants in rented property.

Transport sector

In the transport sector, some incentives were already introduced to increase the use of electric vehicles.³¹ The Federal Government provides an environmental bonus for the purchase of electric vehicle: consumers can get a premium of 4.000 Euro for the purchase of purely electric vehicle and of 3.000 Euro for plug-in hybrids. In both cases, 50% of the premium is financed by the industry. The Federal Government has also invested 300 million Euro for the further development of the charging infrastructure.

In addition to increasing energy efficiency and expanding renewable energy, alternative mobility concepts should also be developed. For this reason, the Federal Government is also keeping on investing in Research and Development. As an example, the National Hydrogen and Fuel Cell Technology Innovation Programme (NIP) promotes alternative drivetrain technologies.

The vision of the Federal Government is to reach a totally “decarbonised” transport system in Germany by 2050: the transportation should be therefore totally independent from fossil fuels and greenhouse-gas-neutral. To this aim, the Federal Government is campaigning for the reduction of subsidies for fossil fuels in order to create a fair competitive environment for all energy sources.

Environmental protection and resource efficiency

Priorities in environmental policies are set on climate protection, sustainable use of energy and resources, a further reduction of substance inputs to the environment and promoting the transition to a green economy.

One of the goals of the Federal Government's Sustainable Development Strategy is to improve resource efficiency without any losses in prosperity while at the same time reducing the use of raw materials.

Already in 2012 the German Federal Government released the **German Resource Efficiency Programme (ProgRess)**: this programme aims not just to enhance resources efficiency but also to establish a more considerate use of raw materials as a way to conserve natural resources, thus increasing raw material input productivity. The programme gives particular importance to market incentives, information, expert advice, education, research and innovation and to strengthening voluntary measures and initiatives by industry and society.

³¹ ibidem

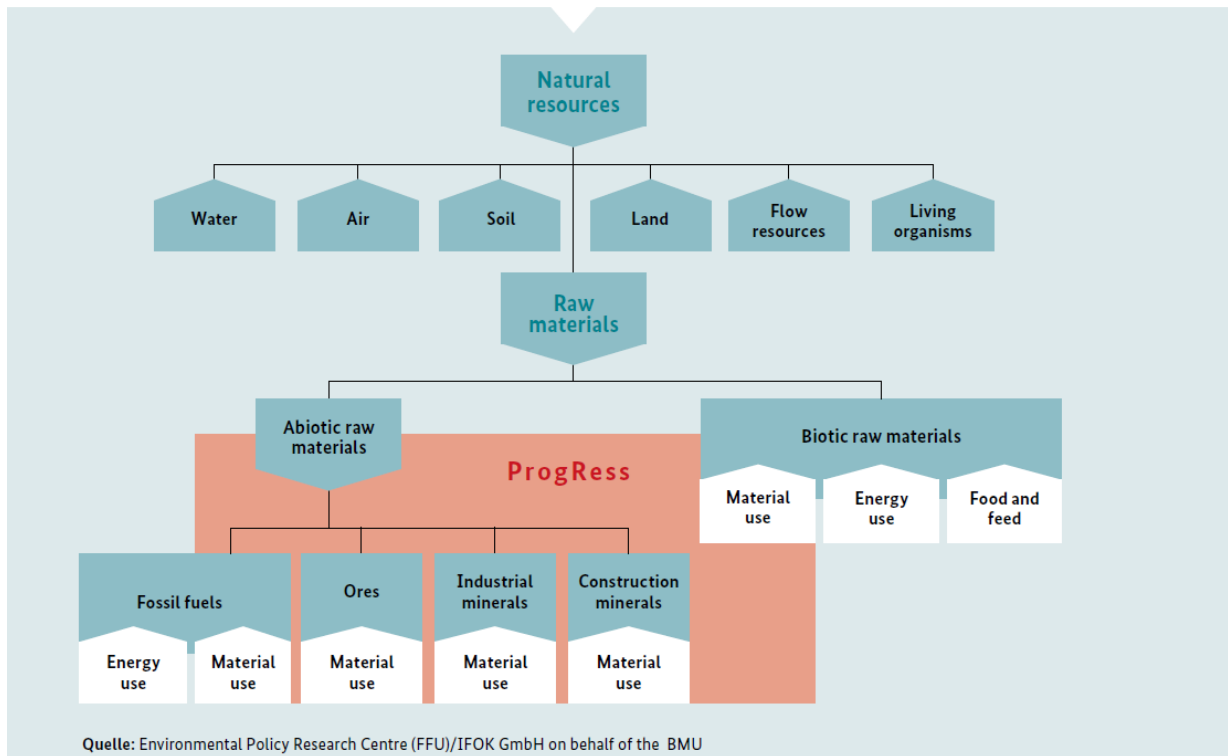


Figure 7 Focus of the ProgRes II

In 2015 a second edition of the programme was launched. ProgRes II is based on the same four guiding principles as ProgRes I:³²

- Combining ecological necessities with economic opportunities, innovation focus, and social responsibility
- Seeing global responsibility as a key guide of national resource policy
- Making economic and production activities in Germany depend less and less on primary resources, and developing and expanding the circular economy
- Securing sustainable resource use for the long term by guiding society towards quality growth

The advance industry sector in Germany with its many high-techs products requires a reliable availability of raw materials. This make the country extremely dependents on imports of energy resources, metals and many key industrial minerals. As many of these materials are imported from regions which are ecologically sensible or political unstable often characterised by poor environmental and social legislation, German policies to secure **supplies of raw materials** has been shaped in the years on Germany's **responsibility towards producing countries**. These policies aims to encourage sustainable development in those countries and, as an objective of resource diplomacy, support peaceful, socially and environmentally compatible resource extraction.

For this reason, Germany has applied to the **international Extractive Industries Transparency Initiative (EITI)** that enables the public and civil society organisations to scrutinise government decisions surrounding dealings in resources. Furthermore, the Federal Government supports partners' countries in East and Central Africa in the

³² Cfr. German Resource Efficiency Programme II - Programme for the sustainable use and conservation of natural resources, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, 2016

development and implementation of certification schemes to curb trade in conflict minerals and to improve compliance with social and environmental standards.³³

Another challenge and requirement for a resource-efficient economy is a **secure supply of sustainably produced regenerative resources** that does not compete with food production. The Federal Government supports this process with a range of strategies and research programmes such as the National Research Strategy BioEconomy 2030 (NFSB 2030) and the National Policy Strategy on Bioeconomy.

According to these strategies, food security has priority where there is competition for land or resource use.

In terms of concrete supporting structure for raising resource efficiency in production³⁴, one of the objective of ProgRes I was the expansion of **resource efficiency advice for businesses**. There are different tool in place for this purpose:

- VDI ZRE offers sector- specific aids, resource efficiency checks and process systematisation tools to assist manufacturing enterprises with internal resource efficiency improvement projects
- The BMWi's go-Inno innovation vouchers scheme have a dedicated module called 'go-efficient' that provides target funding for consulting services to enhance resource efficiency in business
- The BMUB's Environmental Innovation Programme (UIP) supports industrial-scale projects that demonstrate for the first time the implementation of advanced products, processes and systems to avoid or reduce environmental impact
- The BMBF 'r+Impuls' funding programme promotes the transfer into industrial practice of R&D outcomes that offer large potential for improving raw material and energy efficiency in production

Another sector that ProgRes II targets is the **promotion of public awareness of resource-oriented consumption**³⁵.

A few examples are:

- The launch of a consumer advice portal on green living which provides advice on resource efficient consumption and lifestyle
- The incorporation of social and environmental aspects in financial advice services
- Promotion of new consumption models, for example by supporting car sharing schemes
- Regular reporting on the market development of resource-efficient products (Green Products in Germany)
- Intensified communication on resource-efficient products to influence consumers in their purchasing decision
- The institution of a Competence Centre for Sustainable Procurement (KNB) with the task to ensure that sustainability criteria are applied in public procurement

Alongside material efficiency in production and sustainable consumption, a further major element in conserving natural resources is the circular economy.

Germany disposes since 1994 of a Circular Economy legislation (Kreislaufwirtschafts- und Abfallgesetz). The new Circular Economy Act (Kreislaufwirtschaftsgesetz, or KrWG) was enacted in 2012 and has introduced a five-level waste hierarchy. Further measures towards a circular economy comprehends:

- organisational and financial support for product reuse and multiple use schemes and repair centres
- promotion of the idea of sharing rather than owning consumer goods

³³ Cfr. German Resource Efficiency Programme II - Programme for the sustainable use and conservation of natural resources, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, 2016

³⁴ ibidem

³⁵ ibidem

Finally, Germany is trying to eliminate competitive distortions that put resource-efficient products at a disadvantage. For this reason, all subsidised have now to undergo a sustainability impact assessment.

4 Summary

Germany continues its shift toward renewable power generation which in 2016 accounted all together for the 31% of the global power produced. Several measures have already be adopted in the country to support the energy transition and a sustainable development.

Germany belongs to the top performer for indicators on company participation in eco-innovation for both material and energy efficiency activities. The country is also one of the world leaders when it comes to climate protection and expanding the use of renewable energy. Furthermore, Germany has made of waste management an important technology sector and it has the highest waste recovery quotas worldwide. The country has often a pioneer role in shaping EU waste legislation; on a national level, the German government supports sustainable waste management concepts for obtaining raw materials or energy from waste.³⁶

Anyway, despite the ongoing shift toward renewable energies, Germany is still highly dependent on imports of fossil fuels (oil, coal and gas) for its energy needs. The large industrial sector – combined with EU' largest population – contribute to Germany's higher than EU and Danube region averages energy requirements. While the Energy Transition plan is actively contributing in reshaping the country's energy trade balance, Germany is still heavily dependent on third-parties countries (namely Russia) for its energy needs. Additionally, the advance industry sector requires a reliable availability of raw materials and this make the country extremely dependents on imports of energy resources, metals and many key industrial minerals.

In the Energy transition program (Energiewende) pursued by the German government, beside the expansion of renewable energies, a great focus is put on energy efficiency which might reduce the energy consumption.

The goal is to maintain high level of GDP and prosperity while reducing the energy consumption

For what concerns the consumption of material and raw materials, Germany has adopted in 2012 the so called German Resource Efficiency Programme (ProgRes). Aim of this programme is to make the extraction and use of natural resources more sustainable and to reduce associated environmental pollution as far as possible. The programme attaches particular importance to market incentives, information, expert advice, education, research and innovation and to strengthening voluntary measures and initiatives by industry and society.

Since 2000, the share of renewable energy in electricity generation has risen, in particular due to the increased use of wind energy, biomass as well as photovoltaics.

This trend has been driven by legal measures, such as the Renewable Energy Sources Act (EEG) which requires producers of electricity to give priority to renewable energy sources when buying and distributing electricity.

Another significant policy driving this sector is the National Climate and Energy policies, guided by the principle of completely decarbonising the economy.

Additionally, the National Action Plan on Energy Efficiency (NAPE) defines the Energy Efficiency Strategy for the country and it contains a set of instruments designed to motivate companies and consumers to raise energy efficiency: from consultancy, to communication and information about lucrative efficiency measures, up to funding facilities and standards for new installation.

Some of the long term measures of NAPE include:

- The Energy Efficiency Strategy for Building targeting a reduction of 80% in primary energy demand in buildings
- The Energy Saving Legislation introducing a measure for nearly-zero energy building standard

³⁶ Cfr. Ecolnn – Germany National Report on Obstacle and Opportunities

- The Tenancy Law setting the possibility of rent increase after energy-related modernisation.

All measures defined in NAPE stress the fact that raising energy efficiency can also imply market and profit opportunities for companies.

Several other measures have been furthermore adopted by the German Federal Government. In the construction sector, the federal CO₂ Building Renovation Programme supports energy efficiency measures in buildings with low-interest loans and in part repayment or alternatively investment grants. Small and medium-sized enterprises (SMEs) can also obtain low-interest loans to finance energy efficiency measures under the KfW Energy Efficiency Programme. Furthermore, financial incentives have been used in Germany to encourage electromobility. Finally, in Progress II there is a strong focus on sustainable building and sustainable urban development and the resource efficiency of products in the information and communication technology (ICT).

It is interesting to notice that the energy intensity of German economy has shown a phenomenon defined as “absolute decoupling”, which occurs when energy consumption falls while GDP grows. While the absolute decoupling is relevant in economic terms, it also has very significant environmental consequences, since it is likely to alleviate the environmental pressures from energy production and consumption. All the above mentioned measures have indeed had some first successful results. Nonetheless, the implementation has not always been easy. Apart from the commitment of the Government, such measures require in fact a high commitment and engagement of the final consumers. In introducing an environmentally compatible, extensive and climate neutral energy supply also the commerce and industry have a significant role to play. The data available shows that the energy transition will only succeed in Germany if the industry and other big players will significantly expand their investments in energy efficiency and renewable in the future, along with private households.

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