

TRANSFORMATION INTO THE WORLD'S GREENEST INDUSTRIAL REGION - USING THE RUHR METROPOLITAN AREA AS AN EXAMPLE

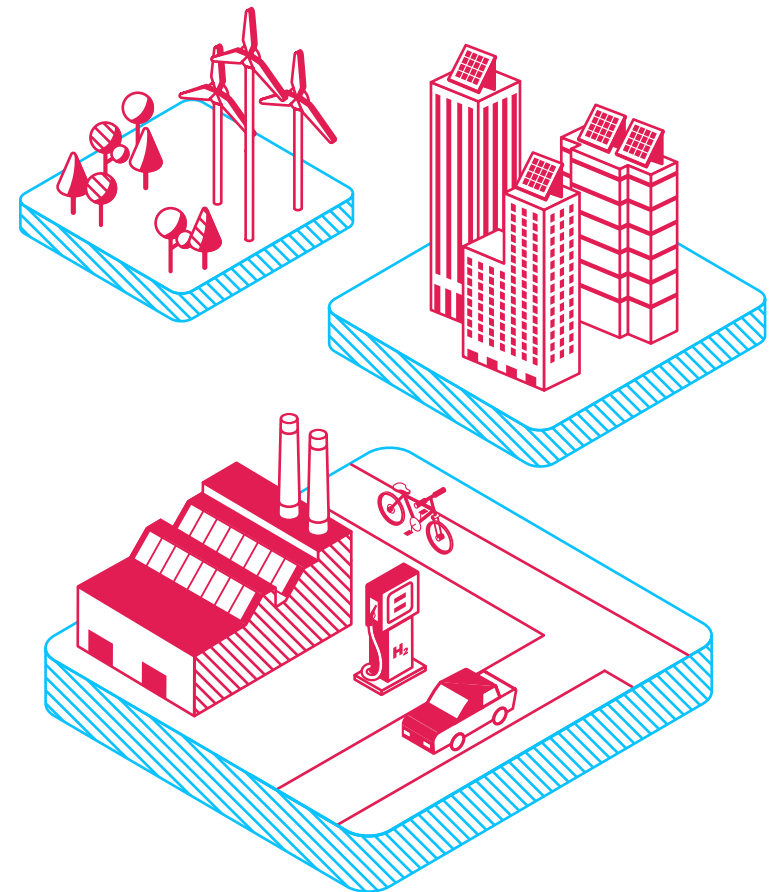
**SUMMARY OF THE STUDY BY THE
WUPPERTAL INSTITUT FÜR KLIMA, UMWELT, ENERGIE GMBH**

BACKGROUND

HOW THE RUHR AREA CAN BECOME THE WORLD'S GREENEST INDUSTRIAL REGION

The consequences of global warming are the subject of news reports almost every day. These stories highlight the urgency of reshaping our economy to limit the rise in temperature that has been caused by humans – and of achieving sustainable development overall. This poses particular challenges for highly industrial regions like the Ruhr area.

However, this transformation also holds tremendous opportunities: green industrial regions can combine economic strength with a high quality of life. In its recent study entitled “Transformation into the ‘World’s Greenest Industrial Region’ – Using the Ruhr Metropolitan Area as an Example”, the Wuppertal Institut für Klima, Umwelt, Energie gGmbH (Wuppertal Institute) examines the main issues involved in this shift towards greater sustainability.





OPPORTUNITIES ARISING FROM ENVIRONMENTAL TRANSFORMATION

In order to attract people and companies, regions around the world want to be seen as attractive and sustainable places to live and do business. Traditional industrial regions have to deal with the environmental legacy of pollution and are often dominated by energy- and resource-intensive production practices. But if these regions take a bold approach to the necessary transformation, numerous opportunities present themselves. After all, new technologies involve investment and create future-proof jobs. Repurposing former industrial sites opens up space for new companies, local recreation areas and industrial nature.

THE RUHR REGION HAS THE POTENTIAL TO BECOME A MODEL GREEN REGION

The Ruhr metropolitan area already has a lot of experience with transformation processes and is now on its way to becoming a sustainable, “green” industrial region. According to the Wuppertal Institute, the challenge is considerable. But if an ambitious, targeted and expedited approach is taken to the transformation process, the Ruhr could provide an important blueprint for many other industrial and metropolitan regions around the world.

The time to take this action has come, as demonstrated by the European Union’s Green Deal and its “Fit for 55” package – politicians see an environmental transformation of the economy as a driver of innovation and growth and are investing in this forward-looking project. This makes now the ideal moment to ask: what does being a “green” industrial region really mean, and how can the environmental transformation of the Ruhr metropolitan area be accomplished?

WHAT THE STUDY BY THE WUPPERTAL INSTITUTE CONTRIBUTES

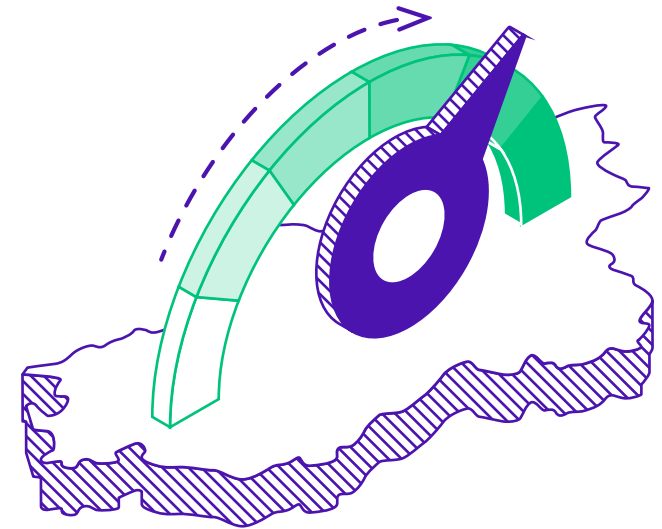
With their study, the authors of the renowned climate and sustainability think tank present for the first time a generally applicable definition of what actually constitutes a green industrial region and how progress can be validly measured.

To do so, they define a large number of relevant action areas and indicators. The study then uses seven selected indicators (one from each of the action areas) as examples in order to examine what pioneer potential the Ruhr metropolitan region holds in the respective area. In the “Think Big” section, it also offers thought-provoking ideas and stimulating suggestions for how the transformation in the Ruhr area could be accelerated.

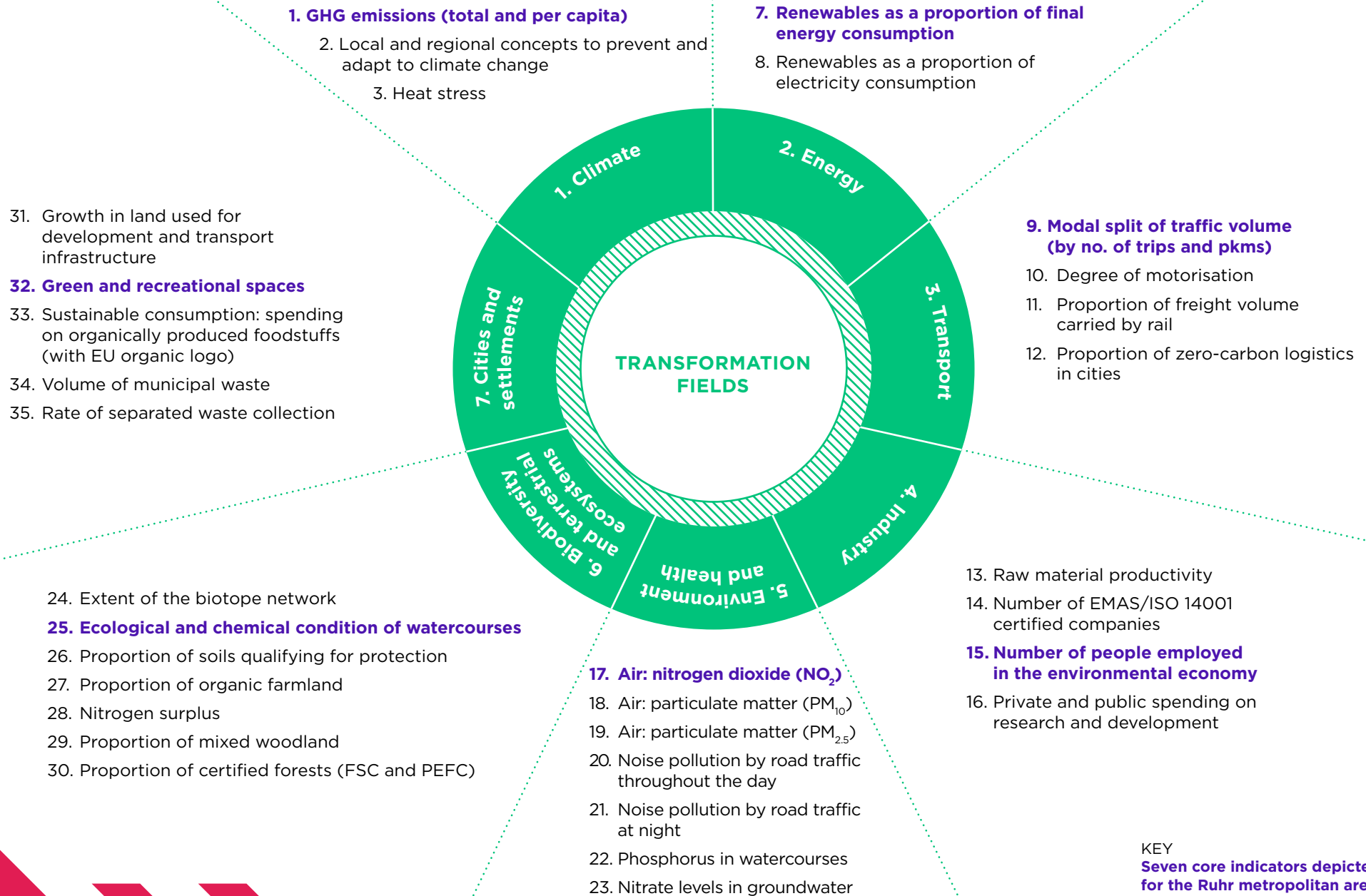
DEFINITION

WHAT DOES BEING A “GREEN” INDUSTRIAL REGION MEAN?

The environmental performance of a metropolitan area cannot be measured solely on the basis of visible criteria such as the number of urban trees planted or how many bike-sharing services are available. The study identifies seven key action areas that industrial regions in transition should take into consideration. In doing so, the Wuppertal Institute refers to relevant documents such as the Sustainable Development Goals set by the United Nations, the European Commission’s European Green Deal, Germany’s National Sustainable Development Strategy and the Sustainability Strategy for the state of North Rhine-Westphalia. The action areas include energy, transport and industry. Specific indicators and targets are assigned to each; for example, the proportion of the electricity mix supplied by renewables or the level of fine particulate air pollution. The total of 35 quantifiable indicators will make it possible to measure and compare the environmental status quo in various industrial regions in future studies.



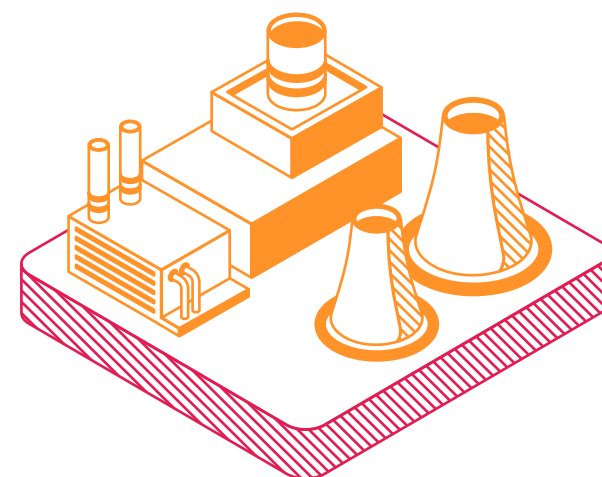
SEVEN ACTION AREAS WITH 35 INDICATORS FOR A GREEN INDUSTRIAL REGION
























APPLICATION TO THE RUHR AREA

WHERE THE RUHR METROPOLITAN AREA HOLDS PIONEER POTENTIAL

The Ruhr metropolitan area has varying degrees of potential to be a pioneer with regard to the indicators examined by the Wuppertal Institute, which have been selected from seven action areas. The Institute's research scientists see high potential for the environmental economy in the "industry" action area, and for green and recreational spaces in the "cities and settlements" action area. The Wuppertal Institute has identified medium potential for the three analysed indicators greenhouse gas emissions ("climate" action area), nitrogen dioxide emissions ("environment and health" action area) and the ecological and chemical condition of water-courses ("biodiversity and terrestrial ecosystems" action area). However, two of the indicators examined - renewables ("energy" action area) and modal split ("transport" action area) - are currently seen as having low potential to take on a pioneering role in the foreseeable future.



AN OVERVIEW OF THE ASSESSMENTS OF POTENTIAL

INDICATOR	POTENTIAL TO BE A PIONEER REGION			In subareas
	Across the indicator area as a whole			
	Low	Medium	High	
Greenhouse gas emissions ("Climate" action area)				<ul style="list-style-type: none"> • Carbon-neutral (steel) industry
Proportion of renewables ("Energy" action area)				<ul style="list-style-type: none"> • Solar generation on roofs and balconies • District heating
Modal split of traffic volume (by number of trips and passenger-kilometres) ("Transport" action area)				<ul style="list-style-type: none"> • Regional cycle network
Number of people employed in the environmental economy ("Industry" action area)				<ul style="list-style-type: none"> • Decarbonisation of primary industries • New business start-ups
Nitrogen dioxide (NO ₂) emissions ("Environment and health" action area)				<ul style="list-style-type: none"> • Use of e-mobility and hydrogen technologies in commercial vehicles
Ecological and chemical condition of watercourses ("Biodiversity and terrestrial ecosystems" action area)				<ul style="list-style-type: none"> • Restoration of watercourses
Green and recreational spaces ("Cities and settlements" action area)				<ul style="list-style-type: none"> • Regional green corridors

LOW POTENTIAL: RENEWABLES AND MODAL SHIFT

The industrial Ruhr region does not have high pioneer potential in all of the indicators examined. However, even in those areas where only a low potential for a pioneering role has currently been identified, subareas could absolutely still develop into model examples. Although available land for the generation of renewable energies is lacking in the region, there is pioneer potential in the ambitious expansion of solar power on roofs and balconies and in the further development of the district heating network, which is already well developed today. In the “transport” action area, the region has so far been characterised by a high proportion of motorised private transport, but according to the Wuppertal Institute, it may be able to perform better in the future with ambitious expansion plans for bicycle use (regional network of (fast) cycle routes).

MEDIUM POTENTIAL: GREENHOUSE GASES, NITROGEN DIOXIDE, WATERCOURSES

In the “climate” action area, greenhouse gas emissions are one key indicator that illustrates the ambiguous situation in which the Ruhr region finds itself. On the one hand, emissions are currently still very high owing to energy-intensive industries. At the same time, the Wuppertal Institute stresses that there is potential for the Ruhr area to develop into an international pioneer region by leveraging its existing competencies in the field of green hydrogen. In the “environment and health” action area, the emission of nitrogen dioxide (NO₂) is an important indicator. These emissions are decreasing in the Ruhr region, as they are in Germany as a whole. Having said that, the future use of green hydrogen tech-

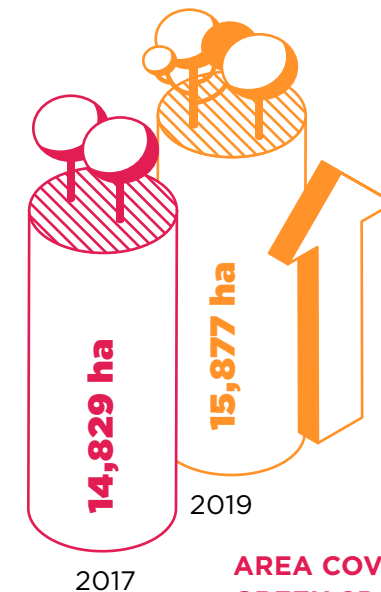
nologies in industry and in some parts of the transport sector could see the Ruhr area develop into a role model for other regions in this respect, too. One key indicator in the “biodiversity and terrestrial ecosystems” action area is the condition of watercourses. The study states that, with the large-scale project to restore the Em-scher river, the Ruhr metropolitan area has achieved “outstanding international prominence”. However, it will take many more years to fully unlock its ecological potential.

HIGH POTENTIAL: ENVIRONMENTAL ECONOMY AND GREEN AND RECREATIONAL SPACES

The Wuppertal Institute sees great potential for the Ruhr metropolitan area to play a pioneering role in the indicator topics it examined that were selected from the “industry” and “cities and settlements” action areas. The core indicator in the “industry” action area is the number of people employed in the environmental economy. Although the Wuppertal Institute already gives a positive assessment of the current situation, it also sees further positive development trends – above all, through the use of decarbonisation technologies. An improved quality of life also leads to increased dynamism among new start-ups from the diverse university scene. In the “cities and settlements” action area, the region is able to draw on a tradition of creating green and recreational spaces that extends back more than a century. Public “Revierparks” intended for sport and leisure, industrial heritage and industrial nature are among its hallmarks. The preparations for the International Garden Exhibition (IGA), which is scheduled to be held in the Ruhr metropolitan area in 2027, will provide additional momentum.



POSSIBLE GROWTH IN THE NUMBER OF PEOPLE EMPLOYED IN THE ENVIRONMENTAL ECONOMY BY 2035

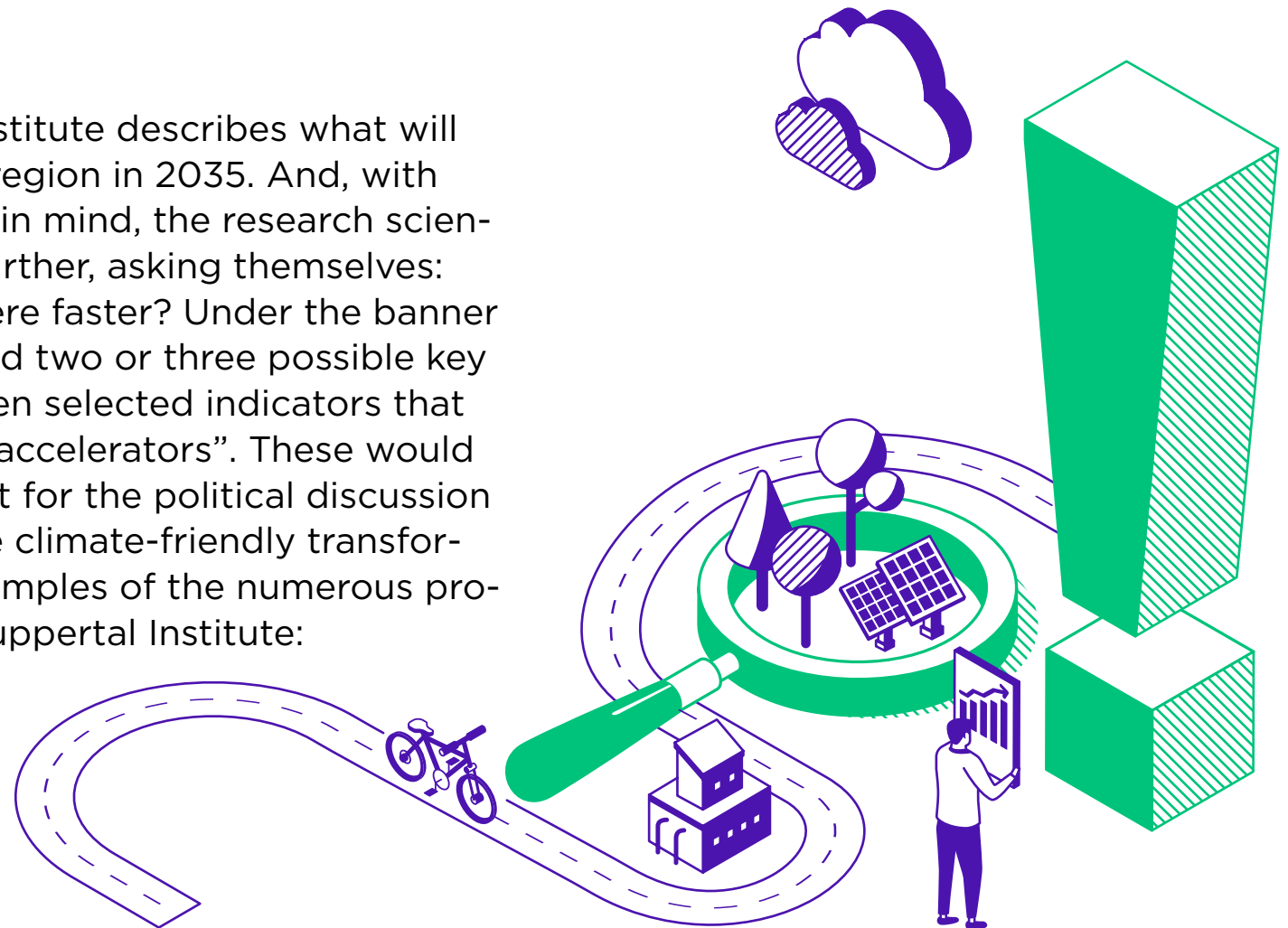


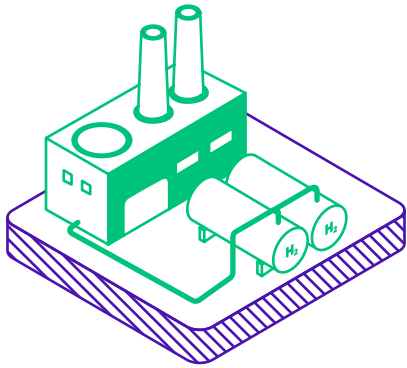
AREA COVERED BY GREEN SPACES AND PARKS

TRANSFORMATION ACCELERATORS

THINK BIG: DRIVERS FOR A GREEN INDUSTRIAL REGION

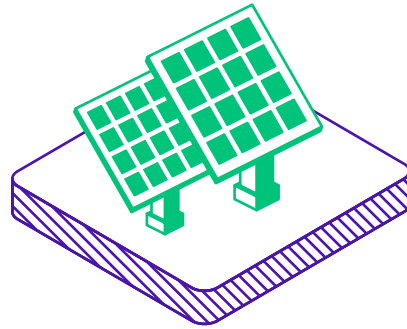
In its study, the Wuppertal Institute describes what will constitute a green industrial region in 2035. And, with the urgency of the challenge in mind, the research scientists have also taken a step further, asking themselves: what actions could get us there faster? Under the banner “Think big”, they have outlined two or three possible key measures for each of the seven selected indicators that could act as “transformation accelerators”. These would serve as a good starting point for the political discussion on how we want to shape the climate-friendly transformation. The following are examples of the numerous proposals put forward by the Wuppertal Institute:





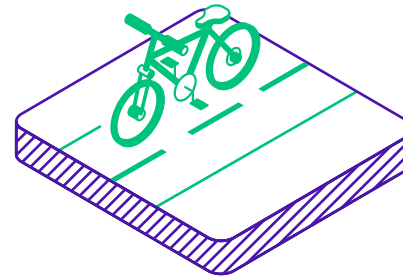
EXAMPLE - GREENHOUSE GASES: MAKING PROGRESS TOWARDS GREEN STEEL

Until now, steel manufacturing has been associated with high levels of climate-damaging emissions. The innovative direct reduction process, on the other hand, is almost emission-free, provided that “green” hydrogen (obtained from renewable energy) is used. The steel companies based in the Ruhr region are already working on this new technology and will need very large quantities of hydrogen in the long term. There are plans for a rapid expansion of the existing hydrogen pipelines in the Ruhr metropolitan area in order to meet this demand.



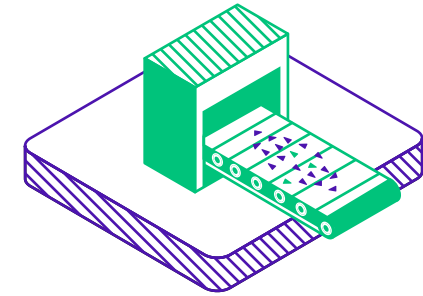
EXAMPLE - RENEWABLE ENERGIES: BALCONY SOLAR SYSTEMS FOR FLATS

The Ruhr metropolitan area has a relatively high proportion of rented flats. As a result, there is strong potential for the use of “balcony power plants”: small photovoltaic systems on balcony railings, which should specifically be rolled out with the aid of grants. The Wuppertal Institute estimates that an ambitious implementation of this project could lead to the installation of an additional 800 megawatts of photovoltaic capacity, roughly doubling what is currently installed.



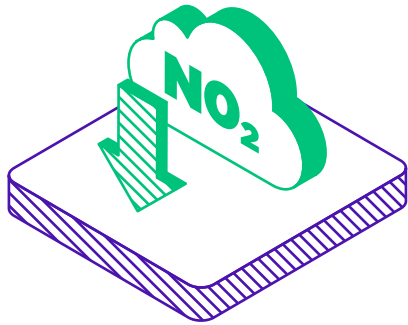
EXAMPLE - TRANSPORT: A 1,000 KM NETWORK OF FAST CYCLE ROUTES

Increasing bicycle use by providing fast and unobstructed connections is an important factor in reducing CO₂ emissions from transport. Already under construction, the RS1 or “Radschnellweg Ruhr” (Ruhr Bike Highway) is projected to be around 100 kilometres long – but the Wuppertal Institute suggests it should be extended tenfold by 2035 to become an area-wide 1,000-kilometre network of fast cycle routes. In order to achieve this goal quickly, cost-efficiently and effectively, existing transport infrastructure should also be used. In particular, lanes on main roads that also pass through local communities should be rededicated for use by cyclists.



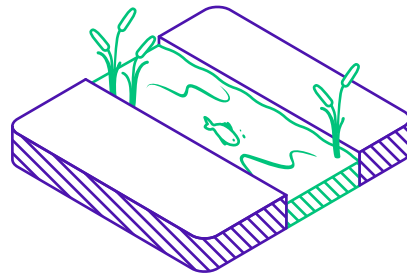
EXAMPLE - ENVIRONMENTAL ECONOMY: AVOIDING WASTE, RETHINKING RECYCLING

The industrial sector and refuse disposal companies should move towards a circular economy in which a high priority is given to avoiding waste and recycling it. This applies in particular to plastic waste, which can be broken down into its chemical components to serve as a raw material for new plastics. Innovative 3D printing paves the way for low-waste manufacturing processes. The Ruhr metropolitan area has a high potential here that it should strive to develop.



EXAMPLE - ENVIRONMENT AND HEALTH: REDUCTION OF NO₂ EMISSIONS FROM MOTOR VEHICLES

Eco-friendly drive systems reduce nitrogen dioxide emissions, which are harmful to human health. The state government of North Rhine-Westphalia has decided, among other measures, that 1,000 waste collection trucks and 3,800 local buses fitted with climate-friendly fuel cell technology will be on the state's roads by 2030. The Ruhr metropolitan area already has a high level of competence in hydrogen and fuel cell technology but this would benefit from greater financial support.



EXAMPLE - TERRESTRIAL ECOSYSTEMS: REDUCTION IN POLLUTANTS ENTERING WATER BODIES

Overfertilisation and the application of pesticides endanger flora and fauna in rivers and lakes. Effective measures against water pollution caused by agriculture include, in particular, significantly reducing the use of fertilisers and adhering to the restrictions on their use within set distances of water bodies. The Ruhr metropolitan area and the state of North Rhine-Westphalia should therefore work towards strengthening the availability of advisory services and grant funding for agri-environmental measures and increasing the rate of organic farming.



EXAMPLE - RECREATIONAL SPACES: COMPETITION TO BE THE "WORLD'S GREENEST CITY DISTRICT"

A competition throughout the Ruhr region aimed at promoting urban green space, both quantitatively and qualitatively, would help to further increase the quality of life offered by the Ruhr metropolitan area. The competition should be implemented without delay and pursue ambitious objectives – for example, that all suitable municipal buildings have green roofs and facades by 2030. The participating city districts should also ensure that smaller green spaces can be reached within a 150-metre radius.

LOOKING BACK TO MOVE FORWARD; EXPERTS IN TRANSFORMATION

The transition to a green industrial region is a major task that will place great demands on individuals and companies alike. But it must be remembered that this “greening” process is vital if industrial regions are to have an economically, environmentally and socially viable future. This transformation can only succeed by everyone working together. The Wuppertal Institute can attest to the fact that the people in the Ruhr region possess characteristics that will take them a long way towards success: farsightedness, experience of transformation, a can-do attitude, an openness to new ideas and a sense of solidarity. These are important cornerstones of a sustainable society in the Ruhr metropolitan area – just as they are for successfully shaping a transformation process in favour of greater sustainability.



LEGAL NOTICE

Publisher:
Regionalverband Ruhr (Ruhr Regional Association)
Regional Director
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Editors:
Regionalverband Ruhr, Scholz & Friends Berlin GmbH

Study and review of the contents of this summary:
Wuppertal Institut für Klima, Umwelt, Energie gGmbH

Layout:
Scholz & Friends Berlin GmbH

Translation:
Sprachwerkstatt Berlin

Date:
August 2021