鲁尔区的低碳城市转型

Low carbon urban transformation in the Ruhr region

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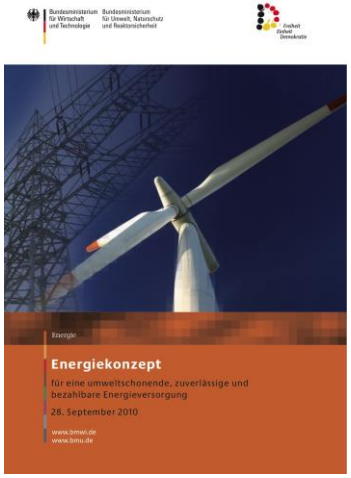
背景 – 温室气体减排目标及城市的重要性
Introductory remarks and background – GHG mitigation targets and why cities matter

与德国气候相关政策的基础
Central basis (framework) for the German climate related policy

从能源概念（2010）及气候保护计划（2016）到即将出台的气侯保护法（2019）

From energy concept (2010) and climate protection plan (2016) to intended climate protection law (2019)

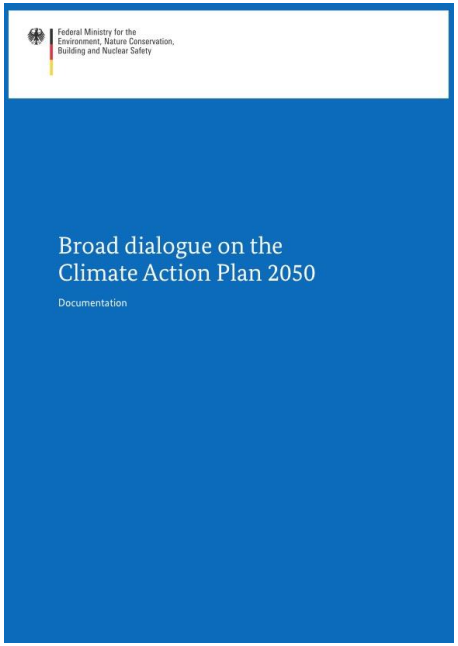


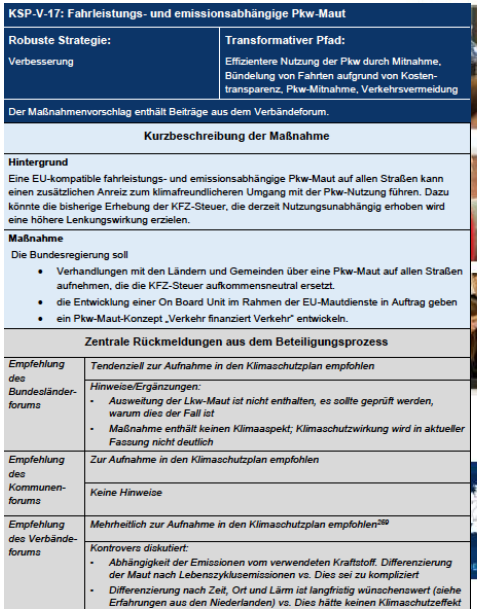
德国能源概念 – 在2010年发布（在2011年落实）制定中央能源及与气候相关的目标

German energy concept – launched in 2010 (adapted in 2011) formulates central energy and climate related targets

Maßnahmenkatalog

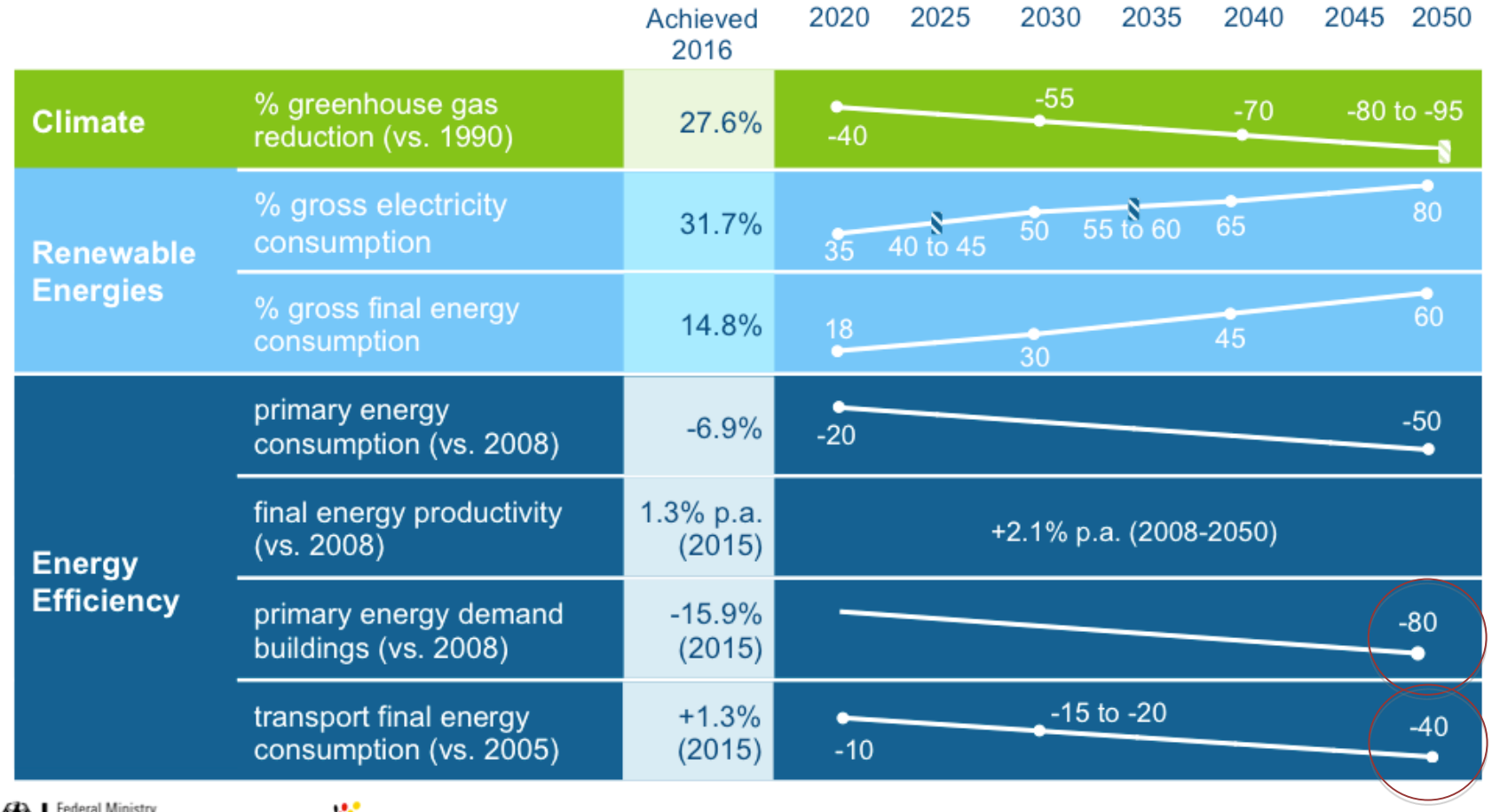
Ergebnis des Dialogprozesses
zum Klimaschutzplan 2050 der Bundesregierung





KSP-V-17: Fahrleistungs- und emissionsabhängige Pkw-Maut	
Robuste Strategie: Verbesserung	**Transformativer Pfad:** Effizientere Nutzung der Pkw durch Mitnahme, Bündelung von Fahrten aufgrund von Kostentransparenz, Pkw-Mitnahme, Verkehrsvermeidung
Der Maßnahmenvorschlag enthält Beiträge aus dem Verbändeforum.	
Kurzbeschreibung der Maßnahme	
Hintergrund Eine EU-kompatible fahrleistungs- und emissionsabhängige Pkw-Maut auf allen Straßen kann einen zusätzlichen Anreiz zum klimafreundlicheren Umgang mit der Pkw-Nutzung führen. Dazu könnte die bisherige Erhebung der KFZ-Steuer, die derzeit Nutzungsunabhängig erhoben wird eine höhere Lenkungswirkung erzielen.	
Maßnahme Die Bundesregierung soll • Verhandlungen mit den Ländern und Gemeinden über eine Pkw-Maut auf allen Straßen aufnehmen, die die KFZ-Steuer aufkommensneutral ersetzt. • die Entwicklung einer On Board Unit im Rahmen der EU-Mautdienste in Auftrag geben • ein Pkw-Maut-Konzept „Verkehr finanziert Verkehr" entwickeln.	
Zentrale Rückmeldungen aus dem Beteiligungsprozess	
Empfehlung des Bundesländer-forums	*Tendenziell zur Aufnahme in den Klimaschutzplan empfohlen* *Hinweise/Ergänzungen:* • *Ausweitung der Lkw-Maut ist nicht enthalten, es sollte geprüft werden, warum dies der Fall ist* • *Maßnahme enthält keinen Klimaaspekt; Klimaschutzwirkung wird in aktueller Fassung nicht deutlich*
Empfehlung des Kommunen-forums	*Zur Aufnahme in den Klimaschutzplan empfohlen* *Keine Hinweise*
Empfehlung des Verbände-forums	*Mehrheitlich zur Aufnahme in den Klimaschutzplan empfohlen*[269] *Kontrovers diskutiert:* • *Abhängigkeit der Emissionen vom verwendeten Kraftstoff. Differenzierung der Maut nach Lebenszyklusemissionen vs. Dies sei zu kompliziert* • *Differenzierung nach Zeit, Ort und Lärm ist langfristig wünschenswert (siehe Erfahrungen aus den Niederlanden) vs. Dies hätte keinen Klimaschutzeffekt*

德国能源转型计划目标的能源概念基础
German Energy Concept basis for Energiewende targets
德国能源转型计划的核心里程碑及其相关的子目标
Central milestones and underlying sub-targets for German Energiewende



Source: BMWi 2016, UBA 2017, Graph by BMWI

Federal Ministry for Economic Affairs and Energy

Energiewende Switch to the Future

城市的重要性–与温室气体减排相关的贡献必须来自城市各个部门
Why cities matter – relevant contribution to GHG mitigation has to come from sectors that are determined by the urban context

气候保护计划的具体温室气体减排目标
Sector specific GHG mitigation goals from the Climate Protection Plan

Area of action	1990 *(in million tonnes of CO_2 equivalent)*		2014 *(in million tonnes of CO_2 equivalent)*	2030 *(in million tonnes of CO_2 equivalent)*	2030 (reduction in % compared to 1990)
Energy sector	466		358	175 – 183	62 – 61 %
Buildings	209	-43%	119	70 – 72	67 – 66 %
Transport	163	-2%	160	95 – 98	42 – 40 %
Industry	283		181	140 – 143	51 – 49 %
Agriculture	88		72	58 – 61	34 – 31 %
Subtotal	1209		890	538 – 557	56 – 54 %
Other	39		12	5	87%
Total	**1248**	**-27%**	**902**	**543 – 562**	**56 – 55 %**

鲁尔区 – 为什么这个地区在温室气体减排很重要
The Ruhr area – why particularly this region matters with regard to GHG mitigation

作为德国能源及工业中心的鲁尔区对德国达到温室气体减排目标发挥着重要作用
Ruhr area as the energy and industry heart of Germany plays a major role for achievig GHG mitigation targets

鲁尔区 – 主要数据一览
Ruhr area – key figures

- 鲁尔区是德国最大的城市大都市区，也是欧洲最大的工业群之一

  The Ruhr Area is Germany's largest urban metropolitan region, one of Europe's largest industrial clusters

- 多中心结构，
  覆盖11个城市及4个地区，

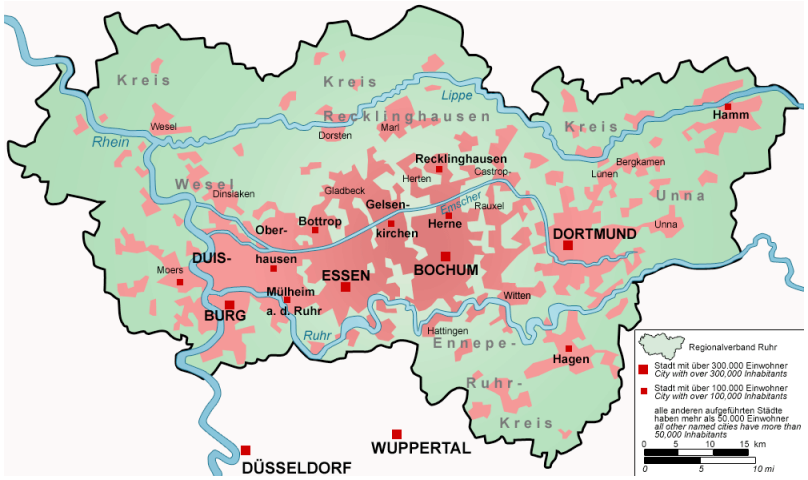
  Polycentric structure, covering 11 cities and 4 districts,

- 人口数目达五百二十万（2012）

  Population of 5.2 mill.(2012)

- 地区生产总值达一千四百亿欧元（2009），劳动人口达一百七十万欧元（2012）

  Regional GDP of €140 billion € (2009), labour force of 1.7 million € (2012)



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鲁尔区－ 该地区面临的主要挑战
Ruhr area – key challenges for the region

- 煤炭和钢铁生产持续下降

Continuous decline of coal and steel production

- 人口减少, 导致地区萎缩

Loss of population, shrinking region

- 已持续数十年的工业比重消减和萎缩.

De-industrialization and shrinking has continued for decades.

从工业到科学，文化，医疗和物流服务的经济产业结构变化

Structural change from industry to science, cultural and medical and logistic services

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鲁尔区 – 经挑选的与气候变化相关的主要活动
Ruhr area – selected key activities with regard to climate change

- 提高能源效率（例如建筑节能）

Increase of energy efficiency (e.g. improvement of insulation of building stock)

- 发电方式的转型和新建热电联产（扩大区域供热）

Transformation of electricity generation and construction of new CHP-power plants (expansion of district heating)

- 增加可再生能源的比重并推进系统整合

Increasing the share of renewable energies and system integration

作为德国能源及工业中心的鲁尔区对达到温室气体减排目标发挥着重要作用
Ruhr area as the energy and industry heart of Germany plays a major role for achievig GHG mitigation targets

鲁尔区 – 与气候变化相关的部分关键措施
Ruhr area – selected key activities with regard to climate change

- 实施新技术（例如储能技术–电转X，智慧电网）

Implementation of new technologies (e.g. Storage technologies – PtX, smart grids)

- 基础设施规划（例如当地气候保护计划，气候中和城市区，鲁尔区创新城市）

Infrastructure planning (e.g. local climate protection plans, climate neutral city quarters, Innovation City Ruhr)

- 全面的研发工作

Comprehensive R&D efforts

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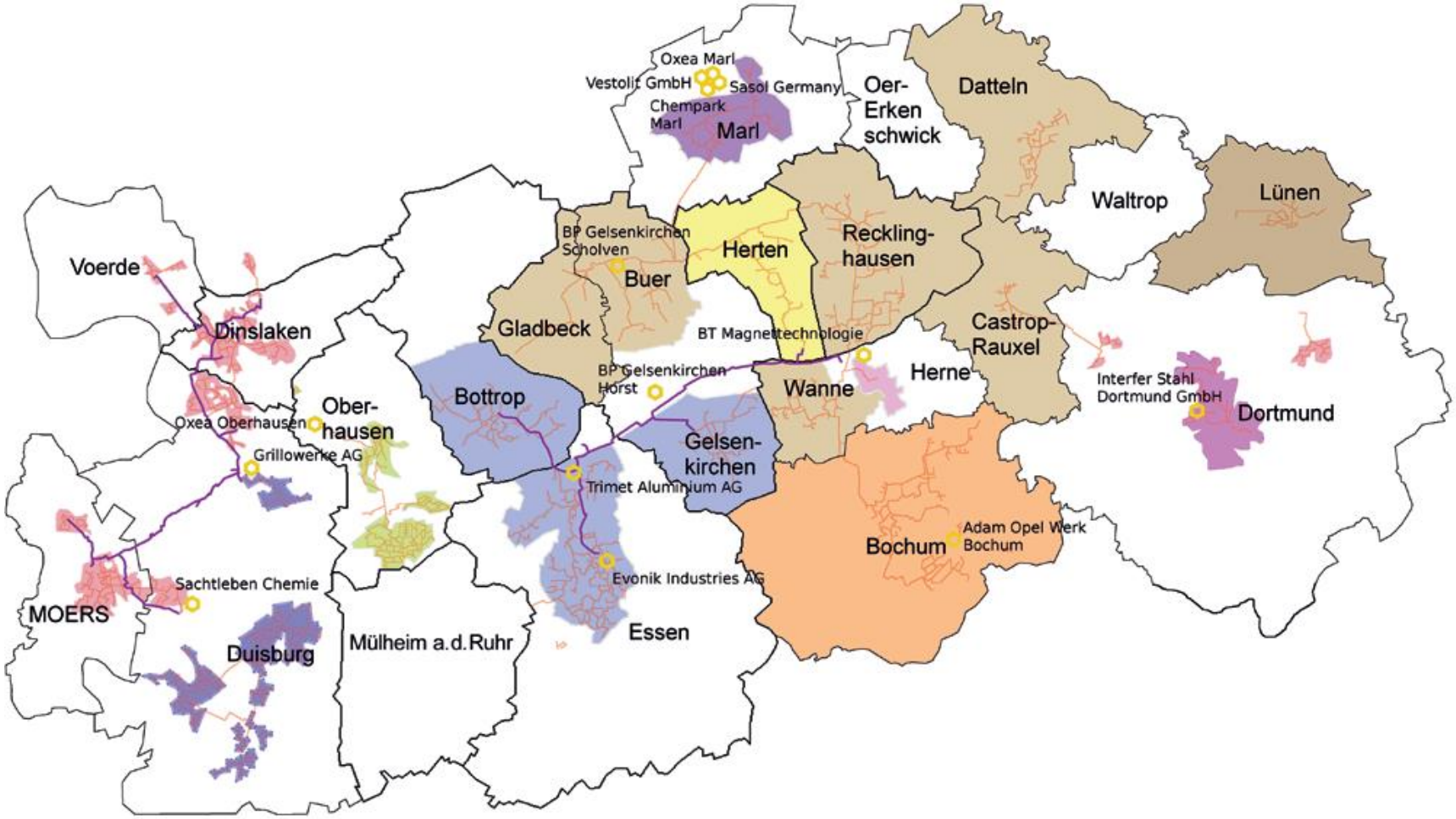
鲁尔区 – 拥有非常完善的区域供热网
Ruhr area – broad areas with very well established district heating grid



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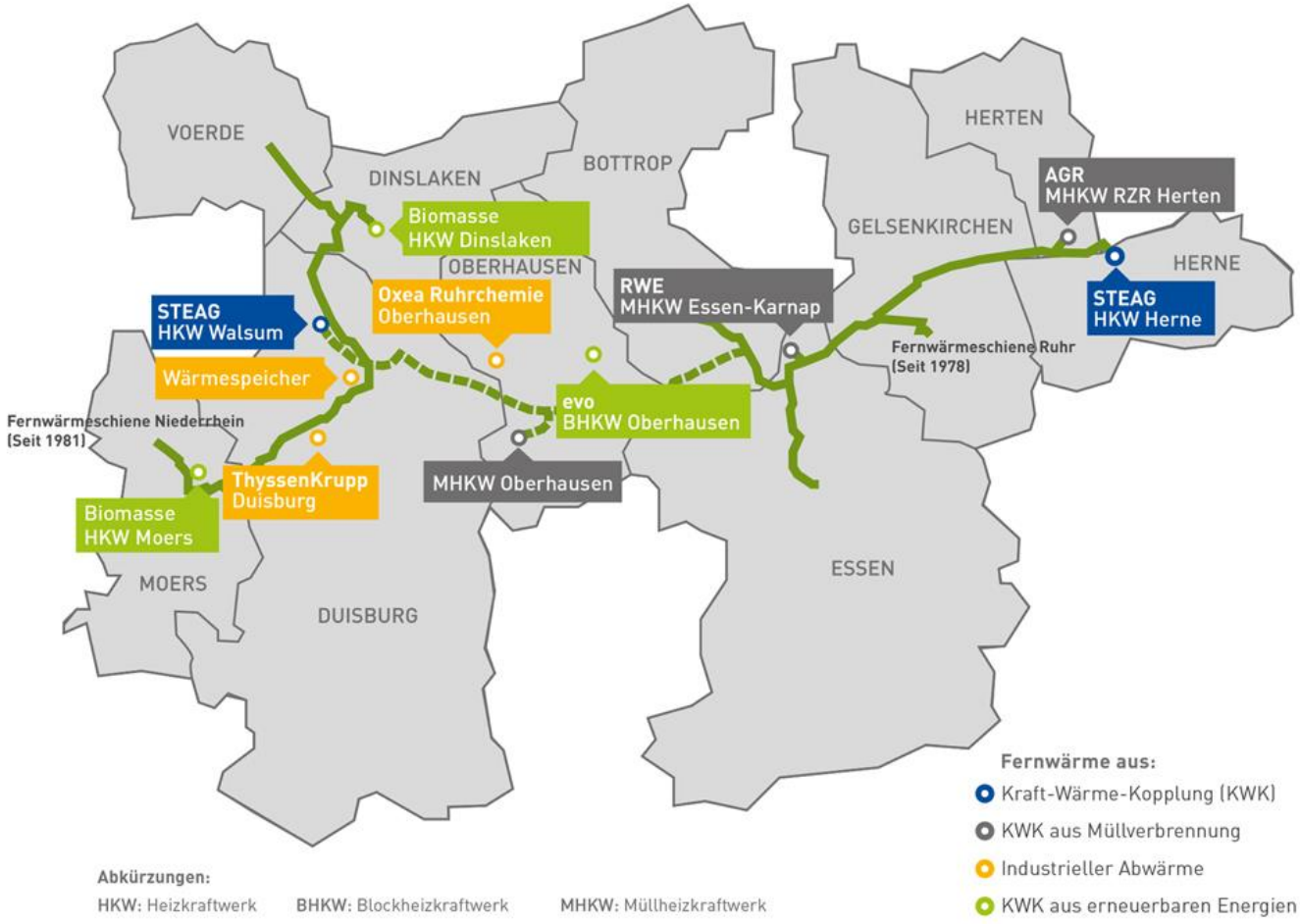
鲁尔区 – 连接区域供热网作为发展的下一步（包括热源的扩展和多样化）

Ruhr area – coupling of district heating grids as next step (incl. extension and diversification of heat sources)



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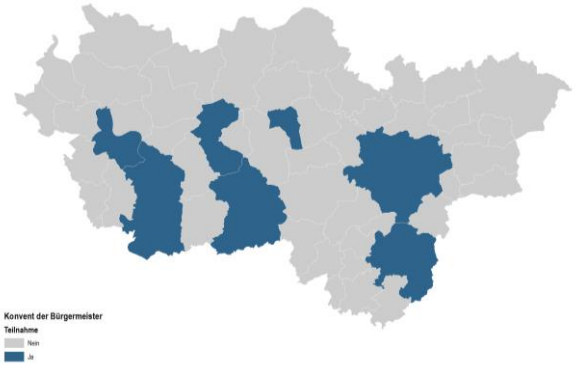
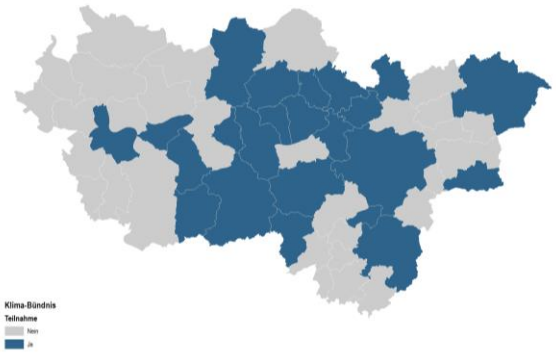
鲁尔区 - 与气候变化相关的部分关键措施
Ruhr area – selected key activities with regard to climate change

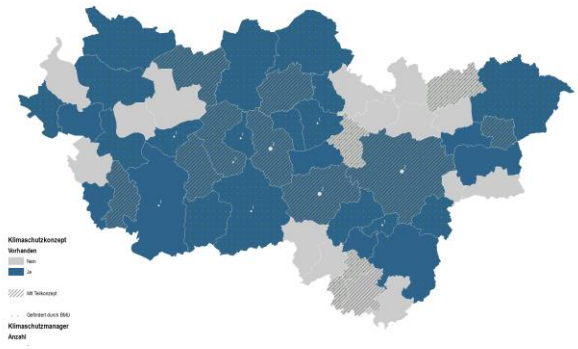
成为市长公约的成员
Membership in the Covenant of Mayors



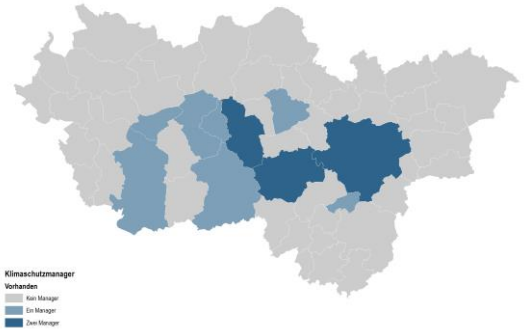
成为气候联盟的成员
Membership in Climate Alliance



气候行动计划和范畴概念
Climate Action Plans and sectoral concepts



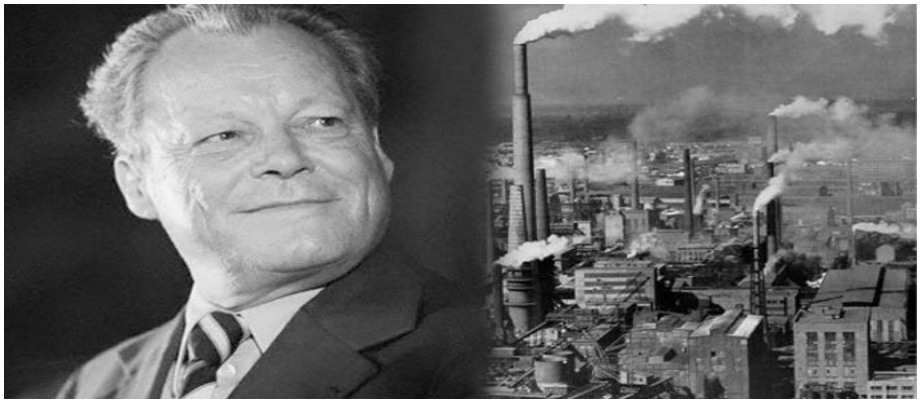
落实气候行动经理
Implementation of Climate Action Managers



城市及地区在成功地实现全球目标方面发挥着重要作用
Cities and regions play a major role for the successful implementation of global goals not at least in Ruhr area

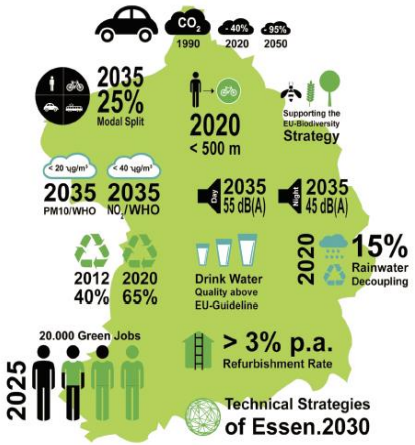
不断努力 成功转型
Continuity matters – successful shaping of transformation

„鲁尔河谷上空的天空应该要再次变成蓝色 “ „The sky above the Ruhr Valley should becom blue again“



1961: Willy Brandt（前总理）(former chancelor)

ESSEN winner 2017 EUROPEAN GREEN CAPITAL



InnovationCity Ruhr
Modellstadt Bottrop

„国际Emscher Park倡议 " （1989 - 1999）
修复被重创的地区
„International Emscher Park Initiative " (1989 - 1999)
renaturation of a heavily impacted region

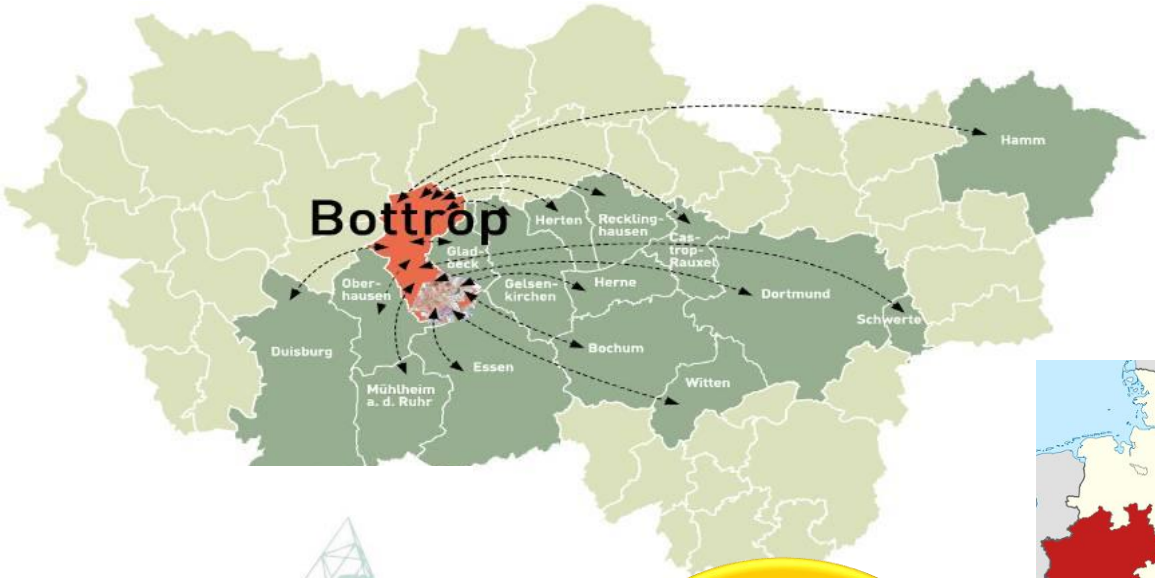
城市先锋–鲁尔区创新城市
Specific urban pioneers Innovation City Ruhr

试验实现德国工业中心温室气体减排目标
Establishment of a real (urban) laboratory to realize ambitious GHG mitigation targets in the industry heart of Germany

蓝天

绿色城市

InnovationCity Ruhr
Modellstadt Bottrop



16个城市
- Bochum
- Bottrop
- Castrop-Rauxel
- Dortmund
- Duisburg
- Essen
- Gelsenkirchen_Herten
- Gladbeck
- Hamm
- Herne_Recklinghausen
- Mülheim an der Ruhr
- Oberhausen
- Schwerte
- Witten

比赛阶段1

5个决赛参选城市
- Bochum
- Bottrop
- Essen
- Gelsenkirchen_Herten
- Mülheim an der Ruhr

比赛阶段2

InnovationCity Bottrop

胜出城市

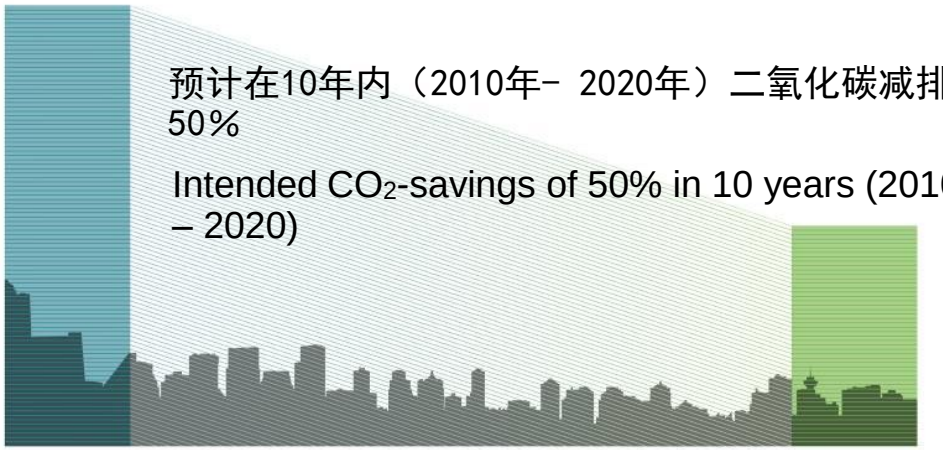
我们致力于保护气候
WWW.ICRUHR.DE

城市先锋–鲁尔区创新城市
Specific urban pioneers Innovation City Ruhr

创新城市不仅将温室气体减排作为具体目标，同时推动城市其它目标的实现

Innovation city addresses not only GHG mitigation as specific target but sets ambition in a broader context

InnovationCity Ruhr
Modellstadt Bottrop



追求双赢的可能性：

将环境目标与提高生活水平和改善区域经济结合（新的绿色工作机会：德国最后一个在博特罗普的地下煤矿在2018年关闭–具有高度的象征意义）

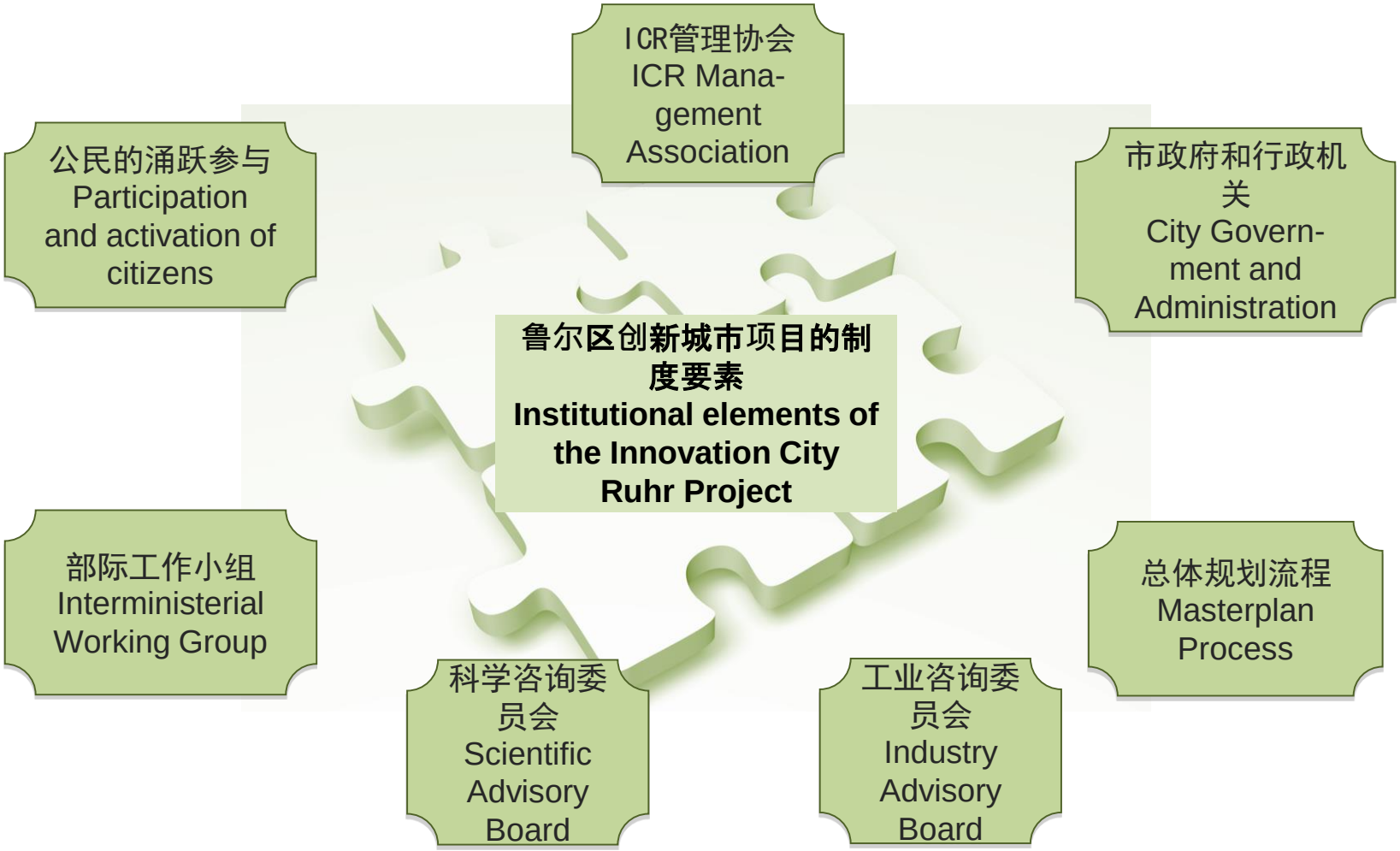
Win–Win potential pursued:

Combining environmental goals with improved living standards and creation of regional economic impulses (new green jobs as substitute: last German hard coal mine will close 2018 in Bottrop – high symbolic meaning)

城市先锋–鲁尔区创新城市
Specific urban pioneers Innovation City Ruhr

智慧治理（管理）结构和总体规划是创新和温室气体减排的成功因素

Smart urban governance (management) structures and masterplan as success factors for innovation and reduction of GHG emissions



城市先锋–鲁尔区创新城市
Specific urban pioneers Innovation City Ruhr

已经实施了超过300多个项目
More than 300 projects have been implemented

改造住宅区 Retrofitting of Residential Areas	*改造公共机构和工业 Retrofitting of Companies*	*可再生能源 Regenerative Energy*	*电动交通 Electric Mobility*	*城市发展 Urban Development*
▪ 正能量建筑 PLUS-ENERGY-Model Houses: ▪ 独立式住宅 Detached House ▪ 公寓 Apartment Building ▪ 商业建筑 Commercial Building ▪ 市建房屋 Social Housing ▪ Rheinbaben区 Rheinbaben district ▪ Rheinbaben咨询程序 Manual Consultation Process Rheinbaben ▪ 宜居Ehrenpark Living at Ehrenpark ▪ 宜居Trapez Living at Trapez	▪ Ruhr West高校校区 Hochschule Ruhr West ▪ 低能耗加油站 Low Energy Gas-Station ▪ 太阳能焊接技术 Welding with Solar Power ▪ Knippenburg / Kruppwald工业区 Industrial Estates Knippenburg/ Kruppwald ▪ Welheimer Mark能源供应 Energy Supply Welheimer Mark ▪ 气候中和零售业 Climate Neutral Retail Sale	▪ 热电联产试点项目 CHP Pilot Project ▪ 10 个微热电联产的应用 Application of 10 Mini-CHP ▪ 双向需求侧管理 Dual Demand Side Management ▪ 智能电网 Smart Grid ▪ 发热轮毂 Warmth on Wheels ▪ 矿井水热能 Mine Water Heat ▪ 使用焦碳厂的工艺过程热 Use of Process Heat of the Coking Plant ▪ 应用氢的总体规划 Masterplan Hydrogen	▪ 改进区域供能电动交通 ▪ E –Mobility in the context of energetic district retrofitting ▪ 电动公共交通 Electric Public Transport ▪ 电动汽车 E-Vehicles ▪ 电动货车 E-Trucks ▪ 租赁系统 Rental System ▪ 城市兼容货车路线导 City Compatible Truck Routing ▪ 汽车共享系统 Car-Sharing ▪ 更换主要车站充电站 Exchange of Charging Station at Main Station	▪ 鲁尔区创新城的总体规划 Masterplan InnovationCity Ruhr ▪ Welheimer Mark的综合城市发展 Integrated Urban Development Welheimer Mark ▪ 42高速公路的太阳能光伏噪音屏障 Photovoltaics Noise Barrier at A 42 Highway ▪ LED路灯 LED-Street Lighting ▪ BEST区的雨水管理 Rain Water Management at BEST Area ▪ 建筑物表面绿化 Cultivation of Facade Surfaces

成功因素:从一开始就采用自下而上和自上而下推动相结合的方法
Selected success factors: bottom up and top down driven participatory approach from the very beginning

创新城市博特罗普以在四周内收集到20. 000个公民签名作为开始（大约1/3的试点地区居民）
Innovation City Bottrop started with 20.000 signatures by citizens in four weeks (ca. 1/3 of inhabitions of pilot area)

具体城市的先锋–鲁尔区创新城市
Specific urban pioneers Innovation City Ruhr

超过300多个项目已被实施–一个颇为成功的计划

More than 300 projects have been implemented – a quite successful project

2020的减排目标：

Mitigation target 2020:

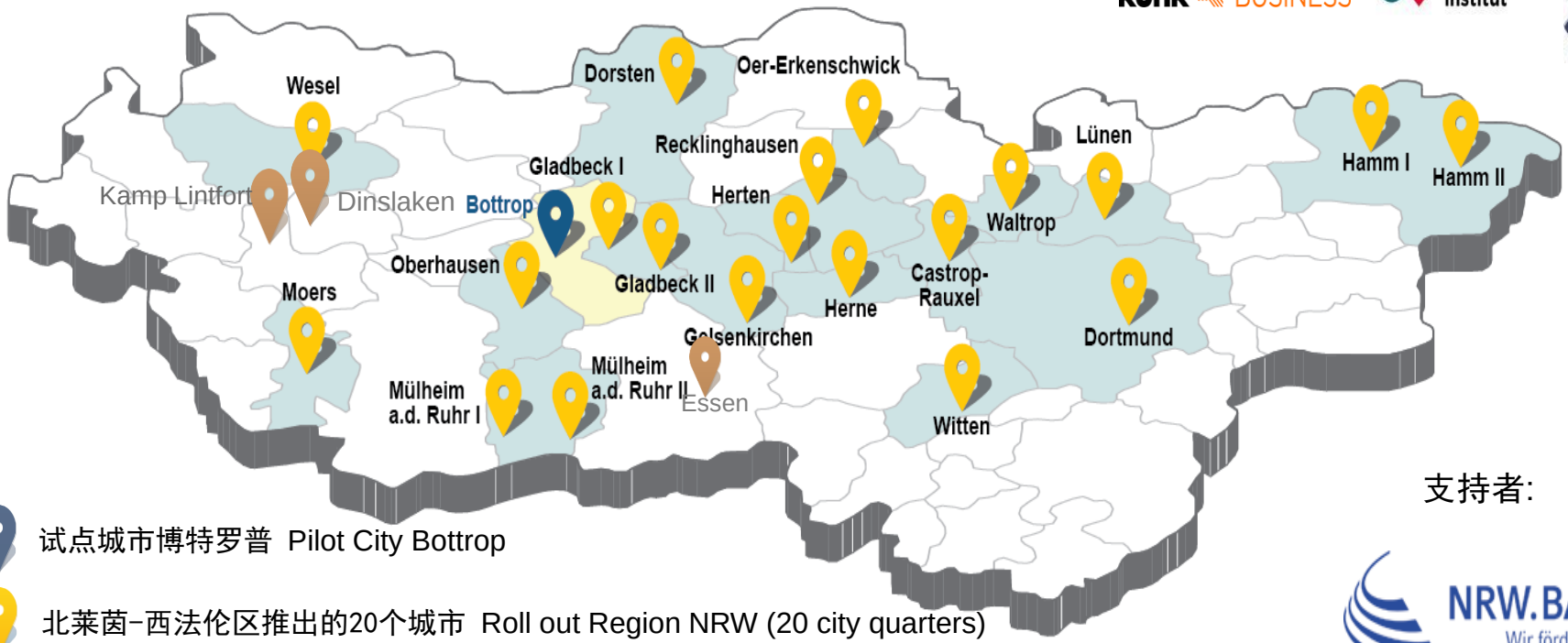
-50%

…2015年末的已达到目标（2018）：

…already achieved by end of 2015 (2018):

- 37,4 % (接近50%) (close to 50%)

成功的转型路径，超过20个鲁尔区的试点地区
Roll out of a successful transformation pathway in more of 20 additional pilot districts across the whole Ruhr Area



试点城市博特罗普 Pilot City Bottrop

北莱茵-西法伦区推出的20个城市 Roll out Region NRW (20 city quarters)

KfW 432资助的3个城市 KfW 432 financed (3 city quarters)

支持者:

EUROPÄISCHE UNION
Investition in unsere Zukunft
Europäischer Fonds
für regionale Entwicklung

Ministerium für Wirtschaft, Innovation, Digitalisier und Energie des Landes Nordrhein-Westfalen

将挑战转化为明确目标
Translation of challenges into clear goals

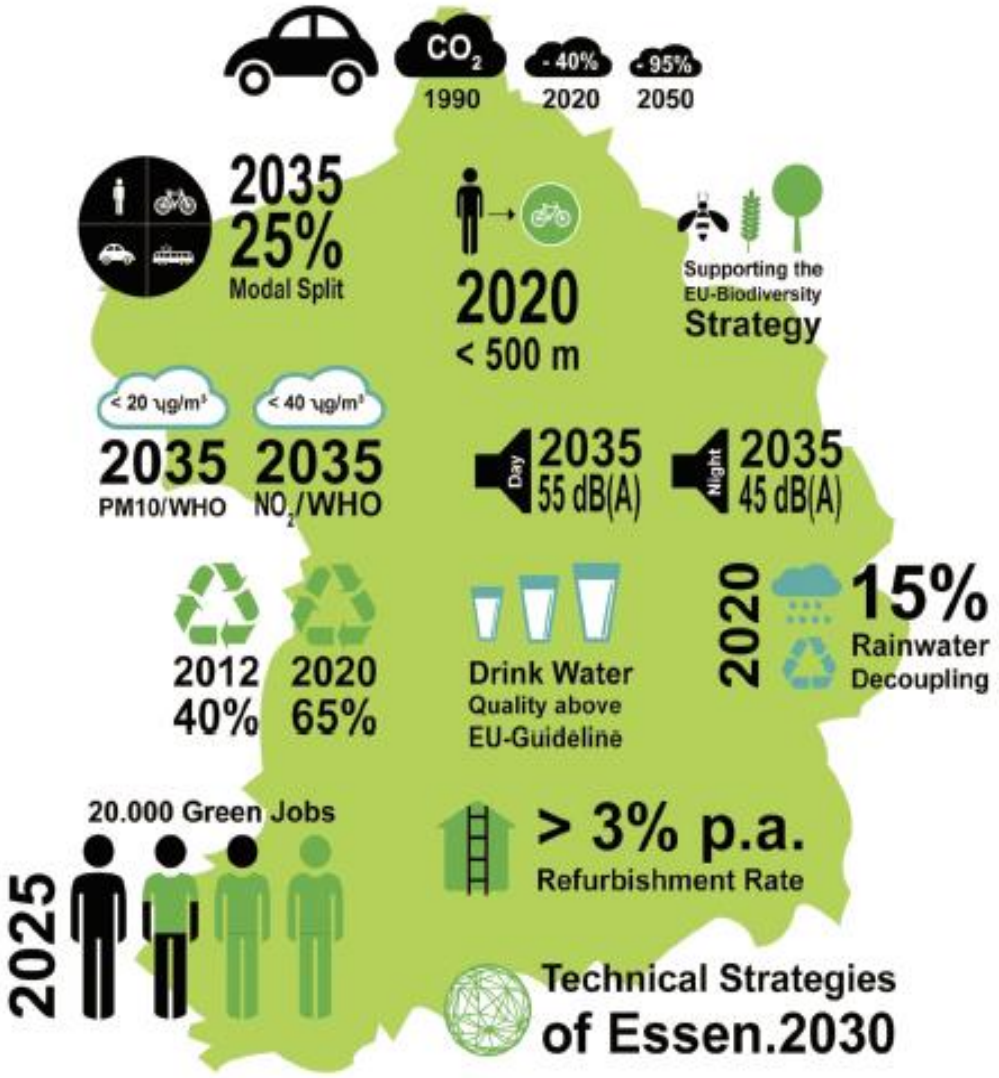
欧洲绿色首都埃森

European Green Capital Essen

ESSEN

Winner 2017

EUROPEAN GREEN CAPITAL



欧洲绿色首都埃森 – 长期转型过程
European Green Capital Essen – embedded in a long-term transformation process

长期不断努力

Continuity matters

埃姆舍尔河的重建计划

Reconstruction of the Emscher River

在鲁尔区为期一百年的项目

A 100-year long project in the Ruhr Area

Emscher has been one of the most poluted rivers in Europe

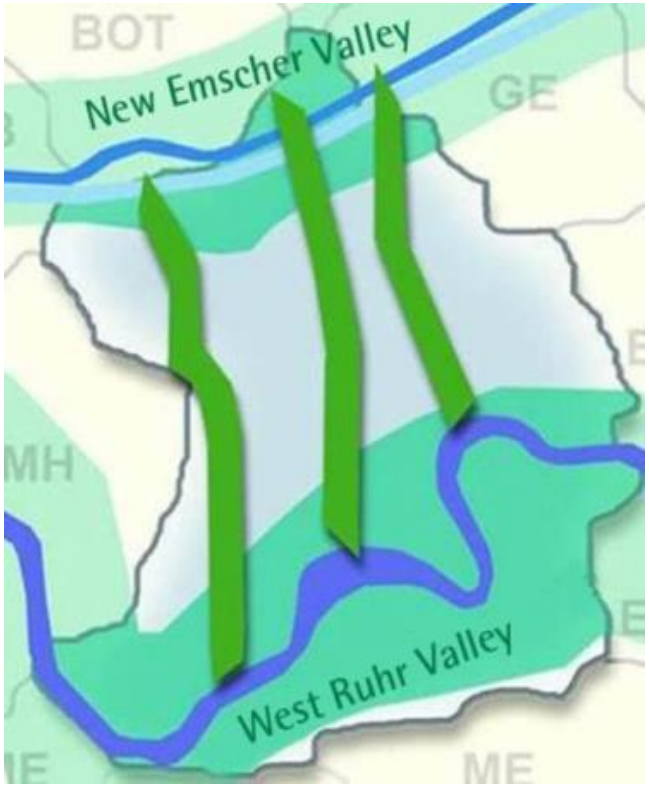
埃姆舍尔河一直是全欧洲污染最严重的河流之一

欧洲绿色首都埃森 – 长期转型过程
European Green Capital Essen – embedded in a long-term transformation process

欧洲绿色首都申请
European Green Capital application as consequent follow up

“水管理的创新途径”计划

Programme “New ways to the water“



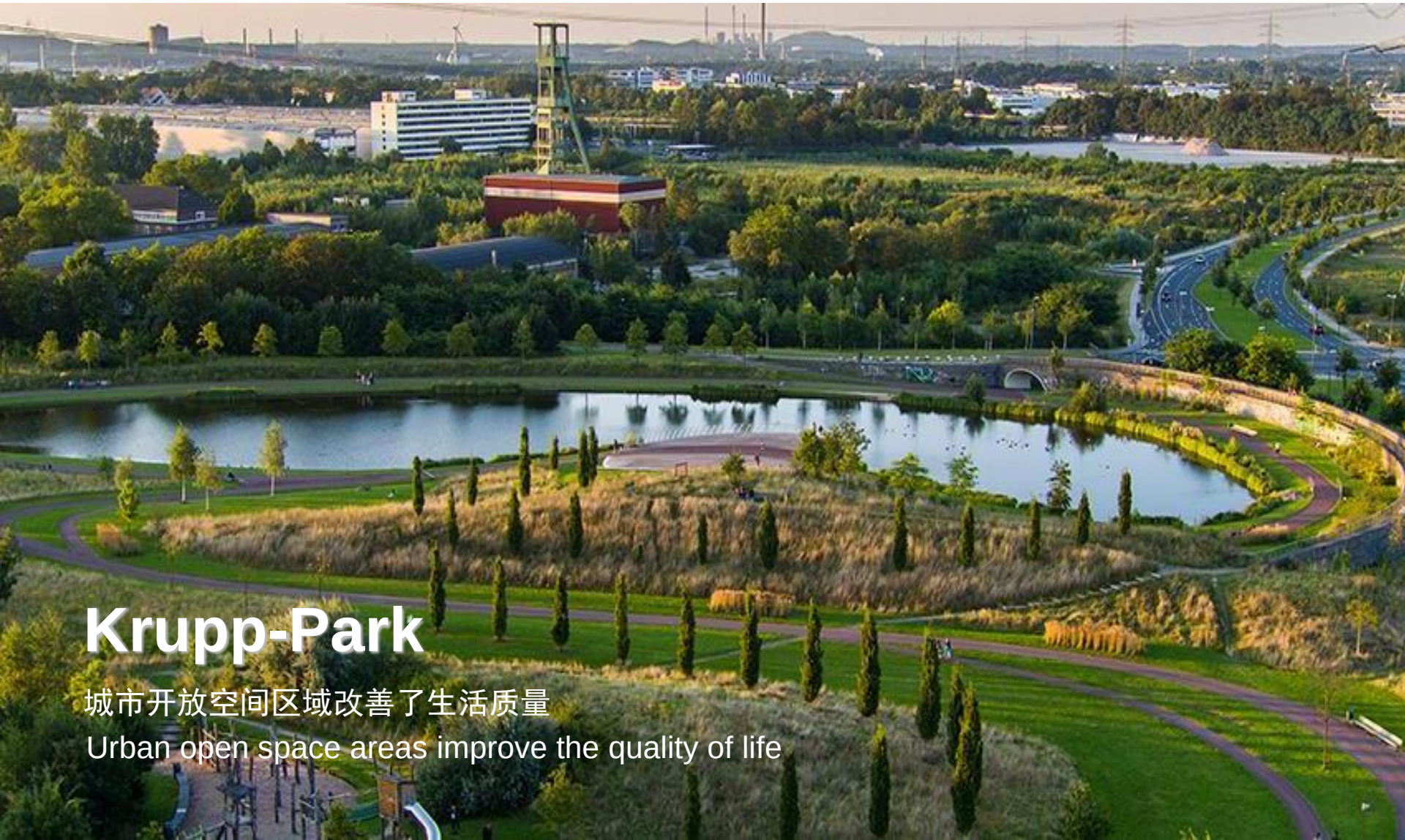
城市开放空间区域改善了生活质量

Urban open space areas improve the quality of life

欧洲绿色首都埃森 European Green Capital Essen

将环境保护与提高生活质量相结合（综合方法）

Combining environmental driven projects with improving quality of life (comprehensive approach)



欧洲绿色首都埃森 European Green Capital Essen

将环境保护与提高生活质量相结合（综合方法）

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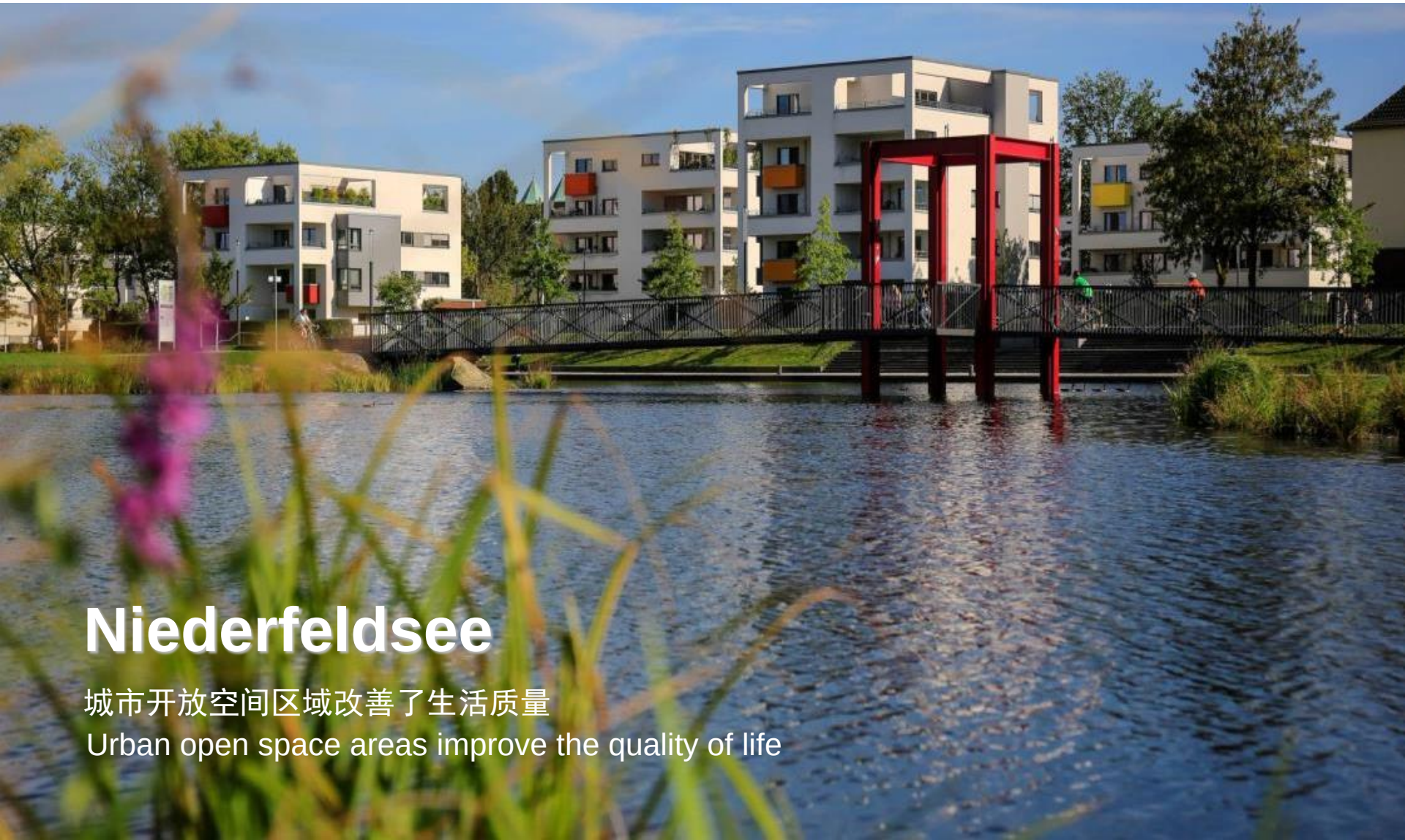


欧洲绿色首都埃森 European Green Capital Essen

将环境保护与提高生活质量相结合（综合方法）
Combining environmental driven projects with improving quality of life (comprehensive approach)

再次在鲁尔河中沐浴的可能性

- 在2017年五月开始
- 在Seaside Beach, Lake Baldeney的官方游泳点
- 通过欧洲游泳水质

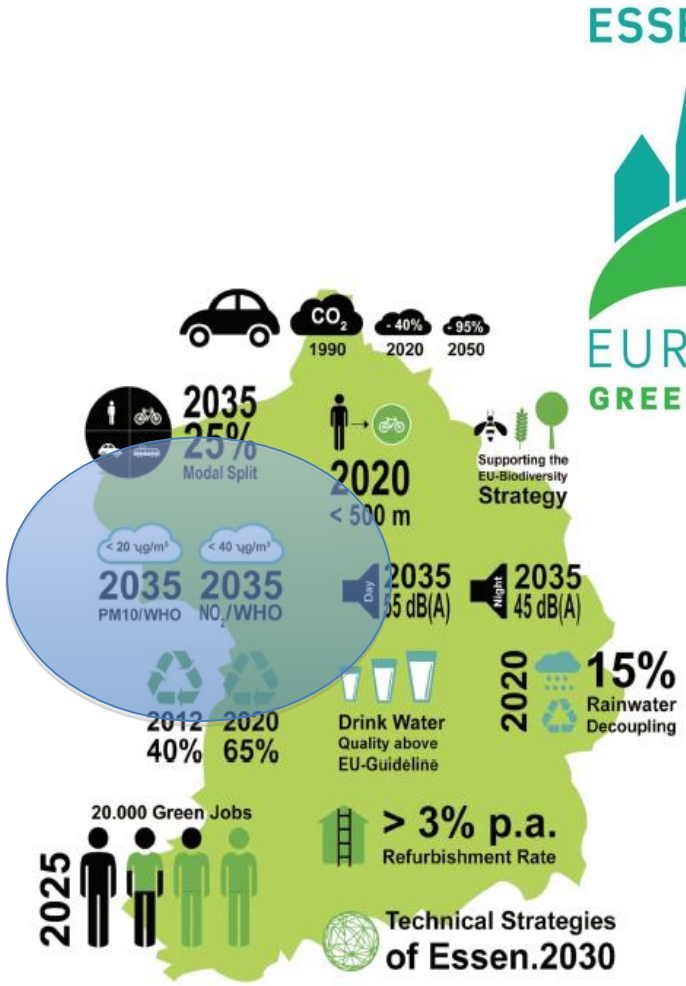
Bathing in the river Ruhr possible again

- Started in May 2017
- Official swimming-spot at Seaside Beach, Lake Baldeney
- Confirmation with european bathing water directive

欧洲绿色首都埃森 European Green Capital Essen

确定主要弱点并提出新倡议 – 针对过量使用汽车以改善空气质量及拥堵问题

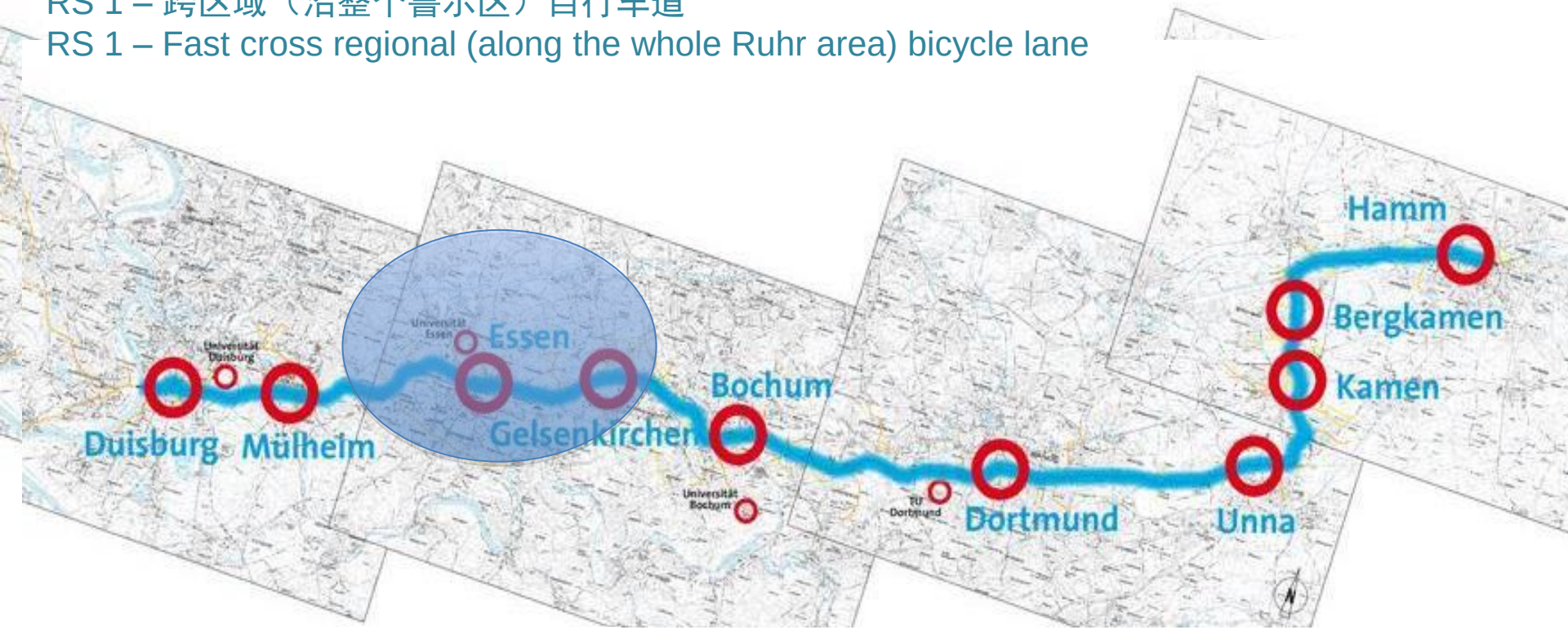
An initiative to identify major weaknesses and start new activities – air quality ad congestion problems through former concentration on cars



欧洲绿色首都埃森 – 推动新的交通出行文化
European Green Capital Essen – implementation of a new transport culture

RS 1 – 跨区域（沿整个鲁尔区）自行车道

RS 1 – Fast cross regional (along the whole Ruhr area) bicycle lane



RS1
DER SCHNELLSTE WEG
DURCHS REVIER

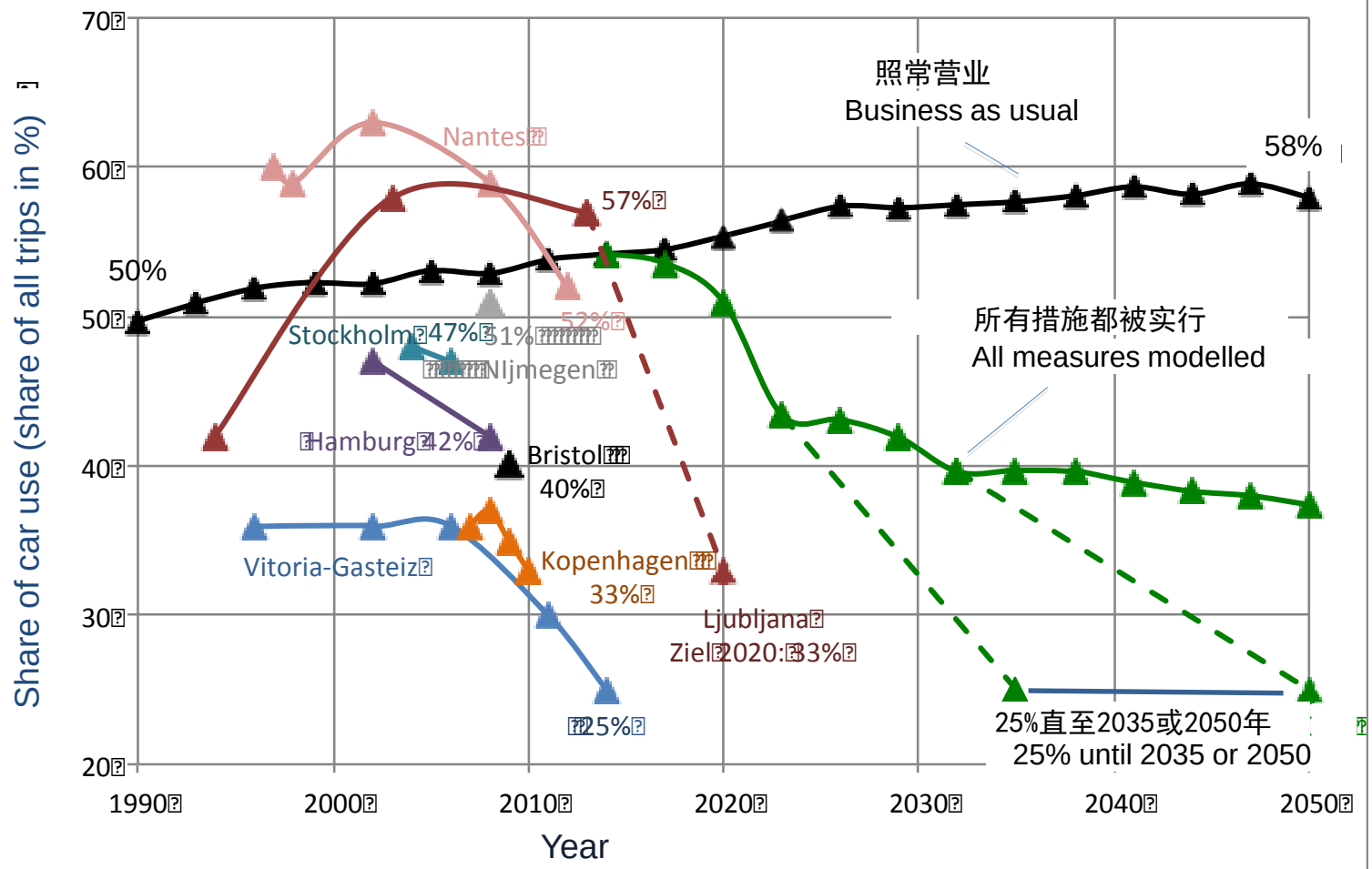
欧洲绿色首都埃森 – 推动新的交通出行文化
European Green Capital Essen – implementation of a new transport culture

RS1自行车公路 – 总长超过一百公里
RS1 Cycle-Highway – more than 100 km

欧洲绿色首都埃森 European Green Capital Essen

埃森遵循前欧洲绿色首都的良好范例－不同交通模式转换的可能性（各个欧洲绿色首都目标的比较）

Essen follwos good example of fromer EGCs - what modal shift is possible (comparison of EGCs targets)



图片：Wuppertal Institute; BAU及所有措施方案：Spiekermann & Wegener 2016;数据：EPOMM modal split tool; 欧盟比赛“欧洲绿色首都”获奖者的申请表

EUROPEAN GREEN CAPITAL

2010斯德哥尔摩
2010 Stockholm
（人口912, 000）
2011汉堡
2011 Hamburg
（人口1. 8百万）
2012维多利亚
2012 Vitoria-Gasteiz
（人口242, 000 ）
2013南特
2013 Nantes
（人口292, 000）
2014哥本哈根
2014 Copenhagen
（人口580, 000）
2015布里斯托尔
2015 Bristol
（人口430, 000）
2016卢布尔雅那
2016 Ljubljana
（人口278, 000）
2017埃森
2017 Essen
（人口581, 000）
2018奈梅亨
2018 Nijmegen
（人口164, 000）

欧洲绿色首都埃森 European Green Capital Essen

埃森遵循前欧洲绿色首都的良好范例 – 不同交通模式转换的可能性（各个欧洲绿色首都目标的比较）

Essen follows good example of fromer EGCs - what modal shift is possible (good practice examples of former EGCs)

2010斯德哥尔摩
人口912. 000

2010 Stockholm
912.000 inhabitants

- 自2006年以来推行城市拥堵费
- 在测试阶段和听证会后正式推出

- Urban congestion fee since 2006
- Introduced after a testing phase and a positive citizen referendum

图5

2012维多利亚
人口242. 000

2012 Vitoria-Gasteiz
242.000 inhabitants

图2

- 在几年内转型到西班牙的“自行车之都（2002年的1%→2014年的13%）[1]
- 重新分配道路空间
- 舒缓交通
- „模仿创新“

- Transition to Spain‘s „cycling capital“ within a few years (1% in 2002 → 13%-share in 2014)[1]
- Redistribution of road space
- Traffic calming
- „Imitate to Innovate“

2013南特
人口292. 000

2013 Nantes
292.000 inhabitants

图4

图3

- 法国第一个城市重新引入城市电车
- +22% 公共交通设施（2000–2008）[2]

- First city of France to reintroduce the city tram
- +22% PT-infrastructure (2000-2008)[2]

图6

图片:图1: Mats Halldin, Commonswiki,https://en.wikipedia.org/wiki/Congestion_pricing#/media/File:Betalstation_Liljeholmen.JPG,CC BY-SA 3.0; 2: Tom Payne (2015) auf This Big City, „Imitate to Innovate: Vitoria-Gasteiz Shows How Cities can Address 21st Century Challenges“,http://thisbigcity.net/imitate-innovate-vitoria-gasteiz-shows-how-cities-address-21st-century-challenges/. 3: Kazunori Matsuo 2005,https://commons.wikimedia.org/wiki/File:Tramway_in_Nantes.jpg, 4: European Commission,http://ec.europa.eu/environment/europeangreencapital/index_en.htm, 5+6: Miriam Müller 2014/2015

欧洲绿色首都埃森 European Green Capital Essen

埃森遵循前欧洲绿色首都的良好范例 – 不同模式转换的可能性 （前欧洲绿色首都的良好实践范例）

Essen follwos good example of fromer EGCs - what modal shift is possible (good practice examples of former EGCs)

2014哥本哈根
人口580. 000

2014 Copenhagen
580.000 inhabitants

图1

- 35%的上班路程是经自行车完成(2010)[3]
- 为骑行者提供绿色波浪（时速20公里）
- 35% of the trips to work are done by bike (2010)[3]
- ‚Green wave‘ for cyclists for 20 km/h

图5

2016卢布尔雅那
人口278. 000

2016 Ljubljana
278.000 inhabitants

图4

图2 图3

- 生态区：扩展步行区
- 重新分配主要道路的部分（Slovenska Straße）
- Ecological Zone: Extension of pedestrian area
- Redistribution of parts of a main road (Slovenska Straße)

图6

图片:图1: Mats Halldin, Commonswiki,https://en.wikipedia.org/wiki/Congestion_pricing#/media/File:Betalstation_Liljeholmen.JPG,CC BY-SA 3.0; 2: Tom Payne (2015) auf This Big City, „Imitate to Innovate: Vitoria-Gasteiz Shows How Cities can Address 21st Century Challenges“,http://thisbigcity.net/imitate-innovate-vitoria-gasteiz-shows-how-cities-address-21st-century-challenges/. 3: Kazunori Matsuo 2005,https://commons.wikimedia.org/wiki/File:Tramway_in_Nantes.jpg, 4: European Commission,http://ec.europa.eu/environment/europeangreencapital/index_en.htm, 5+6: Miriam Müller 2014/2015

欧洲绿色首都埃森 European Green Capital Essen

将环境保护与长期需求的创新相结合（绿色燃料计划）

Combining environmental driven projects with innovations for long-term needs (green fuel project)

- 在Baldeneysee的气候友好航运旅行
- 与Innogy SE合作的创新燃料电池系统
- 由水力生产的燃料甲醇

- Climate friendly touristic shipping travel on Baldeneysee
- Innovative fuel cell system in cooperation with innogy SE
- Fuel methanol is produced by water power on-site

总结 Conclusions

总结 Conclusion

创造可持续和弹性城市基础设施需要什么
Shaping sustainable and resilient urban infrastructures – what does it require

总结 Conclusion

区域携手有助于实现进取的目标（鲁尔区的主要区域机构）

Bundling regional forces helps to achieve ambitious goals (major regional player in the Ruhr area)

REGIONALVERBAND RUHR

METROPOLE RUHR BUSINESS

EMSCHER LIPPE GENOSSENSCHAFT EGLV.DE VERBAND

Initiativkreis Ruhr®

EnergieAgentur.NRW

e·on

RWE

innogy

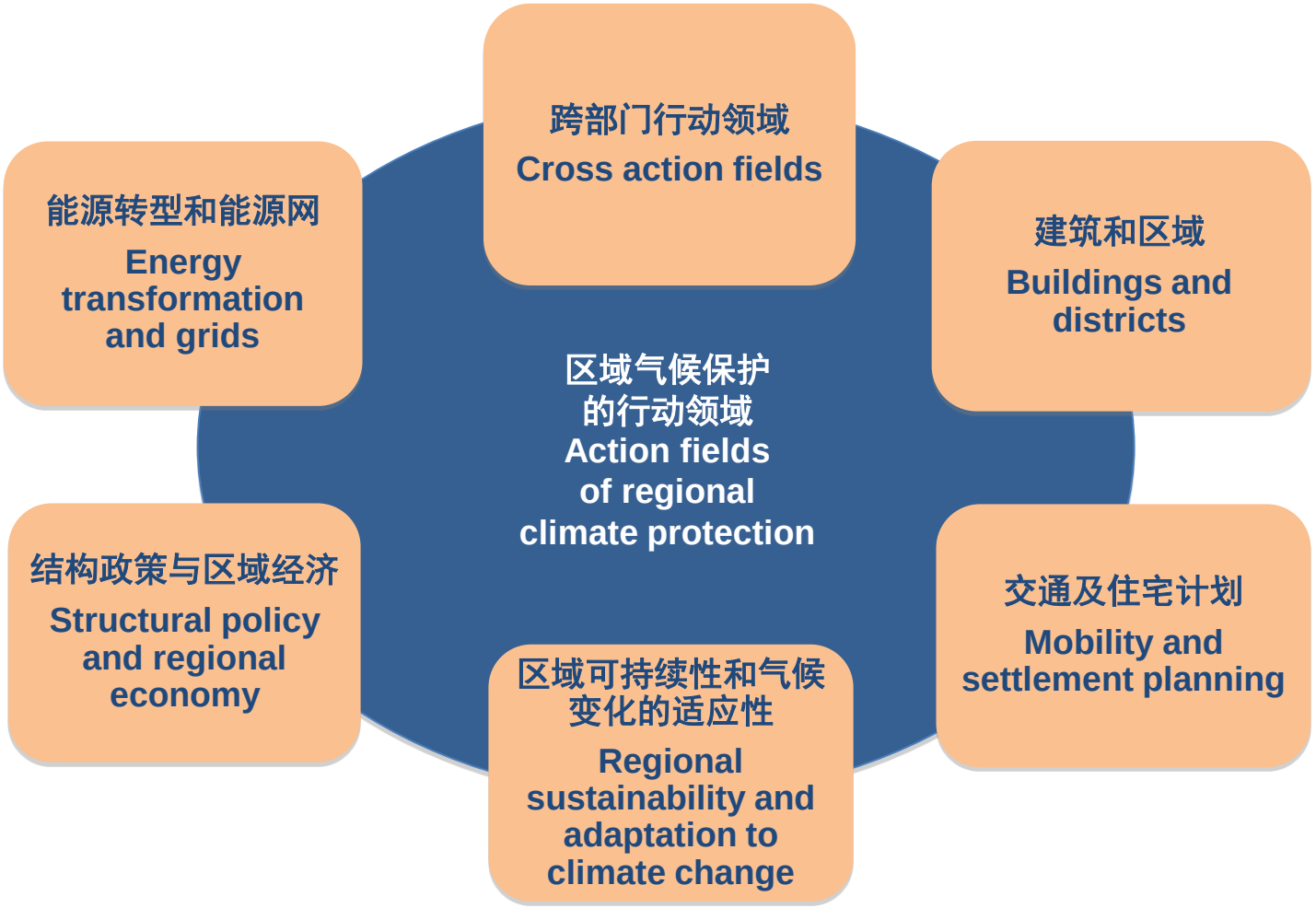
uniper

总结 Conclusion

区域携手有助于实现进取的目标（区域行动概况）
Bundling regional forces helps to achieve ambitious goals (regional action profiles)

总结 Conclusion

区域携手有助于实现进取的目标（区域行动领域及通过合作增加价值）
Bundling regional forces helps to achieve ambitious goals (regional action fields and added value through cooperation)



…关于转型动态
…one last word on transition dynamics

低碳交通系统转型所需的时间
How long transition to a low carbon mobility system might take

过去的经验让我们看到希望–在有利的条件下，车辆替代品占据市场可能会加快

Past experience makes hope – market deployment of alternative vehicles might go rather quickly under certain favourite conditions

The great horse manure crises 1894

1894年的马粪危机

Photo: Fifth Ave NYC on Easter Morning 1900

© 2001-2014 by Tony Seba

Source: US National Archives from (Wikipedia)

1900年的纽约第五大道：汽车在哪里？

New York 5th Avenue um 1900: Where is the car?

1913：马在哪里？

1913: Where is the horse?

Photo: Easter 1913, New York. Fifth Avenue looking north. George Grantham Bain Collection

Source: shorpy.com

潜在的有利条件：电池成本下降，空气质量责任（例如NOx） –必须结合气候保护，改善空气质量和改善城市生活质量等的综合解决方案.

Potential favourite conditions: shrinking cost of batteries, air quality obligations (e.g. NO_x) – integrative solutions necessary combining climate protection, air quality improvement and better quality of living in cities etc.

Wuppertal Institut

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