



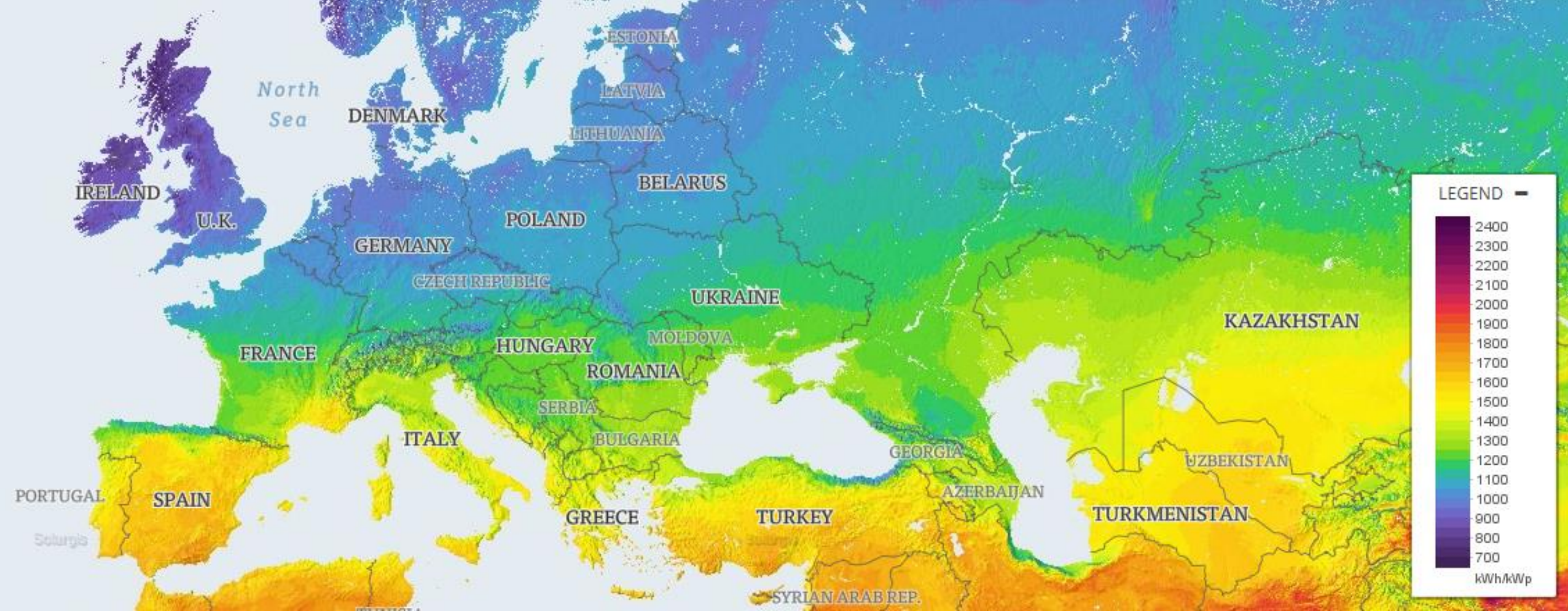
“FORWARD TO AN ENERGY TRANSITION IN UKRAINE”

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ENVIRONMENT AGENCY AUSTRIA **umweltbundesamt**^U

16 September 2021, **AUSTRIAN GREENTECH FOR UKRAINE**, WKO Conference – Austria’s Chamber of Commerce, Grand Hotel L’viv, L’viv, Ukraine



COULD UKRAINE  BECOME A PIONEER
IN FIGHTING GLOBAL CLIMATE CHANGE?

YES!

Global development as seen by evolutionists

ENERGY SYSTEMS ... MIRROR ... SOCIAL SYSTEMS



Pyramids = *vertical*



Noosphere = *horizontal*

ENERGY SYSTEMS ... MIRROR ... SOCIAL SYSTEMS



Centrally planned energy systems:
nuclear, fossil – need strong protection



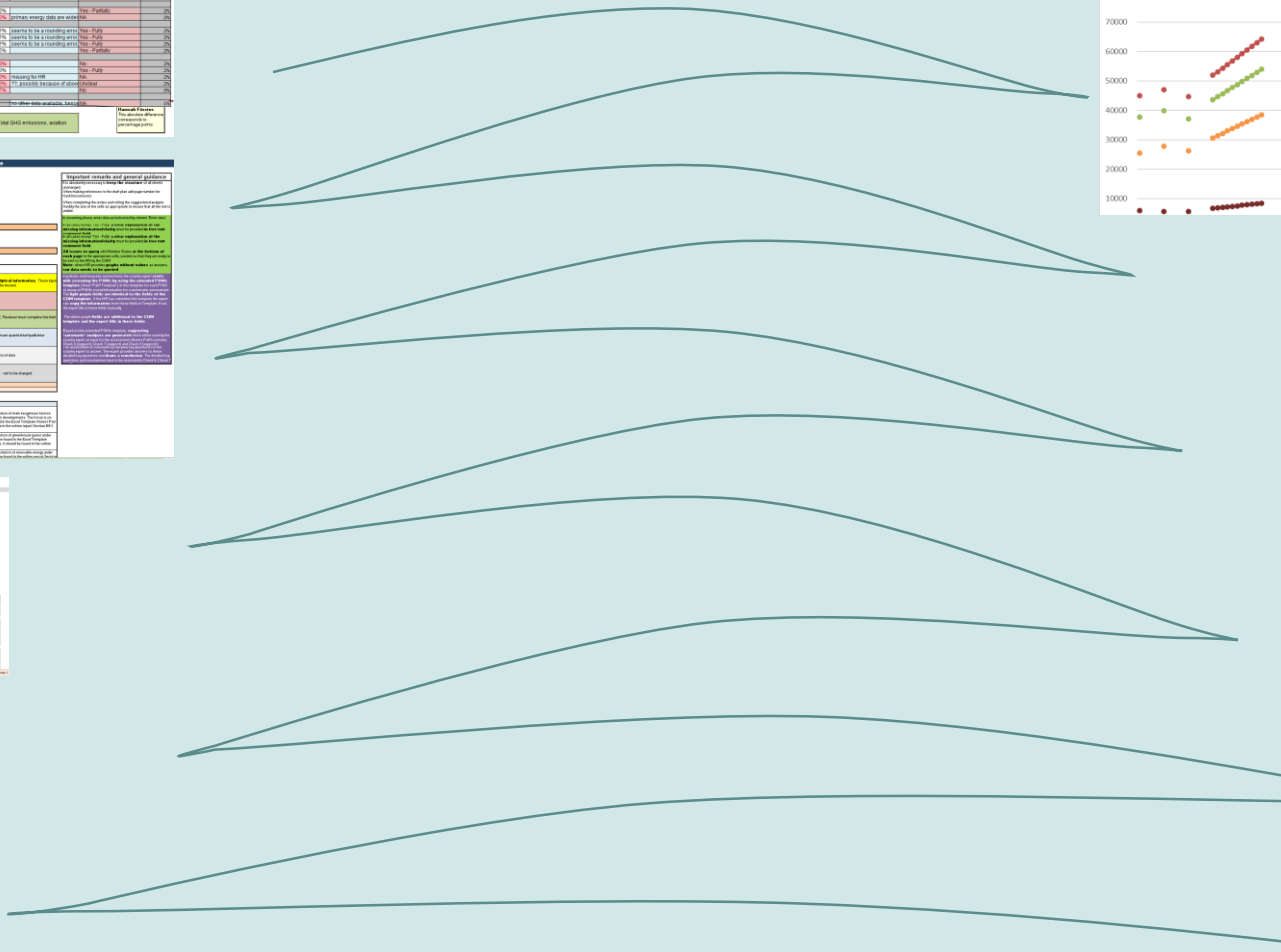
Distributed energy systems:
solar – efficiency improvements

HOW IS POLICY IMPLEMENTATION DONE IN PRACTICE?

Administration

Check 5	Cohesion of the quantitative assumptions used in the modelling or other analytical tools with statistical sources (WEM)
<p>Check 5.1</p> <p>Check 5.1.1: Are the quantitative assumptions used in the modelling or other analytical tools consistent with the statistical sources (WEM)?</p> <p>Check 5.1.2: Are the quantitative assumptions used in the modelling or other analytical tools consistent with the statistical sources (WEM)?</p> <p>Check 5.1.3: Are the quantitative assumptions used in the modelling or other analytical tools consistent with the statistical sources (WEM)?</p> <p>Check 5.1.4: Are the quantitative assumptions used in the modelling or other analytical tools consistent with the statistical sources (WEM)?</p> <p>Check 5.1.5: Are the quantitative assumptions used in the modelling or other analytical tools consistent with the statistical sources (WEM)?</p> <p>Check 5.1.6: Are the quantitative assumptions used in the modelling or other analytical tools consistent with the statistical sources (WEM)?</p> <p>Check 5.1.7: Are the quantitative assumptions used in the modelling or other analytical 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In democratic dialogue, through **MONITORING** of plans



Independent experts

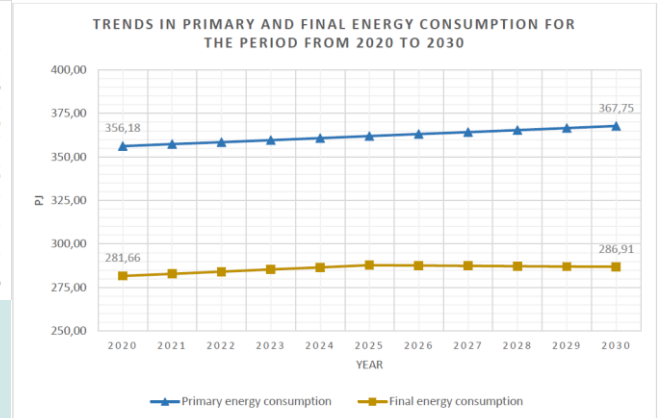
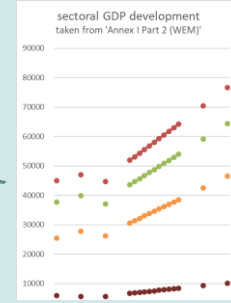


Figure 3-5. Energy consumption trends in the period from 2020 to 2030

Table 3-14: ...

Scenario	Year	Value	Unit
Scenario 1	2020	1000	PJ
	2021	1000	PJ
	2022	1000	PJ
	2023	1000	PJ
	2024	1000	PJ
	2025	1000	PJ
	2026	1000	PJ
	2027	1000	PJ
	2028	1000	PJ
	2029	1000	PJ
2030	1000	PJ	

CAN WE REACH THE **TARGET** OF A REAL **TRANSITION**?

HOW?

THE NEW MINDSET

Renewable Energy Paradigms

Old Paradigm	New Paradigm
Technology assessment	Market assessment
Equipment supply focus	Application, value-added, and user focus
Economic viability	Policy, financing, institutional, and social needs and solutions
Technical demonstrations	Demonstrations of business, financing, institutional and social models
Donor gifts of equipment	Donors sharing the risks and costs of building sustainable markets
Programs and intentions	Experience, results, and lessons
Cost reductions	Competitiveness on the market place

Adapted from: Martinot, E., Chaurey, A., Lew, D., Moreira, J.B. & Wamukonya, N. 2002. Renewable Energy Markets in Developing Countries. Annual Review of Energy and the Environment. 27: 309-348.

What was going on in Europe in 2019?



Youth says: **we** are now the “good examples” for you!





Alexander

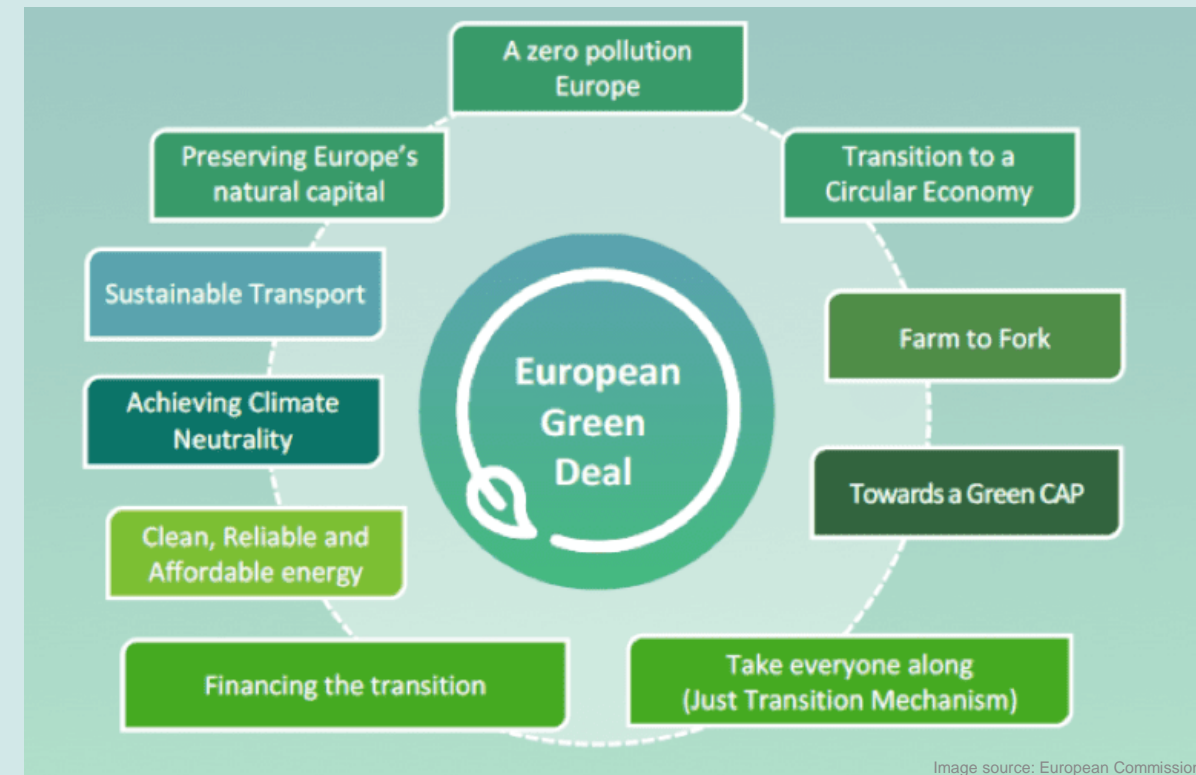
Source: Kleine Zeitung

After these demonstrations, in 2020, the **political result** was the “**EU Green Deal**”!

... a respectful result for engaged European Youth!

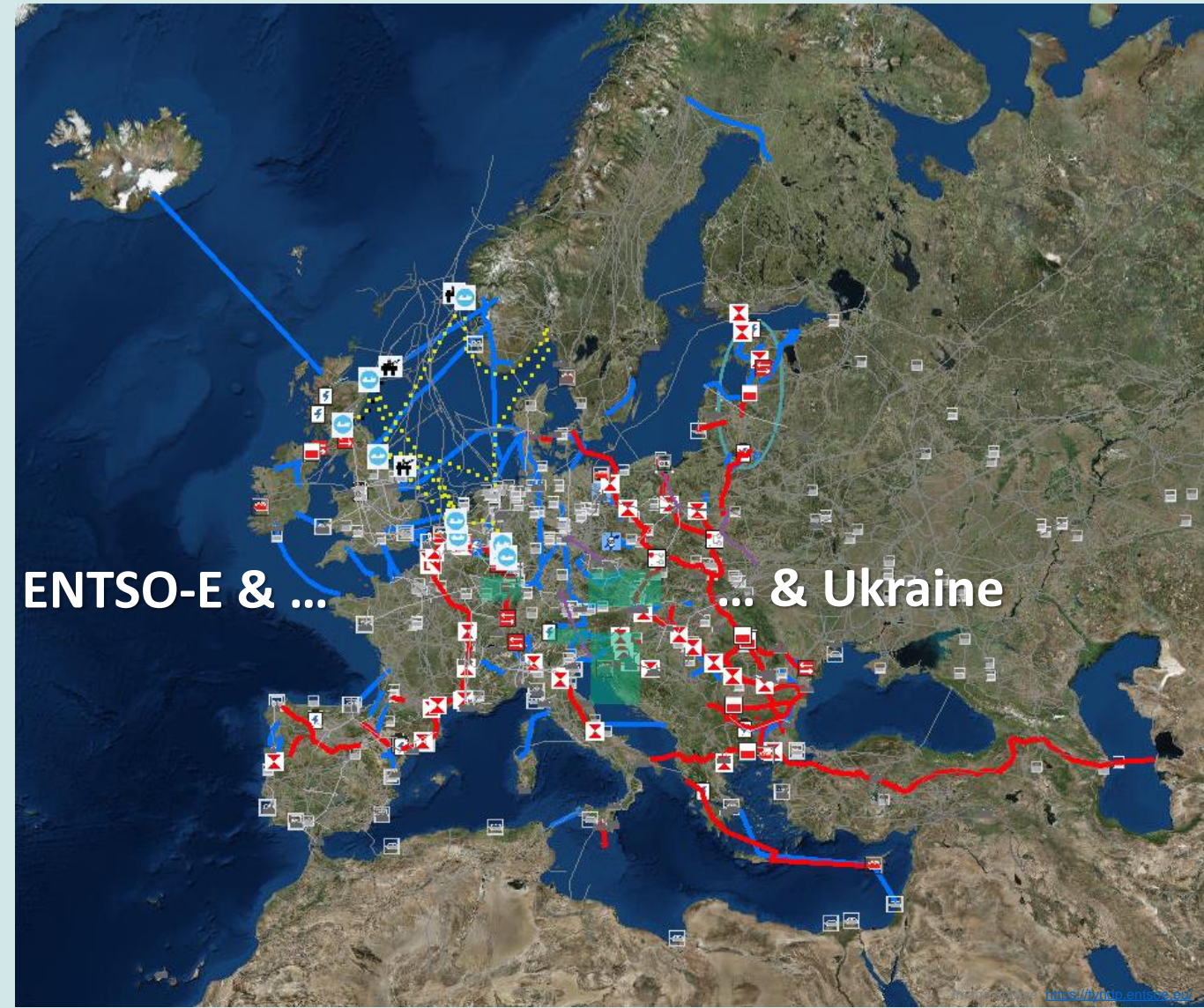
• *Hopes turned into a political plan:*

- Climate neutrality
 - Clean, reliable & affordable energy
 - Financing the transition
 - “Leave no one behind”
- IFIs support Green Energy
- Read my Erasmus+ proposal “Radiate” to implement curricula on renewables in Ukraine:



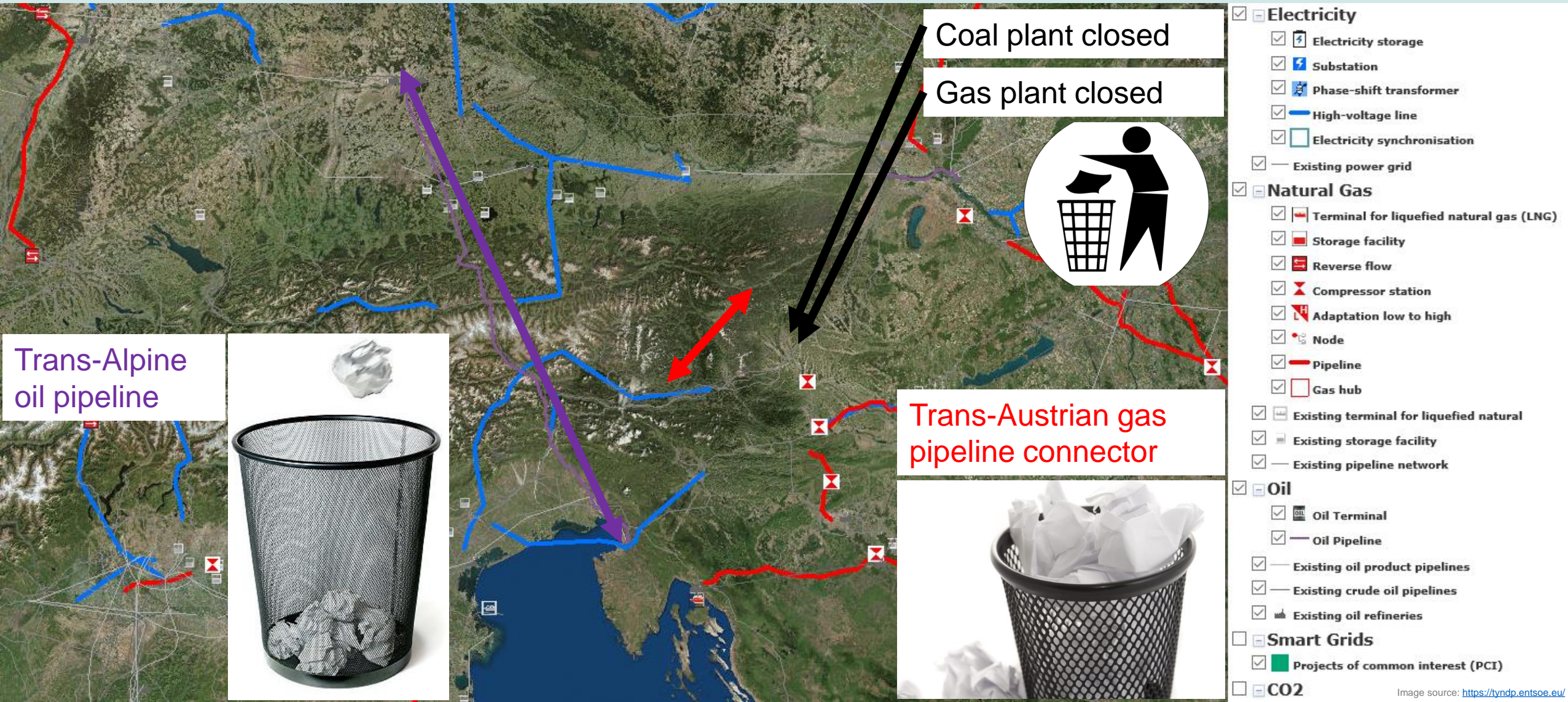
AUSTRIA & EU: INTEGRATION WITH UKRAINE

- **Energy infrastructure map:** current European [plans](#) for electricity, gas & oil pipelines to be built
- Ukraine now [joins](#) **ENTSO-E**, the European association for the cooperation of transmission system operators (TSOs) for electricity
- New oil & gas pipeline plans cost 1-2 M€/km (see [analysis](#)) and often **do no more pay off** in Austria



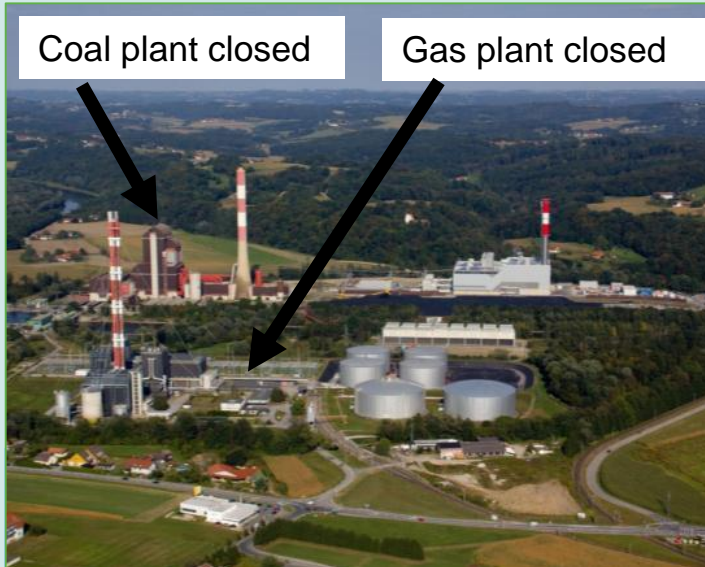
AUSTRIA: THE FOSSIL EPOCH IS NOW ENDING

Pipeline plans are *cancelled* and fossil power plants are *closed down*



In practice, some years ago:

New Trend in Austria: fossil power plants close down, even if fully functional

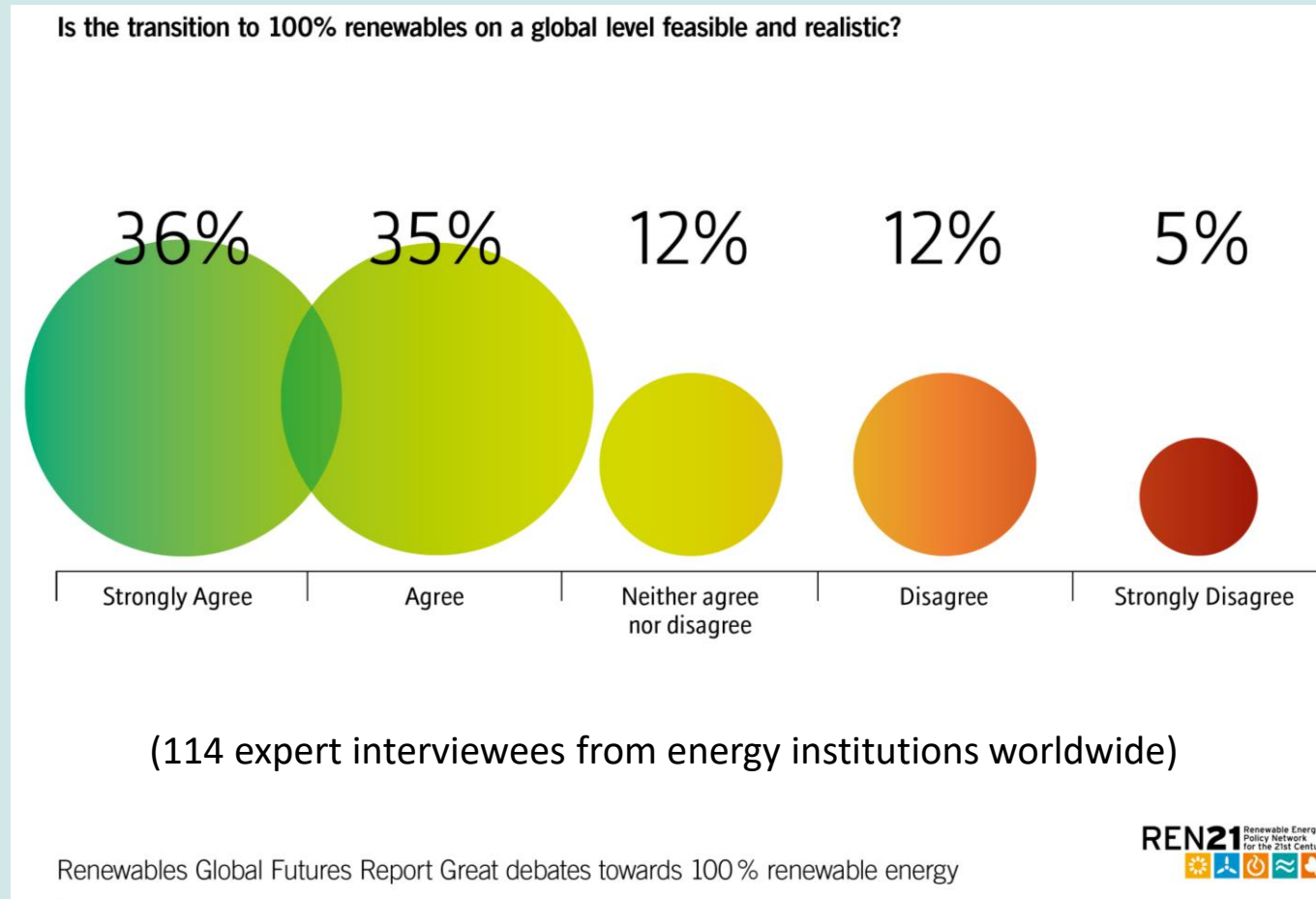


NATIONALE UND INTERNATIONALE TRENDS



ARE WE ALL REALISTS? – WHAT EXPERTS THINK:

- 71% agree that a transition to 100% renewable energy is globally feasible



PRICES FOR RENEWABLES DECREASE STRONGLY

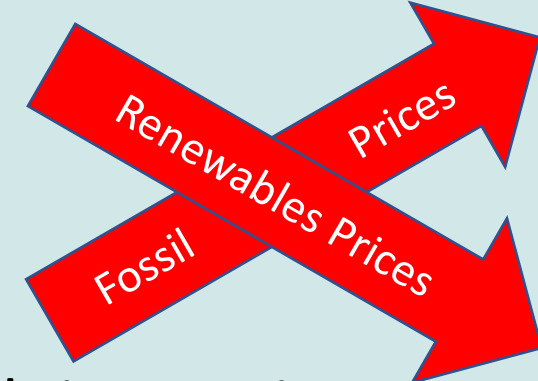
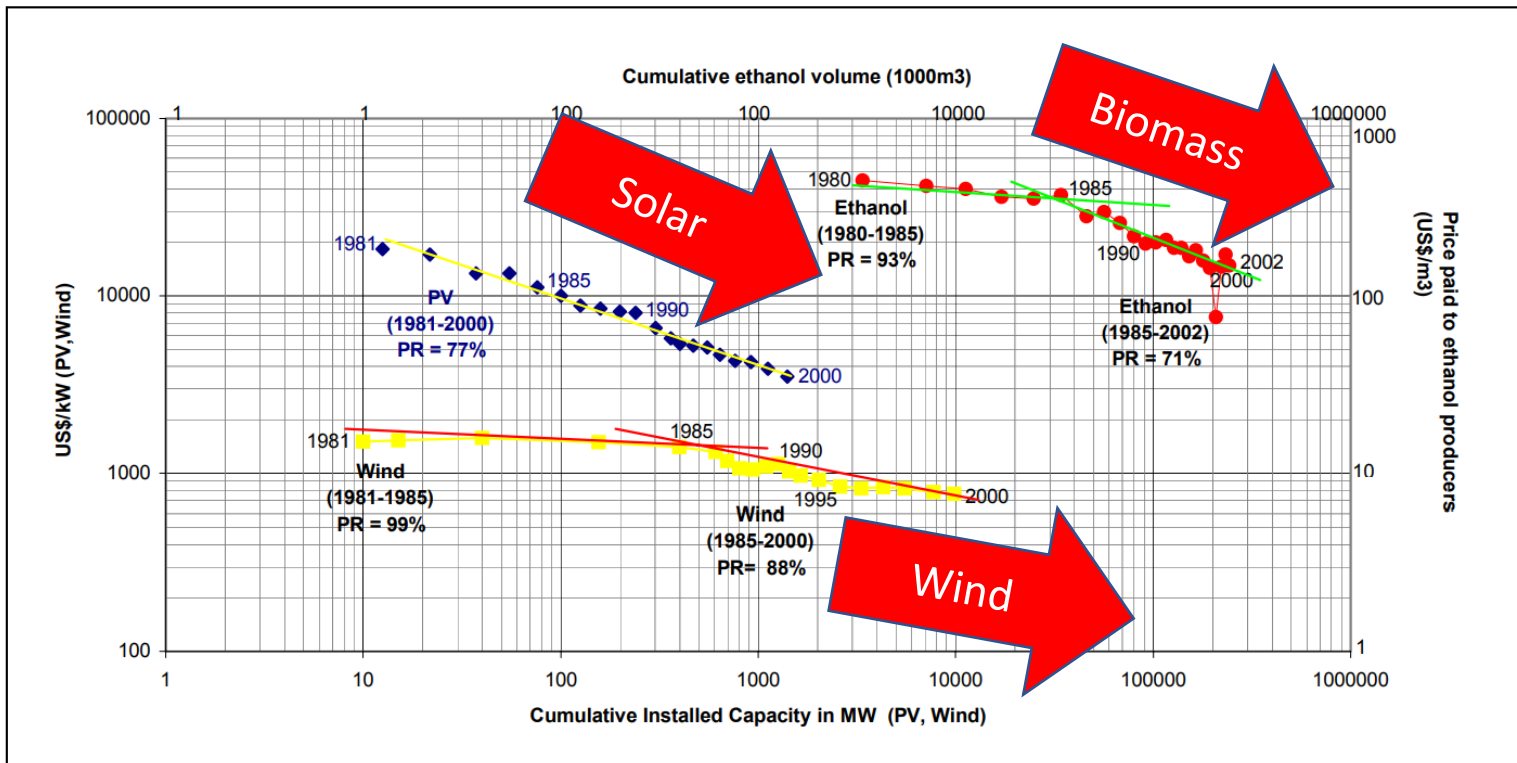


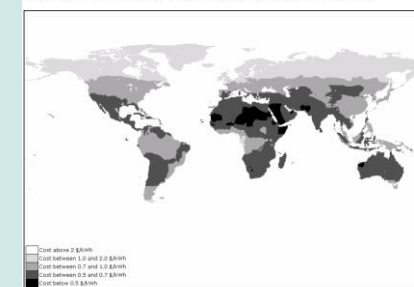
Figure 1: Experience Curves for Photovoltaics, Windmills, and Ethanol Production



Sources: for wind turbines, L. Neij., P. Dannemand Andersen., M. Durstewitz, P. Helby, M. Hoppe-Kilpper, and P.E. Morthorst, Experience Curves: A Tool for Energy Policy Assessment (2003); for photovoltaics, V. Parente, R. Zilles, and J. Goldemberg, "Comments on Experience Curves for PV Modules," Progress in Photovoltaics: Research and Applications, John Wiley & Sons, Ltd (2002); for ethanol, J. Goldemberg, S.T. Coelho, P. M. Nastari, and O. Lucon, "Ethanol Learning Curve: The Brazilian Experience," Biomass and Energy (Submitted for publication).

With increasing capacity installed, **prices** for solar, wind and biomass energy) **decrease** considerably – and already overtook attractiveness of fossil fuels as of now!

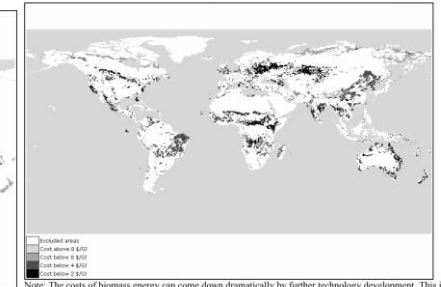
Figure 3: Geographical Distribution of Present Costs for Solar Electricity



Note: The costs of PV electricity can come down dramatically by further technology development.

Source: Hoogwijk, M., de Vries, B., Winkler, J. & Turkenburg, W. Submitted for publication. Assessment of the global and regional technical and economic potential of photovoltaic energy.

Figure 4: Geographical Distribution of Present Costs for Biomass Energy

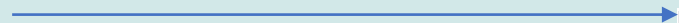


Note: The costs of biomass energy can come down dramatically by further technology development. This image is available in greater detail that shows specific regions.

Source: Hoogwijk, M., de Vries, B., Winkler, J. & Turkenburg, W. Submitted for publication. Potential of grown biomass for energy under four land-use scenarios.

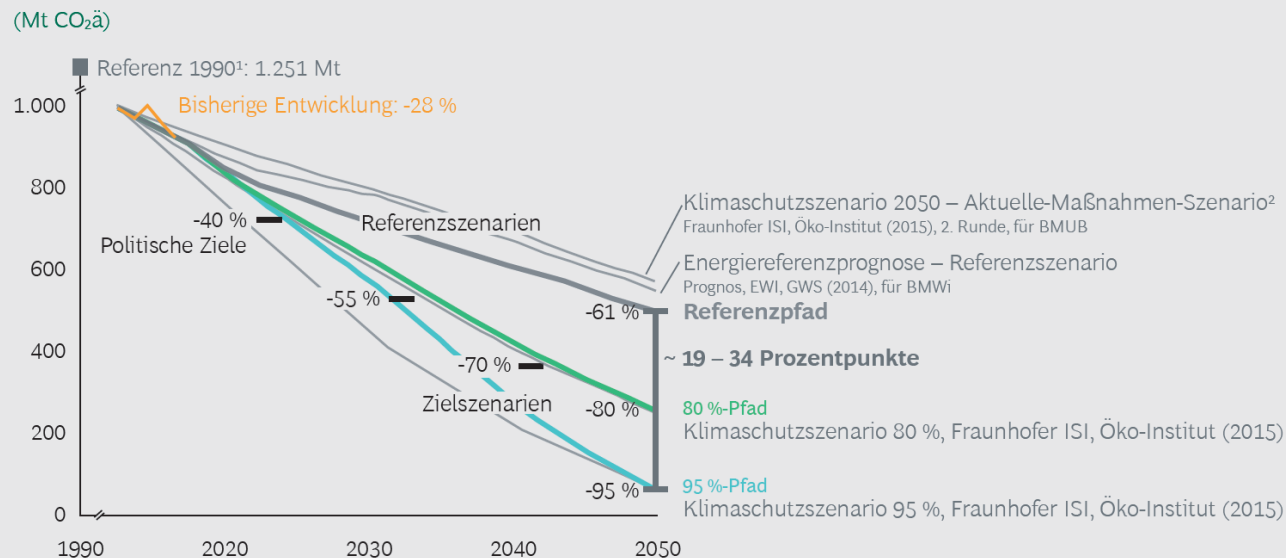
EXAMPLE: CLIMATE PATHS FOR GERMANY (BDI STUDY)

RESULT: -80% REDUCTION IS POSSIBLE AT "NO COSTS" FOR THE ENTIRE ECONOMY

- **3 Paths:** Reference, -80% & -95% emissions
- The Reference Path: 

REFERENZSZENARIO ERGIBT EINE ERHEBLICHE LÜCKE ZU POLITISCHEN THG-REDUKTIONSZIELEN

ABBILDUNG 8 | Verlauf Referenzpfad vs. politische Ziele vs. 80 %- und 95 %-Klimapfade

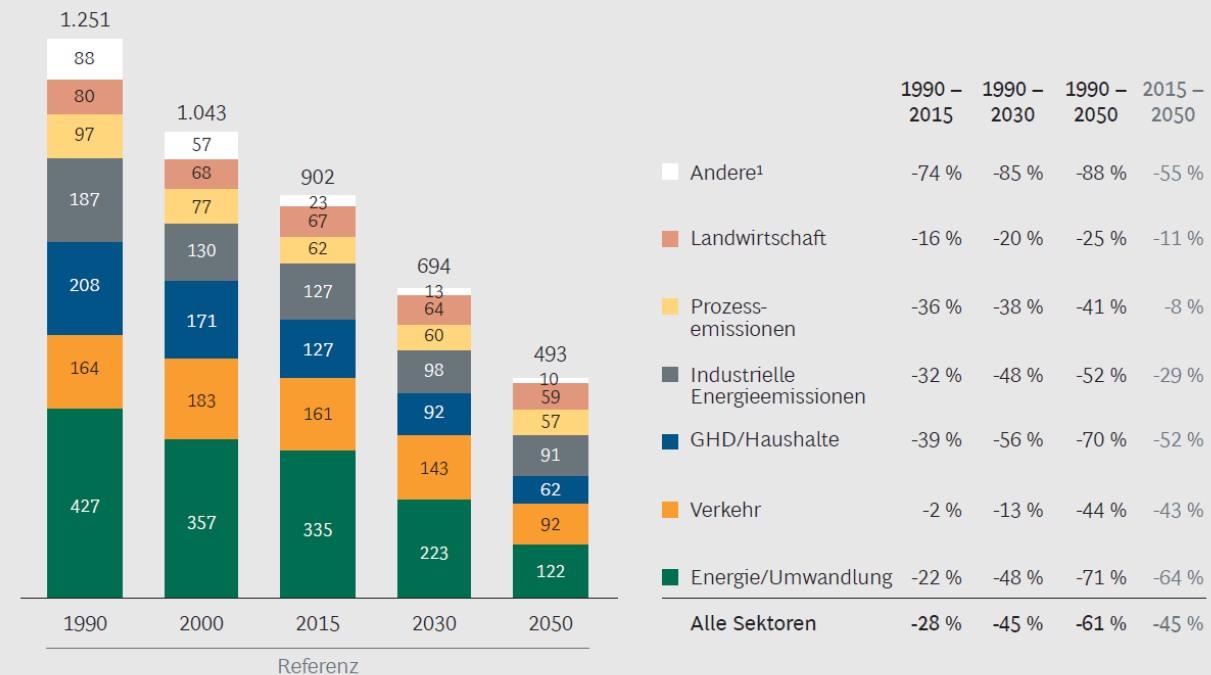


REFERENZ: MINUS 61 PROZENT EMISSIONEN ZWISCHEN 1990 UND 2050

ABBILDUNG 7 | Emissionsentwicklung nach Sektoren in der Referenz

THG-EMISSIONEN DEUTSCHLAND 1990 – 2050
(Mt CO₂ä)

SEKTORSPEZIFISCHE EINSPARUNGEN
(%)



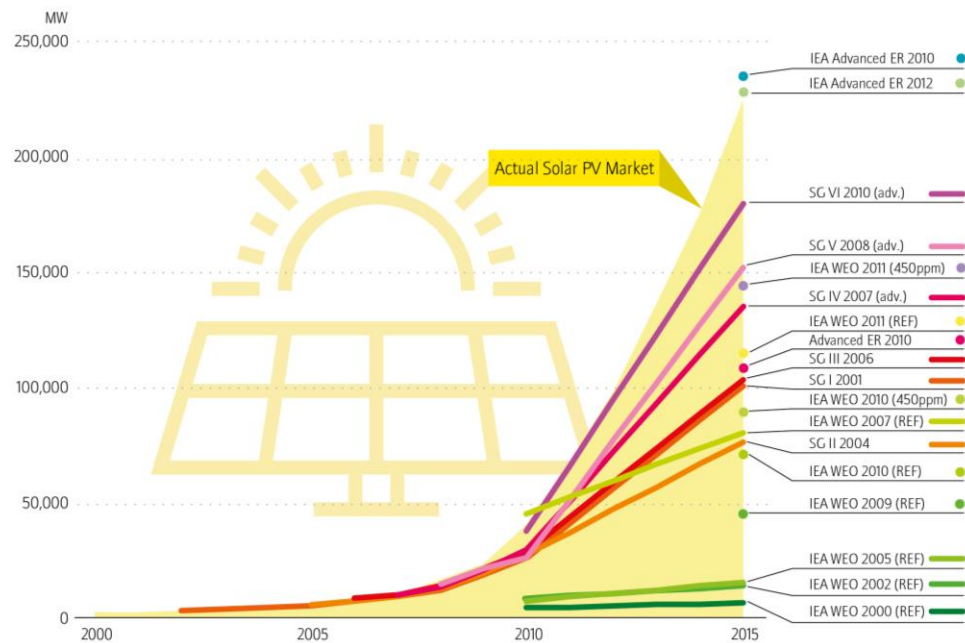
¹ Enthält Abfallwirtschaft, flüchtige Emissionen und Militär
Quelle: Prognos

¹ Exkl. internationaler Luft- und Seeverkehr und LULUCF ² Inkl. aller technischen Maßnahmen, die bis Oktober 2012 ergriffen wurden
Quelle: Überblick Szenariendarstellung Klimaschutz in Deutschland bis 2050, Öko-Institut und Fraunhofer ISI (2016); Prognos; BCG

DID SCENARIOS TRULY TELL THE FUTURE?

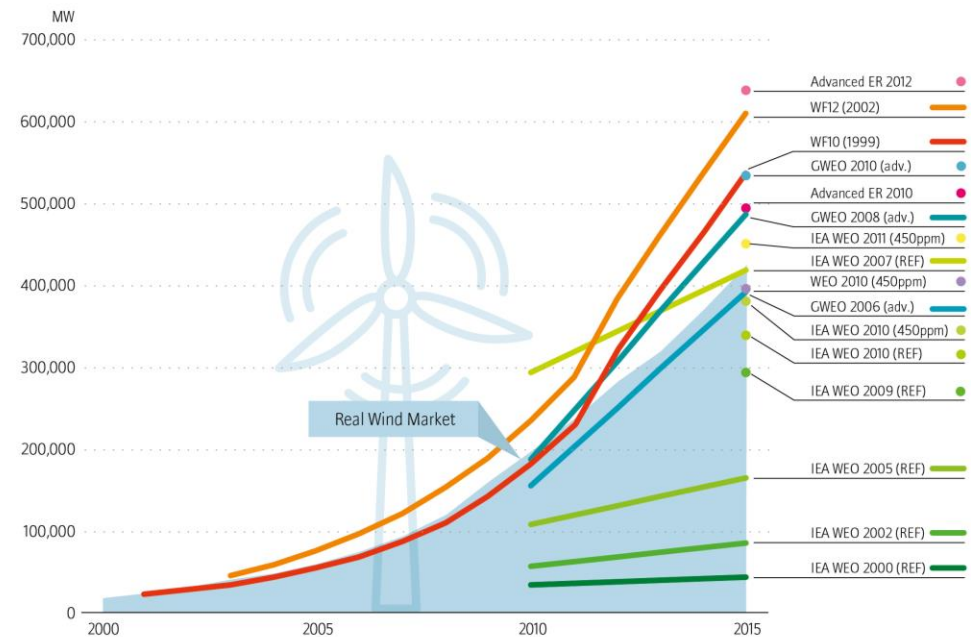
- For solar (and wind), earlier scenarios were even **“under-optimistic”!**

Solar photovoltaic projections versus real market developments

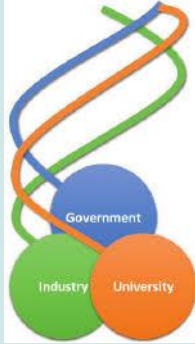


Renewables Global Futures Report Great debates towards 100 % renewable energy

Wind power projections versus real market developments



Renewables Global Futures Report Great debates towards 100 % renewable energy



What we worked in **Ukraine** on **Renewable Energy Sources (RES)**:

a guided interview with two dozen stakeholders in Ukraine from five sectors of society, in the frame of a EU Twinning project

- Stakeholders from the **triple helix of innovation**, enlarged to a “**quintuple helix**”:
 - **Research & University**, e.g. KPI, LPI, Academy of Sciences, Mohyla University etc.
 - **Civil Society & NGOs**, e.g. Ecodia, Dixi Group, Heinrich Böll F., 350.org, Greencubator
 - **Industry & Enterprises**, e.g. Ukrenergo, D.Tek Renewables
 - **Governance & Administration**, e.g. Verkhovna Rada Energy Committee
 - **Media**, e.g. Bloomberg
- **Result**: Draft recommendations for the SAEE website, based on expert interviews
- **Main message**: There should be **tailored information** for different **groups** of stakeholders, (**S + M + L**), such as individuals, house owners, energy cooperatives, small and medium businesses (SMEs), large businesses, industrial investors, and international actors
- Detailed **reports** and articles on **obstacles** and **ways forward** for RES in Ukraine, **e.g.**: Як подолати перешкоди, які стоять перед більш активним розповсюдженням ВДЕ на місцевому рівні 18



Main conclusions

for how to improve RES deployment in Ukraine by means of enhanced information

- The two dozen interview partners identified the **key options for improvement in 5 domains**
- And provided **best practice examples** to be followed, regarding these types of obstacles:
 1. **Financial**, e.g. how to obtain suitable and cheap credits
 2. **Administrative**, e.g. how to master the complex application process
 3. **Technological**, e.g. types of RES installations and how to choose them
 4. **Social**, e.g. energy cooperatives
 5. **Fact-based information** on RES
- See the specialized [reports](#) on the detailed results:
 - Обізнаність щодо переваг ВДЕ та потреби в інформації для просування ВДЕ
 - and the [report](#) on existing information on RES in Ukraine



Проект ЄС Твінінг “Розвиток відновлюваної енергетики в Україні”
Контракт Твінінг №: ENI/2018/403-147

1. Financial obstacles

What type of financial information do you think is needed for better promoting renewable energy installations?

- The general assessment provided by interview partners was that (especially for **small and medium actors**) financial obstacles are of primary importance.
- Generally, the most important parameter for potential future actors is the **payback period**.
Most important influences are:
 - > (i) **prices** of the installation,
 - > (ii) expectable **incomes** for electric energy are decisive,
 - > (iii) the available **financial instruments**, including different **effective** interest rates,
 - > (iv) **risks** in assessing all of the above, including a guaranteed possibility for **actually selling** electricity to the grid,
 - > (v) evidently the **choice** of technological model for the installation which means divergent technical **lifetime**.
- House owners, especially in villages, could therefore decrease their cost enormously, especially when aided by “self-construction initiatives” (providing professional expert advice) which were typical for the first RES epochs in Austria.

2. Obstacles of administrative complexity

What type of administrative information do you think is needed for better promoting renewable energy installations?

- The key message: **too high administrative complexity**
- The general assessment provided by interview partners focused **on the too high complexity of administrative procedures especially for small and medium actors**. For some interviewees, administrative hurdles are larger than financial hurdles, and they say that clear rules are needed.
- According to many interviewees, obstacles are mainly
 - > (α) **high prices of connection to the electric grid**
 - > (β) **corruption** and
 - > (γ) **high complexity** of the involved administrative procedures, and to retrieve necessary info.

3. Social obstacles (organisation of energy communities)

What type of social information do you think is needed for better promoting renewable energy installations?

- The **key** message:
- The **general assessment** provided by interview partners **focused on the importance of social innovation** (mostly through **self-responsible civil-society** structures) in order to put into practice the technological options which in principle are already here.
- (α) **identify experts** as cooperation partners
- (β) **energy cooperatives** and **OSBB**
- (γ) **best practice** examples

4. Best practice examples

What type of information do you think is needed for better promoting renewable energy installations?

- **Best-practice examples:** there could be “best practice examples” inspiring other Ukrainian citizens:
 - Additionally, at the municipal level, four city mayors target 100% RES until 2050, namely L’viv, Chortkiv, Kamianets-Podilskyi, Zhytomyr. These cities also targeted partners from NGOs and asked for improvements, and also searched for investments. Such a target also helps cities to obtain more investments, and these cities also use their own money.
 - The “Association of active consumers and prosumers” will exert influence also in the future
 - There is an Energy transition platform of 5 environmental NGOs, and the idea is to also invite business.
 - 100RES is intercontinental, there is also 100RES.ua.
 - Ecoclub Rivne NGO.

5. Education: fact-based information to be provided

What type of information do you think is needed for better promoting renewable energy installations?

- The **general assessment** provided by interview partners highlights that **awareness raising** is of very high importance.
- (α) clear factual information on fact-based realities
- (β) vivid and appealing information on best-cases as encouraging motivator for the population
- (γ) dispersion of unfounded prejudices against RES.
-
- Basis diagnosis:
 - There is a great lack of education on RES: on the university level, on the workers level, on the population level.
 - In Ukraine, there is a balance between understanding REN as a business case for profit versus as resulting from environmental and renewable awareness.
 - The new president wishes: the government in a smart phone. Hence most relevant services are online. This should include also RES.
 - One expert answered: If you searched for information on renewables, where would you go? - I would find an acquaintance, not an office. "I would more rely on someone's experience."

My conclusion:

The energy system is the *manifestation of values* of the societal system.

*Self-responsible,
reliable, sustainable,
democratic*