THE SWITCH

AN EXHIBITION ON PEOPLE & ENERGY

INTRO

About the exhibition guidebook

EXHIBITION

This exhibition is motivated by the creator's impression, that Germans know very little about where their energy comes from and what power of choice they have.

This exhibition would like to demystify the production and import of energy in Germany. It concentrates on the major sources of energy, with their benefits and problems.

At the beginning of the exhibition each visitor is given a card with a QR code. The code can be scanned throughout the exhibition and provides information on which energy providers in your neighborhood invests how much of their investment in the portrayed energy source. This interaction guides visitors to making a switch regarding the choice of their energy provider. More is explained in section 3.

Throughout the exhibition, visitors are invited to interact with the exhibition. Further, there are multiple ways for visitors to ask questions, and consequently receive answers and inform any future projects.

GUIDEBOOK

This Guidebook provides information how to install the exhibition and gives some initial ideas on the content of posters.

There are clear limitations to the exhibition in terms of detail. However, this raw format also enables people form other nations to build on the framework.

TOC

TABLE OF CONTENTS

1 Renewable Energy

All installations show what the energy asset produces in energy in one day / one week / one year

WIND ENERGY

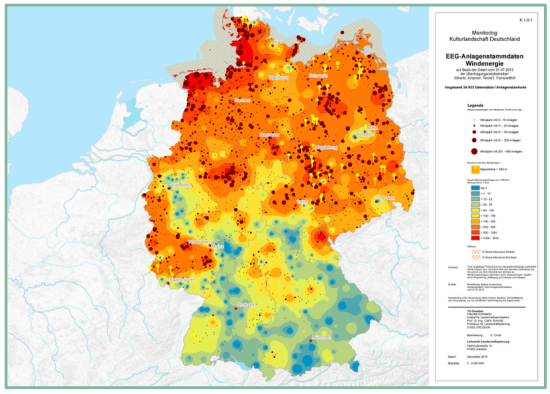
- A miniature wind farm is digitally linked with a real wind farm in Northern Germany, and mimics the turbines' movements in real time. Real wind farm is shown on a monitor.
- A monitor explains why certain turbines are not turning (i.e. no wind, maintenance, or curtailment).
- Potential sponsorship from Vestas, to provide model turbines.

INTERACTION

- People can ask any question on wind energy in a computer and receive either an immediate answer or are asked to provide their email address for a follow-up.

POSTER

- 26.6% of Germany's energy is produced by on-/& off-shore wind.
- Issue of volatility for electricity network.
- Difficulty with uncertain subsidy.
- Examples of energy independent villages.

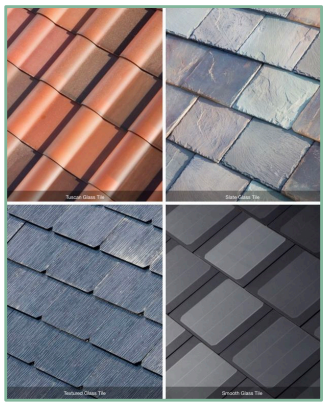


1 Renewable Energy

All installations show what the energy asset produces in energy in one day / one week / one year

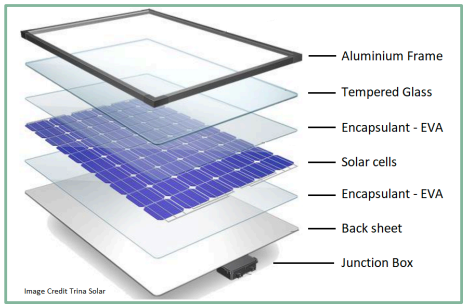
SOLAR ENERGY

- A real size solar panel, portable solar panel, and a comparison of traditional rooftiles and Tesla solar tiles are exhibited.
- A model solar panel is divided in its layers and every layer is explained.



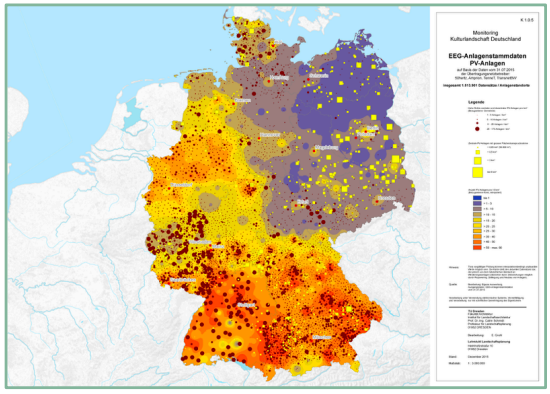
INTERACTION

- In a machine they can guess how many smart phones can be charged by the electricity produced by each of the presented solar panels.
- People can ask any question on solar energy in a computer and receive either an immediate answer or are asked to provide their email address for a follow-up.



POSTER

- 9.7% of Germany's energy is produced by solar.
- Issue of volatility for electricity network.
- Difficulty with uncertain subsidy.

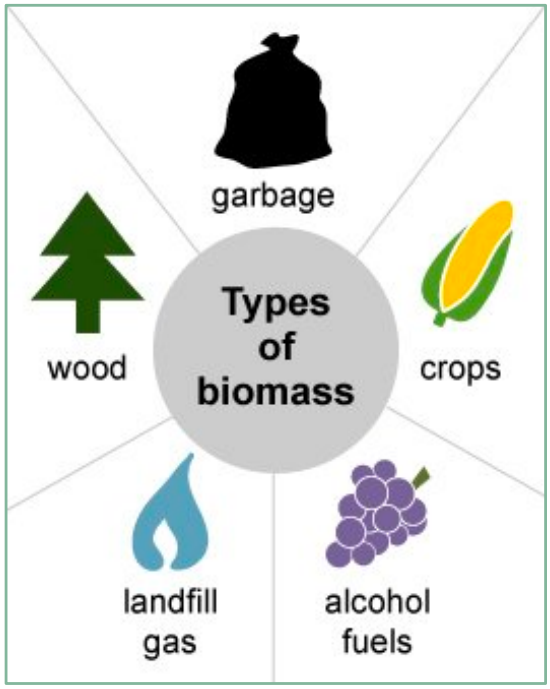


1 Renewable Energy

All installations show what the energy asset produces in energy in one day / one week / one year

BIOMASS ENERGY

- Show different stages of the biomass.
- Show how much energy is produced by one garbage can.
- Show different kinds of biomass facilities (different input, different methane capacity).



INTERACTION

- Organic waste drop-off station.
- Sign petition with personal note to the local politician to promote biomass from waste rather than crops.

POSTER

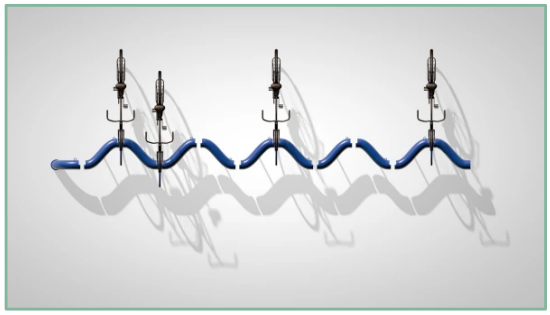
- 8.0% of Germany's energy is produced by biomass
- Issue of competition to food production

1 Renewable Energy

All installations show what the energy asset produces in energy in one day / one week / one year

KINETIC ENERGY

- A bike is connected to a station that switches on one light bulb after the other,, the more you hit the pedals.
- A new innovation from Amsterdam is presented, where you receive a special front wheel. The wheel stores the energy generated while cycling and braking in batteries. Once you park the bike in the docking station the energy is distributed to the local grid.



INTERACTION

- Guests are welcome to try the bicycle. Preferably there would be two and people could go into competition.

POSTER

- Detailed explanation of the S-PARK project in Amsterdam

2 Nonrenewable Energy

All installations show what the energy asset produces in energy in one day / one week / one year

COAL / LIGNITE ENERGY

Information is mostly presented on posters:

- Coal and climate (CO2 emission).
- Coal and air (Particle pollution).
- Coal and water (Heavy metal pollution).
- Coal and biodiversity (Soil, flora, and fauna degradation).
- Coal and people (People are loosing their homes, communities and are surrounded by a degraded environment).
- 19.9% of Germany's energy is produced by hard coal and lignite together.
- Germany's coal production is declining since 2013., but a new coal plant opened in 2020.

INTERACTION

- Guests are invited to design a protest sign against Garzweiler II extending further (extension results in more people losing their homes and more biodiversity getting destroyed).

2 Nonrenewable Energy

All installations show what the energy asset produces in energy in one day / one week / one year

NATURAL GAS ENERGY

Information is mostly presented on posters:

- 16.1% of Germany's energy is produced by natural gas.
- In 2019 , Germany was the largest consumer of natural gas in Europe.
- Germany has no natural gas sources but is well connected with the rest of Europe by pipelines. Most energy is imported from Russia through NordStream.

INTERACTION

- Guests are invited to design a protest sign against NordStream II.

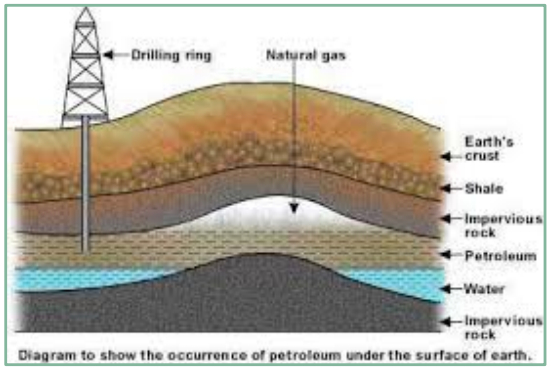


Diagram to show the occurrence of petroleum under the surface of earth.

2 Nonrenewable Energy

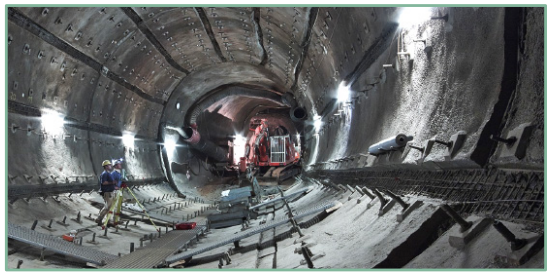
All installations show what the energy asset produces in energy in one day / one week / one year

NUCLEAR ENERGY

- Germany's remaining nuclear plants are planned to close by 2022.
- With nuclear phasing out in only two years the biggest question for Germany is the final storage of nuclear material. The Konrad facility is being build for that purpose.
- 11.3% of Germany's energy is produced by nuclear reactors.

INTERACTION

- Selfie walls where you become a character in scenes from the Simpsons, related to nuclear material.



3 MAKE THE SWITCH

Learn where your energy comes from and how easy you can change its source.

This theme guides you through the whole museum

- First you submit your zip code (or are given one in the city the exhibition is, if you don't have one or don't want to share).
- You receive a card that now has this information and can be scanned throughout the museum (please see next page for draft).
- In every room you can scan your card for each energy source and the comparison of energy providers will be adapted to your zip code.
- The goal of this card is to make the visitors familiar with their local energy providers. They can learn what each provider invests in.
- At the end of the exhibition visitors are invited to scan their card one last time. The screen will now inform them, that they can scan the QR code with their phone and it will guide them to a website that compares all the energy providers they learned about, in terms of cost, sustainability, and overall terms. This final step gives visitors the opportunity to put what they have learned to practice.
- The website will also give them guidance on how time consuming the process is. This varies depending on which energy provider the visitor is receiving their energy from.



3 MAKE THE SWITCH

DESIGN OF CARD WITH QR CODE

FRONT:

BACK:

THE SWITCH

EXHIBITION ON PEOPLE & ENERGY

Your zip code: 10115, Berlin

Please scan me at all stations marked

4 OUTLOOK

The current proposal for the exhibition shows the bare minimum of what is needed to guide visitors to a switch of their energy provider, more towards renewable energies.

The topic of energy can be further extended, for example with the following topics:

- Hydrogen. Grey, blue, and green ways to produce it. Where is it necessary, and where is it too expensive?

- German energy import – closer look at Russia, France, Norway, and Poland.

- Germany's global responsibility.

- Mobility: Are electric cars the solution? An analysis of efficiency, CO2, and ethical footprint of batteries.

- Remunicipalization in Germany.



5 SOURCES

Bundesamt für Naturschutz (BFN). 2015. *Deutschlandweite Verteilung der Elektrizität aus Windkraft, Photovoltaik und Biomasse*. https://bit.ly/39WsCWJ Visited December 5th 2020.

Bundesnetzagentur. 2020. *Ihre Rechte als Energieverbraucher.* https://bit.ly/3mU3RxH. Visited on October 16th 2020.

Clean Energy Wire. 2020. *Germany's energy consumption and power mix in charts*. https://bit.ly/2K2GhQN.Visited December 5th 2020.

EIA. 2020. *Germany*. https://www.eia.gov/international/analysis/country/DEU. Visited December 5th 2020.

Keles, D.; Yilmaz, H.Ü. 2020. *Decarbonisation through coal phase-out in Germany and Europe – Impact on Emissions, electricity prices and power production*. Energy Policy. Vol. 141. https://bit.ly/37JPWUB

Student Name: Beatrix von Schroeder
Email: Freib591@newschool.edu
GANT 6405: Anthropology & Design
Professor: Shannon Mattern
Date: December 10th, 2020

THE SWITCH: AN EXHIBITION ON PEOPLE AND ENERGY

A SUPPORT PAPER

Infrastructure is an important factor in our lives. The mobility, electricity, water, and much more, that we receive from it make our lives convenient. But our infrastructure has a visibility issue. Or perhaps more of a recognition issue. Independent of its great importance to people, we tend to only notice these services, once they stop working. Consequently, humans also greatly underestimate the power infrastructure has, not only on humans but on whole ecosystems. This paper focuses on the infrastructure of the energy sector and suggests the format of an exhibition, to connect people to energy's usefulness in their lives, as well as its large influence on our climate.

THE ISSUE

A set of general interviews with friends and family in Germany on their motivations and pains regarding climate change, has brought me to two important insights:

1) People were asking for tangible, less abstract solutions to combat climate change.
2) They were so terribly informed on the infrastructures they use, that they didn't even know of the existence of such solutions, for example in the energy industry.

From my background in renewable energies I knew very well about two other truths:

1) Renewable energies provide a significant benefit to our climate, as they give us arguments to keep coal, gas, and oil in the ground.
2) In Germany we have a multitude of energy providers that only invest in renewable energy and Germans have the right to choose their energy provider freely.

The combination of my insights from the interviews and my knowledge on the energy industry has led me to question: How can Germans gain a closer connection to the topic of energy, to see its environmental potential, as well as their own power of action on the topic?

THE FORMAT

With a large number of online platforms providing well-organized information on different energy providers and how to change to a sustainable provider I needed to find a way to spark people's interest in energy. As a consequence, from sparking their interest I was hoping for more people to use these online services and switch to a renewable energy provider. The decision of a format fell on a pop-up exhibition, based on another set of interviews with friends and family.

The exhibition The Switch is an interactive access point for anybody to get familiar with the topic of energy provision. While people learn more about the source, benefits, and problems of the German energy mix, they gain a first-hand experience of producing energy. More importantly, the exhibition shares individualized information with each guest through a QR code on their ticket. Through this very QR code, people compare their energy provider's energy sources in every room. Finally, it is the same QR code, that leads people to the already discussed online services, comparing their energy providers and helping them to make the switch.

THE OUTCOME

The exhibition wants to meet people at their equal footing. Neither is their complex scientific talk, nor too simplified information that makes people feel stupid. The guidebook provided here can be published as an open-source file. It is encouraged that people create pop-ups with the given ideas and build on them. This way and also through multiple feedback options build into the exhibition, the exhibition will keep on learning from its users and will serve them better in the future.

This format is the start of more interventions to follow, where I would like to introduce people to tangible and effective ways to combat climate change.

BIBLIOGRAPHY

Bundesamt für Naturschutz (BFN). 2015. *Deutschlandweite Verteilung der Elektrizität aus Windkraft, Photovoltaik und Biomasse*. https://bit.ly/39WsCWJ Visited December 5th 2020.

Bund Friends of the Earth Germany. 2020. *Ökotipp: Schluss mit schmutzig – jetzt zu grünem Strom wechseln.* Presseportal. Visited on October 16th 2020. https://www.presseportal.de/pm/7666/4709143

BMWI. 2020. *Erneuerbare Energien.* Visited on October 16th 2020. https://www.bmwi.de/Redaktion/DE/Dossier/erneuerbare-energien.html.

Bundesnetzagentur. 2020. *Ihre Rechte als Energieverbraucher*. Visited on October 16th 2020. https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Verbraucher/Rechte/rechte-node.html.

Bundesverband Erneuerbare Energien e.V. Klare Zielverfehlung bei EU-Verpflichtung zum Ausbau Erneuerbarer Energien in Deutschland. Visited on October 16th 2020. https://www.bee-ev.de/presse/mitteilungen/detailansicht/klare-zielverfehlung-bei-eu-verpflichtung-zum-ausbau-erneuerbarer-energien-in-deutschland/

Clean Energy Wire. 2020. *Germany's energy consumption and power mix in charts*. https://bit.ly/2K2GhQN.Visited December 5th 2020.

EIA. 2020. *Germany*. https://www.eia.gov/international/analysis/country/DEU. Visited December 5th 2020.

Hildebrandt, A.; Silber, C. 2020. W*o Klimaschutz beginnt. Zum bewussten Umgang mit Energie und Wasser.* Klimawandel in der Wirtschaft. Springer Gabler, Berlin. Pp. 247-258. https://doi-org.libproxy.newschool.edu/10.1007/978-3-662-60395-6_21

Keles, D.; Yilmaz, H.Ü. 2020. *Decarbonisation through coal phase-out in Germany and Europe – Impact on Emissions, electricity prices and power production.* Energy Policy. Vol. 141. https://www-sciencedirect-com.libproxy.newschool.edu/science/article/pii/S0301421520302226

Mattes, A.; Wittenberg, E. 2012. "*Nur wenige wechseln den Stromanbieter": Sechs Fragen an Anselm Mattes*, DIW Wochenbericht, ISSN 0012-1304, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin, Vol. 79, Iss. 7, pp. 10. https://www.econstor.eu/bitstream/10419/58110/1/685565742.pdf

Mika, B.; Goudz, A. 2019. *Energiewende in Deutschland*. Blockchain-Technologie in der Energiewirtschaft. Spinger Vieweg, Berlin, Heidelberg. https://doi-org.libproxy.newschool.edu/10.1007/978-3-662-60568-4_2

Renn, O.; Marshall, J.P. 2016. *Coal, nuclear and renewable energy policies in Germany: From the 1950s to the "Energiewende"*. Energy Policy, Vol. 99. Pp. 224-232. https://www-sciencedirect-com.libproxy.newschool.edu/science/article/pii/S0301421516302294

Sunder, G. 2006. *Was hält Verbraucher vom Wechsel zu Ökostrom ab?*. Zentrun für europäische Studien, Universität Trier. http://edoc.vifapol.de/opus/volltexte/2012/3577/pdf/060.pdf