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The Future of Energy

Citizens in Transition

Acceptance issues and challenges in the French and German energy transition contexts

May, 29th 2018

SynappCity
URBAN CHANGE STRATEGIES

algorus CONSULTING
ENERGY, STRATEGY & PROJECTS

Wuppertal Institut

Image Ville Environnement

This study has been carried out thanks to the financial contribution from Tuck Fondation

Agenda of the presentation

Introduction

1. Radically different contexts in France and Germany

2. Citizen Acceptance towards Energy Transition technologies

3. Novel typology of citizen societal issues and Best practices

4. Concepts of innovative solutions

Conclusion

*„The Energy Transition is an **ideal of society**“*

Gaël Giraud - research director at the CNRS

- ✓ **Society and citizens are key for change**
- ✓ **Acceptance has become critical to succeed**
- ✓ **Encourage a large number of citizens to take into consideration local energy issues**

Objectives and Specificities of this study

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Based on a **French / German comparison study** of project experiences and best practices:

- For citizens :

  To **be better considered and involved** in Energy transition related projects

- For developers of Energy transition projects :

  To **minimize risks of confrontation and delay** due to conflict with neighbour citizens and to **provide a best practices document**

- For innovative companies and start-ups :

  To propose **citizen acceptance management solutions** leading to new business models

Project consortium

A binational and multi-disciplinary team

Algorus
Project leader

Technologies

Territories

Romain Nouvel
Solution Design

SynappCity
Coordination

LIVE
Research (FR)

Societies

Wuppertal Inst.
Research (DE)

Project timeline

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Phase 1
collect, compare

Phase 2
structure issues

Phase 3
Conceptualize solution

Analyse
State of the Art, Data, Publications

Round table
French-German

Qualitative interviews
Selected stakeholders

Societal issue categorization

Focus on 2 techno
Smart meters, wind parks

Solution Design
Final report

Round Table – November 11th, 2017 - Strasbourg

Round table – November 11th, 2017

22 participants (50% France, 50% Germany) from diverse profiles :

- Energy supplyers (Stadtwerke Düsseldorf, EDF Deutschland)
- Smart grid operators (Enedis, C-sells)
- Energy project lawyers (Sterr-Kölln & Partner)
- Consultants (Trion, Endura Kommunal)
- Research & Academic (Laboratoire LIVE CNRS/Unistra, Aachen University, Laboratoire BETA, ENSAS)
- Citizen organisations (GbR Rutesheim-Solar-Aktiv-I, Energie Partagée, Heidelberger Energiegenossenschaft)

…gathered during 1 day workshop to :

- Compare on-site project results in France and Germany
- Share issues, experiences and Best Practices
- Co-develop innovative solutions

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Few words to describe citizens in the Energy Transition

Mentimeter

17

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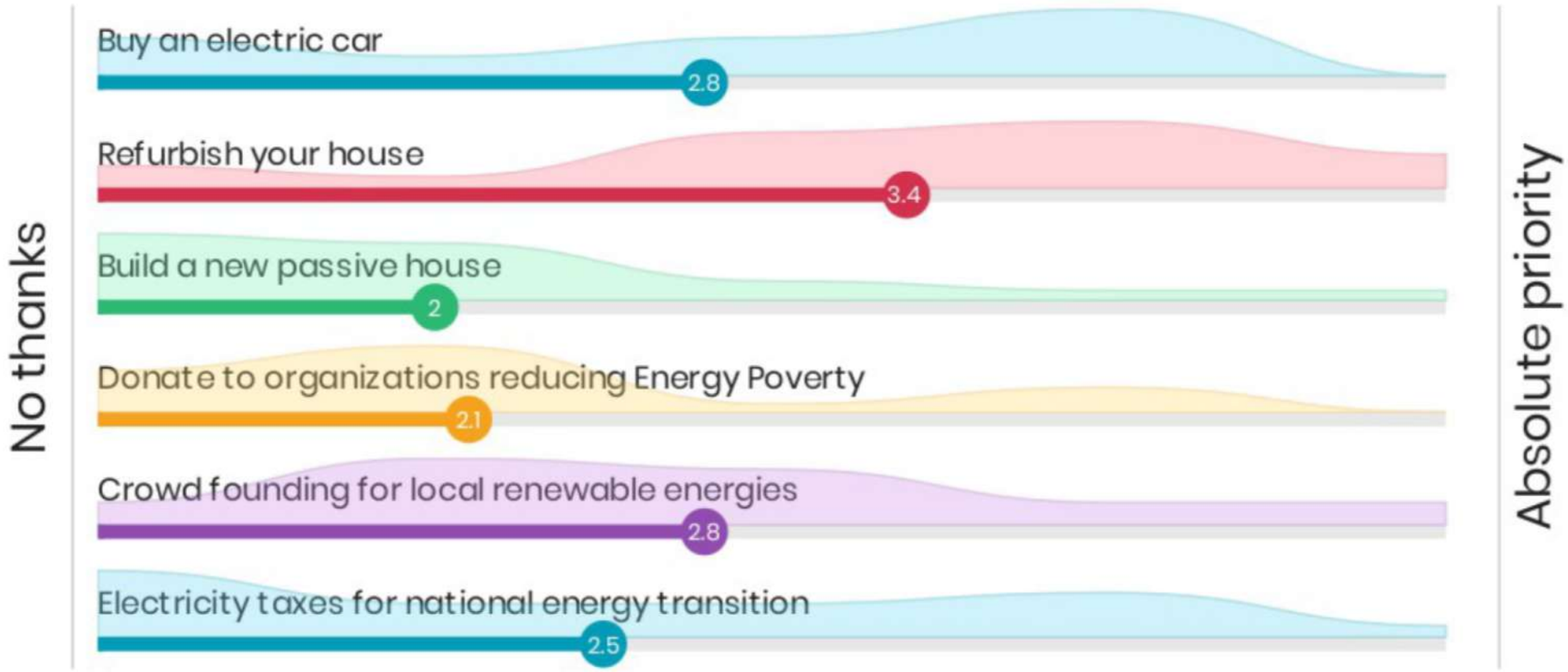
Where would you invest your money?

Mentimeter



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Radically different contexts in France and Germany

Different understandings of the Energy Transition

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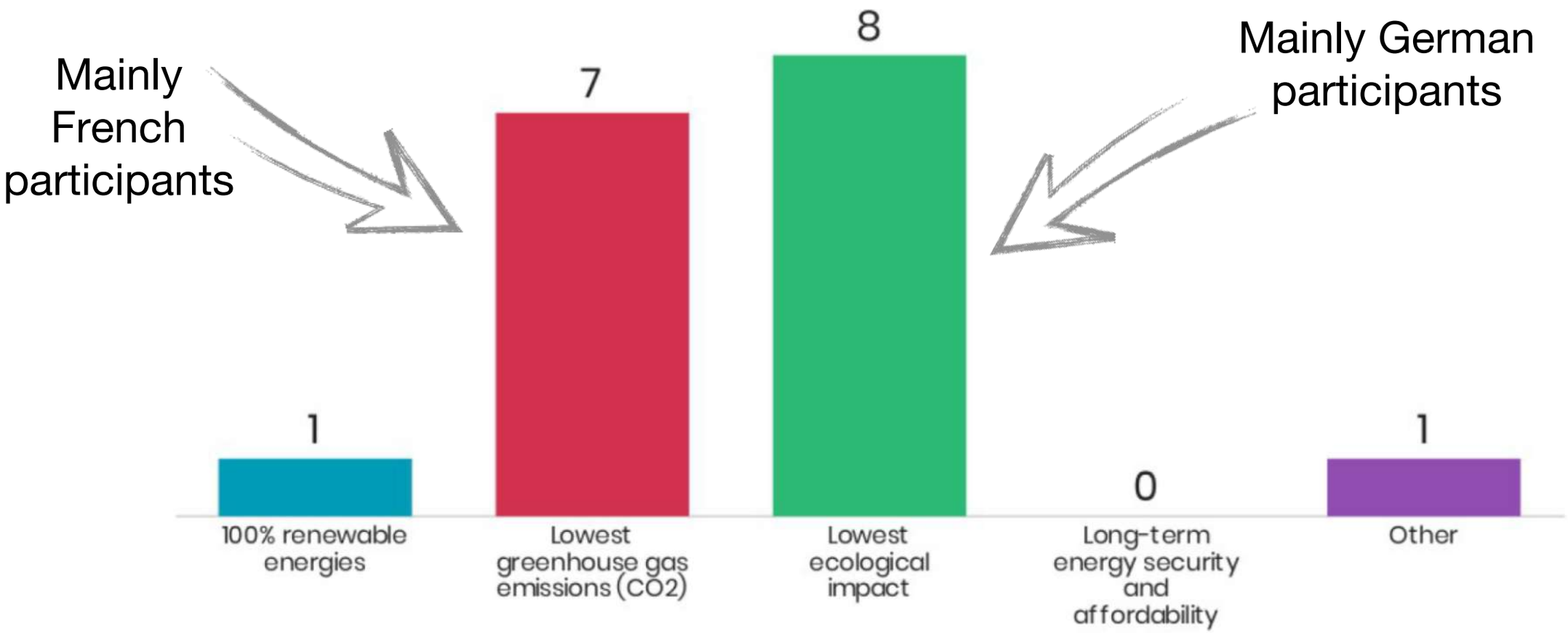
What is the finality of Energy Transition for you?

Mentimeter



Sources: Pool during round-table

Keys of context

Waldsterben

Tschernobyl

Amoco Cadiz

Libération

Erika

Indépendance

Wiederaufbau

30 glorieuses

Bund

Nationalisations

Wirtschaftswunder

Stadtwerke

Politique industrielle

Liberalisierung

2016:

- ☐ **France (Continental) : 543.965 km², 66 Mio hab.**
- ☐ **Deutschland: 357.340km², 82 Mio hab.**

An history of environmental policy

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1970 1980 1990 2000 2010

Umwelt Environnement

Pionier Quartiere
Quartiers pionniers

Umweltchartas
Chartes environnementales

Klima Climat

Agendas 21

Klimapläne
Plans Climat

Erneuerbaren Energien
Énergies renouvelables

Smart grids

ICT TIC

EU/UE : Concerto **Smart City**

Comparable Energy Transition objectives

GHG reduction (Compared to 1990)	**2020: -20%**	**2020: -40%**
	2030: -40%	**2030: -55%**
	2050: -75% (factor 4)	**2050: -80% up to -95%**
RES development	**Assigned by European Union**	
	23% of the energy mix until 2020	**18% of the energy mix until 2020**
	National	
	32 % of the final consumption until 2030	**30% of the final consumption until 2030**
Energy savings	**Primary energy consumption**	**Primary energy consumption**
	Until 2030 : -30% compared to 2012	**Until 2020: -20 % compared to 2008**

Sources : ecologique-solidaire, caisse des dépots et territoires, bundesregierung, hal upec upem, umweltbundesamt

As set in COP21 and European Directives

…far to be achieved

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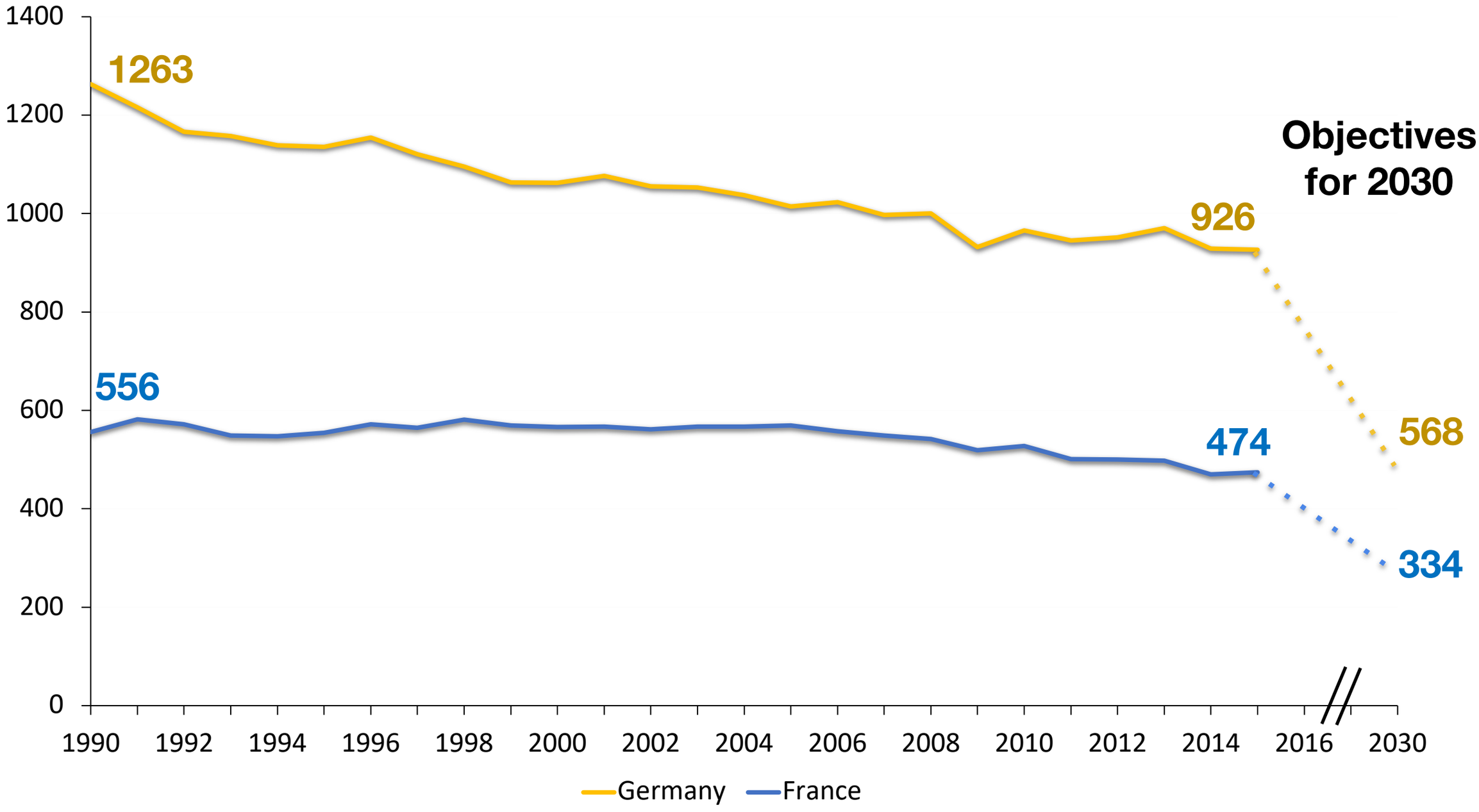
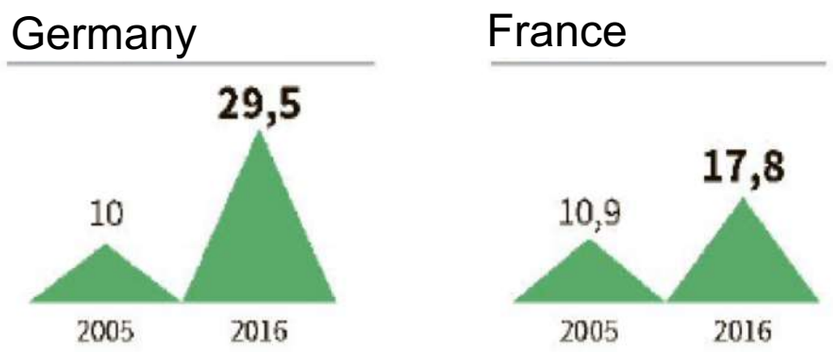
GHGas Emissions in Million Tons eq CO2

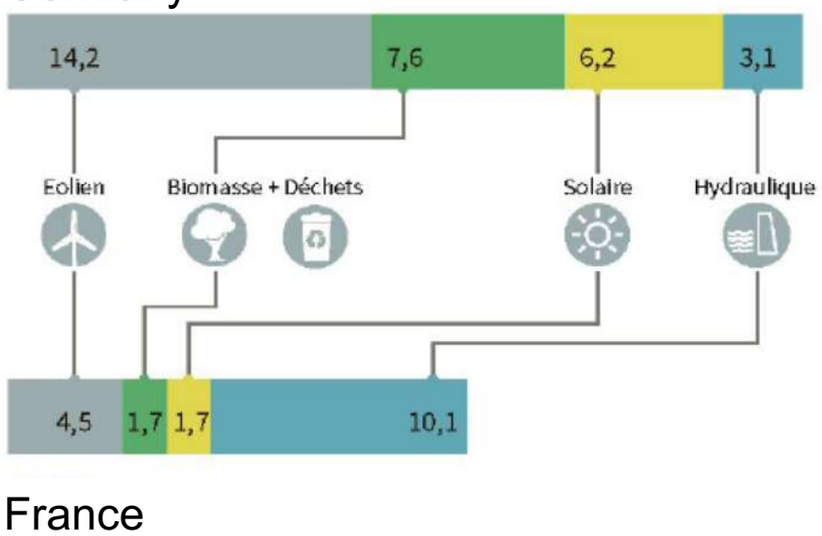


Sources : Eurostat

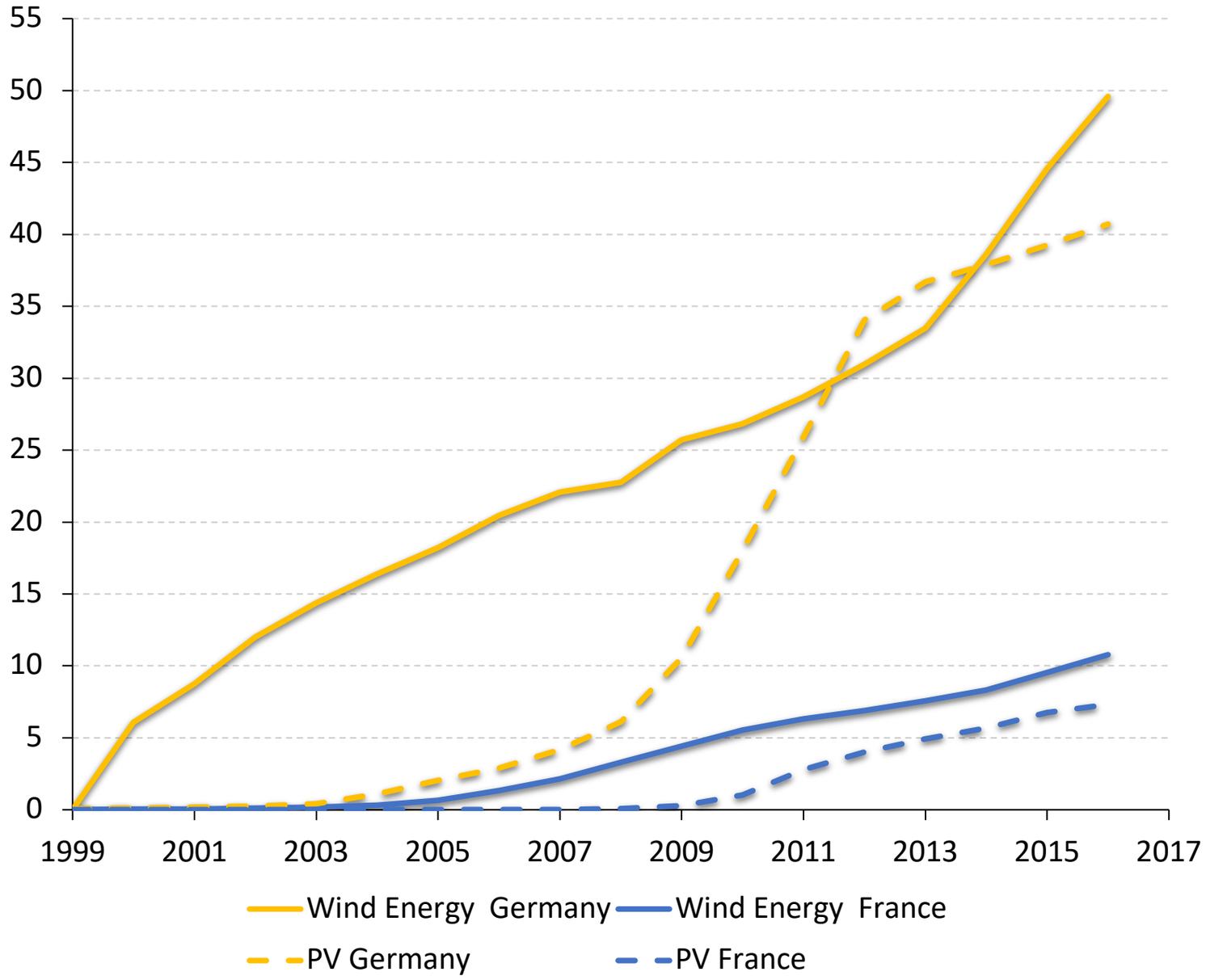
Renewables in the Electricity mix

Renewable share in the electricity generation (%)





Power Capacity (GW)



Sources figures : BP, BMWi, Ministère de la transition énergétique, France Stratégie, RTE, BMU, UMWELT BUNDESAMT, AGEB, UFE, Eurostat, Le Monde

Consumption and energy prices

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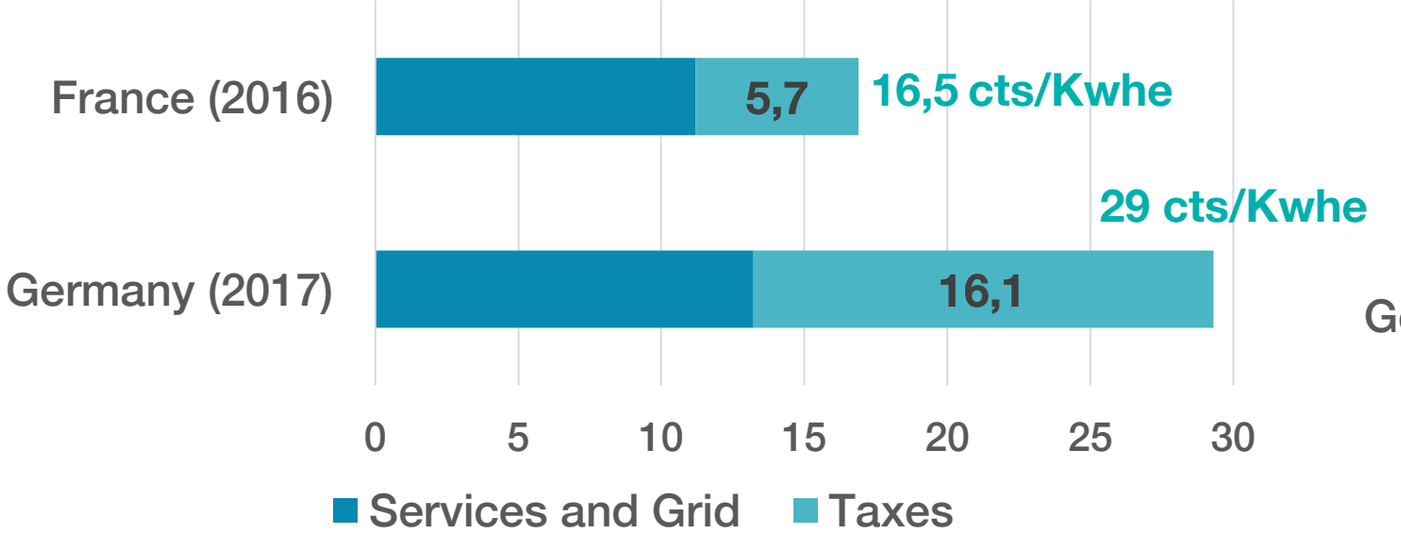
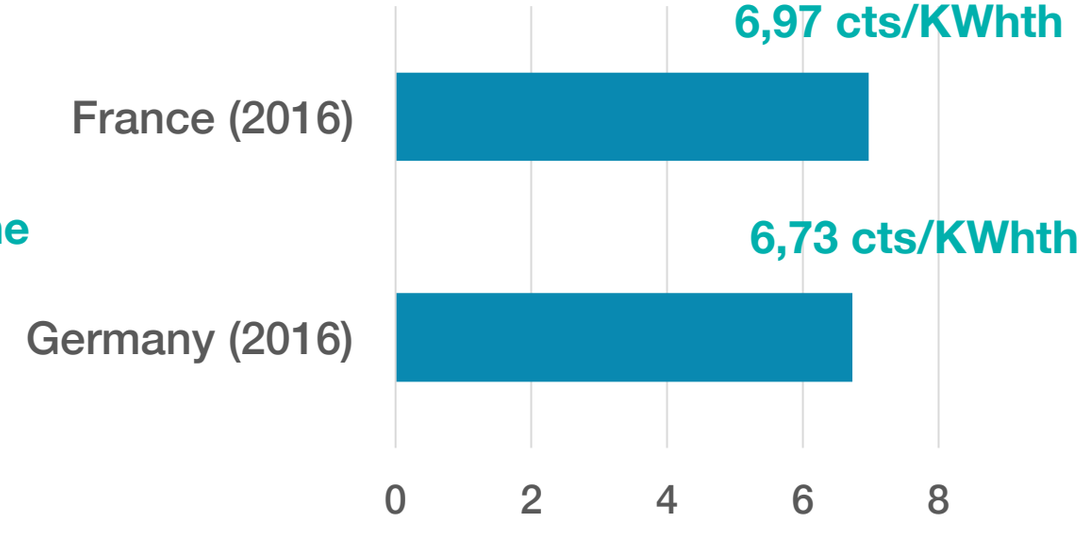
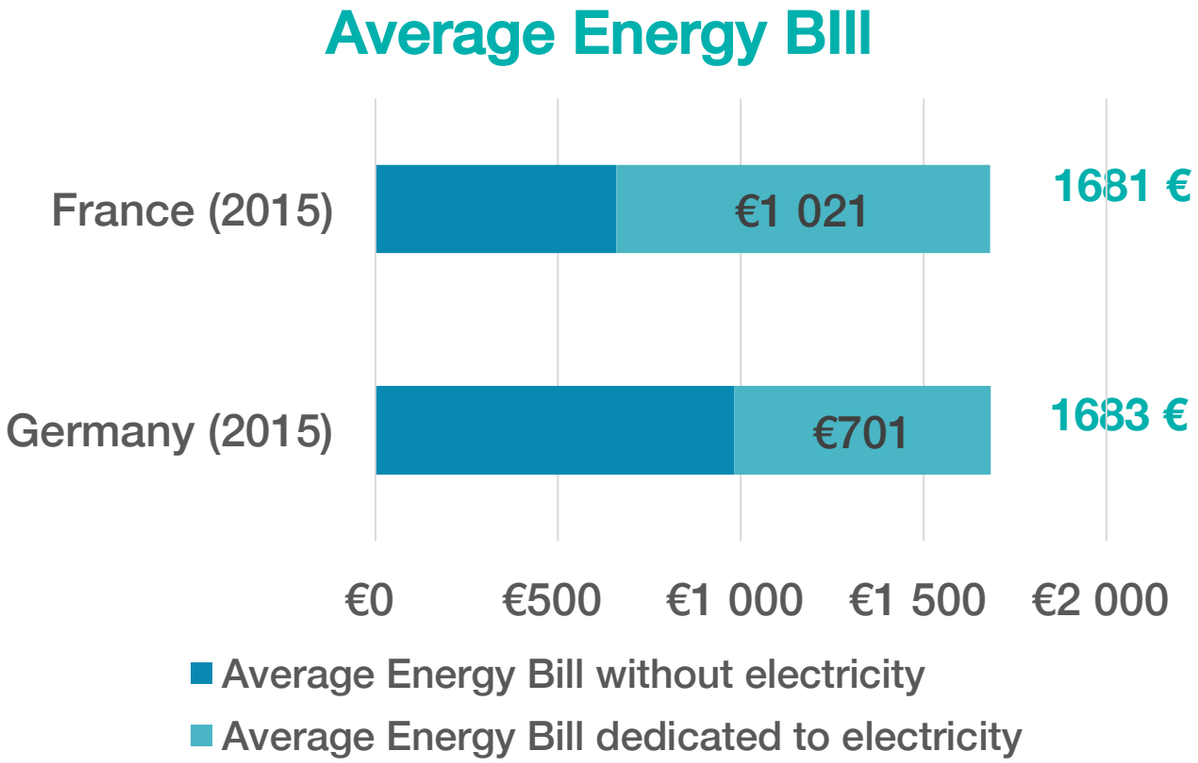
Average Electricity Price



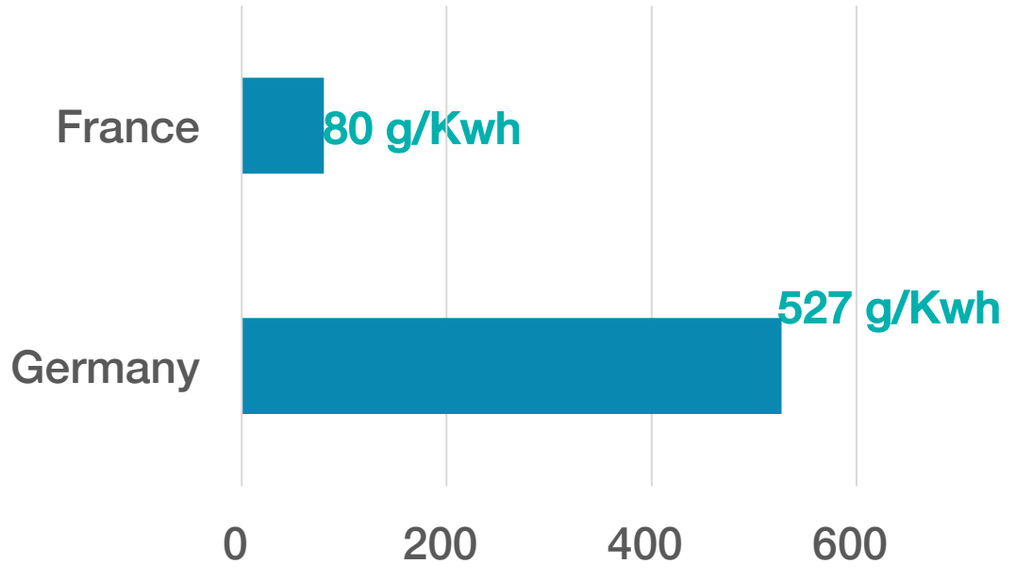
Average Gas Price



Average Energy BIll



CO2 Emission per KWh



Sources figures : BP, BMWi, Ministère de la transition énergétique, France Stratégie, RTE, BMU, UMWELT BUNDESAMT, AGEB, UFE, Eurostat, Le Monde

Understanding the different contexts is key to analyse the citizen acceptance and investigate the replicability of best practices

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- National and energy policy , centralised vs federal
- Supply and consumption technologies
- Cultural factor, community organization
- Science : academic research, R&D
- Electricity industry : Stadtwerke vs Few actors
- Energy market

The difference between *Energiewende* and *Transition Energétique* cannot be based on a dichotomy between the French nuclear plants and the German lignite and coal plants

Energy field project typical organization

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“Grand Projet” and State driven

Welfare-state with
State-owned Companies (EDF, Engie…)

↓

Leaders in the French Energy System
Development since WW2
Modernizing, Securing
Managing past transitions

↓

Guiding principles
Territorial equity, Energy access,
Social equity, Unique tariff

Social market economy driven

High Number of
Decision Making Stakeholders

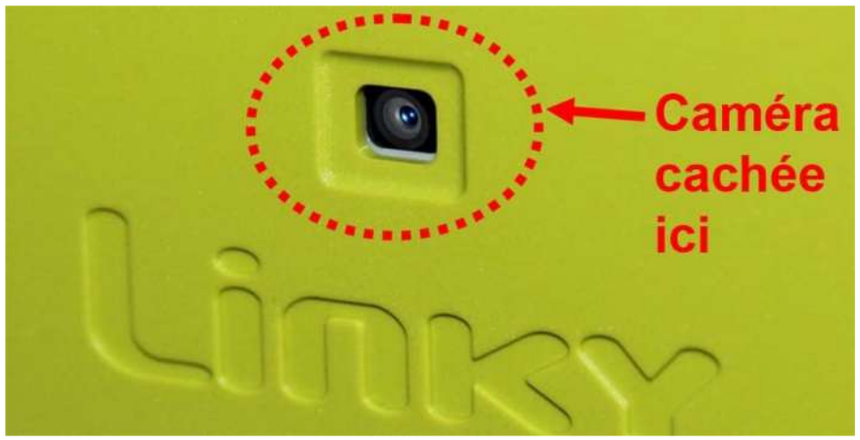
↑

Municipalities, Citizens and Companies
Small various projects, Market Driven

↑

Social Market Economy
Guided by Laws and Incentives

Citizen Acceptance towards Energy Transition technologies



Different forms of Citizen Acceptance

Rating	Action: Passive	Action: Active
Positive	Approval	Supporting Participation
Negative	Rejection	Resistance

C.A.R.M.E.N. 2014 and Zoellner et al. 2009, derived from Dethloff 2004

Both Energy Transitions reach a similar high level

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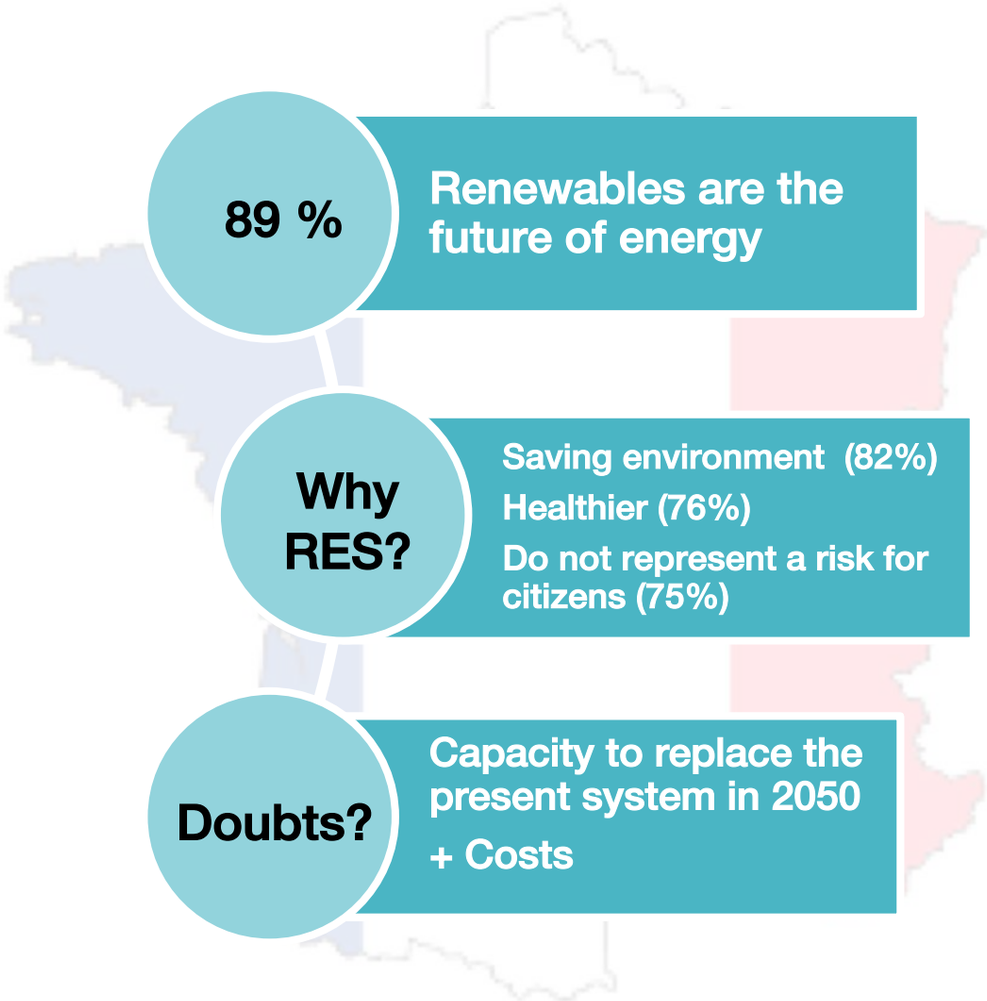
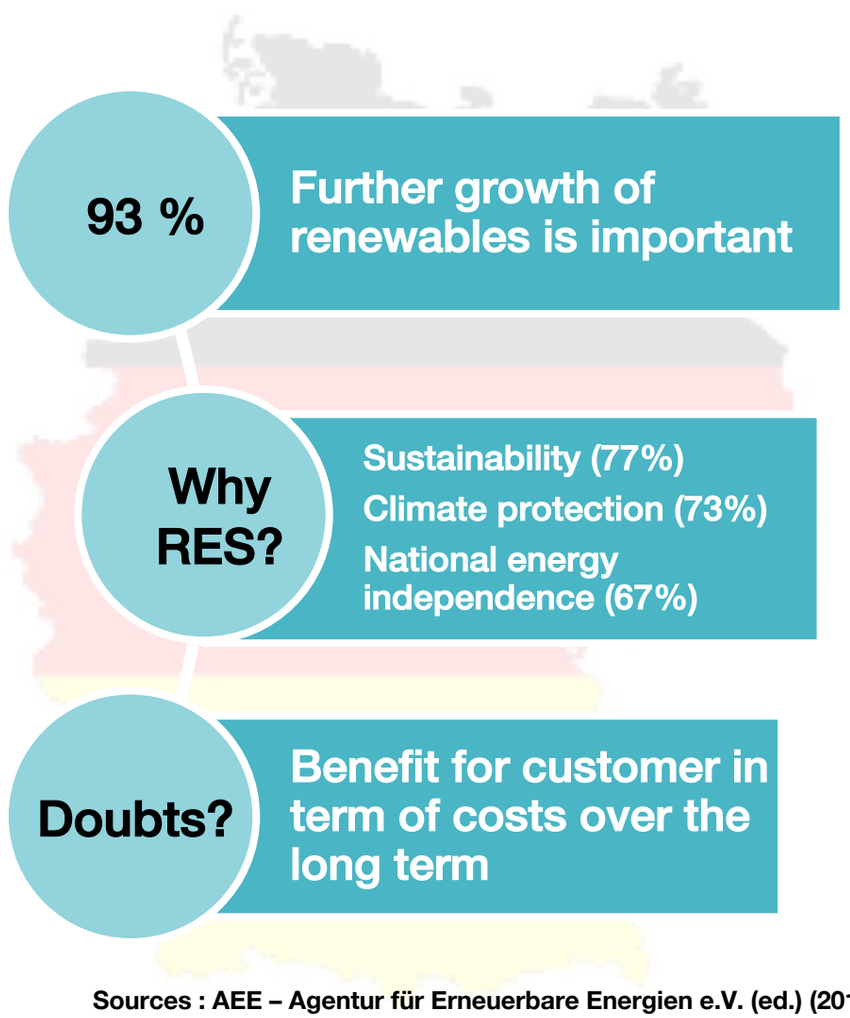
- German and French population widely supports the expansion of renewable energies (respectively 93% and 89%)

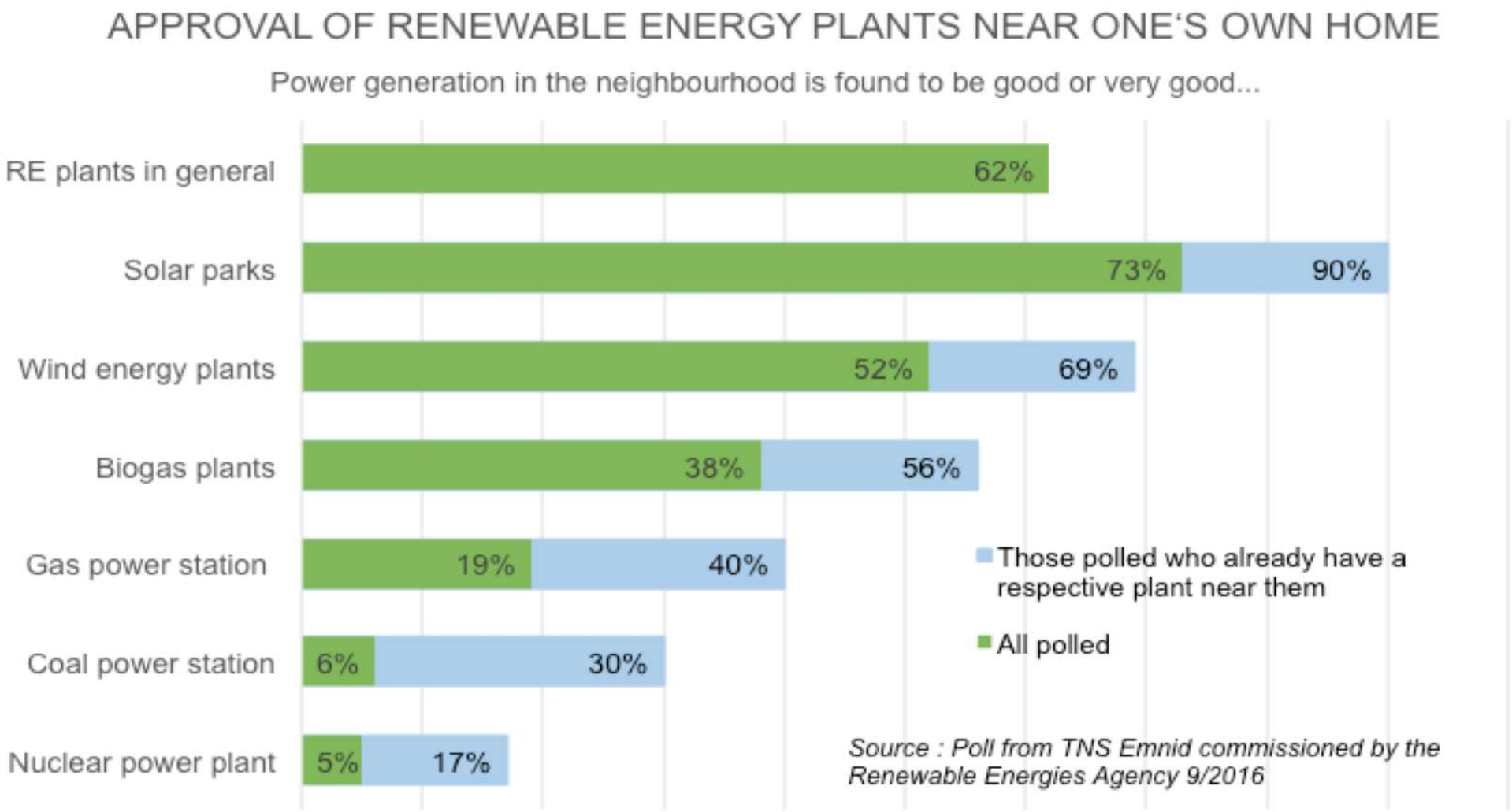
- Proponents in both countries are part of all political affiliations, educational levels, age groups and income classes.





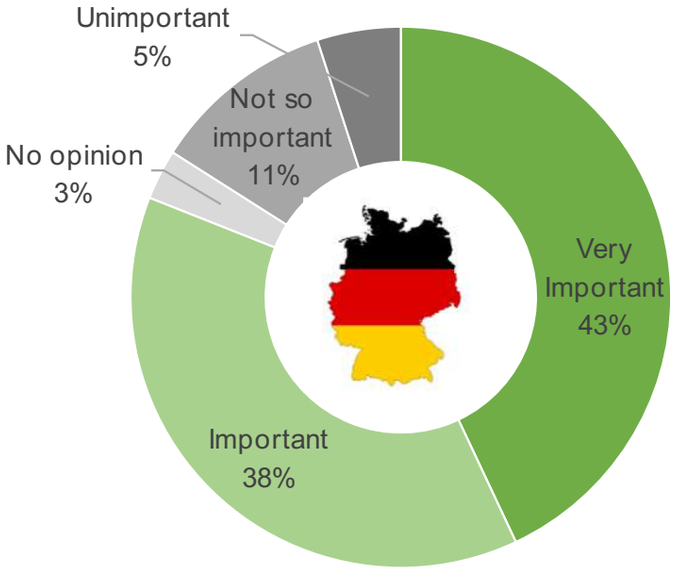
Sources : AEE – Agentur für Erneuerbare Energien e.V. (ed.) (2015), IPSOS, Harris Interactive survey conducted for Heinrich Böll Stiftung

Influence of experiences

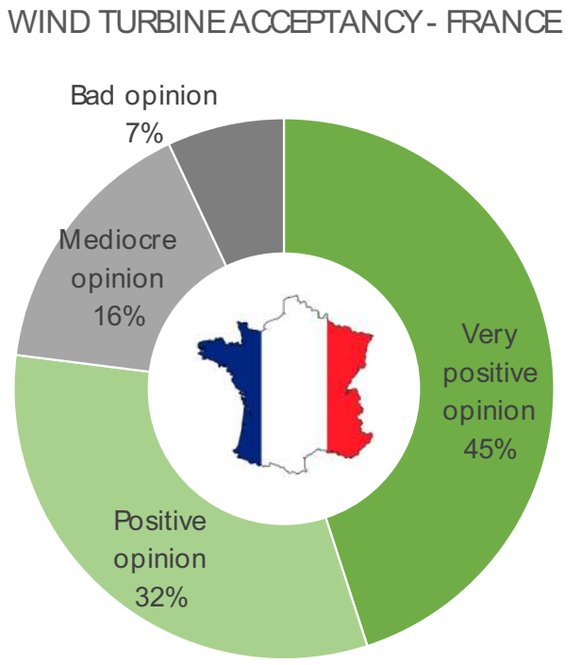


The more **experiences and touch points** citizens already had with **renewable energy technologies**, the **higher their acceptance**

Focus on Wind Energy project acceptance



Source : Survey of forsa, contracted by Fachagentur



Source : Survey of IFOP

- **The Indifferent (44%):** Wind turbines haven't entered their everyday life, they never discuss about them.

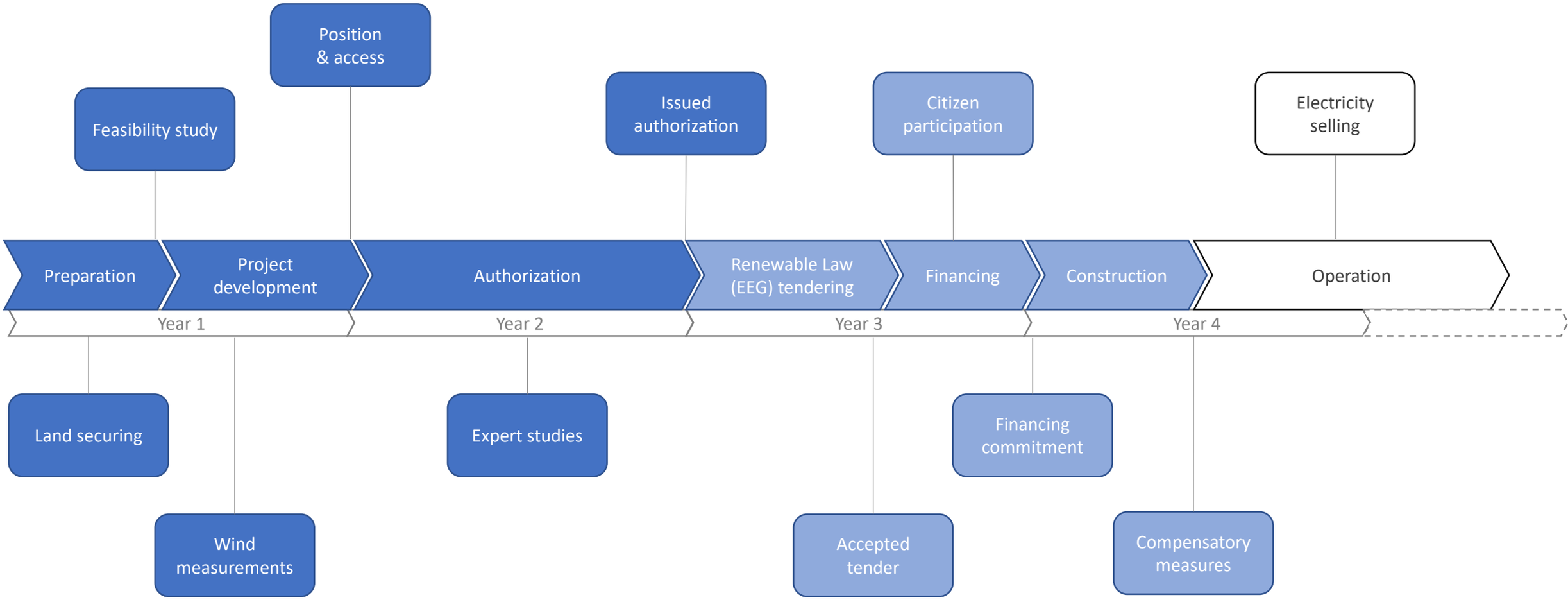
- **The Confident and Convinced (34%):** Their proportion even grows to one half among the population which have been well informed early in the project..

- **The Enthusiastic (8%):** Their proportion is doubled among the population which have been well informed early in the project.

- **The Annoyed (8%):** Their irritation comes generally from an inappropriate project implementation (generation of degradations during the building phase, feeling of saturation).

- **The Anxious (2%):** They are extremely few, and become either convinced or annoyed while the wind energy project is realized.

Wind energy projects

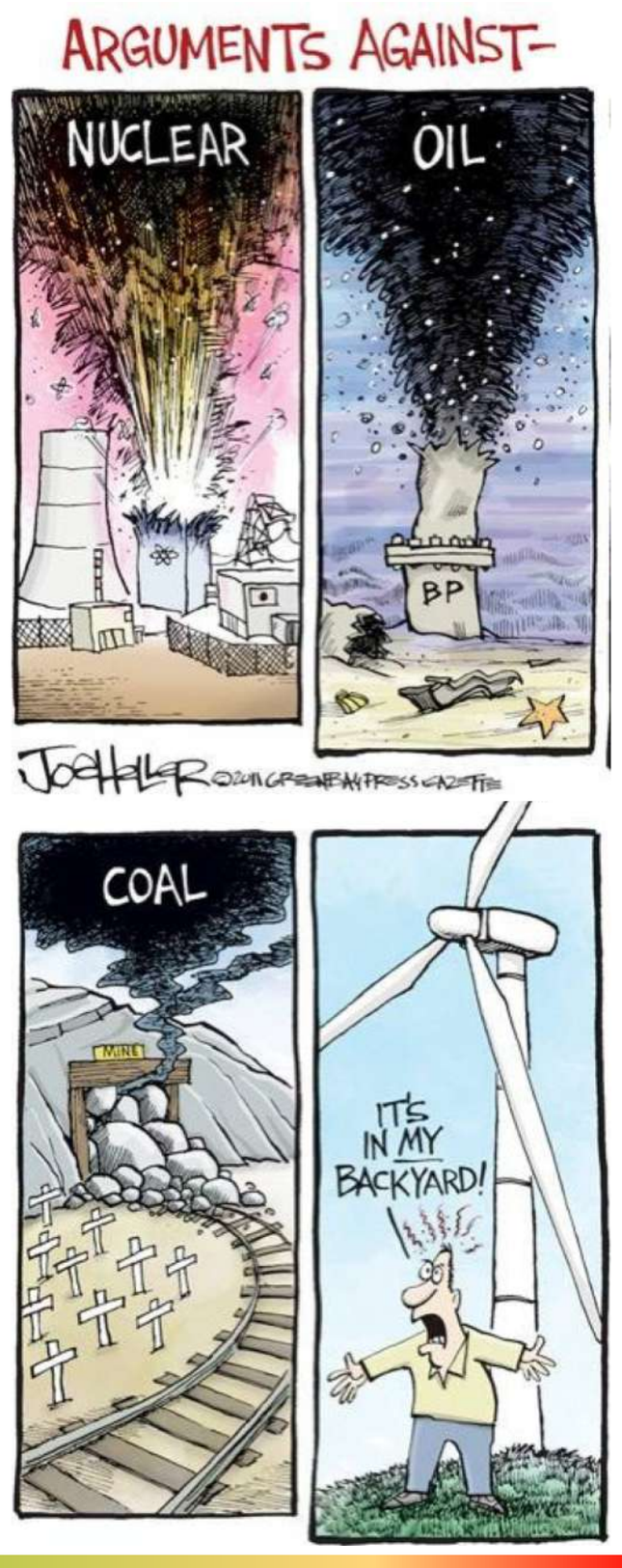


A wind energy project, from the first meetings to the implementation, may last 2 to 4 years in Germany, and up to 10 years in France

Opposition : Minority, with different reasons

- Structured organizations and federations acting over the whole country

- Local population, and the NIMBY syndrome :
  - Financial impact (house prices, tourist revenues)
  - Health impact
  - Environmental impact
  - Protection of aesthetic values
  - Sanctification of one's home…



Focus on Wind Energy project acceptance

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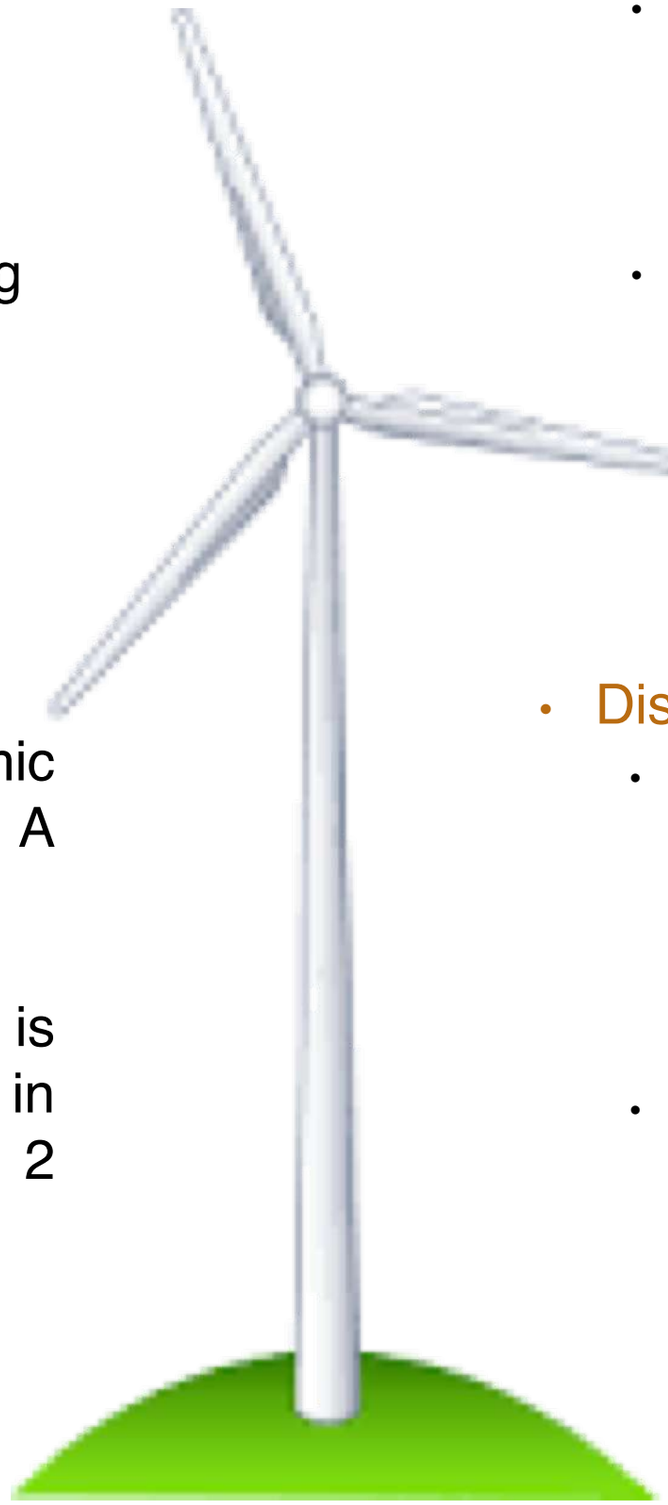
- Shadow casting:
  - Stationary or periodically depending on the operating state.
  - may not affect a surrounding building for more than 30 hours per year and 30 minutes per day



- Bird strike:
  - The collision of birds with the rigid and moving components
  - Flight routes of migratory birds and nature reserves are preventively taken into account

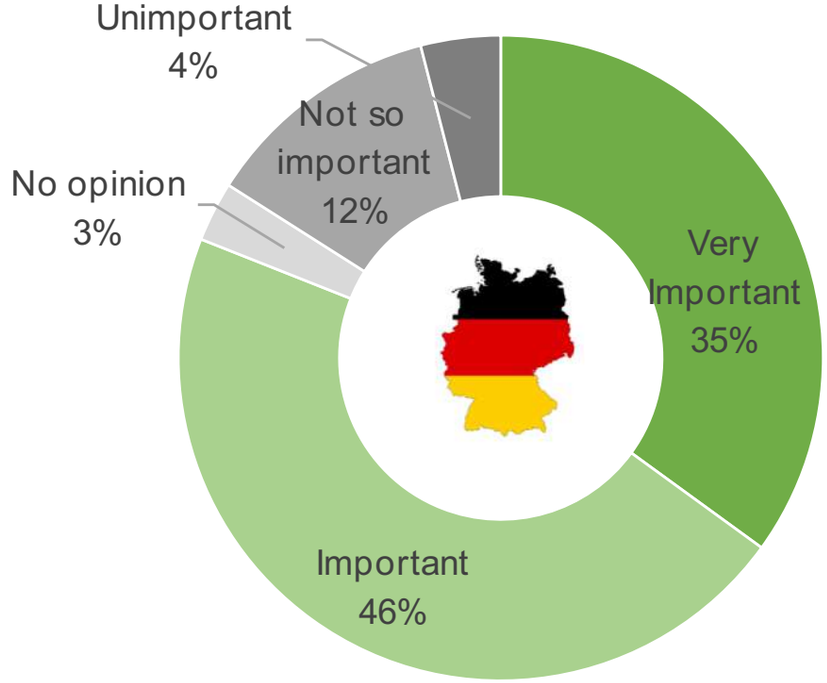
- Sound emission:
  - Generation of aerodynamic and mechanical noise A sound survey is required.
  - A minimum distance is officially fixed (500m in France, between 500 and 2 000m in Germany)

- Disco effect:
  - Disco effect describes the reflection of light on the surface of the rotor blades.
  - Modern rotor blades are covered with a dull color

Citizens wish to get more involved

- In both France and Germany, ~80% of citizens find Citizen cooperatives important for the energy transition,

- …while only 46% trust conventional energy production and distribution companies



Sources : Ipsos, Harris Interactive for Heinrich Böll Stiftung , Forsa for Fachagentur Windenergie an Land

Spectacular increase of Renewable Energy Cooperatives

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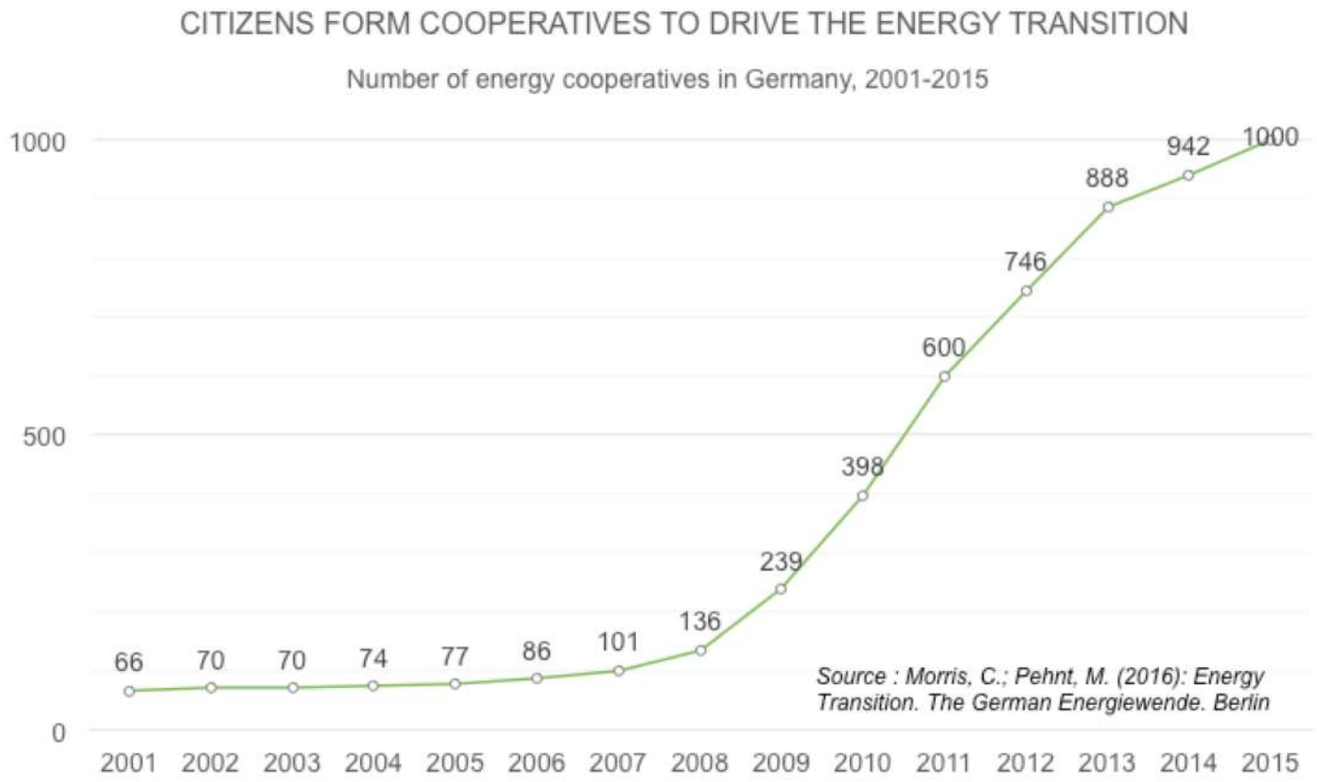
- In 2015 : 165 renewable energy cooperatives in France / ~1000 in Germany



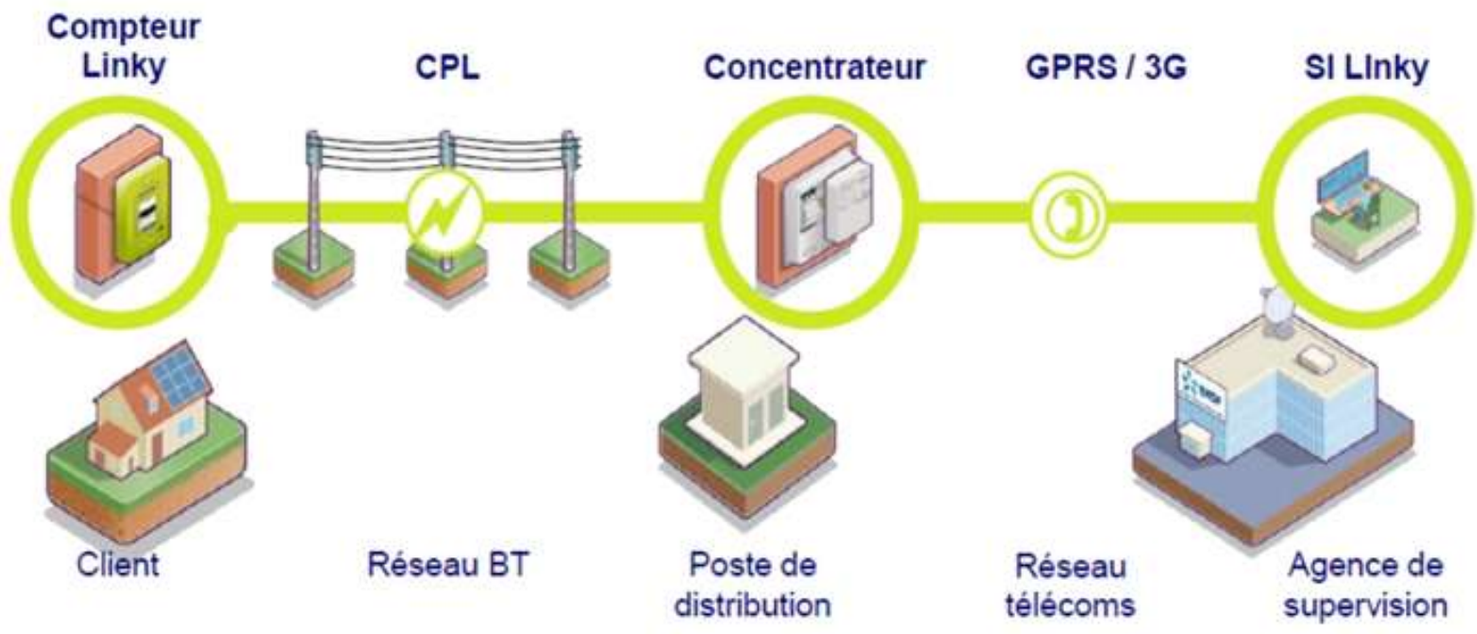
- 50% of renewables are in the hands of citizens and cooperative groups in Germany

Most French people assess this is the role of the state and public authorities to lead the energy transition, whereas German citizens are used since many years to take a personal part in energy transition project.

Smart meter deployment strategies

Smart meter deployment follows an European directive. its national application in France and Germany is radically different:

- « **Grand Projet** » **Linky in France** in 35 million households by 2021 (5 billions €).



- **Gradual deployment in Germany**, where all network operators are expected to replace the current meters with “advanced” meters before 2032

Smart meters and Citizens

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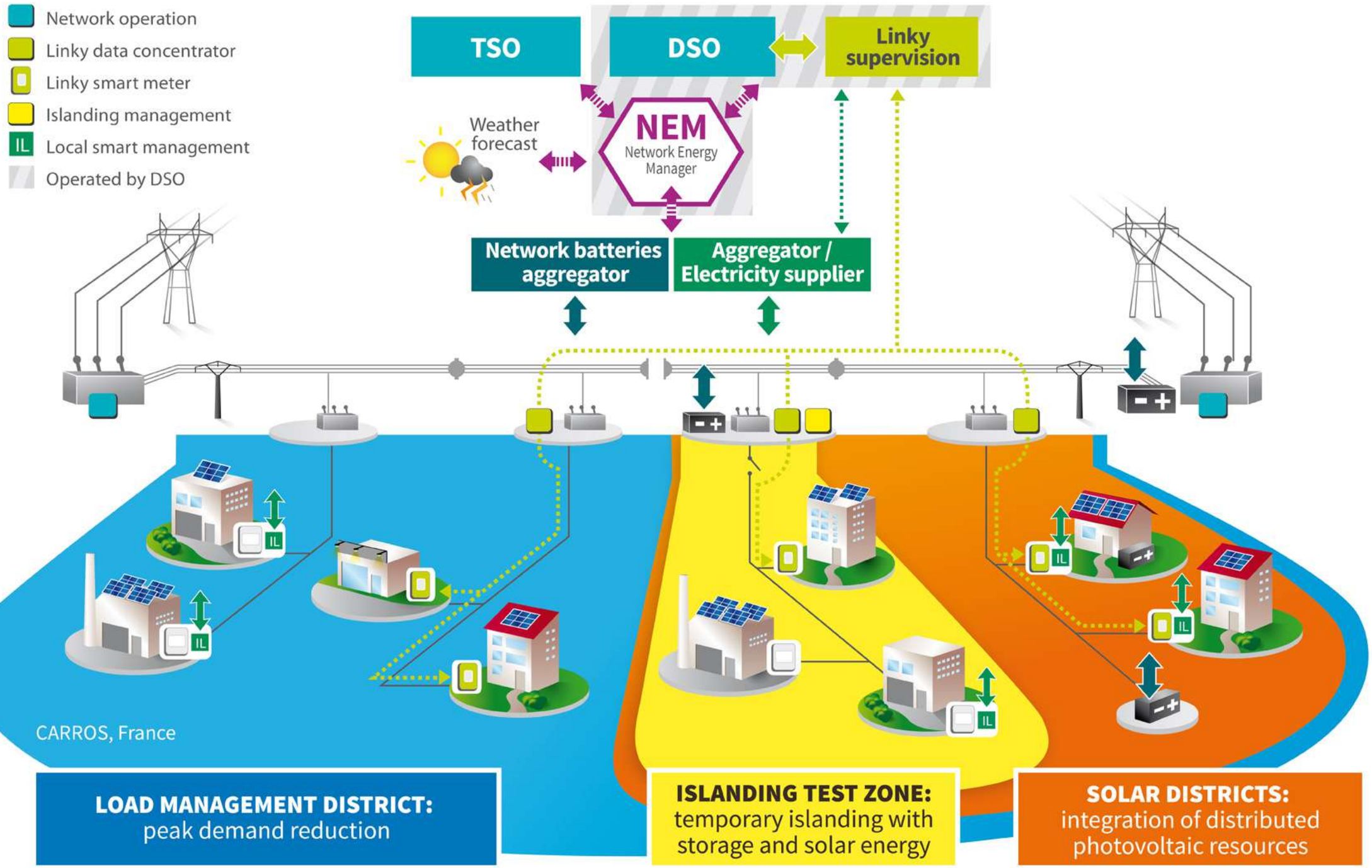
Consumption	• Better control over the consumption profile • Decide when appropriate, to alter their consumption patterns
Demand-side management and peak shaving	• The consumer accepts to deter a certain level of consumption to another period of the day. • Remuneration of peak shaving
Health risk and electromagnetic fields	• National and European standards fix an electromagnetic exposure limit • The *Linky* system in France is operated with a Power Line Carrier technology (PLC).
Data privacy	• *The Linky* smart meter transfers only anonymized daily data (Validation by the CNIL) • No information about daily usages.
Costs and savings	• Investment costs are balanced by operational savings for the DSO • Energy savings for customers

Resistances and active oppositions against Linky deployment

Nicegrid is a pilot project at South of France (Carros).



Nice Grid and citizens

New technologies include the **Linky Smart Meter**, **storage facilities** and **new prediction algorithms**.

During peak hours participants have been encouraged to limit their consumption from 6 to 8 pm and to test the flexibility of their electric heating system. Results show a drop of power consumption: 20% for residential and 10% for I&C (10MW) consumers.

The two major reasons for customers to engage into the project were the expected financial gains and the opportunity to act collectively.

C/sells and citizens

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C sells

C/sells Pilot Fellbach/Stuttgart

- **Passive Buildings**
- **solar panels (10kWp)**
- **heat pump**
- **battery storage**
- **wallboxes for E-Mobility (grid stabilizing)**


Foto: bruckerarchitekten.de

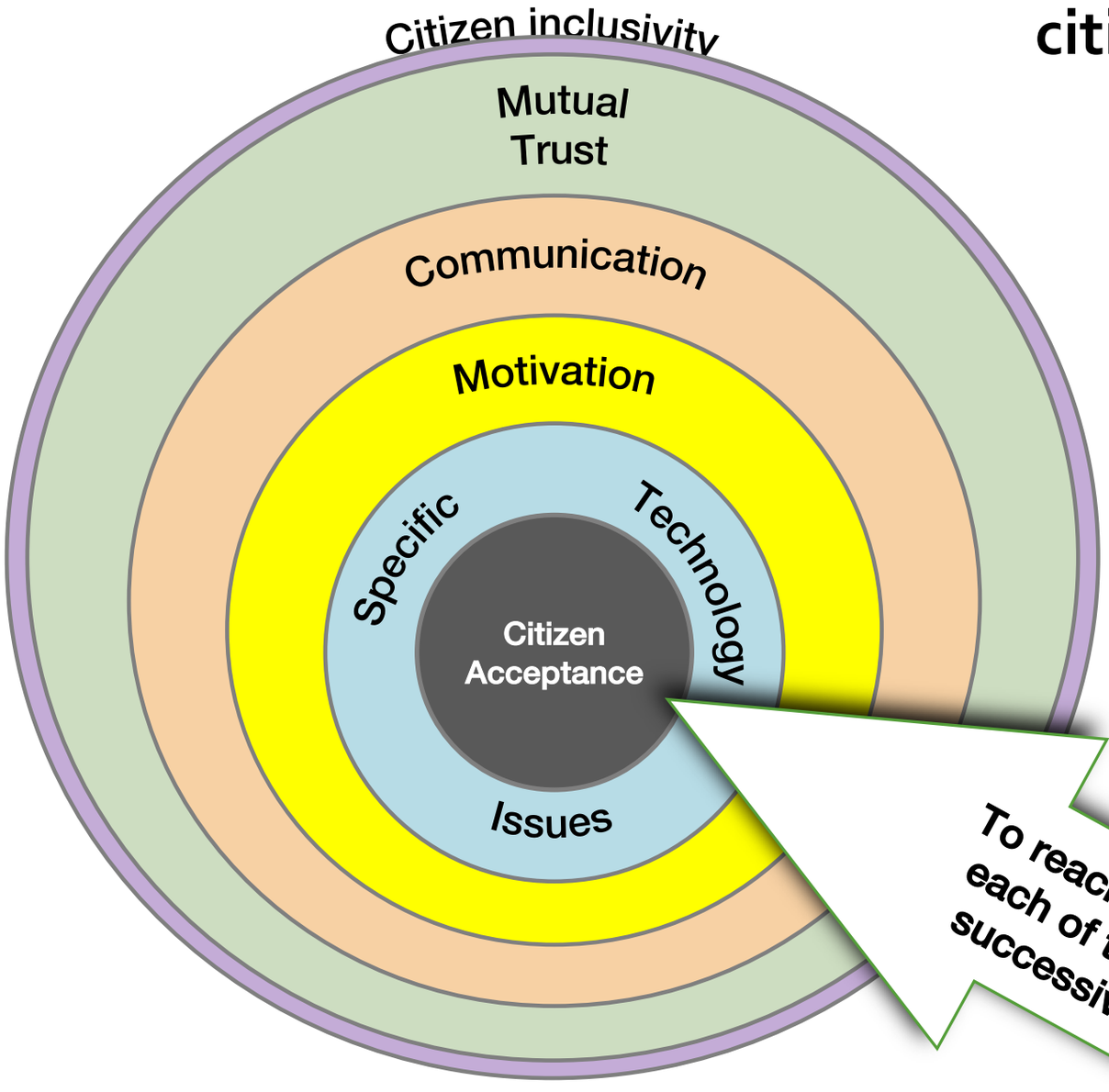
50 Million €

10 spatially defined « Cells »

Motivate actors

Novel typology of citizen societal issues and Best practices

Societal Issues categorization



Five onion layers to represent five types of societal issues between citizens and energy transition projects :

Citizen inclusivity (INC)

Mutual trust (TRU)

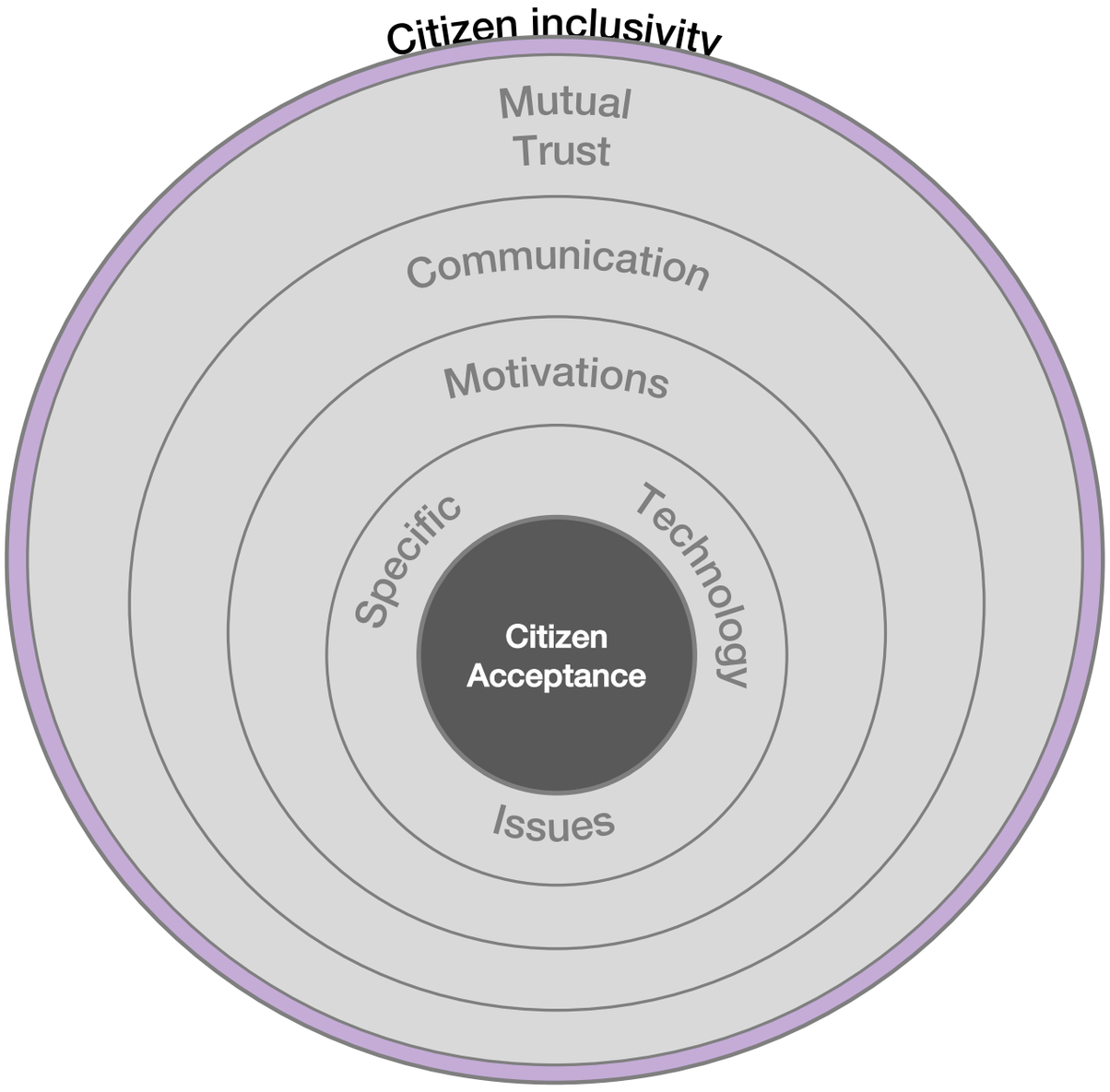
Communication (COM)

Motivation and Incentives (MOT)

Technology specific issues (TEC)

Interdependence and relationships of acceptance issues

Citizen Inclusivity



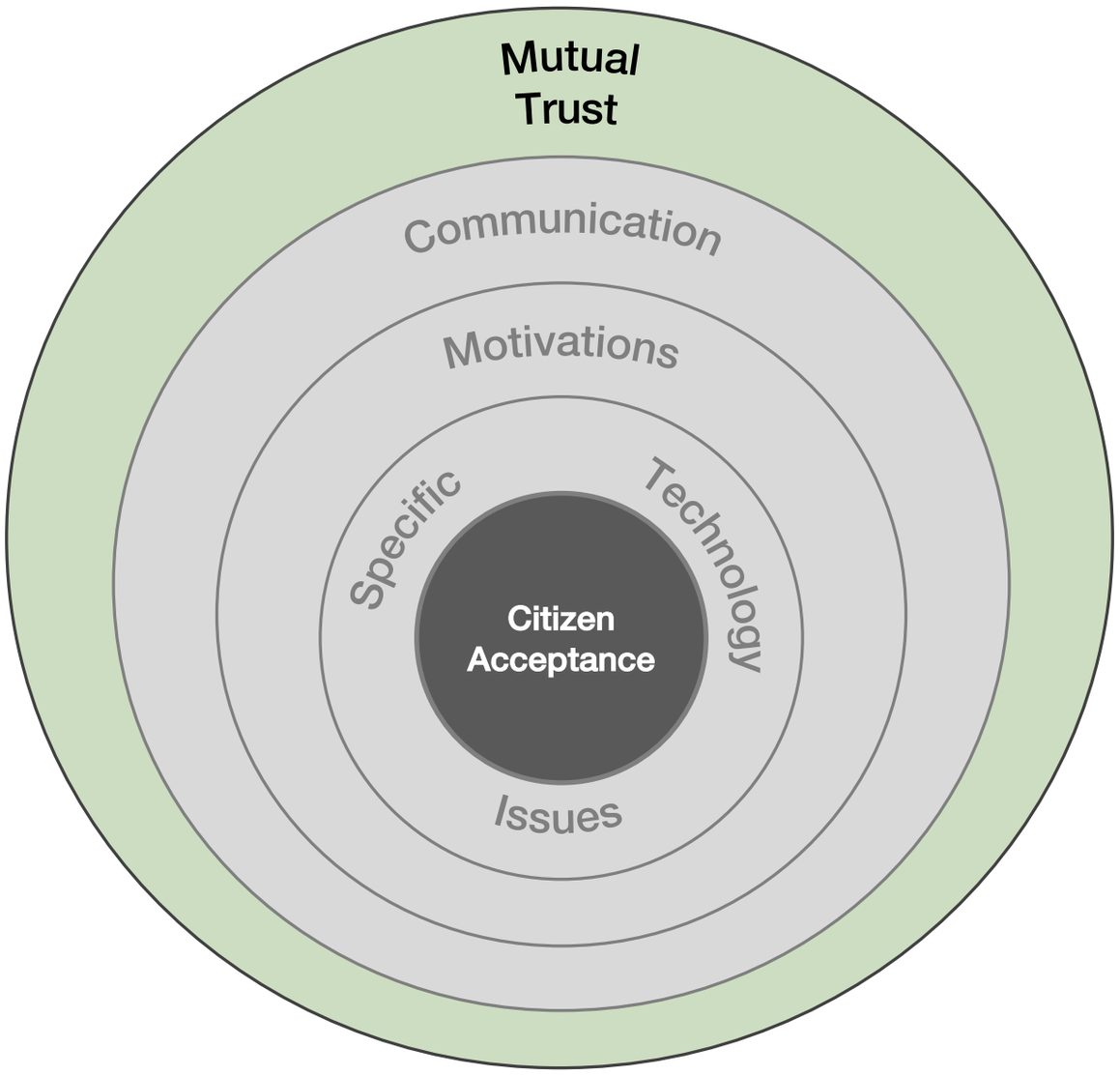
Citizen inclusivity

Societal base of Citizen acceptance for Energy Transition.

If citizens feel excluded from this process, or if the rules are not designed for them, they are likely to become indifferent, suspicious or even reluctant to any energy transition project.

INC – Citizens Inclusivity
INC.1 – Overcoming political and institutional barriers
INC.2 – Overcoming legal and administrative difficulties
INC.3 – Dialogue and listening
INC.4 – Participative decision-making
INC.5 – Enabling citizen initiatives

Mutual Trust

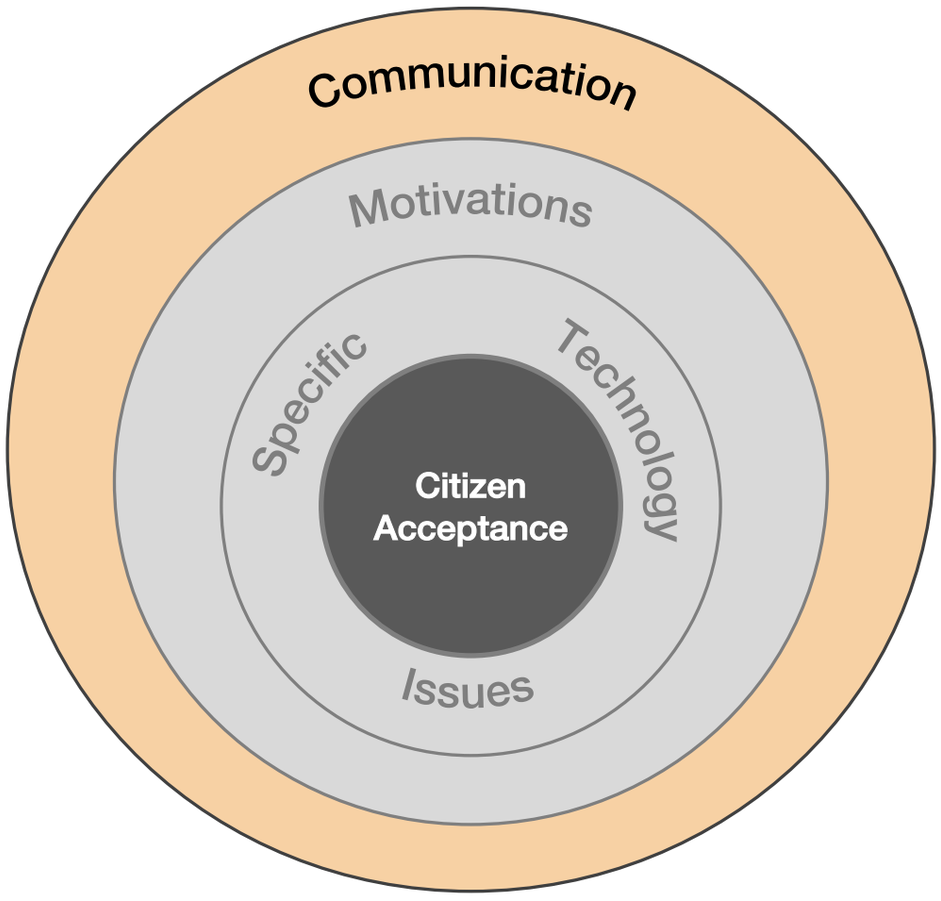


Mutual trust

Trust and credibility are prerequisites at the beginning of any energy transition projects.

This social capital should be further maintained and cultivated during the project development and operation phases.

TRU – Mutual Trust
TRU.1 – Project management and accountability
TRU.2 – Finding local relays
TRU.3 – Social justice
TRU.4 – Analyzing the risks
TRU.5 – Dealing with negative experiences



Communication

Limited contact to citizen, culture of secrecy on projects issues are not even compatible with bottom-up projects.

Citizens should not feel passed by or they might develop forms of resistance.

COM – Communication and Knowledge Exchange

COM.1 – Quality and timeliness of Information

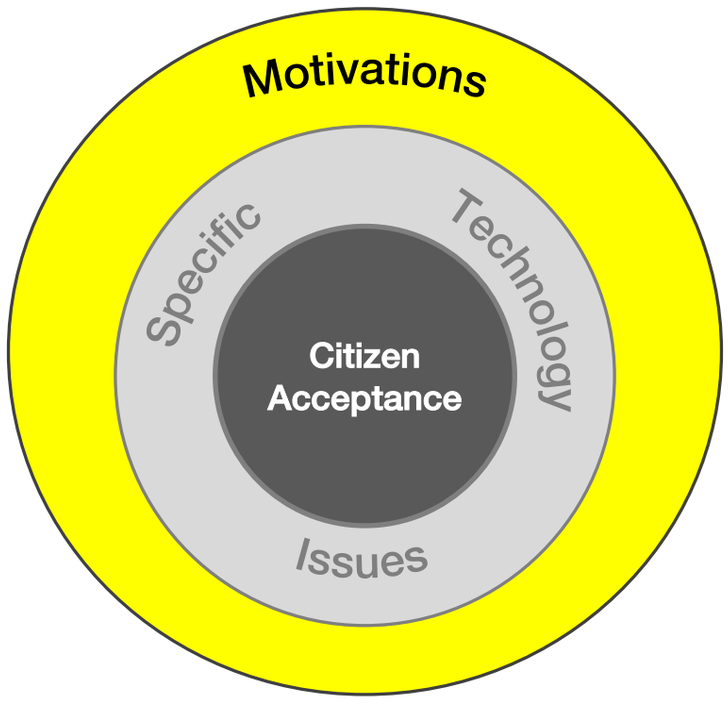
COM.2 – Information transparency

COM.3 – Audience-centered communication

COM.4 – Reweaving the relation between science and society

COM.5 – Dealing with external opponents

Motivations and Incentives



Motivation and Incentives (MOT)

Enabling and emphasizing financial as well as social advantages form positive attitudes toward the energy transition

Citizen acceptance is higher if benefits and risks are shared fairly.

MOT – Motivation and Incentives

MOT.1 – Citizens' resistance to change

MOT.2 – Financial benefits for the citizens

MOT.3 – Symbolic rewards

MOT.4 – Reviving community feeling and local identity

Motivations and Incentives

Technology specific issues (TEC)

Specific issues and risks must be openly assessed, anticipated, and minimized, possibly with citizen experiences and information technologies.

TEC – Technology Specific Issues

TEC.1 – Technology intrusiveness

TEC.2 – Change in neighborhood morphology

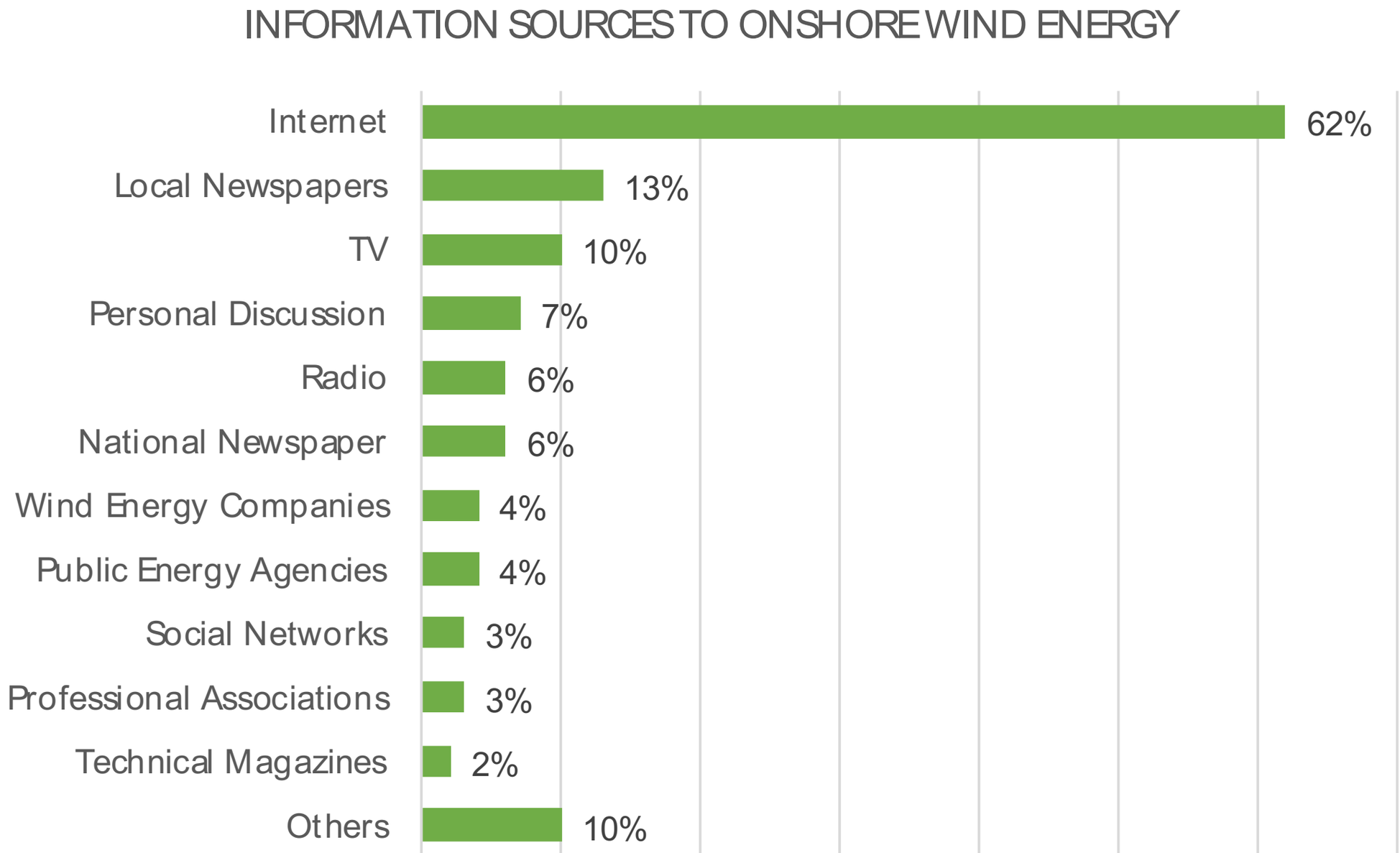
TEC.3 – Individual freedom restrictions

TEC.4 – Finding beta users for immature technologies

TEC.5 – Poor local technical skills

Concepts of innovative solutions

Internet = Main information source



Source : Survey of forsa, contracted by Fachagentur

Citizen Information and Participation 2.0

Technology-based solution

Use the most of Web2.0, Virtual reality and Civic tech

for information, participation and catalyst purposes

Challenges to answer

- **Communication** before and during Energy transition projects is key to increase citizen acceptance

- Citizens wish **information** of good quality and timeliness (COM.1), transparent (COM.2) and adapted to their personal needs and knowledges (COM.3).

- Having a **realistic impression** of the degree of intrusiveness (TEC.1) and visual impacts on the neighborhood (TEC.2) of the finished project before it starts would diminish the doubts of people without experiences of such technologies.

- **Discussing with relatives**, friends, or trustful persons of their surrounding who have already experiences such projects appeases also these doubts (TRU.2).

Citizen Information and Participation 2.0

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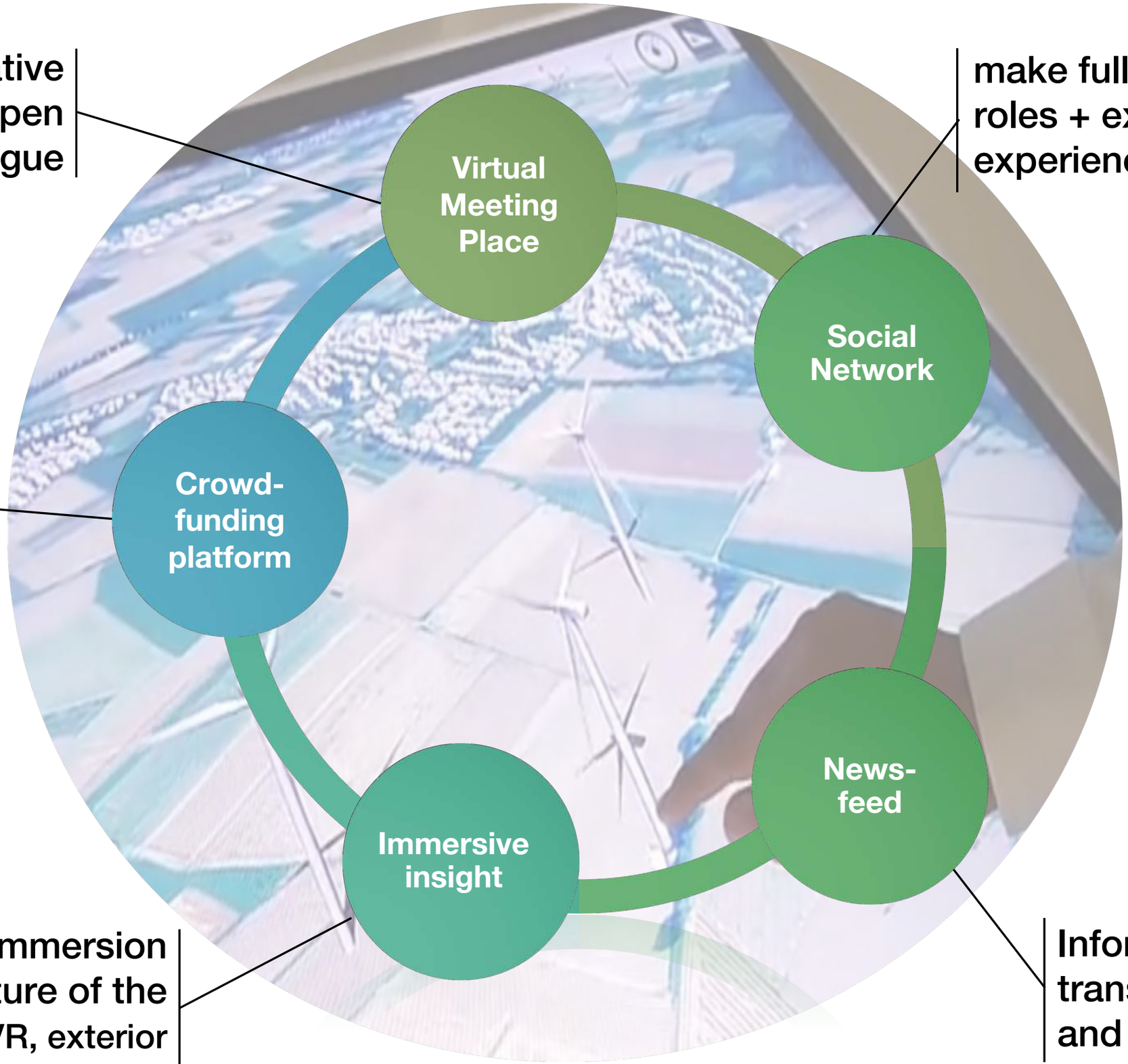
Collaborative platform, open dialogue

make full use of community roles + exchange experiences



Get citizens financially involved

multi-sensory immersion in the future of the project (VR, exterior soundscapes restitution)

Information transparency and timeliness

Living Labs and experimental space

Citizen-centered solution

Reach citizen expectations and needs by involving them in the design and evaluation process of innovative products and services

Living Labs and experimental space

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Project finalization with high citizen acceptance

Beta Users

First Idea / Prototype

Group of Citizens

Project Needs

Citizen Demand

Regulation Law

Insight Research

Prototyping and Field Testing

Project Finalization

Conclusions

Key findings

Different understandings of the Energy transition exist in France and Germany

Two different approaches of Energy transition technology deployment, based on “Grand Projet” in France, and social market economy in Germany (example of the smart meter deployment)

Several kinds of citizen oppose energy transition projects in both lands, representing though a minority of the population

Citizens generally want to be more involved into the Energy transition, even if this involvement expresses in different ways in France and Germany.

Bottom-up initiatives can be the combined catalyzers of Energy transition, citizen acceptance and community feelings

Past errors can be avoided, risks can be anticipated, and citizens can fully appropriate their Energy transition.

To be continued…

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Annexes

Reactions to Wind park project

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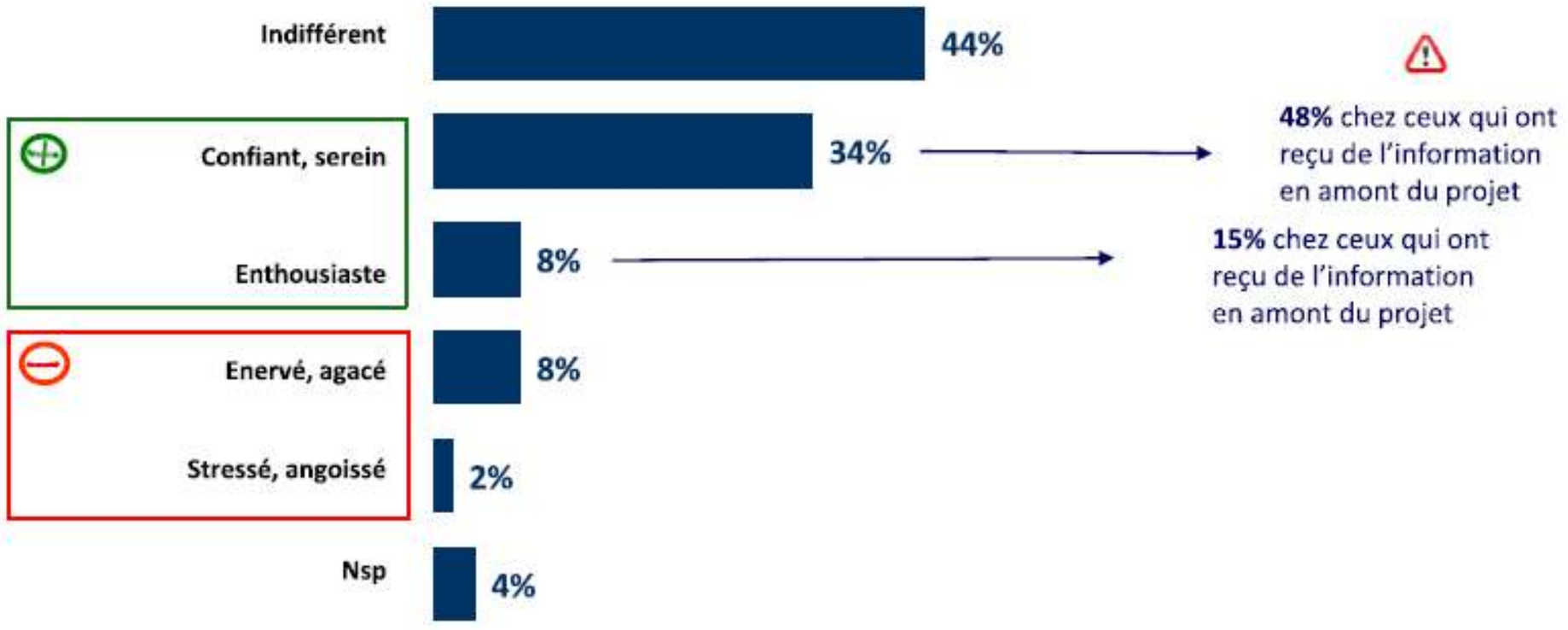
QUESTION : *[Aux riverains]* **Quand vous avez appris la construction du parc éolien près de chez vous, qu´avez-vous ressenti ?**

Vous étiez ... ?



France Energie Eolienne

7e Colloque National Eolien Atelier n°4 : Une énergie de proximité : comprendre et activer les leviers de soutien populaire

Societal Issues

INC – Citizens Inclusivity
INC.1 – Overcoming political and institutional barriers
INC.2 – Overcoming legal and administrative difficulties
INC.3 – Dialogue and listening
INC.4 – Participative decision-making
INC.5 – Enabling citizen initiatives
TRU – Mutual Trust
TRU.1 – Project management and accountability
TRU.2 – Finding local relays
TRU.3 – Social justice
TRU.4 – Analyzing the risks
TRU.5 – Dealing with negative experiences
COM – Communication and Knowledge Exchange
COM.1 – Quality and timeliness of Information
COM.2 – Information transparency
COM.3 – Audience-centered communication
COM.4 – Reweaving the relation between science and society
COM.5 – Dealing with external opponents

MOT – Motivation and Incentives
MOT.1 – Citizens' resistance to change
MOT.2 – Financial benefits for the citizens
MOT.3 – Symbolic rewards
MOT.4 – Reviving community feeling and local identity
TEC – Technology Specific Issues
TEC.1 – Technology intrusiveness
TEC.2 – Change in neighborhood morphology
TEC.3 – Individual freedom restrictions
TEC.4 – Finding beta users for immature technologies
TEC.5 – Poor local technical skills