

RESOURCE  
ACQUISITION

MANUFACTURE

PACKAGING AND  
TRANSPORTATION

USE

END-OF-LIFE



## Round Table Discussion: “Projection to the future: Energy mix and price”



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# AMANAC – CSA LCA Workshop Round-table Discussion



## Thinking ahead in LCA

- LCA requires the use of assumptions:
  - availability of raw materials
  - energy required for the manufacturing of a product,
  - the capacity of the production installation,
  - the allocation of energy consumed in a plant which produces multiple products on the same equipment,
  - the product's usage behavior or any variable that affects a product's life cycle.





## Projections on electricity generation mix

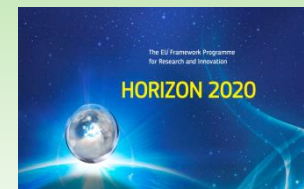
The composition of the generation mix in each country is determined by:

- the power production
- the integration of renewables
- the evolution of storage technologies
- power transport
- supply security of power
- environmental, economic and political factors





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## Case Study

**Subject of Study:** The operation of innovative high-temperature microwave powered system for the thermal treatment of cement – glass – ceramics, consuming ***Electrical Energy***.

- **Conducting LCA ①** →

**Present:**

Lab-scale operation

- **Conducting LCA ②** →

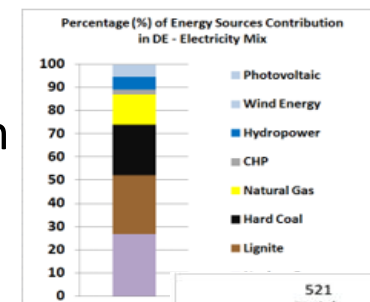
**Future:**

Industrial scale.

→ **Future Energy Data  
required!!!**

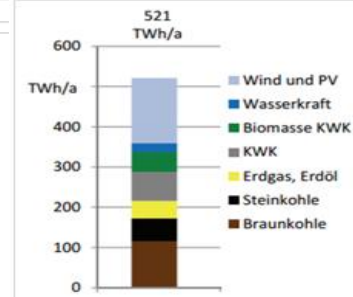
### **Scenario 2015:**

Current German  
Electricity Mix



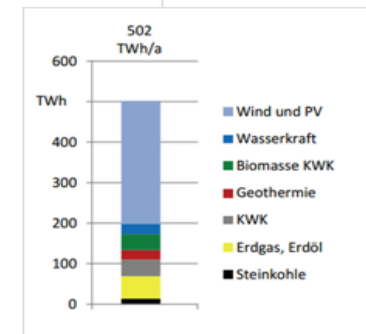
### **Scenario 2030:**

Generation 40%  
from RES.



### **Scenario 2050:**

Generation 80%  
from RES.

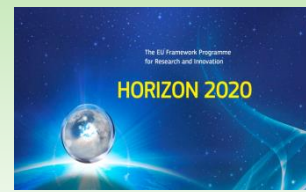


19th May 2016





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## Case Study

**Subject of Study:** The operation of innovative high-temperature MW system for the thermal treatment of cement – glass – ceramics, consuming **Electrical Energy**.

### Approach followed:

Documented scientific forecasting studies provide future data on electricity mix composition which can be introduced into the LCA.

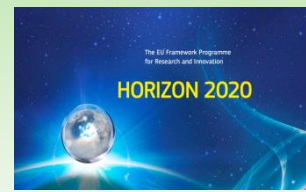
### Indicative Sources:

- [Electrical Power Vision 2040 for Europe](#), Study by EUREL
- VDE-Studie: [Energiespeicher für die Energiewende](#) (Germany)
- ...





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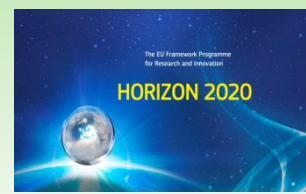
## Thinking ahead in LCC

- Life Cycle Costing (LCC) is a methodology for systematic economic evaluation of life-cycle costs over a period of analysis.
- All the costs are discounted to a **present day** value (Net Present Value – NPV).
- NPV takes into account the **future depreciation** of money.
- The cost categories introduced into a LCC analysis are direct and indirect costs.
- The “Indirect Costs” category includes the **energy costs**.





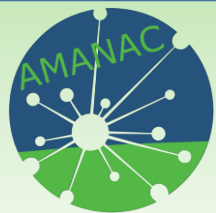
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## Energy Price forecasting: a difficult and complex process

- Electricity storage is profitable only under specific conditions and power system stability requires a constant balance between production and consumption.
- Electricity demand depends on
  - weather (temperature, wind speed, precipitation, etc.)
  - the intensity of business and everyday activities (on-peak vs. off-peak hours, weekdays vs. weekends, etc.).
- Electricity market is characterized by dynamic prices
  - Seasonality at the daily, weekly and annual levels,
  - Abrupt, short-lived and generally unanticipated price spikes.





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## Energy Price forecasting: finding data

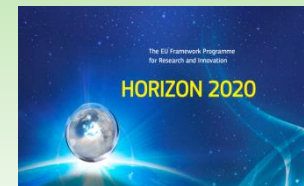
- The [EU's Energy Trends publications](#) present energy market scenarios for 2030 and 2050 based on current trends and policies.
  - They highlight possible energy demand,
  - energy prices,
  - greenhouse gas emissions,
  - and other potential developments.
- Annual Energy Outlook 2015 (USA)
  - Projections in the [Annual Energy Outlook 2015](#) (AEO2015) focus on the factors expected to shape U.S. energy markets through 2040







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## Open Issues – Let's discuss

- Energy mix projection
  - Have you dealt with it?
  - Methodology followed
  - Helpful resources
- Energy Price projection
  - Have you dealt with it?
  - Reports used?
  - ...

