Long-term assessment integrating social acceptance

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Introduction

- Energy modelling to offer mitigation and adaptation solutions to the climate crisis
- Current scenarios non feasible due to lack of acceptance
- Need to find methods to include these questions into energy modelling

Plan

I.   Social Acceptance – concept

II. Energy modelling – presentation and first scenarios

III. Search for indicators

IV. Discussion

# Concepts at stake and points of view

- Acceptance : *a posteriori* evaluation of a project
- Acceptability : *a priori* evaluation of a project
- Support : active engagement **for** a project
- Opposition : active engagement **against** a project
- NIMBY (Not In My Back Yard) : Opposition between a general positive opinion and a local opposition

Citizens: people living near the project who might oppose or support it.
Industrials: companies locally or nationally involved in the design or the realization of the project.
**Decision makers:** local and national politicians who have an impact on location decisions, public investments, etc.
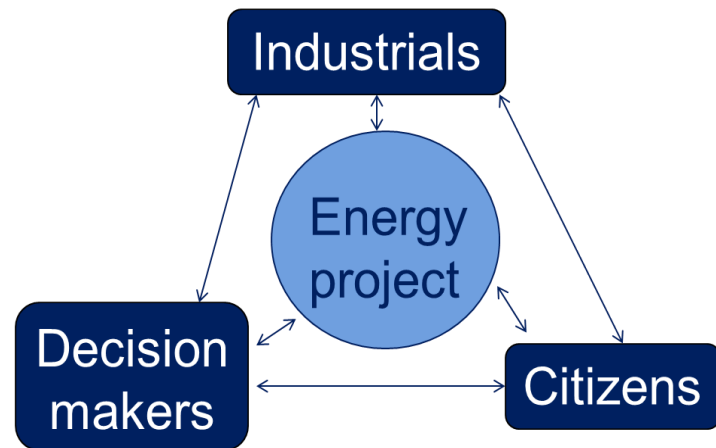
Three-dimensional assessment of social acceptance

Social acceptance as a three-dimensional assessment (Wüstenhagen et al, 2007):

- Community acceptance : Stakeholders concerned by a local project
- Socio-political acceptance : broad, policy making
- Market acceptance : adoption and diffusion of technologies

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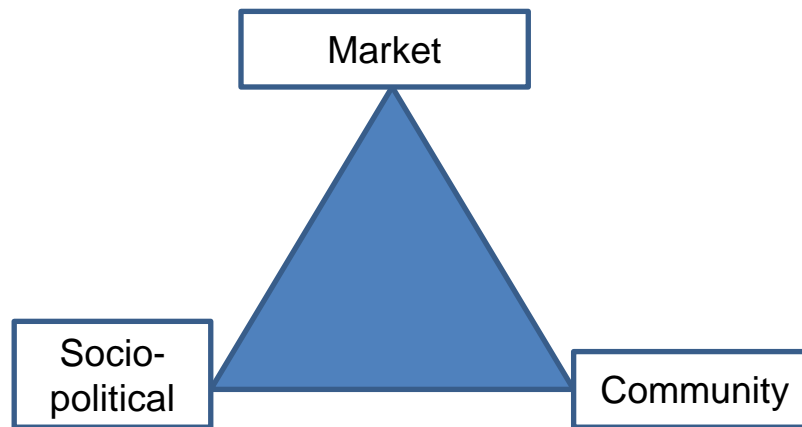
TIAM-FR: *French version of the TIMES Integrated Assessment Model*

Optimization, linear programming
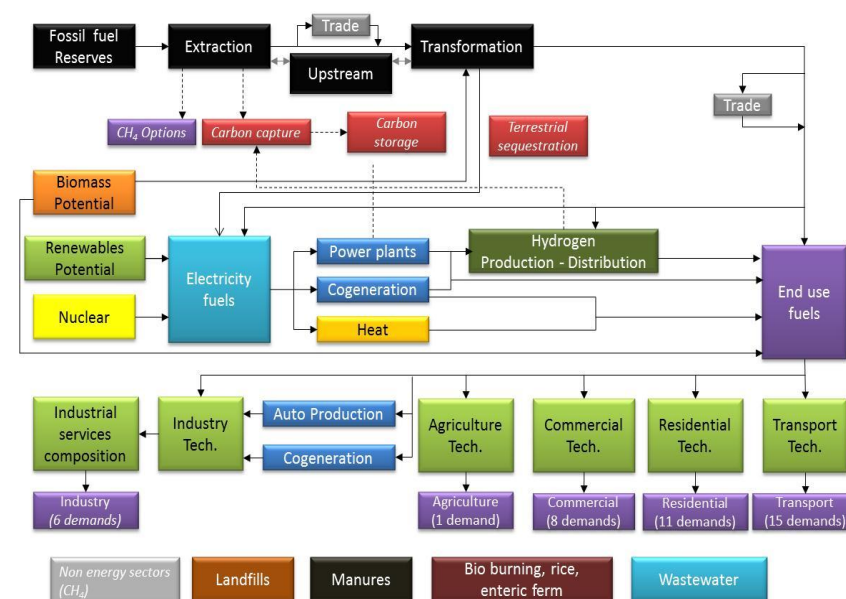Minimization of the total discounted cost of the system

Bottom-up
Long-term: **2010**-2100
Multi-regional:15 regions (+T-ALyC)
Multi-sectors: 6 sectors
42 demands

585 729 data
11 646 commodities (about 770/region)
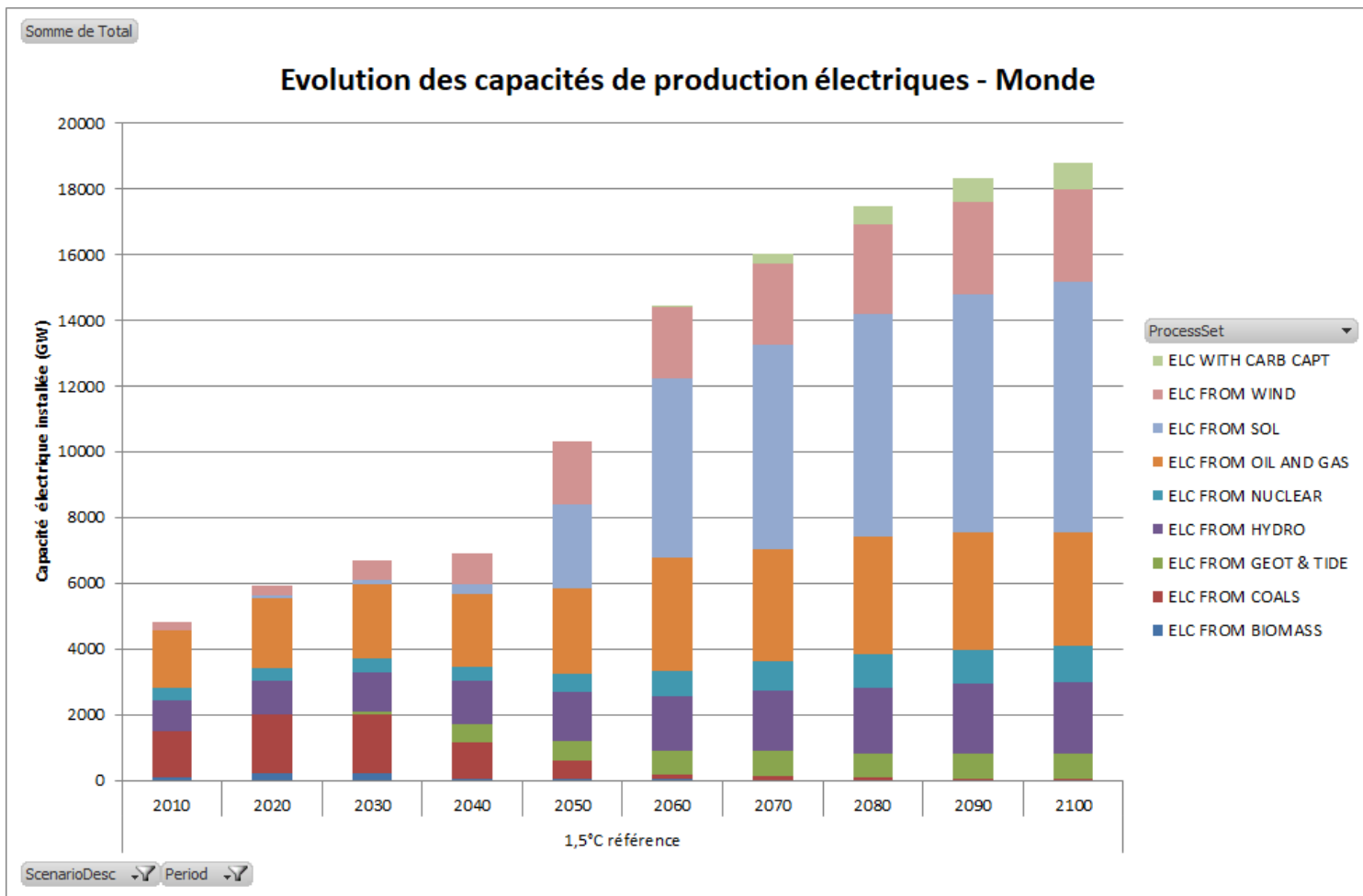39 817 technologies (about 2 500/region)
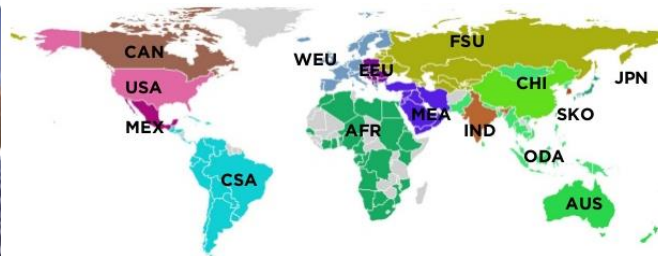
$$NPV = \sum_{r=1}^{R} \sum_{y \in YEARS} (1 + d_{r,y})^{REFYR-y} * ANNCOST(r,y)$$

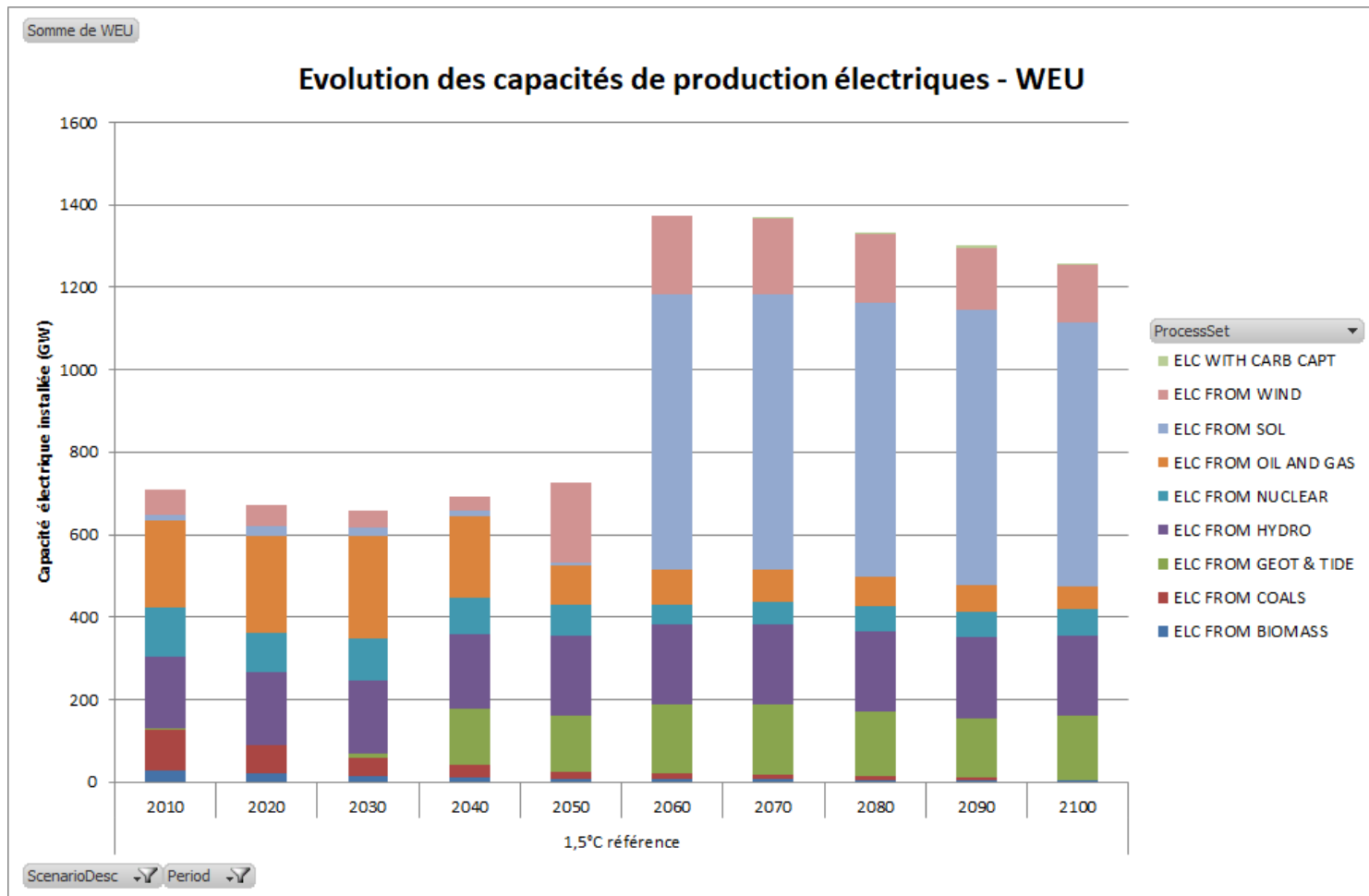*Where*
NPV is the net present value of the total cost for all regions over the projected period;
ANNCOST (r,y) is the total annual cost in region r and year y;
dr,y is the discount rate;
REFYR is the reference year for discounting;
YEARS is the set of years and R is the set of regions (15 regions)

First scenario– results – 1,5°C

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First scenario– Focus WEU

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Focus WEU – Focus on solar power

Evolution des capacités de production électriques - WEU
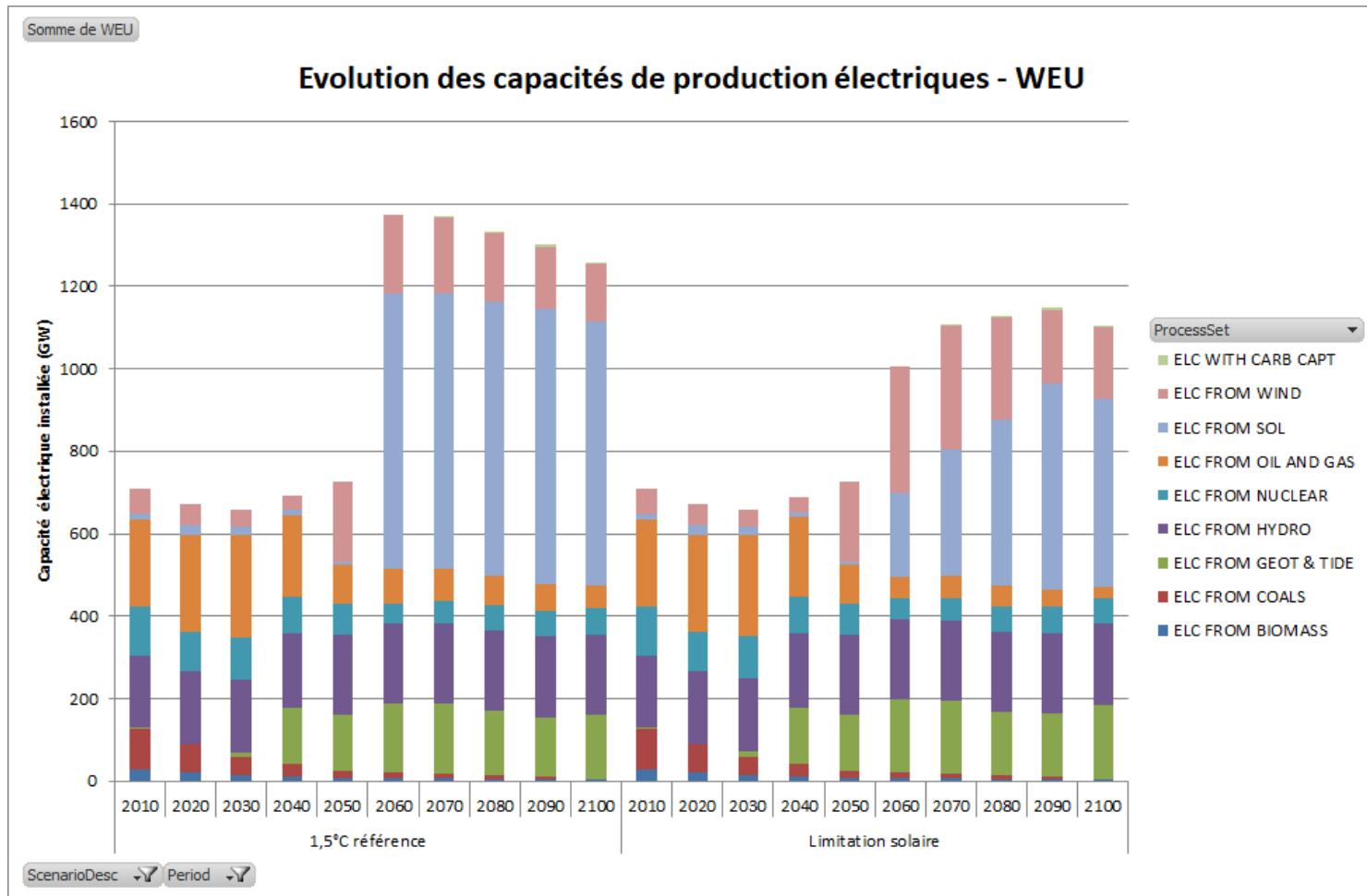
This is not enough

- Looking for better modelisation and to incorporate indicators
- Parameters that influence social acceptance
  - Energy
  - Economy
  - Territory
  - Democracy
- Sustainable Development Goals (SDG)

Sustainable Development Goals

- Goal 1 : End poverty in all its forms everywhere
- Goal 2 : End hunger, achieve food security, and improved nutrition and promote sustainable agriculture
- Goal 3 : Ensure healthy lives and promote well-being for all at all ages
- Goal 4 : Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5 : Achiever gender equality and empower all women and girls
- Goal 6 : Ensure availability and sustainable management of water and sanitation for all
- Goal 7 : Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8 : Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9 : Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10 : Reduce inequality within and among countries
- Goal 11 : Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12 : Ensure sustainable consumption and production patterns
- Goal 13 : Take urgent action to combat climate change and its impacts
- Goal 14 : Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15 : Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16 : Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17 : Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development
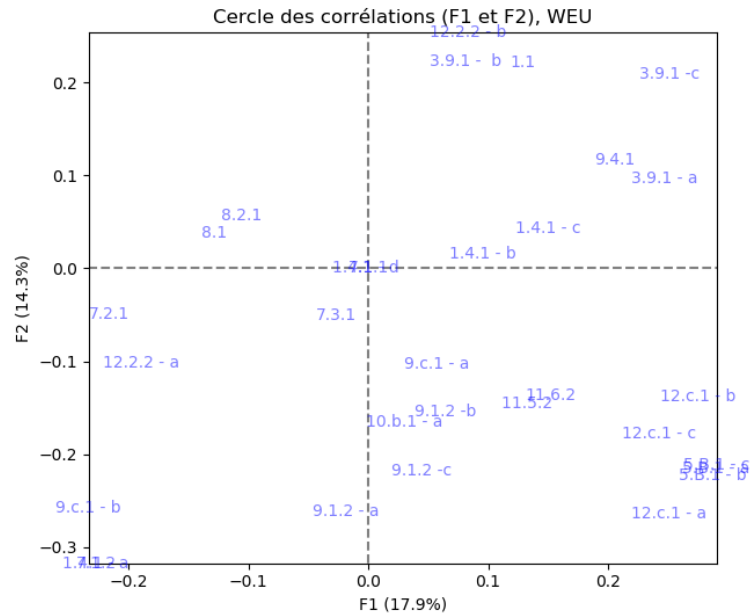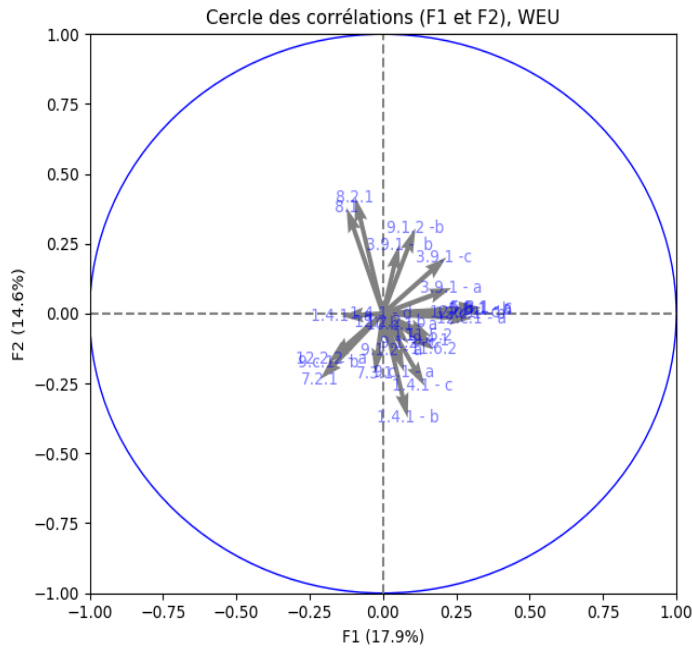
Relevant to energy and climate ; somehow relevant to energy and climate

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SDGs methodology

- Selection of SDG indicators related to social acceptance of solar power

- Principal component analysis by zone for a fixed year for the chosen indicators

- Principal component analysis : change the base of the data to have an orthonormal base with the first vectors being the most explanatory

- Correlation circle : Project data in a 2D-graph. Axis are the two most explanatory vectors.

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SDGs PCA for WEU, year 2015.

Cercle des corrélations (F1 et F2), WEU

Cercle des corrélations (F1 et F2), WEU

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Discussion

- Integrating social acceptance has an impact on the scenarios
- Need to find the appropriate set of indicators
- Working with SDGs is difficult because of the amount of data
- PCA did not give clear results

- More work to do to find the good way to integrate social acceptance into energy modelling

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THANK YOU FOR YOUR ATTENTION

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