INSPIREgrid
emPOWERing people

Workshop "How to engage stakeholders in landscape planning, design and aesthetics of grid infrastructure"

19 - 20 May 2015, Milan

Multi-criteria and multi-stakeholder assessment for energy grid planning

A simulation game

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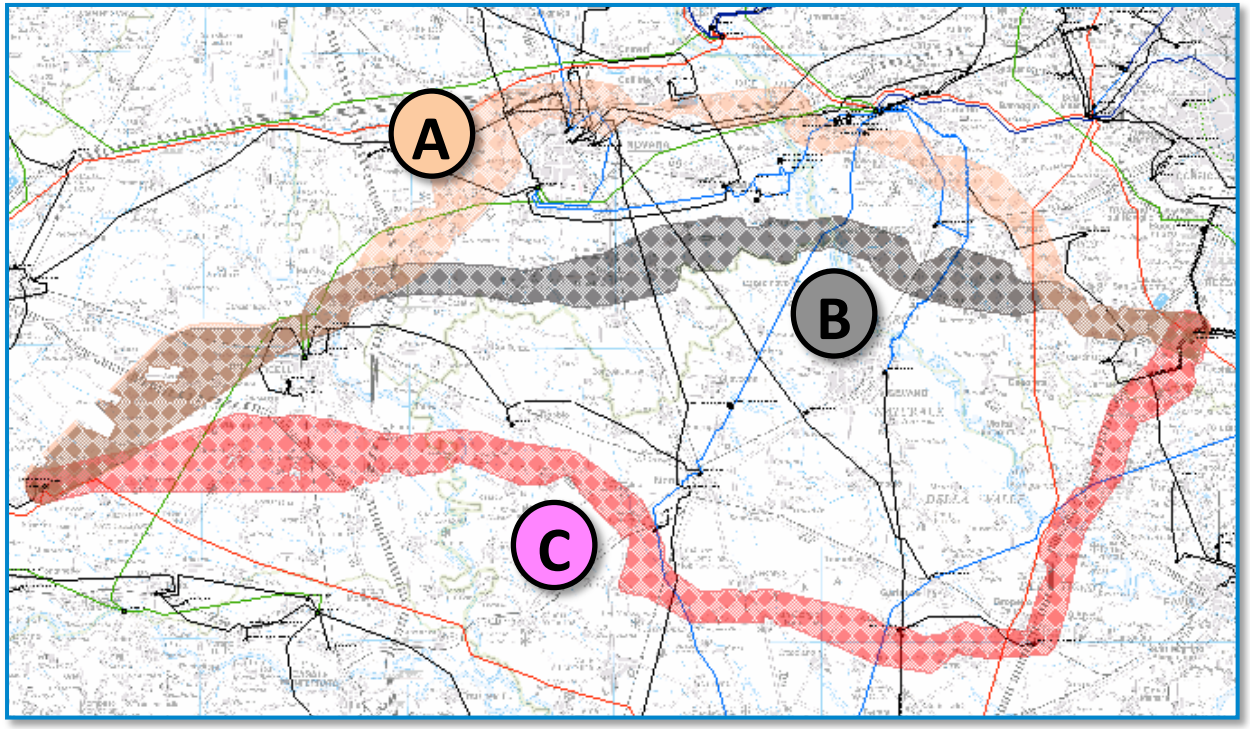
SEVENTH FRAMEWORK PROGRAMME

An example of grid planning



Laniado E., Motawi A., Rizzuto R., Cappiello A., Micotti M., "La valutazione ambientale strategica del piano di sviluppo della RTN", AEIT, n.11, novembre 2008.

Choice among three alternative corridors (A, B, C) and the do-nothing option (0).

What are the positive and negative effects of such infrastructure?

How to assess and compare the (four) alternatives?

Positive and negative effects

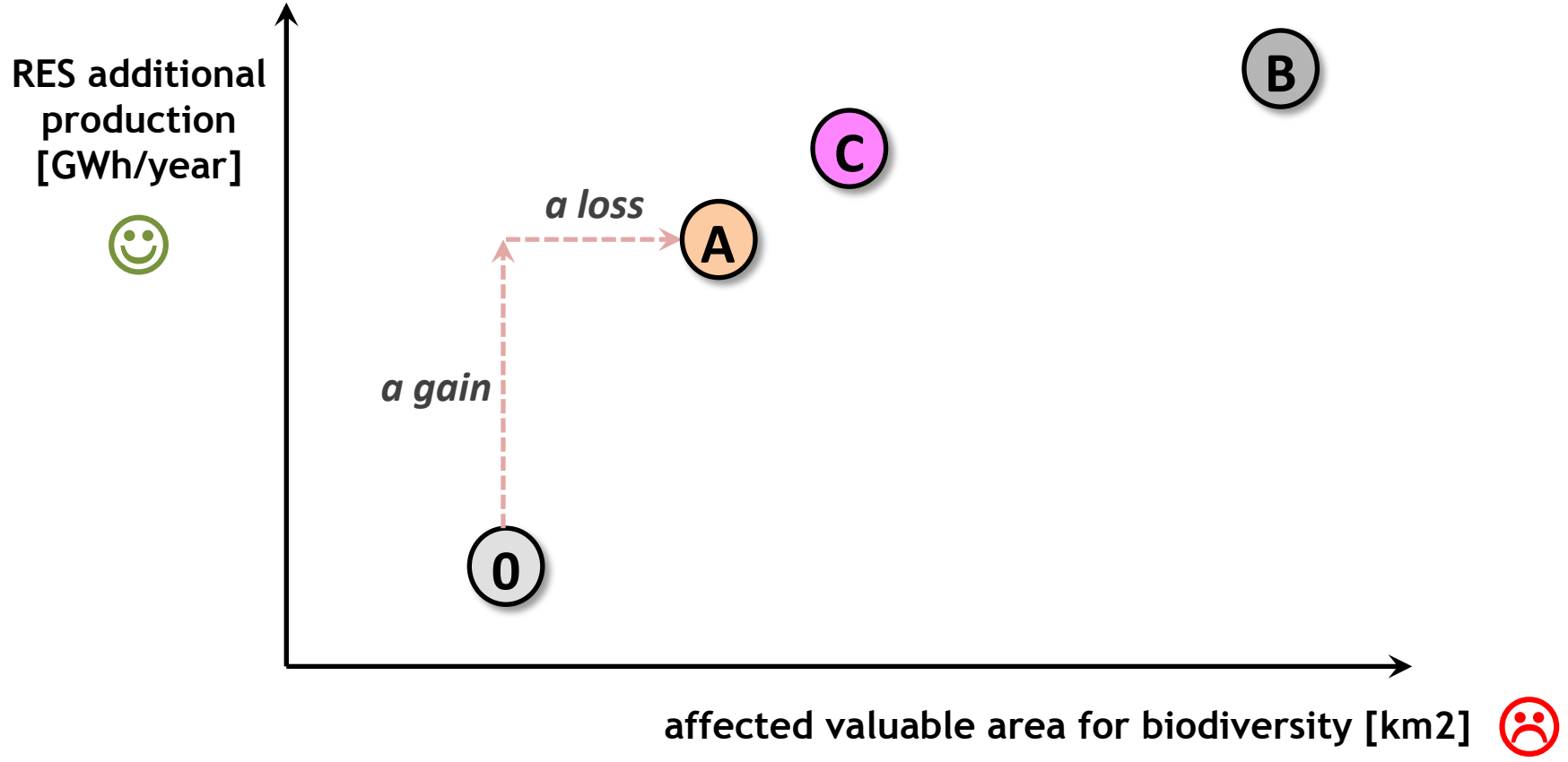
- security of supply ☺
- transmission losses ☺
- RES integration ☺
- technical resilience ☺
- …

- landscape ☹
- ecosystems ☹
- property values ☹
- GHG emission ☺☹
- …

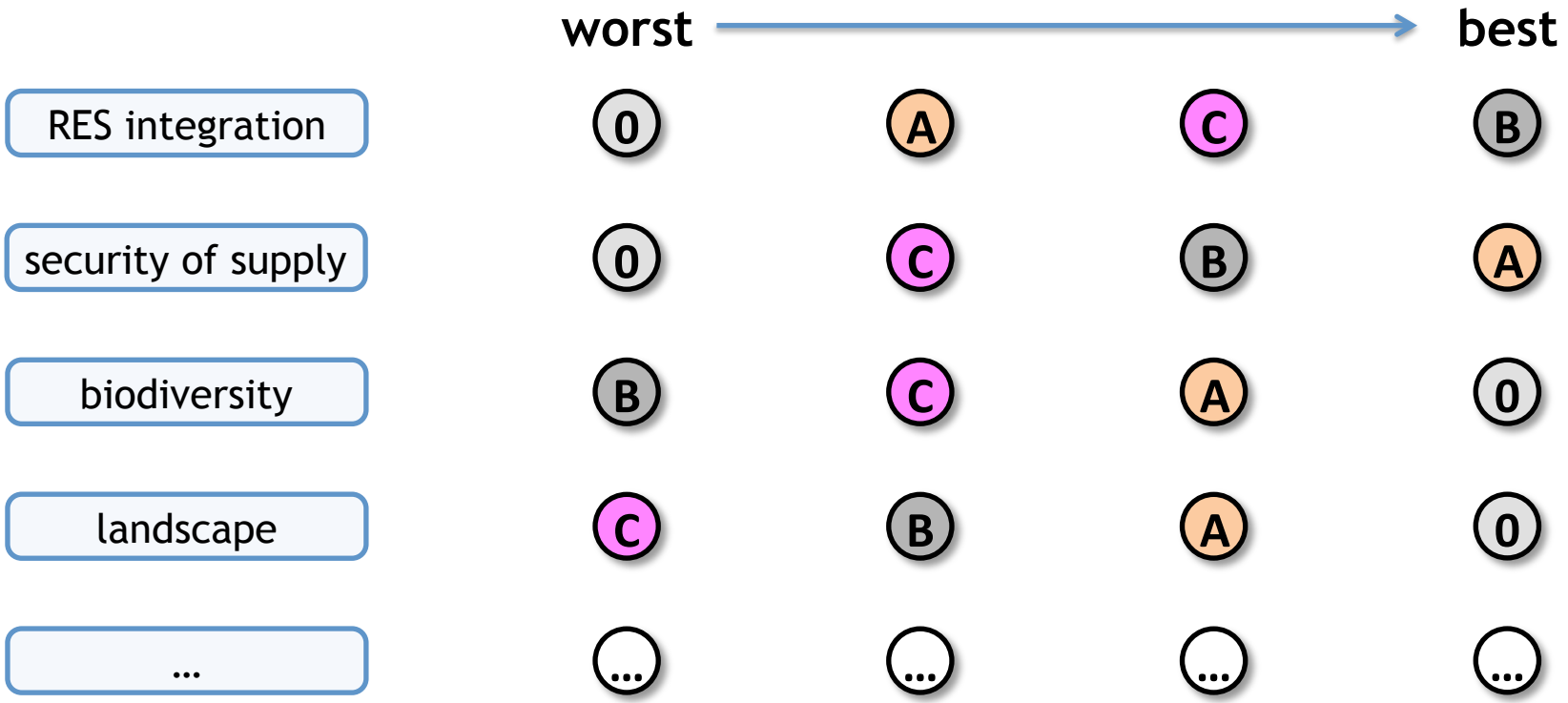
- Local vs global effects
- Complex estimation of effects
- Conflicting aspects

Multiple conflicting aspects

Let's consider two aspects (**criteria**) to evaluate and compare the four alternatives



Comparison of the alternatives



How to assess and compare the (four) alternatives? Different possible methods …

- Cost Benefit Analysis (monetization of all the effects)
- Multi-Criteria Analysis

Multi-Criteria Analysis: the main steps (1)

Identification

- Scenarios
- Stakeholders
- Alternatives
- Objectives

Estimation of the effects of the alternatives

(indicators definition, methods to populate the indicators)

Comparison of the alternatives

(methods to synthetize the information coming from different indicators)

Multi-Criteria Analysis: the main steps (2)

Identification

- Scenarios
- Stakeholders
- Alternatives
- Objectives

Estimation of the effects of the alternatives

(indicators definition, methods to populate the indicators)

Comparison of the alternatives

Indicator definition and estimation

Monetary cost	Investment + operating and maintenance costs [M€]
RES integration	RES additional production [GWh/year]
…	…
Landscape scenic elements	Number of landscape scenic elements (e.g. historical center, lakes, mountains, etc.) affected by the line
Biodiversity	Affected valuable area for biodiversity [km2], considering Sites of Community Importance, ecological network, etc.
…	…

Multi-Criteria Analysis: the main steps (3)

Identification

- Scenarios
- Stakeholders
- Alternatives
- Objectives

Estimation of the effects of the alternatives

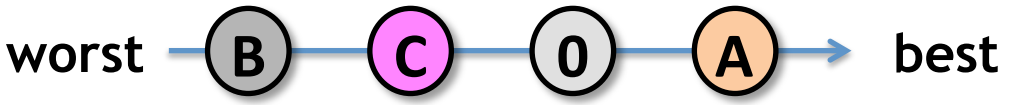
(indicators definition, methods to populate the indicators)

Comparison of the alternatives

Elicitation of the **stakeholder preferences**

- Importance (**weights**) of the criteria, so that such measure - related to single indicators - can be harmonized and aggregated

Ranking of the alternatives, according to the stakeholder preferences



Setting criteria weights

Weights indicate how much trade-off the stakeholder is willing to accept considering two criteria

elicitation

Is it more important RES integration or Biodiversity? How much?

Setting criteria weights

In addition to the stakeholder preferences, weights depend also on the specific case

Case A

	Alternative 1	Alternative 2
Monetary cost	0 M€	**1 M€**
RES integration	0 GWh/y	40 GWh/y
…	…	…

More importance (weight) to the **RES integration**

Case B

	Alternative 1	Alternative 2
Monetary cost	0 M€	**500 M€**
RES integration	0 GWh/y	40 GWh/y
…	…	…

More importance (weight) to the **Monetary cost**

Note: two extreme simplified cases

The case for the role game

UTOPIA

Note: description → to help you impersonate the role

City of Duckburg

132 kV

A

B

Hydro power plant

UTOPIA

C

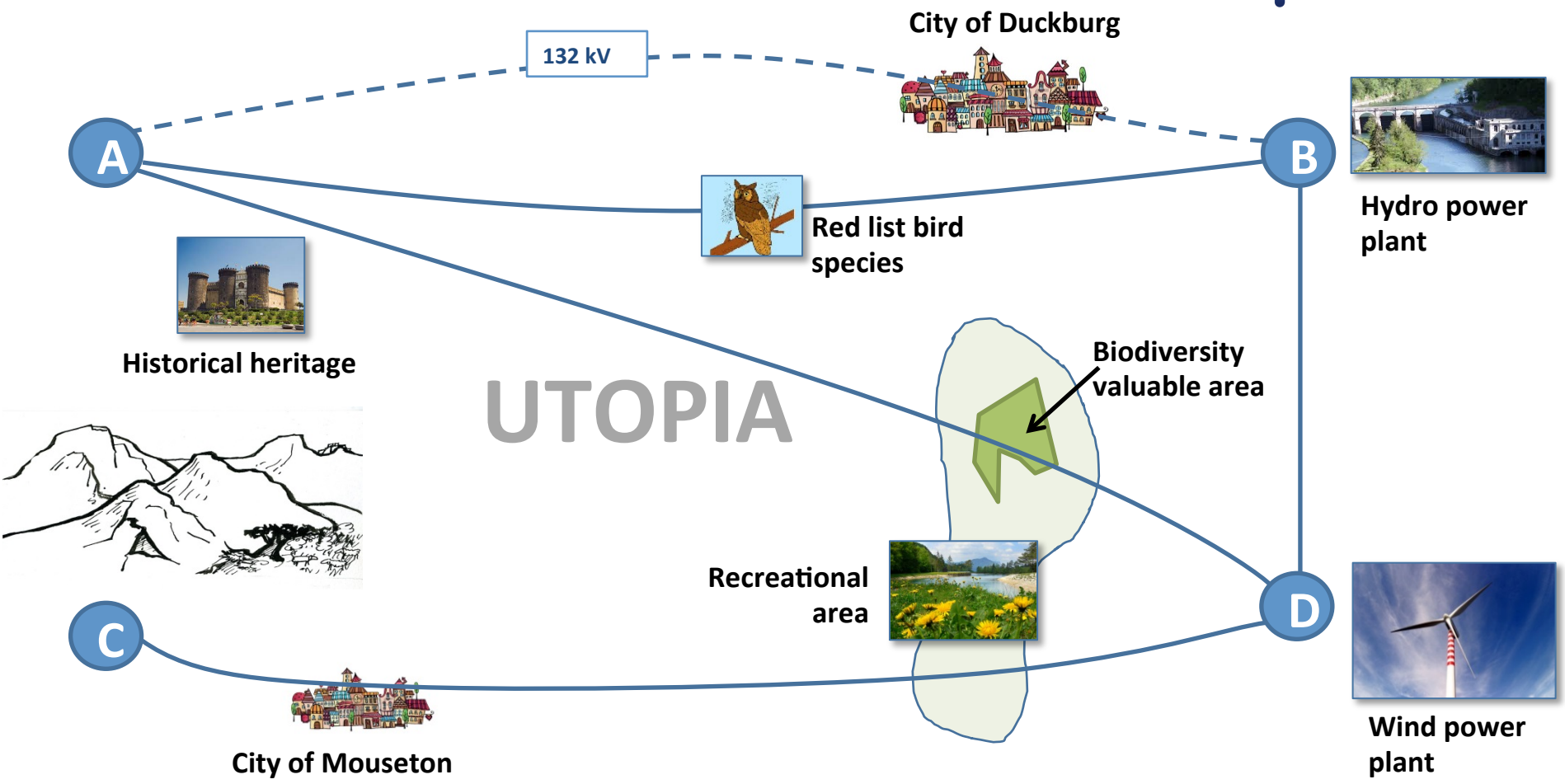
City of Mouseton

D

Wind power plant

Needs

- Improve the security of supply
- Remove the impacts on Duckburg
- Support to RES integration (hydropower and wind power)
- Reduce the CO2 emissions thanks to the RES integration



Alternative lines

- AB
- AD
- CD

+ DB

AD → possible also a compensation as regards historical heritage

How to evaluate and compare the alternatives?

SECTOR	INDICATORS
TECHNICAL ASPECTS	C1 - Risk of network disruption [-]
	C2 - RES additional production [GWh/year]
INVESTMENT COST	C3 - Project cost [M€]
SOCIO – ECONOMIC ASPECTS	C4 - Population near the power lines [inhabitants]
	C5 - Touristic income [%/year]
ENVIRONMENT	C6 - Valuable area for biodiversity [km^2]
	C7 - Vulnerable bird species [-]
	C8 - GHG emissions avoided [tonCO_2eq/year]
	C9 - Land not yet infrastructured [km]
"LANDSCAPE"	C10 - Cultural and landscape valuable areas [km^2]
	C11 - Cultural heritage and landscape elements [-]
	C12 - Visibility of the line [-]

Description of the effect range on each criterion

Rules of the game and workshop development

- Played stakeholders (roles)
- Scheduled activities
- Surveys at the end of the activities
- Each participant willing to participate is kindly asked to participate to the full workshop of today.

Roles and groups

- **Roles attributed by chance:** a TSO could become, for instance, a tourism operator or an affected citizen, and vice versa
- **5 heterogeneous table-groups** of discussion: at each table all the main stakeholders' categories are represented:

  - ***TSOs***
  - ***tourism operators***
  - ***environmental association***
  - ***landscape association***
  - ***citizens of Duckburg***
  - ***citizens of Mouseton***
  - ***a public body (Region)***
  - ***Local energy company***

Role play sequence – DAY 1

- ***15:15*** **- Presentation of the role play**
- ***15:40*** **- Coffe break**
- ***16:00*** **- Participants** find their table and **sit** there
  - ***Activity 1****: discussion within groups – evaluation criteria – 40'*
  - ***Activity 2****: discussion within groups – weights priorities – 60'*
- ***17:45 – Final discussion***
- ***18:00*** **- End of the first part** of the workshop (Day 1)

Activity 1

Main task: role assumption and statement of individual positions about the criteria importance

Time: **40'**

a. **Each participant presents very briefly her-himself to the other participants**

b. **Selection of a representative for the table group**

c. **The stakeholders prioritize criteria according to their role**

d. **Each participant presents their views to the other participants and the criteria that are most important to them**

Activity 2

Main task: develop a group ranking of the criteria according to importance groups

Time: **60'**

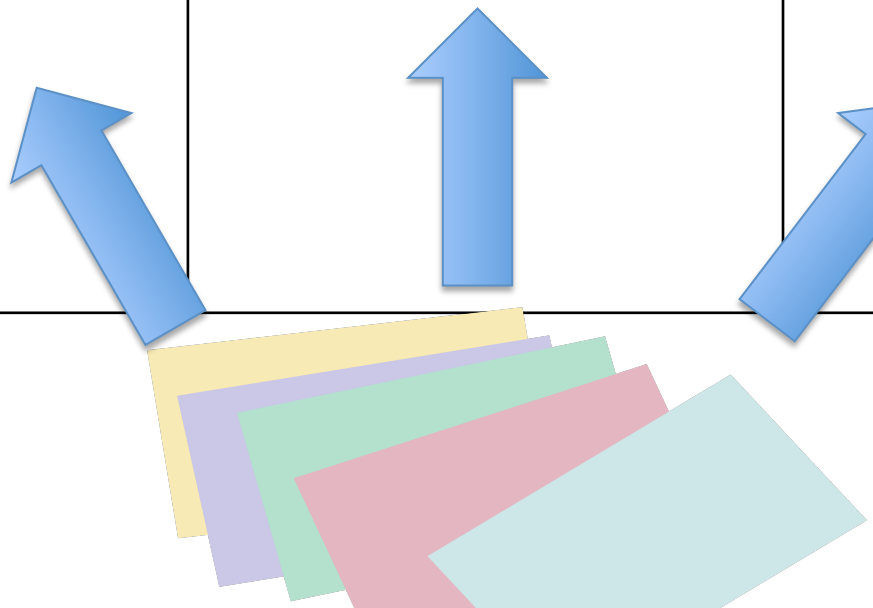
e. **Participants discuss in order to reach an agreement on grouping criteria according to at least three importance levels** (most important criteria, average importance, and lower importance)

f. **If the group easily reaches an agreement on this first level, the table is invited to refine the ranking**

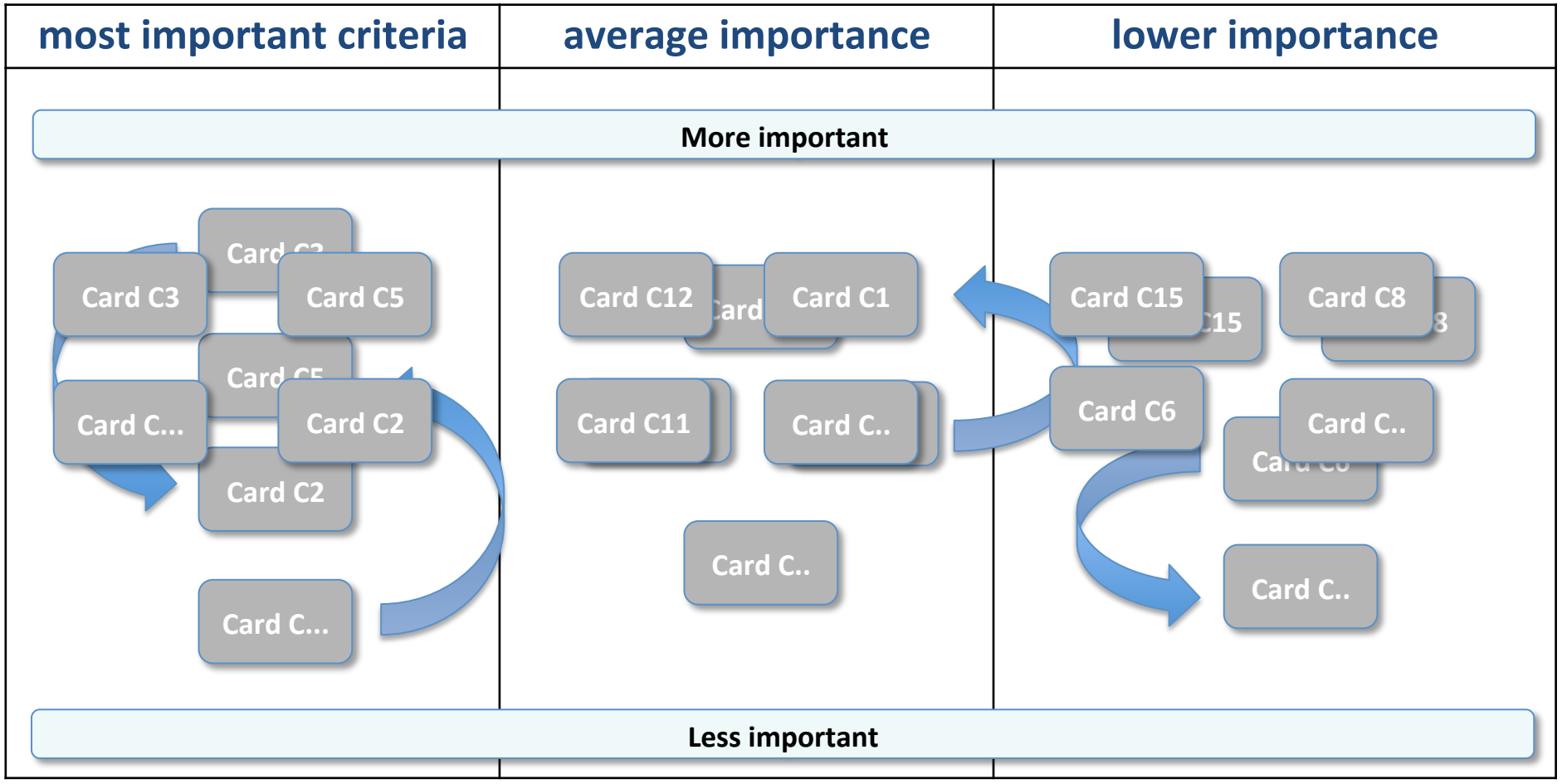
g. **Each participant individually fills a survey**

Grouping criteria according to three importance levels

most important criteria	average importance	lower importance
Card C3	Card C12	Card C15
Card C5	Card C1	Card C8
Card C...	Card C11	Card C6
Card C2	Card C..	Card C..



Refining of the ranking



Presentation of the results

- The results of both activities will be presented tomorrow morning (May 20th)
- 09:00 - Presentation of the results of the MCAs according to the ranking generated the day before
- 09:45 - The participants fill out a surveys on the results
- 10:00 - End of the workshop and start of the field-trip

Tips for role-playing

- Wear your HAT! 
- You ARE one of the key stakeholders of the case study
- Play your role given background information
- Take it easy! Don’t worry about details. No need to stifle into role or exaggerate it
- Be “creative”
- Observe critically while acting
- Remember that you may create coalitions/alliances with the other stakeholders
- Please consider the time duration of the activities