

# Smart Sustainability Simulation Game

Case 4: Recycling - Unit 2  
25.06.2024

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# 01

## Organizational information

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**Final Live Session (Mandatory Attendance)**

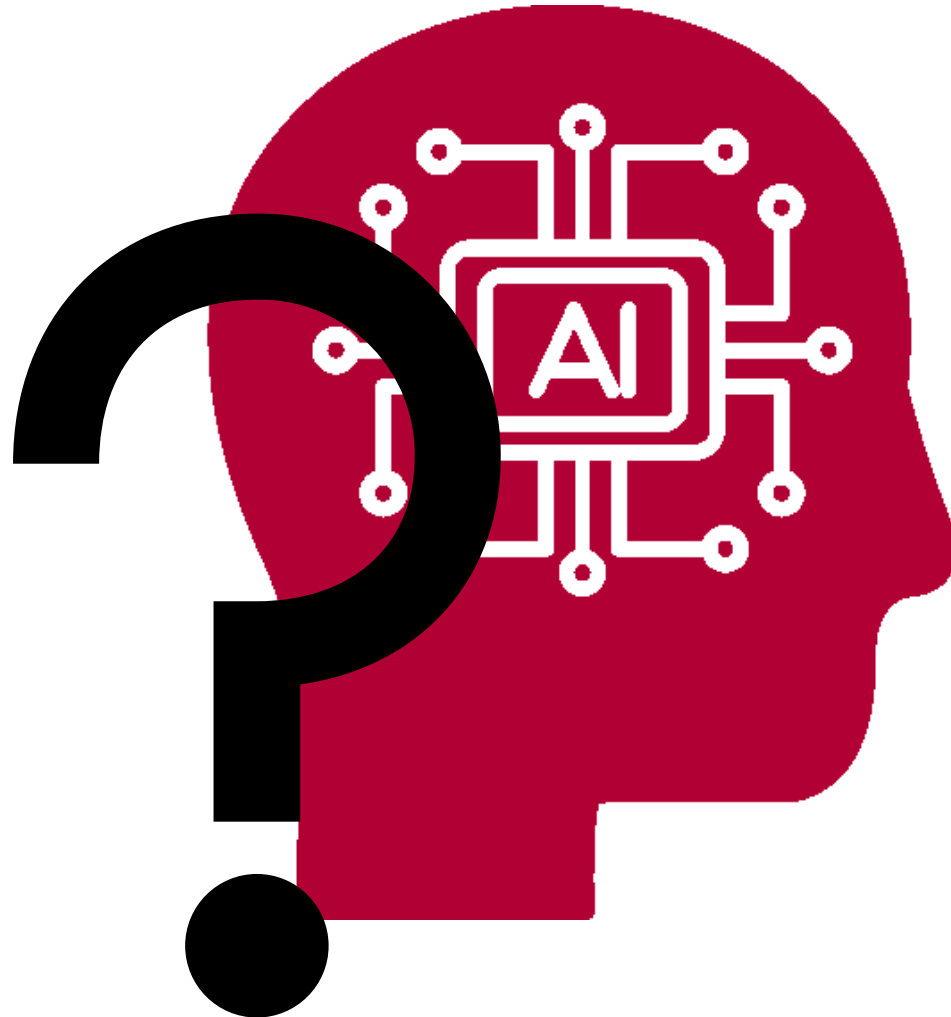
02.07.2024



**Submission of the individual reflection report**

15.07.2024

## Time for Feedback



How was the  
last week?

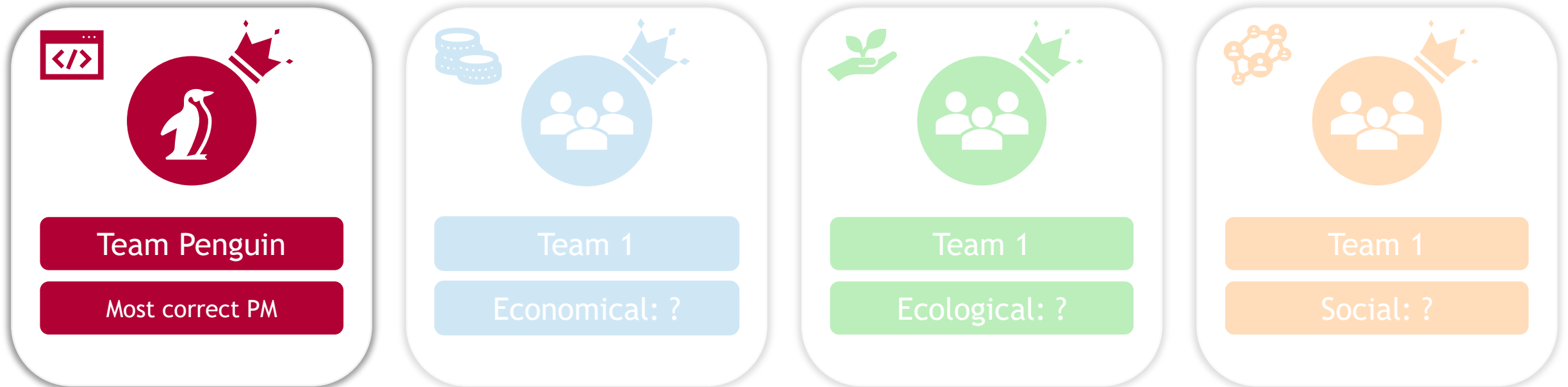
Any Questions?

# 02

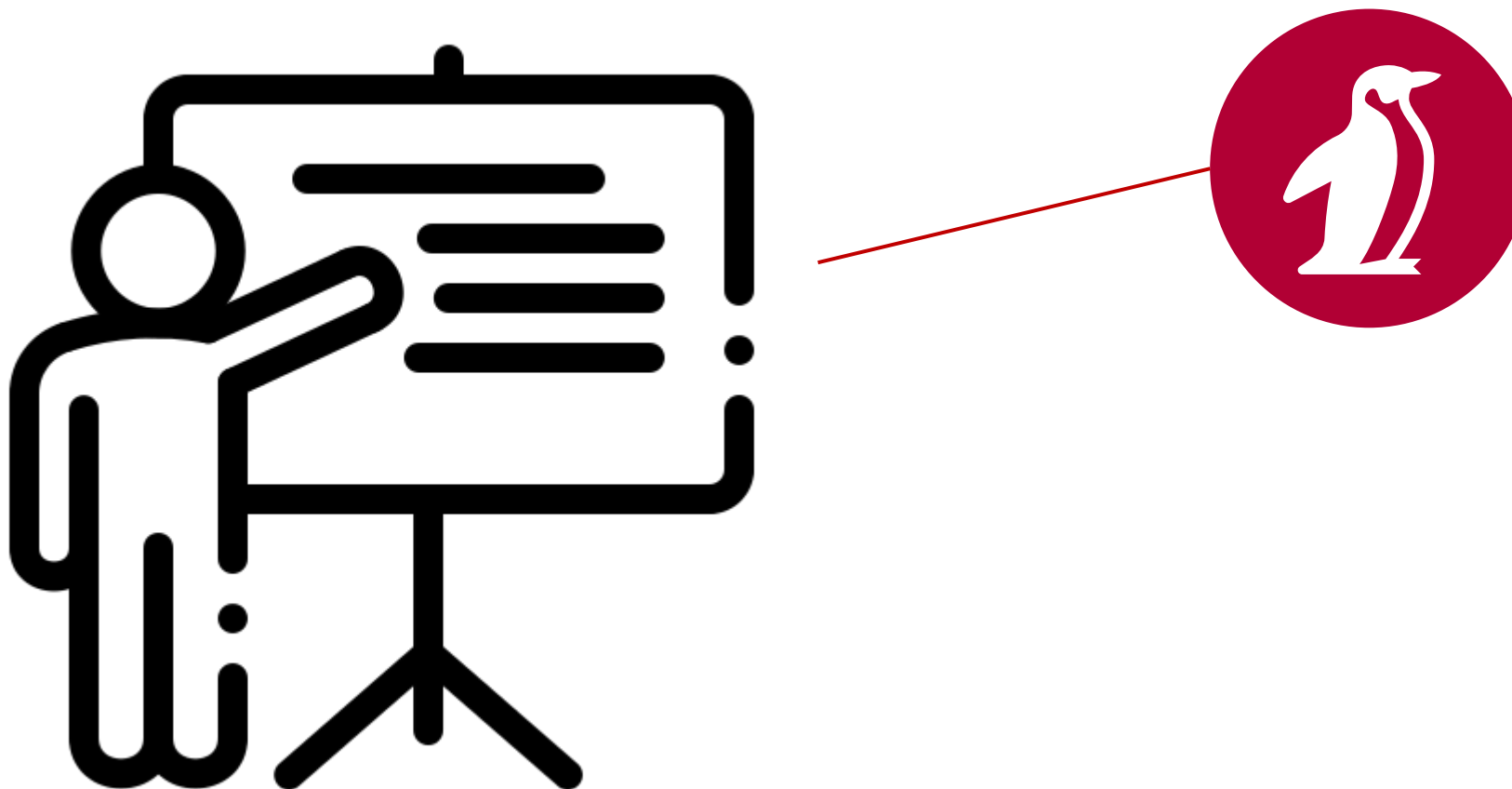
## Case 4: Your results

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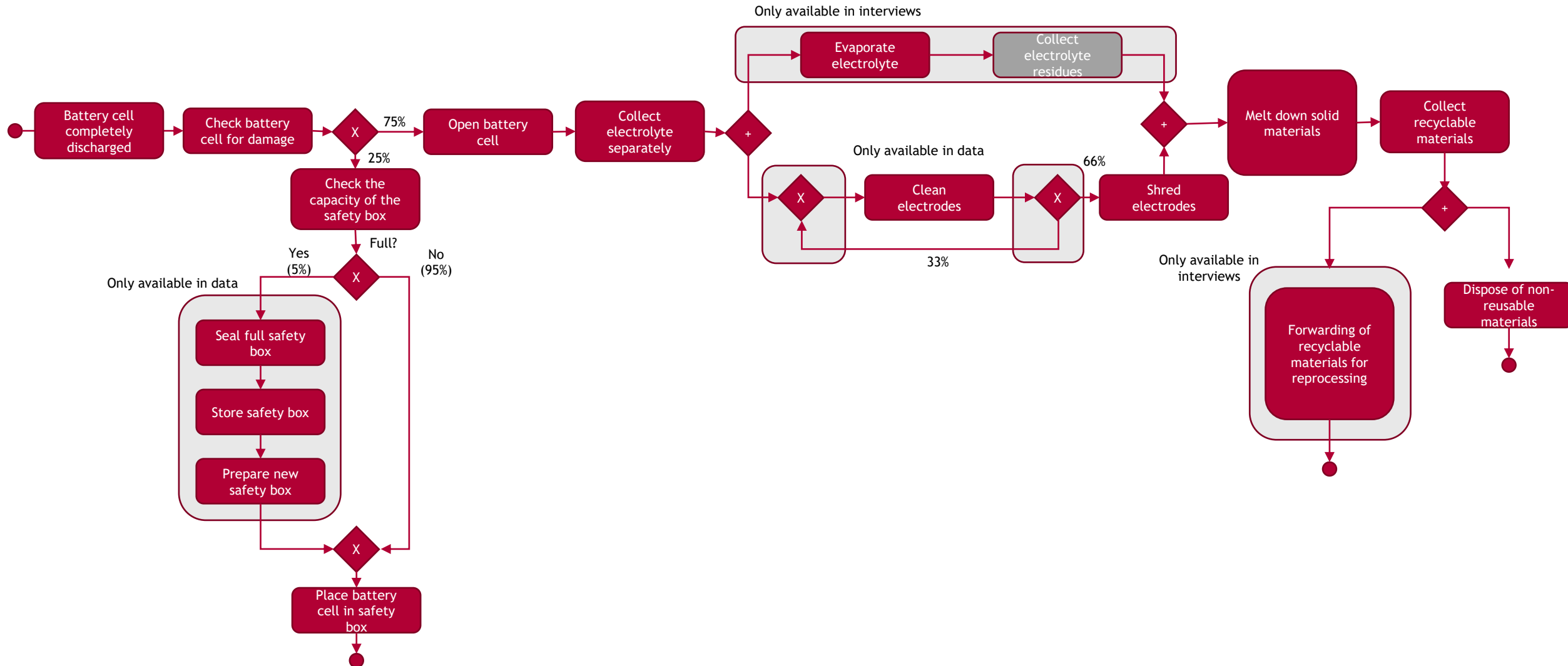
## Case 4: Leaderboard



## Case 4: Presentation of results



## Case 4: Sample solution





# 03

## Case 4: Recycling - Unit 2

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# Overview of the cases

## Case 1: Material procurement

- What materials should I buy and when?
  - Value chain level: Procurement
- Time Series Analysis

## Case 2: Quality Management

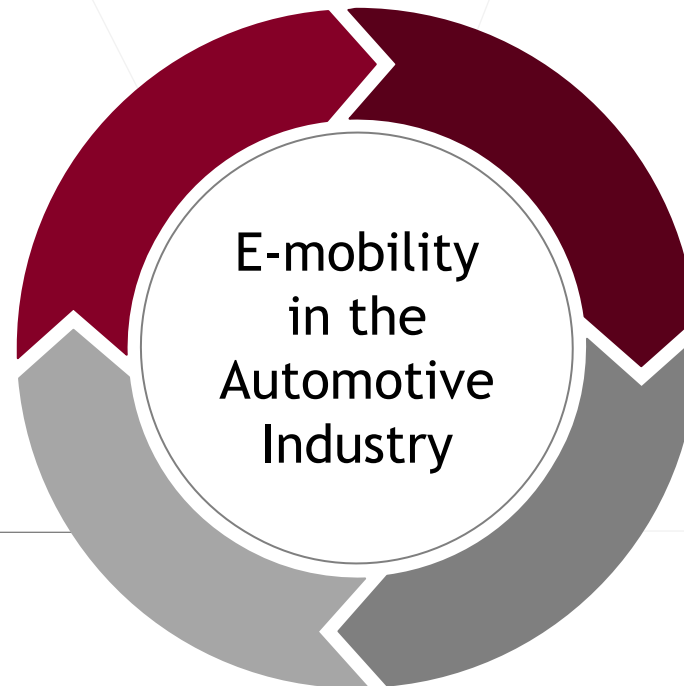
- How to ensure good quality?
  - Value chain level: Operations/production
- Computer Vision

## Case 4: Recycling

- How much effort do I put into recycling?
  - Value chain level: After-sales-services
- Process Mining

## Case 3: Predictive Maintenance

- How often and when should I maintain my machine?
  - Value chain level: Operations/production
- Predictive Analytics



## Three common methods of evaporation



### Heat Evaporation

Applying heat to the electrolyte in a controlled environment to vaporize the solvent, leaving behind the lithium salts as solids.



### Vacuum Evaporation

Subjecting the electrolyte to a vacuum, which reduces the boiling point of the solvent, allowing it to evaporate at a lower temperature.



### Distillation

Heating the electrolyte to its boiling point and collecting the vapor, which is then condensed back into a liquid, leaving behind the salts.

# The methods show different features of ecological, economic, and social sustainability



## Heat Evaporation

- consumes a significant amount of energy to heat the electrolyte to its boiling point
- cost-effective in terms of equipment and operational costs, yet high energy costs
- easier to train personnel to operate heat evaporation equipment

## Vacuum Evaporation

- more energy-efficient than heat evaporation
- equipment can be more expensive to set up and maintain compared to heat evaporation, yet lower energy costs
- may require more specialized training and maintenance expertise

## Distillation

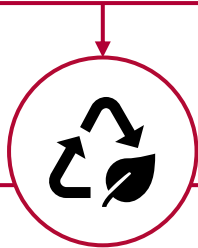
- energy-intensive
- capital-intensive due to the need for specialized distillation equipment
- higher demand for trained professionals in the field, potentially benefiting local communities

## Case 4: Battery Recycling of Edison Cars AG

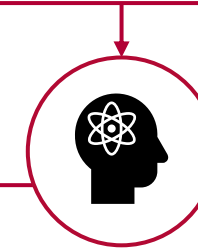


## Case 4: Battery Recycling of Edison Cars AG

The CEO of Edison Cars AG was very satisfied with your process model and that you brought the evaporation of the electrolyte to his attention. He wants you to rethink this process step and figure out the options for the evaporation. The development team identified three methods for evaporation called heat evaporation, vacuum evaporation, and distillation, which all lead to the same result. As you became an expert for battery recycling, management wants you to compare the three methods and recommend one of them for the new facility.



The **CEO aims to know** which **evaporation methods** should be used.



The CEO emphasizes that is very important for him to get a comprehensive **overview on the different sustainability factors**.

## Your task for the second week

1

- Conduct research on each of the three electrolyte evaporation methods
- Understand how the methods work and try to find differences

2

- Gather information on ecological, economic, and social sustainability of each of the evaporation methods
- Use the worksheet provided for the second week to identify relevant numbers

3

- Decide on the importance of the three types of sustainability for the Edison Cars AG
- Tip: Conduct weighting for each sustainability factor

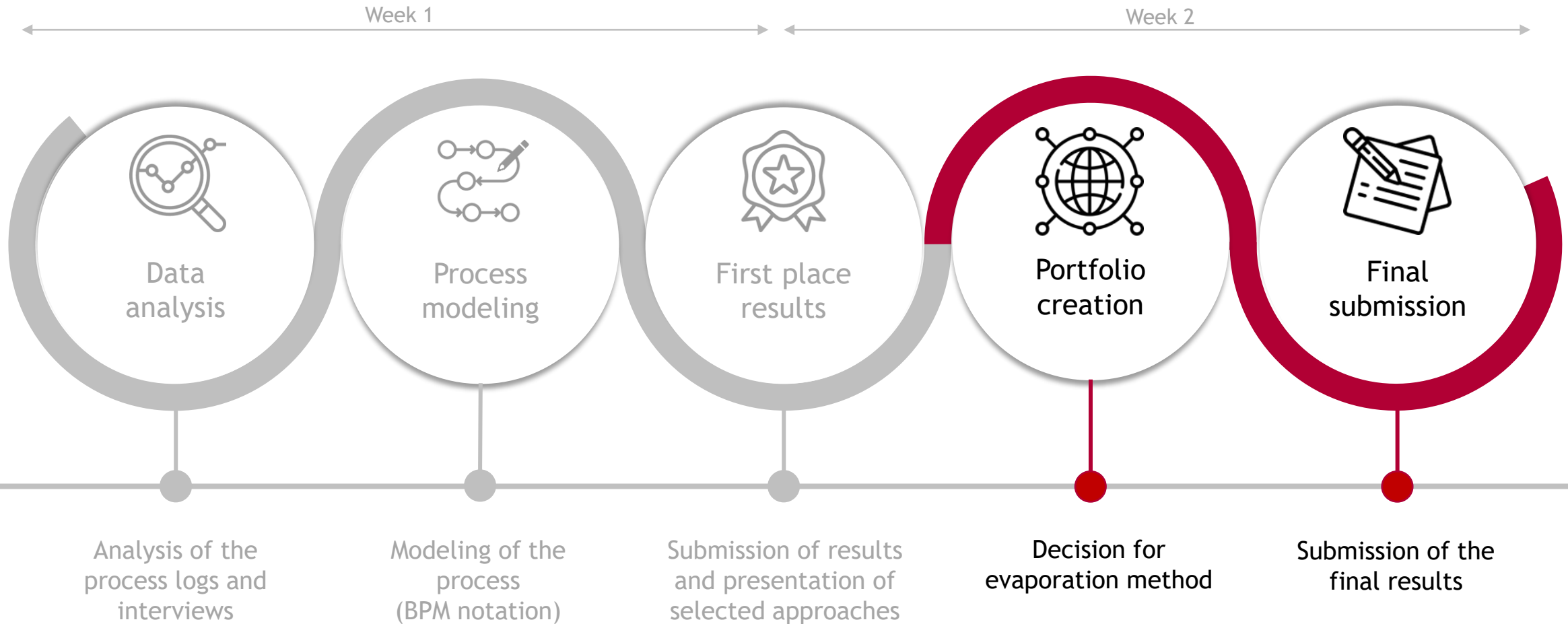
4

- Compare the sustainability scores you calculated for each of the three methods
- Identify the overall most sustainable method for your battery recycling process and give a recommendation

5

- Prepare a presentation summarizing your findings, including sustainability scores, recommendation and justification
- Prepare to discuss the results with the managers of Edison Cars AG

## Case 4: Time schedule





## Case 4: Input

**Worksheet**  
Contains description of the task  
and the exact submission details



**Task  
completion**

## Case 4: Submission

The following documents must be emailed to [s3g@fim-rc.de](mailto:s3g@fim-rc.de) as one zip folder by 09:00 AM on 01.07.2024:

### Calculation

Description of the steps you did during the evaporation comparison



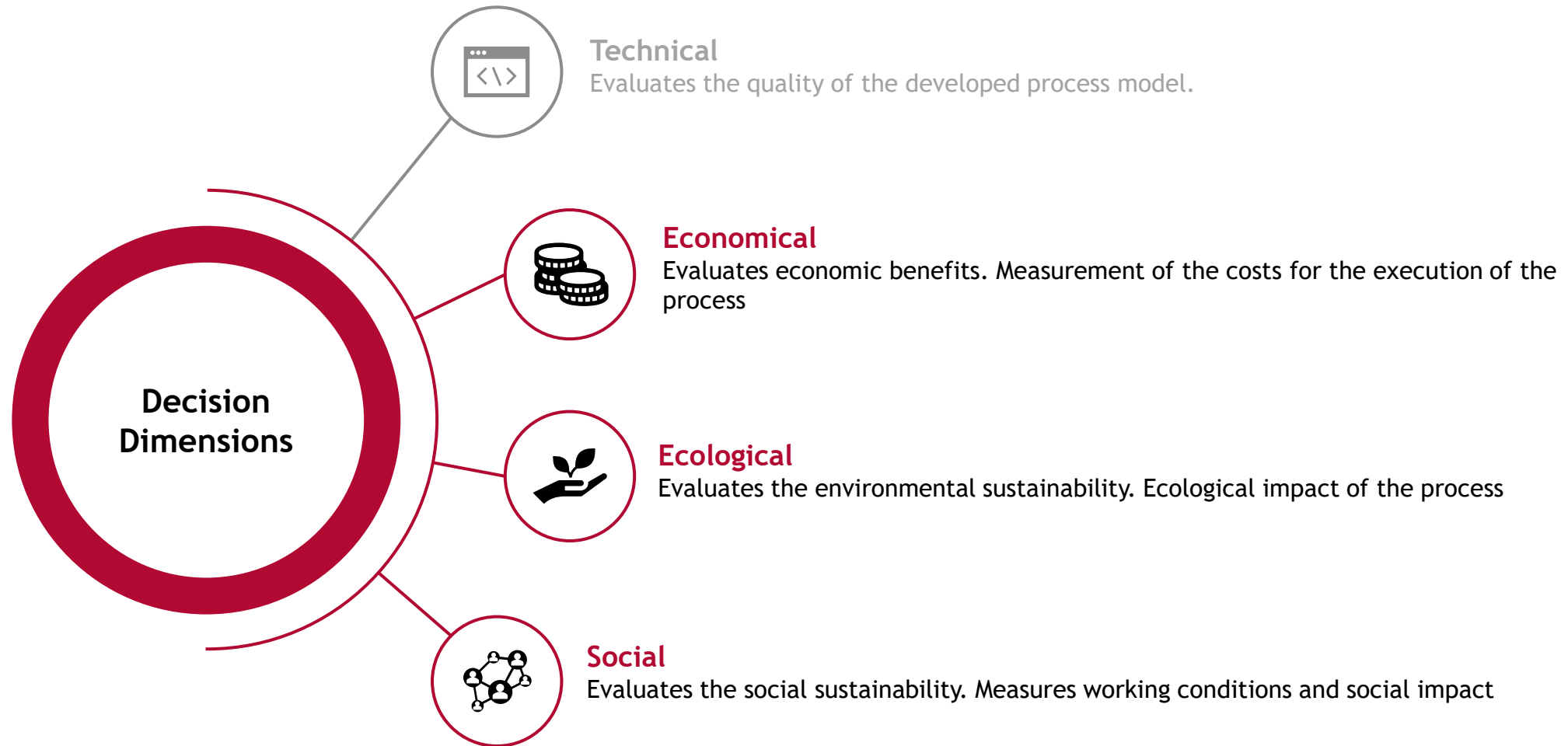
## Submission



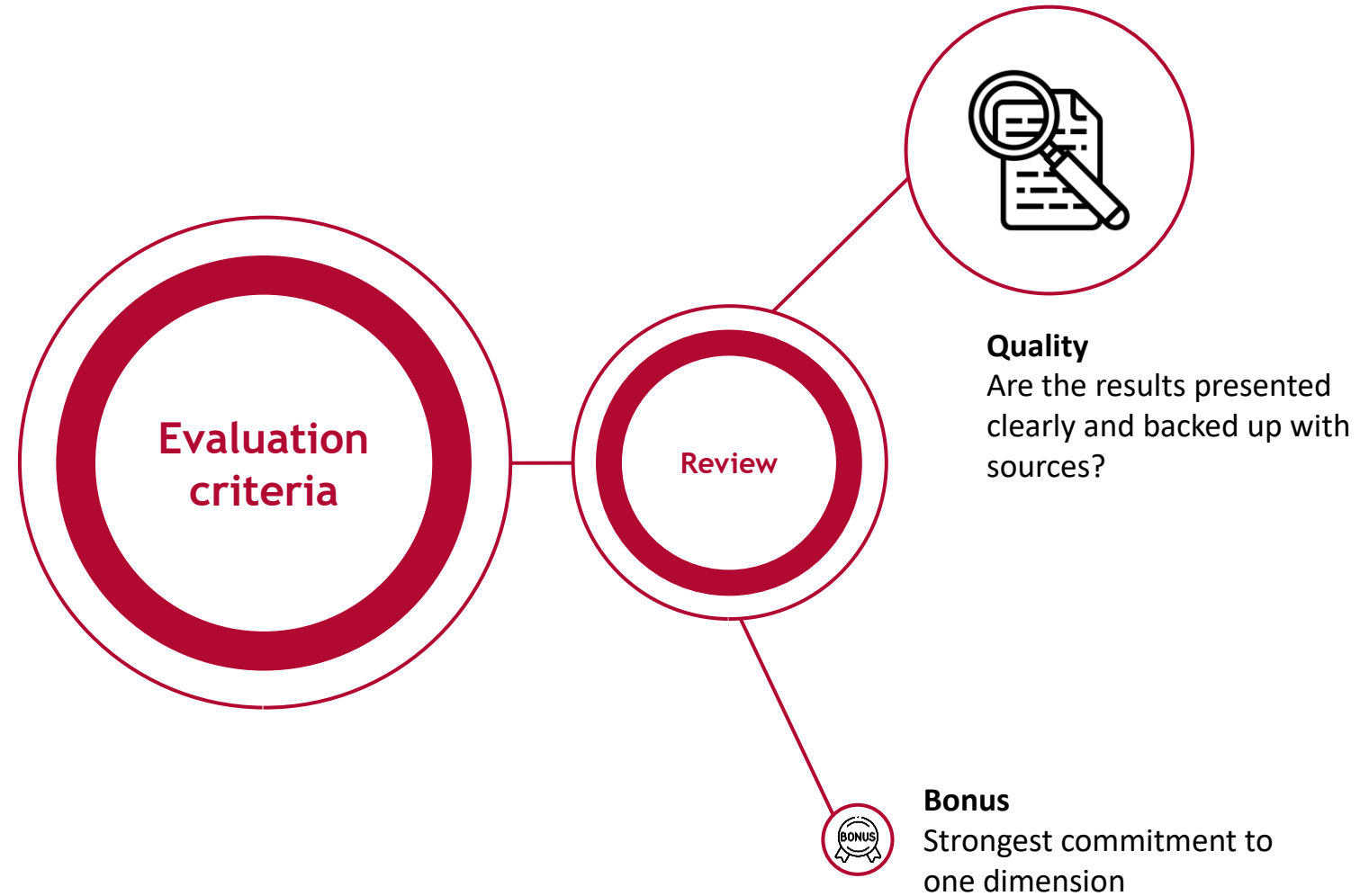
### Presentation

A PowerPoint presentation explaining your decisions

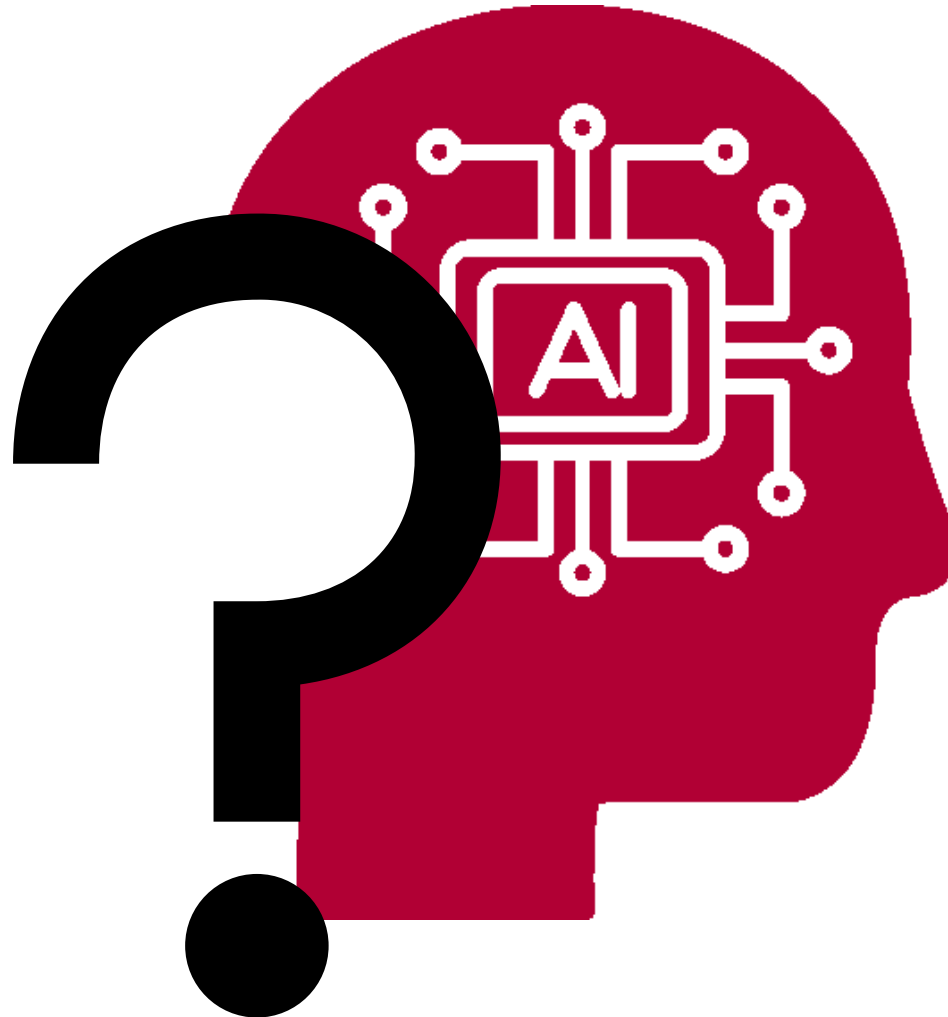
## Case 4: Dimensions of decision-making



## Case 4: Evaluation criteria



## Case 4: Any Questions?



Any Questions?