
DTU

42620 Science, Technology and Society

January 2026

Introduction to the SDG guideline

Phases 2 and 3

Michael Hauschild (Pernille Ohms)

Agenda

- Teaching goals
- The history behind the SDG methodology
- **Phase 1** – Selecting the application of the study
- **Phase 2** – Scoping the assessment
- **Phase 3** – Identifying and categorising effects
- **Supporting tools** – we use three supporting IT tools
- Group work

Teaching goals

- Understand the importance of adopting a **life cycle / systems perspective** and considering a wide range of **impacts** within each of the three **sustainability dimensions** - environment, society and economy.
- Be able to **conduct a sustainability assessment** of the introduction of a **new technology** in relation to the UN sustainable development goals (**SDG**s).

Phase 2:

1. Understand and scope the system described in the case
2. Identify and present all relevant processes in the life cycle of the system
3. Seek knowledge and select a starting point for your data collection

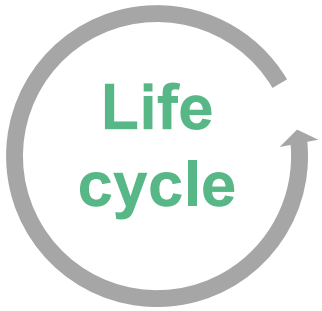
Phase 3:

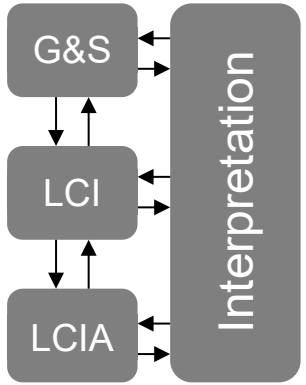
1. Understand the difference between processes and effects
2. Identify physical and non-physical effects and direct and in-direct effect

Development of the SDG methodology

SDG methodology

GREENHOUSE GAS PROTOCOL



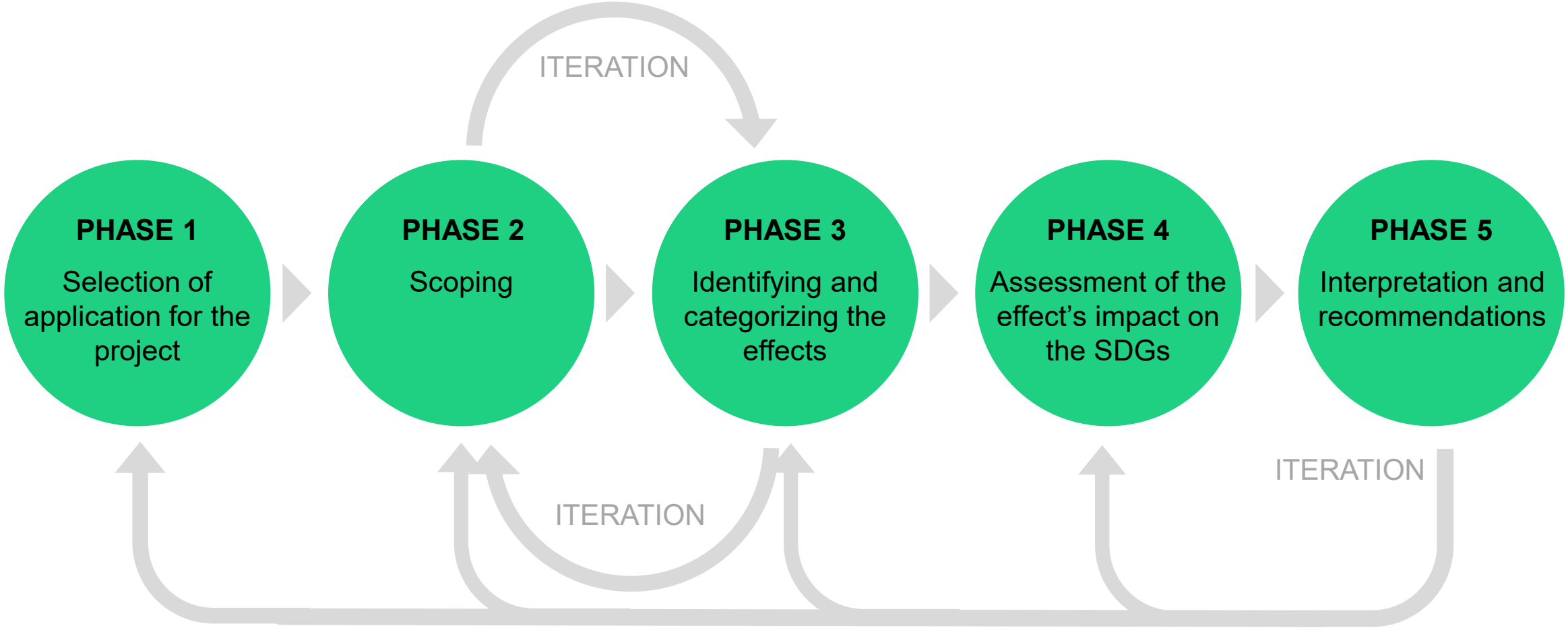


Purpose of the SDG methodology

To assess the contribution from a project or a technology shift on the SDGs

- semi-quantitatively and in a life cycle perspective

The phases in the SDG methodology



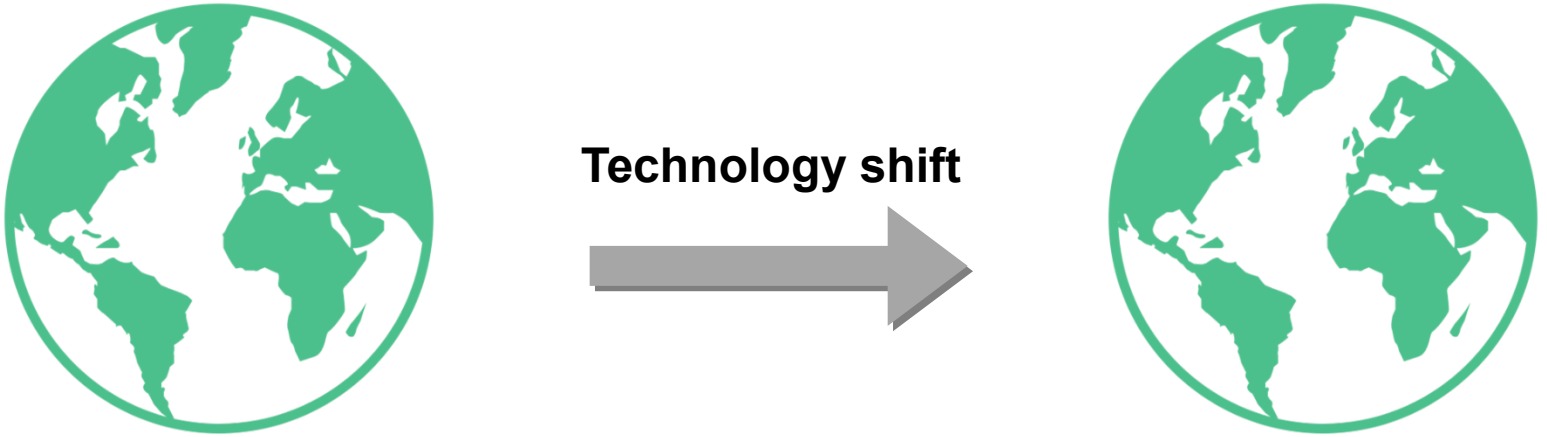
Phase 1

Selecting the span of the case project:

The functional output, considering:

Time, application and geography

Two systems – one technology shift



BEFORE the change

The BASELINE system

AFTER the change

The NEW system

The functional output

One bag

Can we – <u>fairly</u> – compare these two bags?

The functional output

One bag

What is the function of the bag?

The functional output

~~One bag~~

To carry

Carriage of 10 litres of products for 100 metres

The functional output

To carry

Carriage of 10 litres of products for 100 metres

+

+

The BASELINE system

+

+

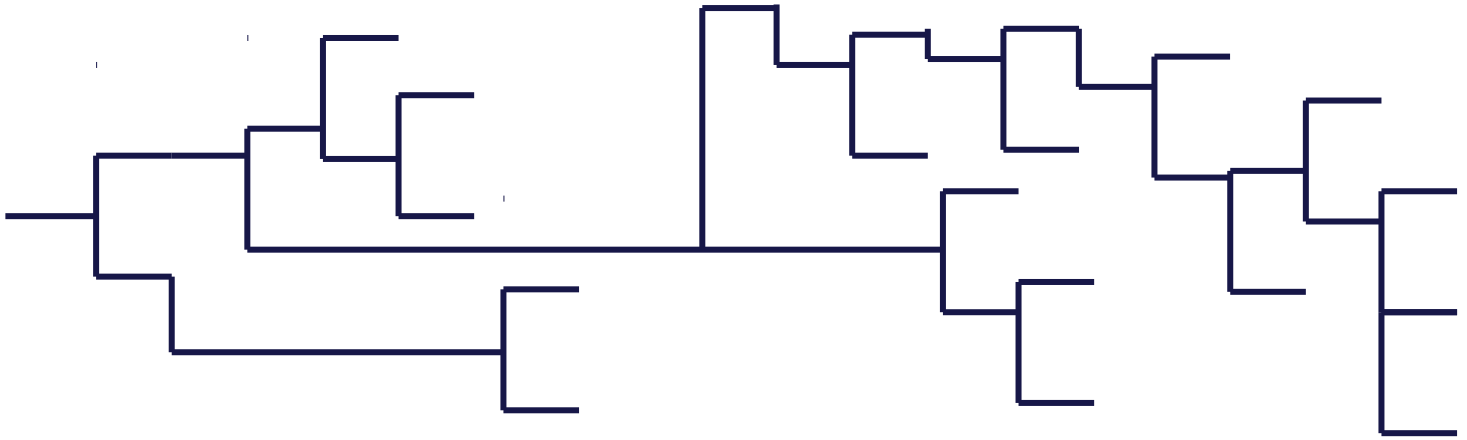
The NEW system

Phase 2

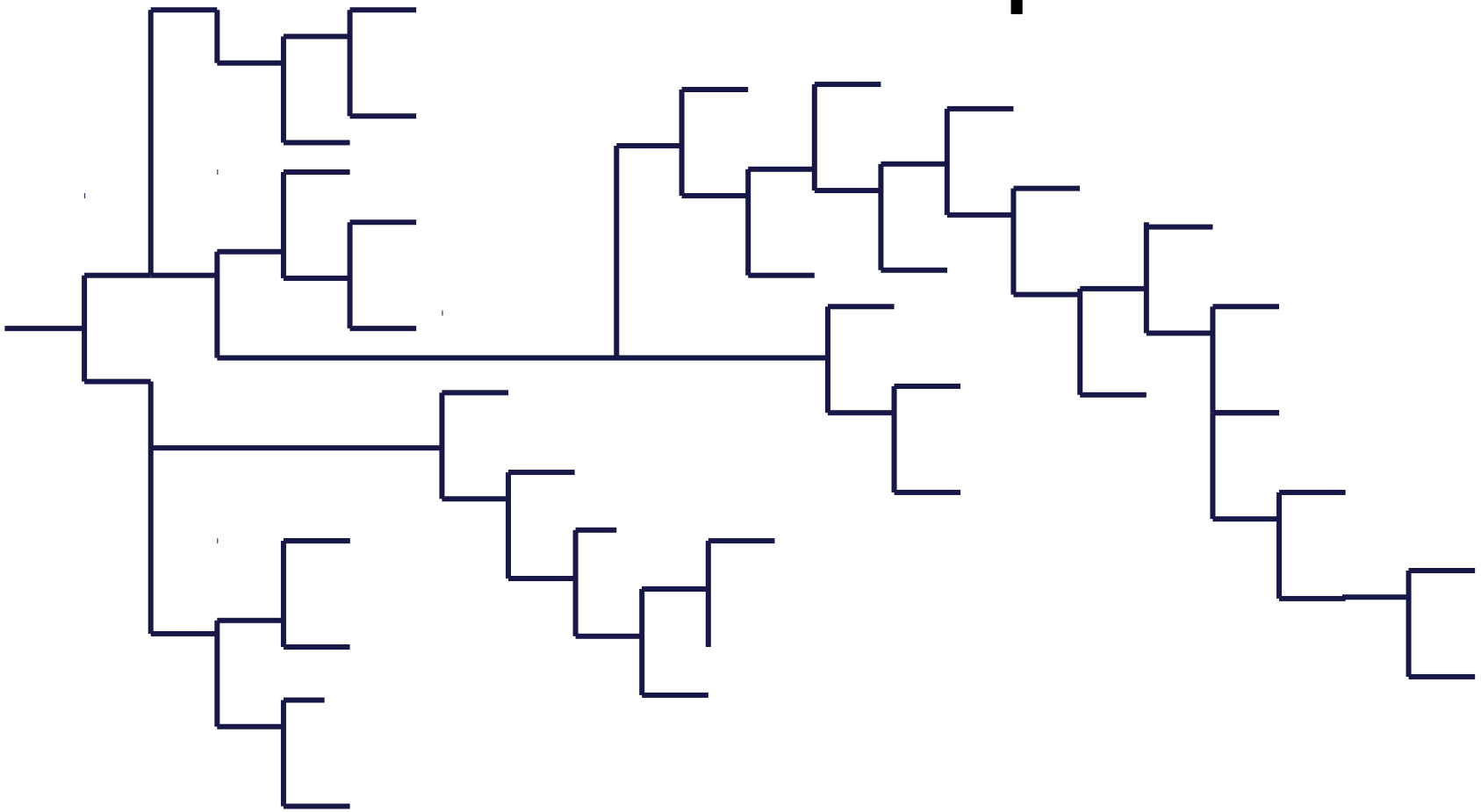
Scoping* the baseline system and the new system

* How much do we need to include in our study of the case?

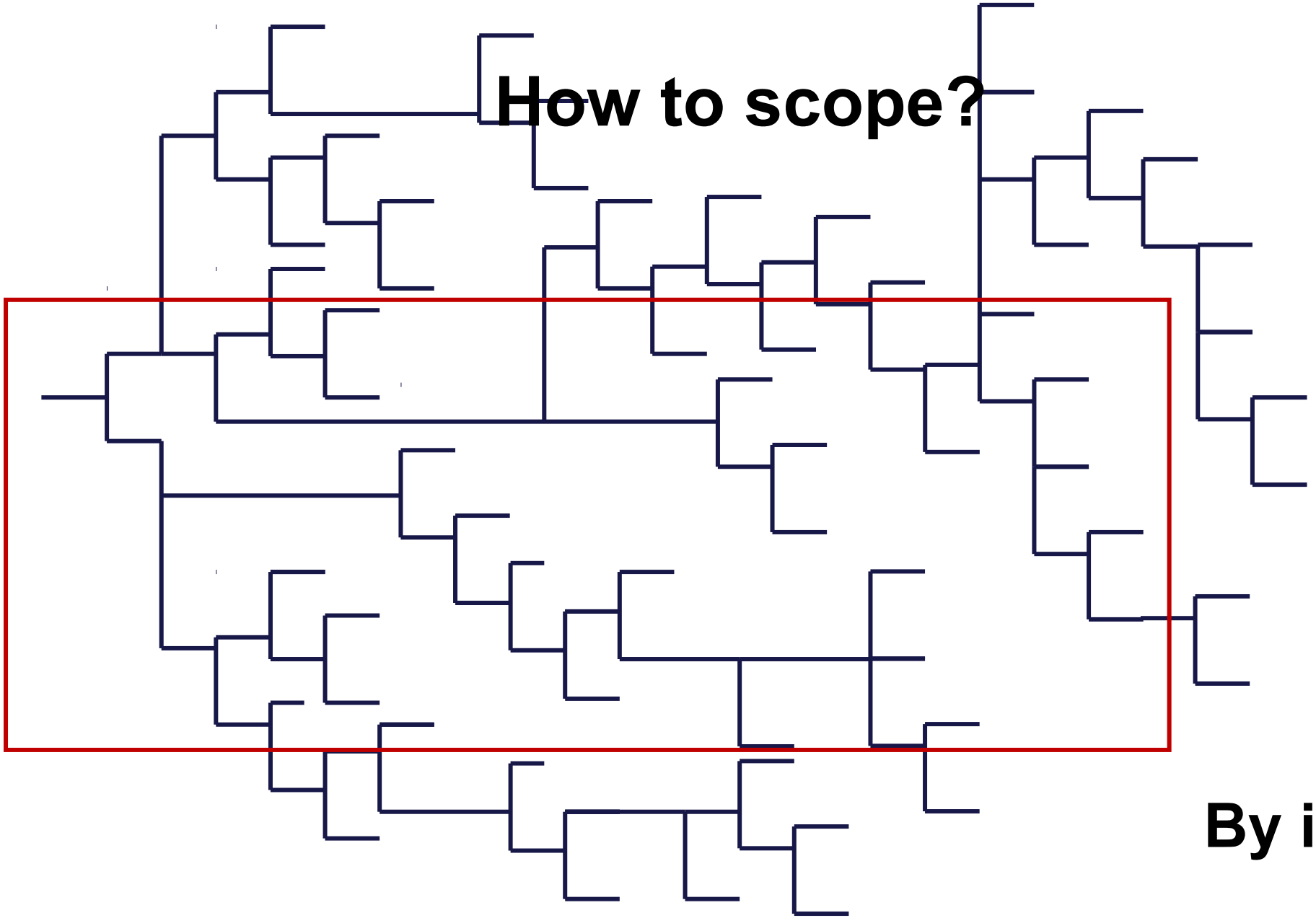
How to scope?



How to scope?

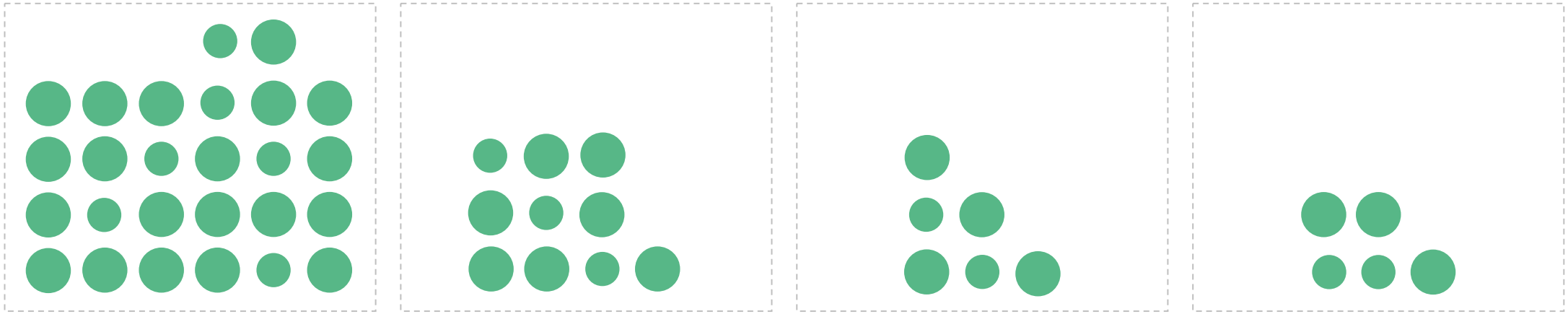


How to scope?



By iteration!

The life cycle perspective provides structure



Materials and components

Production

Use and maintenance

Reuse, recycling and discarding

Exercise: Identify processes

BASELINE system

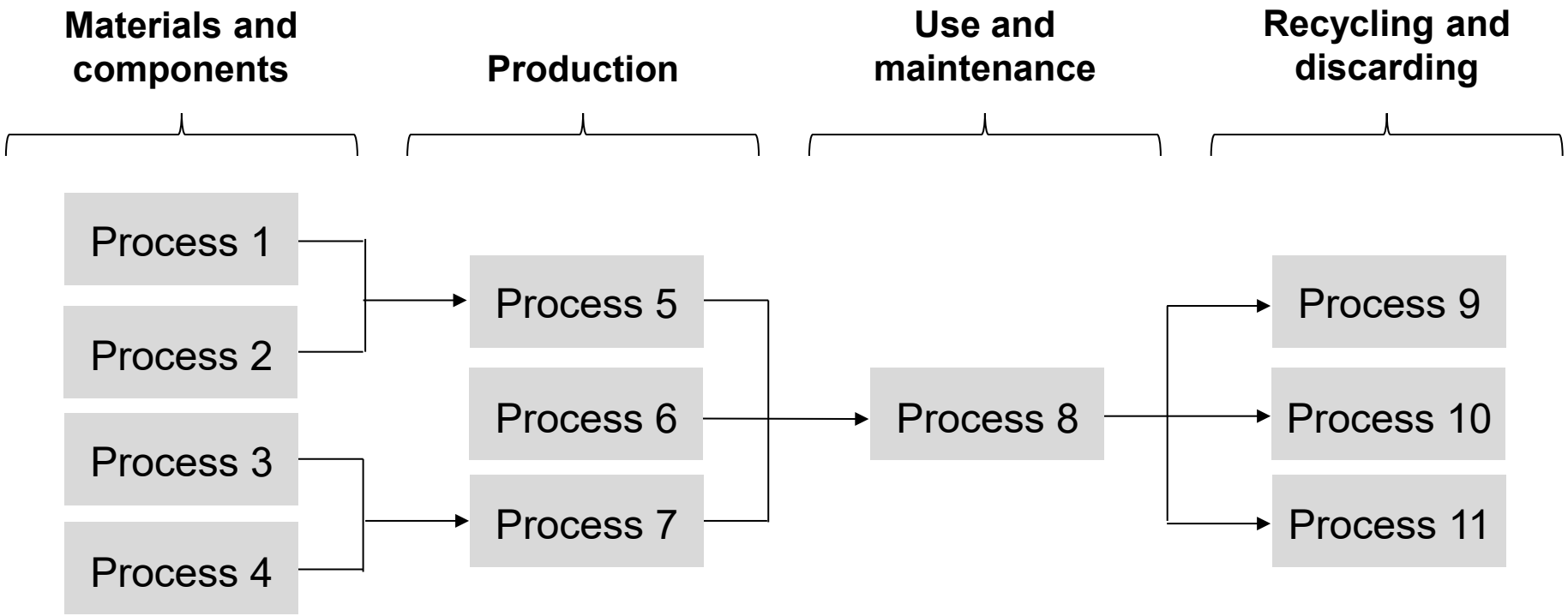
Exercise: Identify processes

The BASELINE system

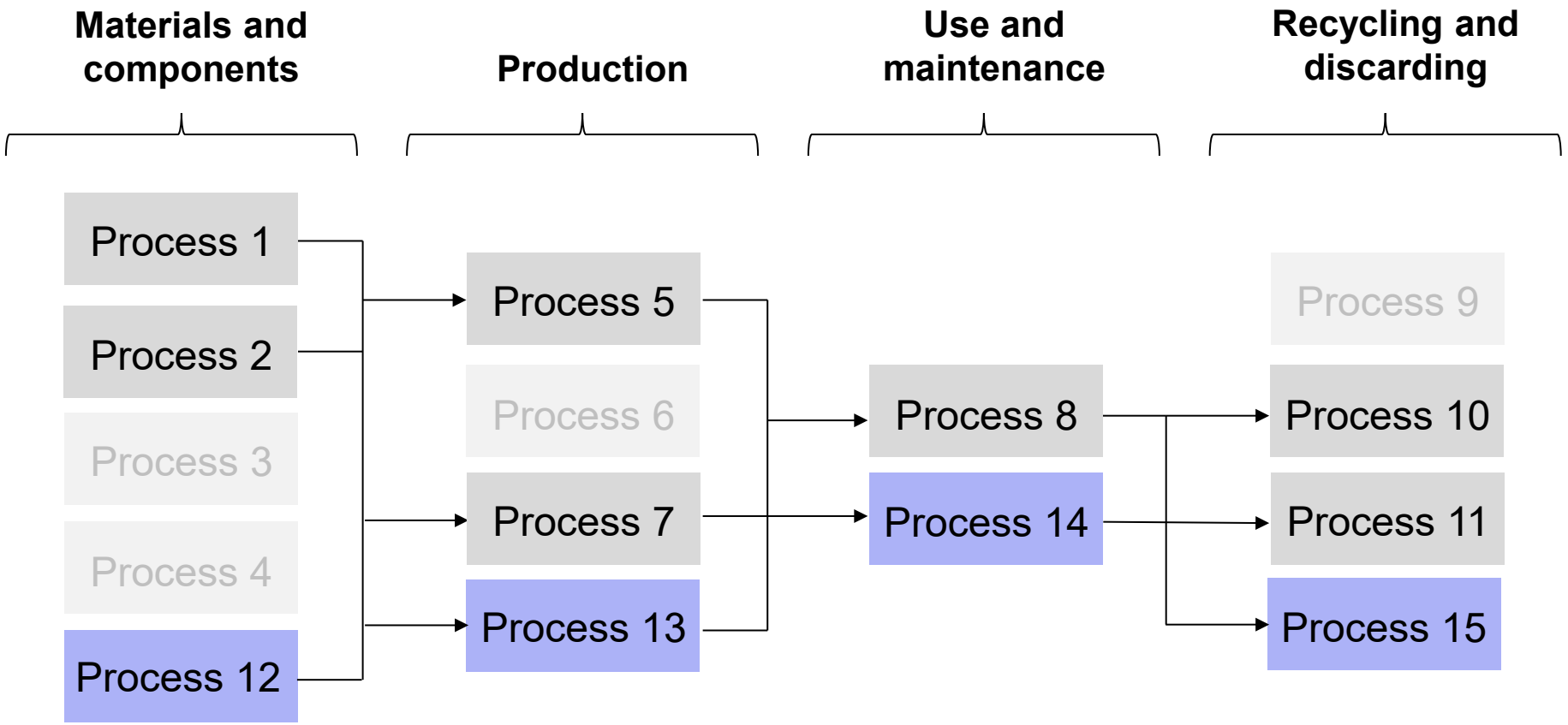
The NEW system

- 54000L urine collected at Roskilde Festival (2015)
- Used as alternative fertilizer in barley fields
- 11 tons of barley for beer production (2016)

Phase 2:
Life cycle of the BASELINE system



Phase 2:
Life cycle of the NEW system



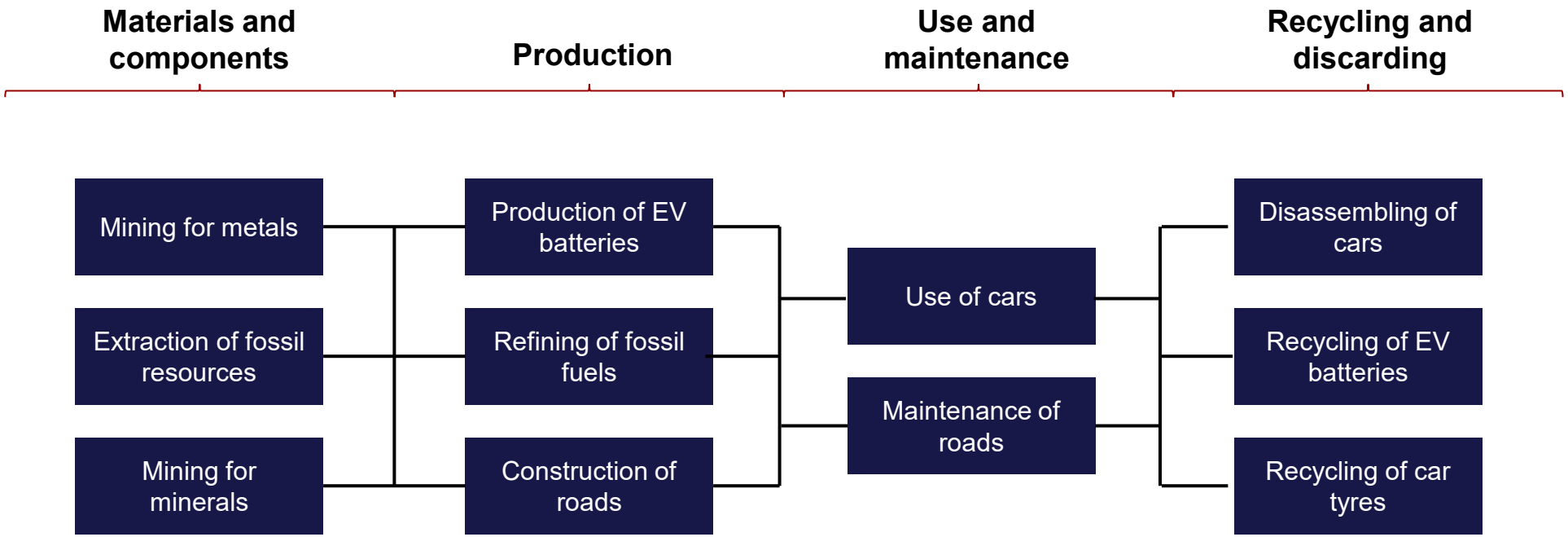
Compared to the BASELINE system:

Removed process

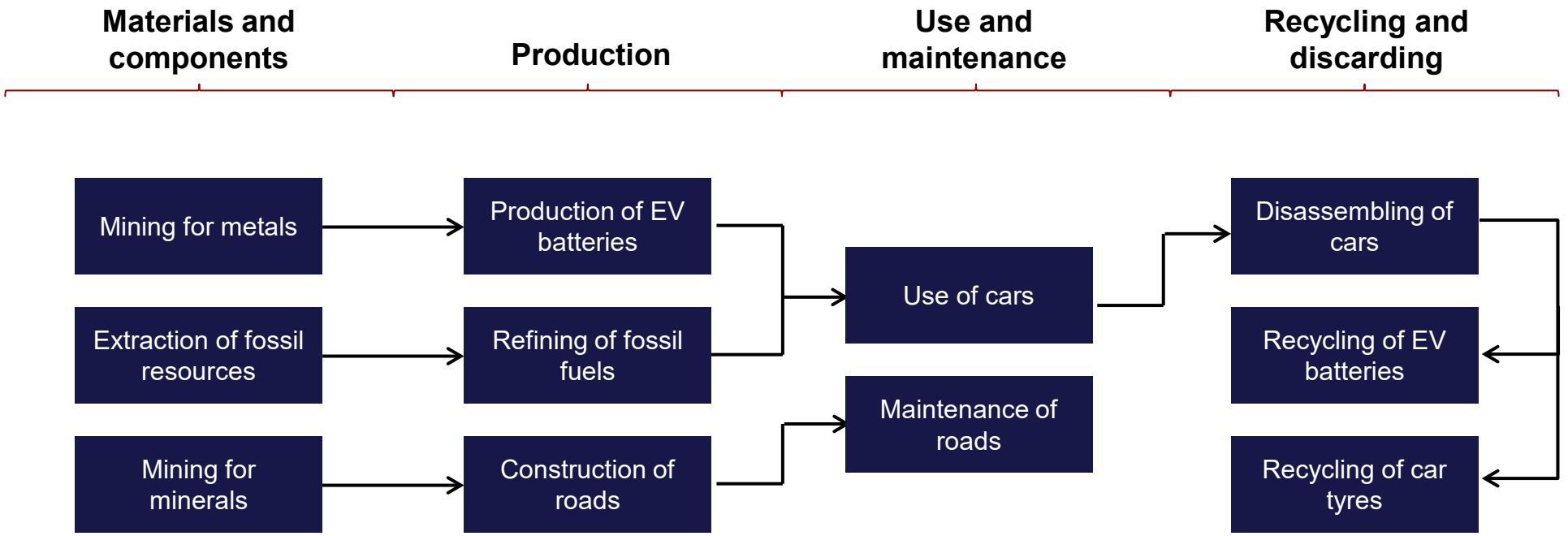
Added process

How to develop a useful process diagram?

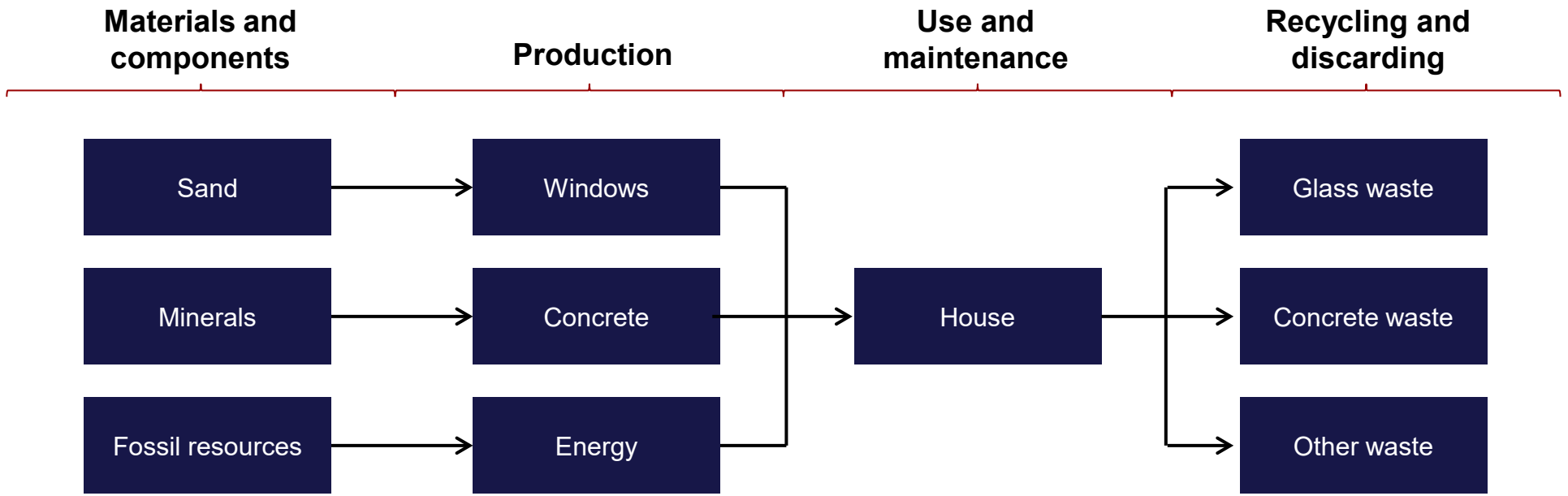
How to develop a useful process diagram?



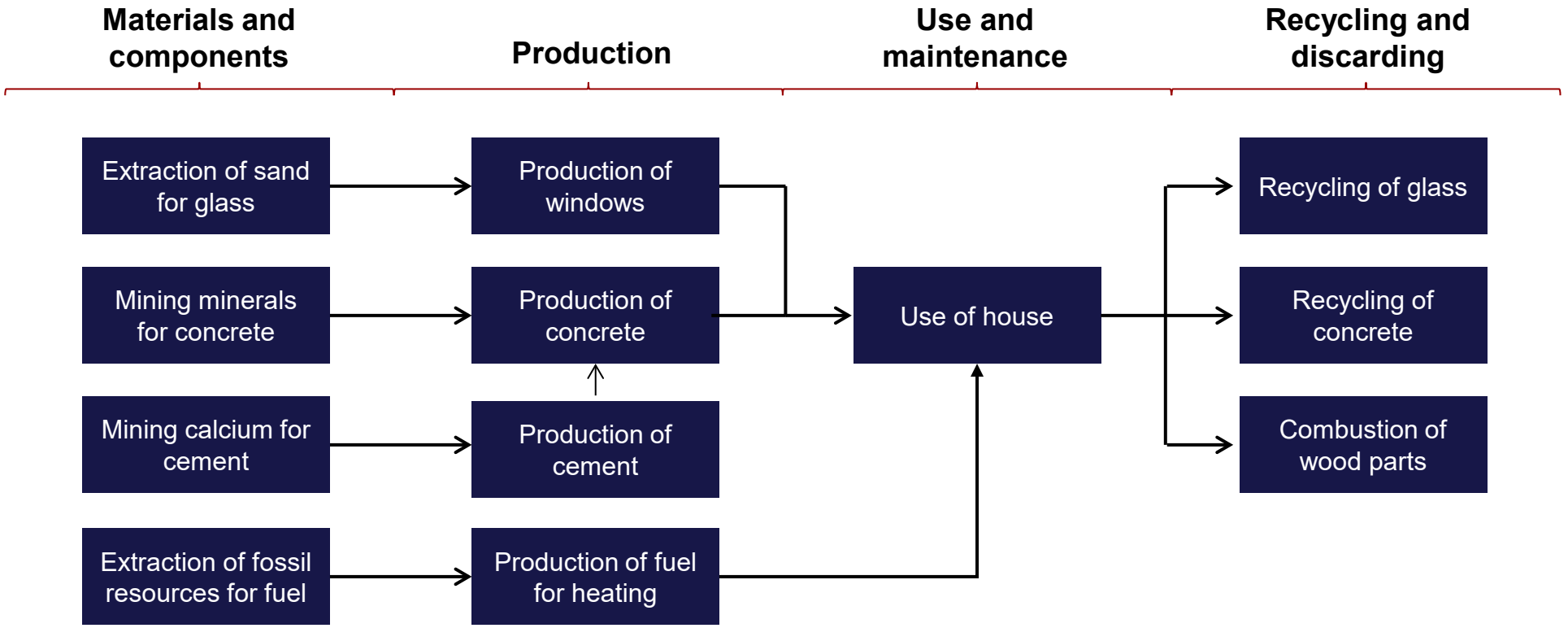
How to develop a useful process diagram?



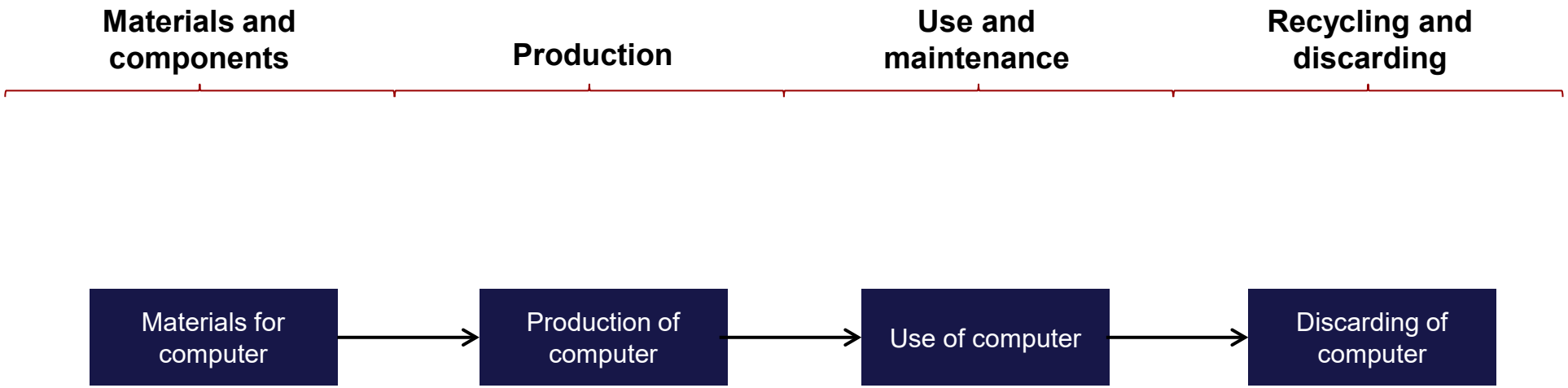
How to develop a useful process diagram?



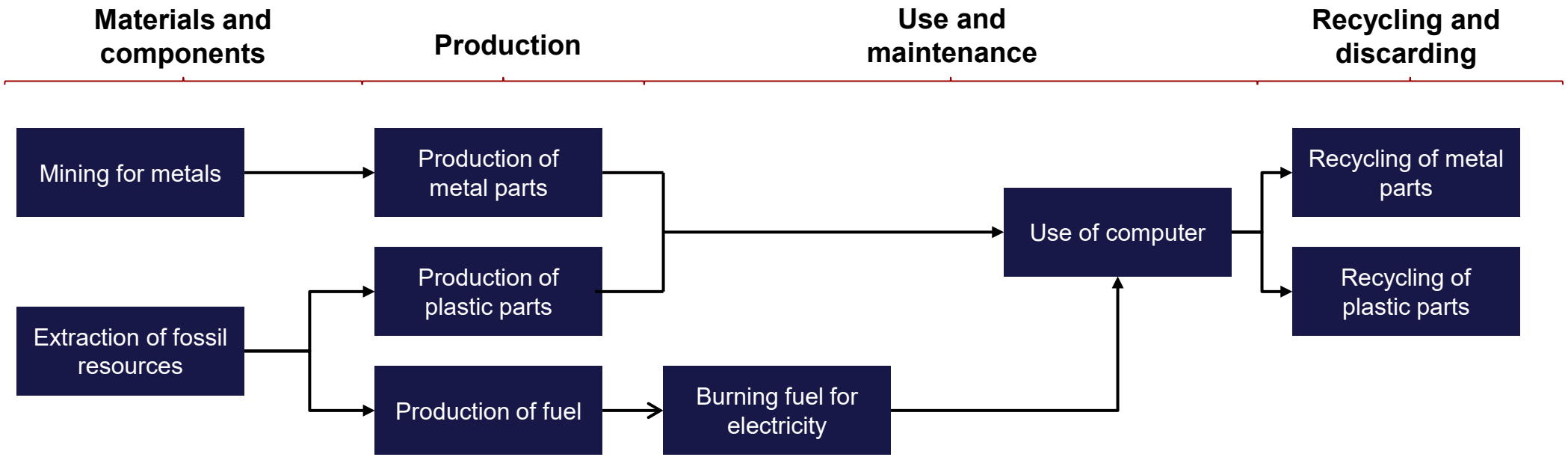
How to develop a useful process diagram?



How to develop a useful process diagram?



How to develop a useful process diagram?



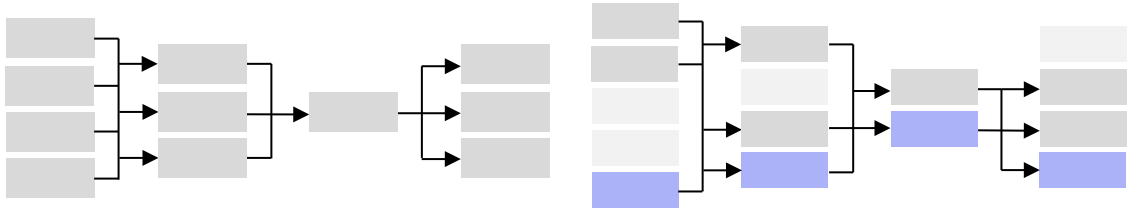
Summing up
What do we expect from phase 2?

1 **DEFINING and SCOPING of…**

The BASELINE system

The NEW system

2 **A process diagram of each**



What processes are in the BASELINE system and which in the NEW system?

1. Conduct a scoping of a system
2. Identifiy and present all relevant **processes** in the life cycle of a system

Questions?

Phase 3

Working on effects

Phase 3:
Identifing and categorizing the effects

BEFORE change

The BASELINE system

EFFECTS

=

The difference between the BASELINE and the NEW system

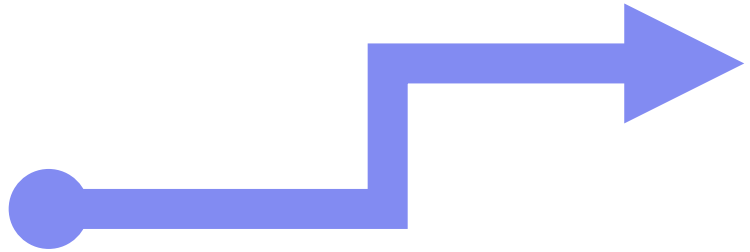
AFTER change

The NEW system

Phase 3:
Identifing and categorizing the effects

DIRECT EFFECTS

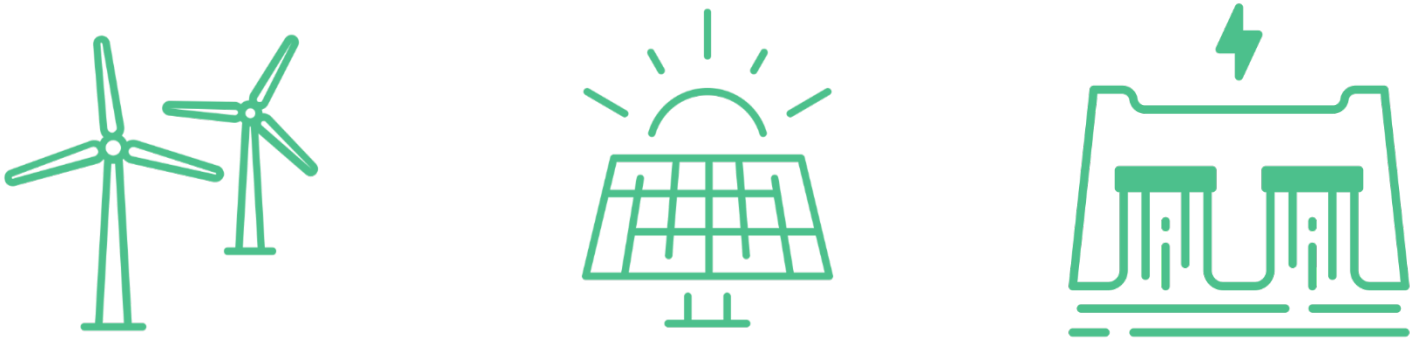
Directly caused by the change.
Reflects the purpose of the change.



IN-DIRECT EFFECTS

Often unexpected consequences from the change, impacting other products, processes or systems.

Exercise:
Direct and in-direct effects



Which are the direct and which the in-direct effects from replacing fossil energy with renewables (wind, solar and hydro)?

Phase 3:
Identifing and categorizing the effects

PHYSICAL EFFECTS

Direct changes in physical conditions, caused by the change.

NON-PHYSICAL EFFECTS

Changes in social behavior, working conditions, education aspects, equality etc.

Physical or non-physical effects?

PHYSICAL

Lower extraction of minerals for cement production

Workers feeling more secure in the work space

NON-PHYSICAL

Altered education need from the introduction of new technology

NON-PHYSICAL

Increased accessibility for people with disabilities (equality)

NON-PHYSICAL

Lower fuel consumption for transportation

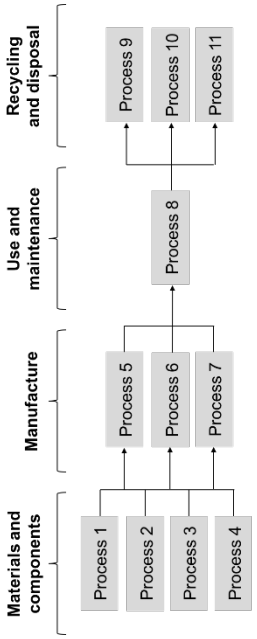
PHYSICAL

More plastic is being recycled

PHYSICAL

Phase 3:
Identifing and categorizing the effects

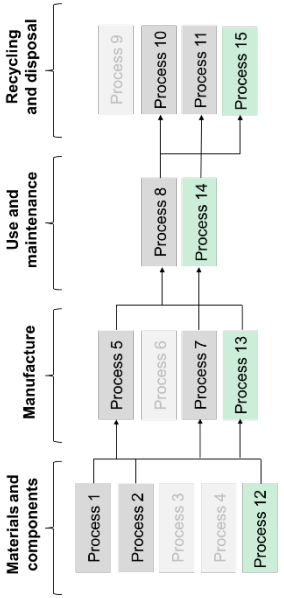
BASELINE system



Materials and components	Production	Use and maintenance	Recycling and discarding
Process 1	Process 5	Process 8	Process 9
Process 2	Process 6		Process 10
Process 3	Process 7		Process 11
Process 4			

Phase 3:
Identifing and categorizing the effects

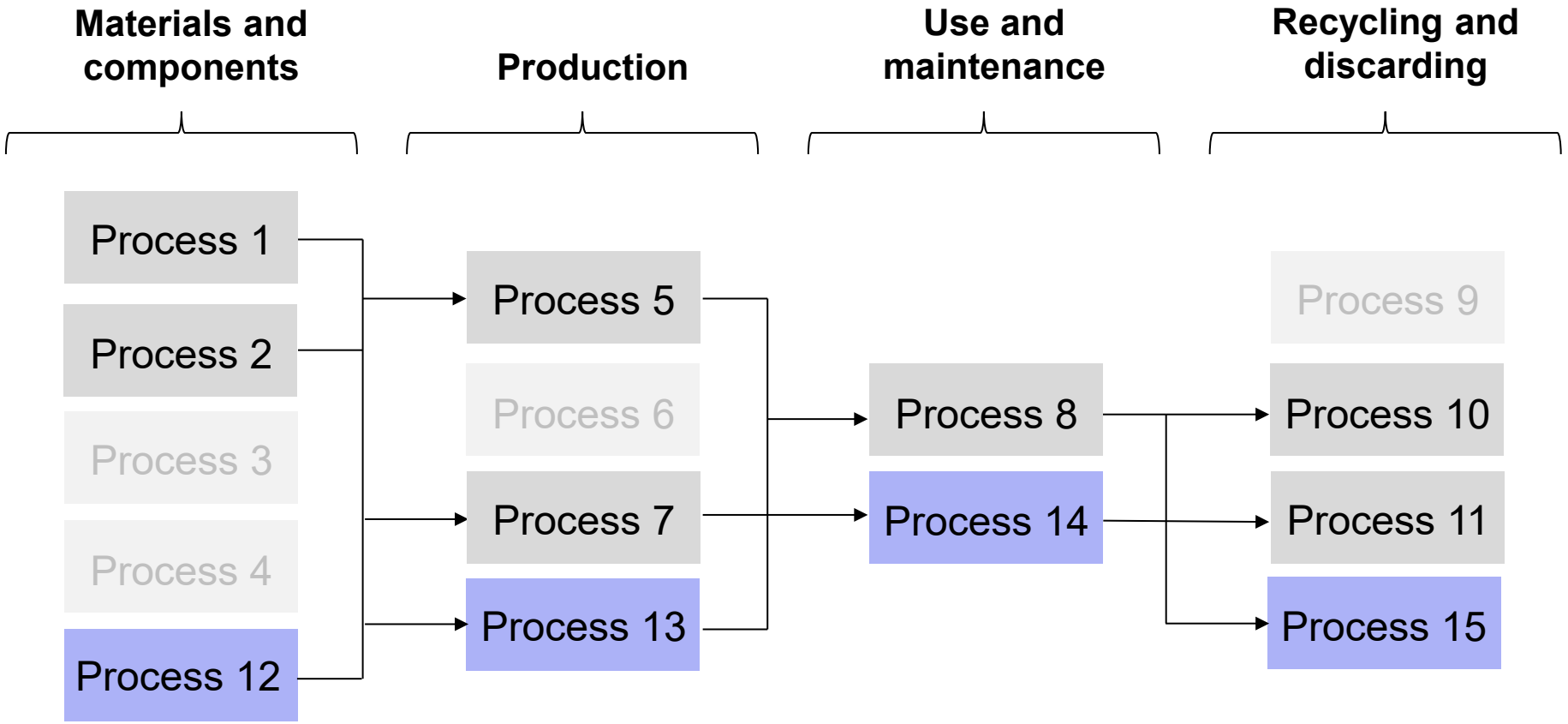
The NEW system



Materials and components	Production	Use and maintenance	Recycling and discarding
Process 1	Process 5	Process 8	Process 9
Process 2	Process 6	Process 14	Process 10
Process 3	Process 7		Process 11
Process 4	Process 13		Process 15
Process 12			

Phase 3:
Identifing and categorizing the effects

The NEW system

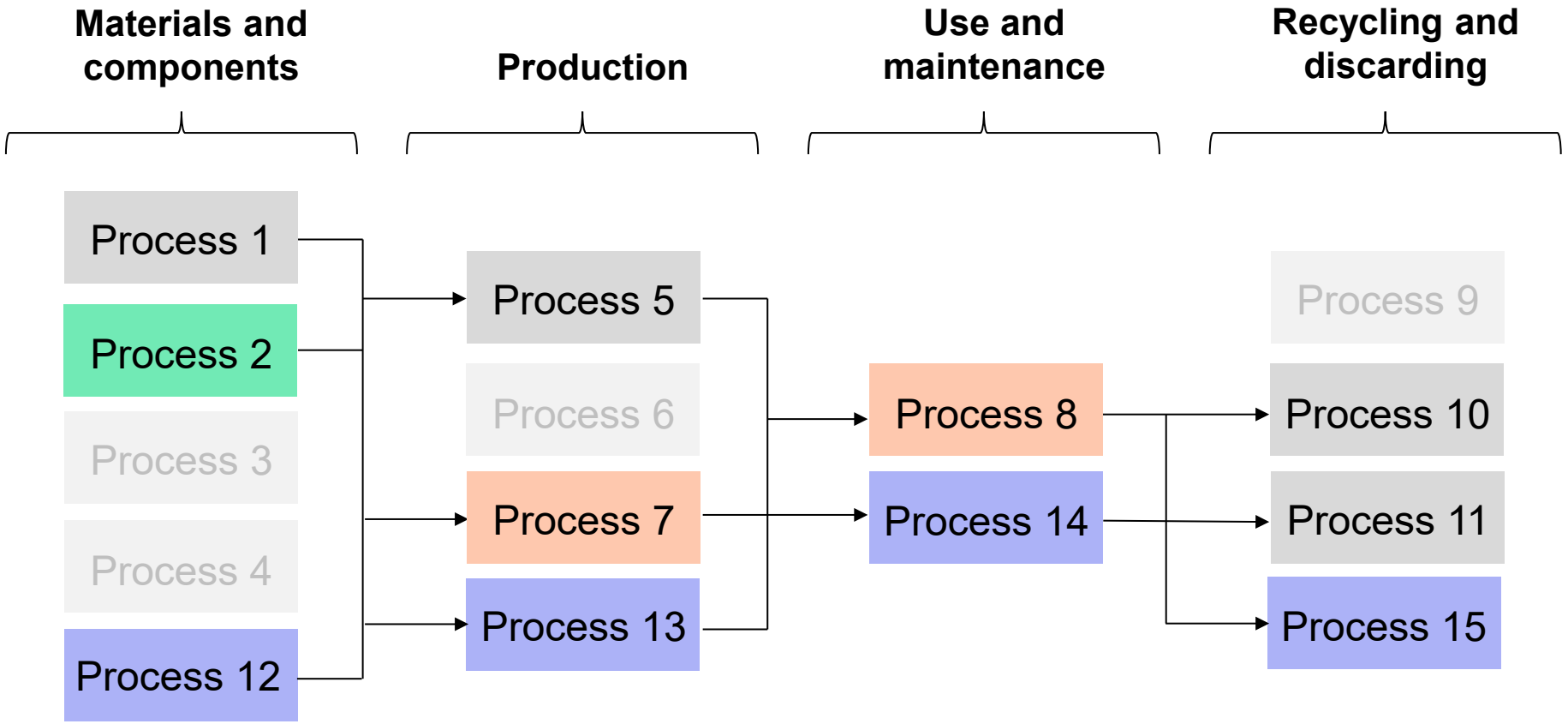


Compared to the BASELINE system:

Removed process

Added proces

Phase 3:
Identifing and categorizing the effects



The NEW system

Compared to the BASELINE system:

- Increased process
- Reduced process
- Removed process
- Added process

Phase 3:
Identification of the effects from changes in processes

Materials and components	Production	Use and maintenance	Recycling and discarding
Process 1: *no change*	Process 5: *no change*	Process 8: *no change*	**Effect 10:** *Process 9 removed*
Effect 1: *Process 2 increased*	**Effect 5:** *Process 6 removed*	**Effect 8:** *Process 14 added*	Process 10: *no change*
Effect 2: *Process 3 removed*	**Effect 6:** *Process 7 reduced*	**Effect 9:** *Non-physical effect added*	Process 11: no change
Effect 3: *Process 4 removed*	**Effect 7:** *Process 13 added*		**Effect 11:** Process 15 added
Effect 4: *Process 12 added*			

Compared to the BASELINE system:

- Increased process
- Reduced process
- Removed process
- Added process

Phase 3: Identification of effects from changes in processes

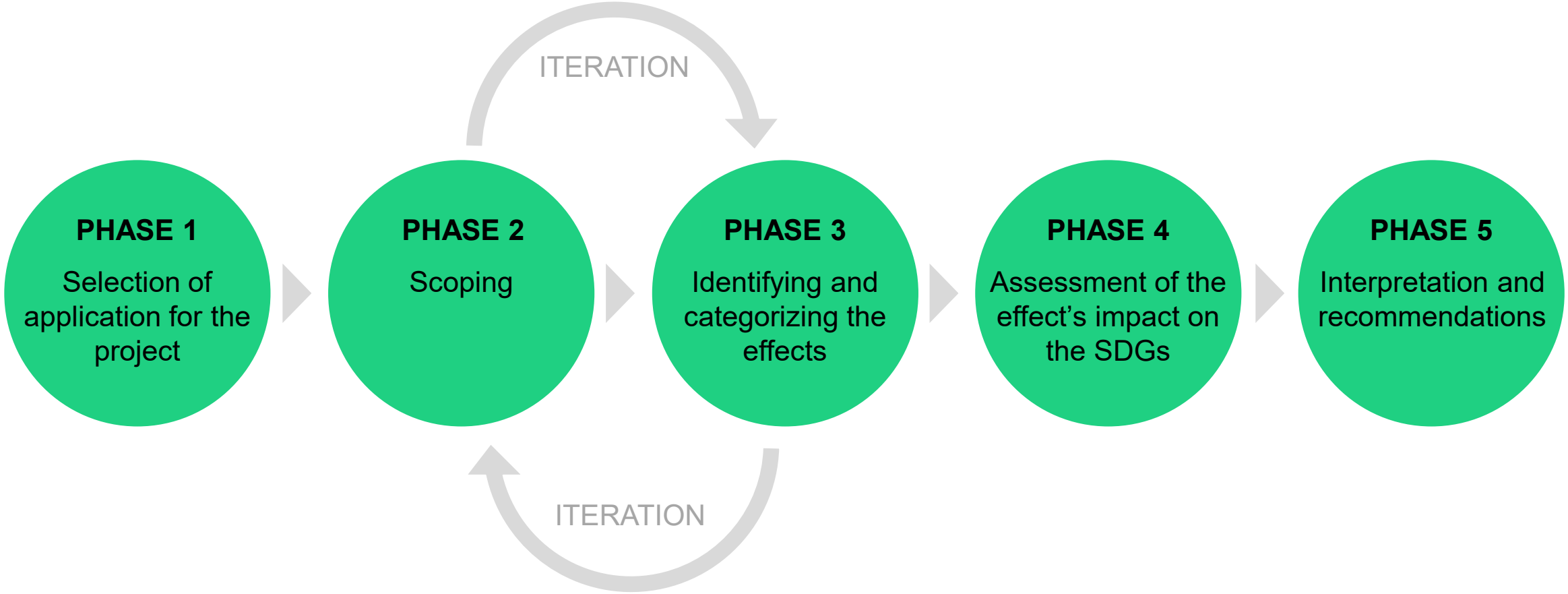
Physical Effects Table

Raw materials	Production	Use	Recycling & End-of-Life
~~Effect~~ =	~~Effect~~ =	~~Effect~~ =	Effect 10 −
Proces 1: Ingen ændring	Proces 5: Ingen ændring	Proces 8: Ingen ændring	Process 9 fjernet
Effect 1 ↗	Effect 5 −	Effect 8 +	~~Effect~~ =
Process 2 øget	Process 5 fjernet	Process 14 tilføjet	Proces 10: Ingen ændring
Effect 2 −	Effect 6 ↘		~~Effect~~ =
Process 3 fjernet	Process 7 reduceret		Proces 11: Ingen ændring
Effect 3 −	Effect 7 +		Effect 11 +
Process 4 fjernet	Process 13 tilføjet		Process 15 tilføjet
Effect 4 +			
Process 12 tilføjet			

Non-Physical Effects Table

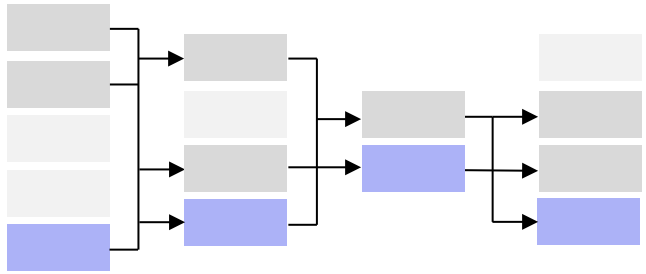
Raw materials	Production	Use	Recycling & End-of-Life
		Effect 9 +	
		Ikke-fysisk effekt tilføjet	

Phase 3:
Iteration between phase 3 and phase 2



Summing up
What do we expect from phase 3?

Process diagram and effect tables i SDGUI



Physical Effects Table

Raw materials	Production	Use	Recycling & End-of-Life
~~Effect~~ =	~~Effect~~ =	~~Effect~~ =	Effect 10 −
Proces 1: Ingen ændring	Proces 5: Ingen ændring	Proces 8: Ingen ændring	Process 9 fjernet
Effect 1 ↗	Effect 5 −	Effect 8 +	~~Effect~~ =
Process 2 øget	Process 5 fjernet	Process 14 tilføjet	Proces 10: Ingen ændring
Effect 2 −	Effect 6 ↘		~~Effect~~ =
Process 3 fjernet	Process 7 reduceret		Proces 11: Ingen ændring
Effect 3 −	Effect 7 +		Effect 11 +
Process 4 fjernet	Process 13 tilføjet		Process 15 tilføjet
Effect 4 +			
Process 12 tilføjet			

Non-Physical Effects Table

Raw materials	Production	Use	Recycling & End-of-Life
		Effect 9 +	
		Ikke-fysisk effekt tilføjet	

Understand that **effects** are **changes in processes**

Identify both **direct** og **in-direct** and **physical** and **non-physical effects**

Questions?

Draw.io, SDGUI, and Queueue

Introduction to supporting tools

Overview

- Draw.io or PowerPoint
  - Useful for Phase 2 diagramming
  - Singleuser or multiuser

- SDGUI
  - Webbased tool for working with SDGs
  - Singleuser

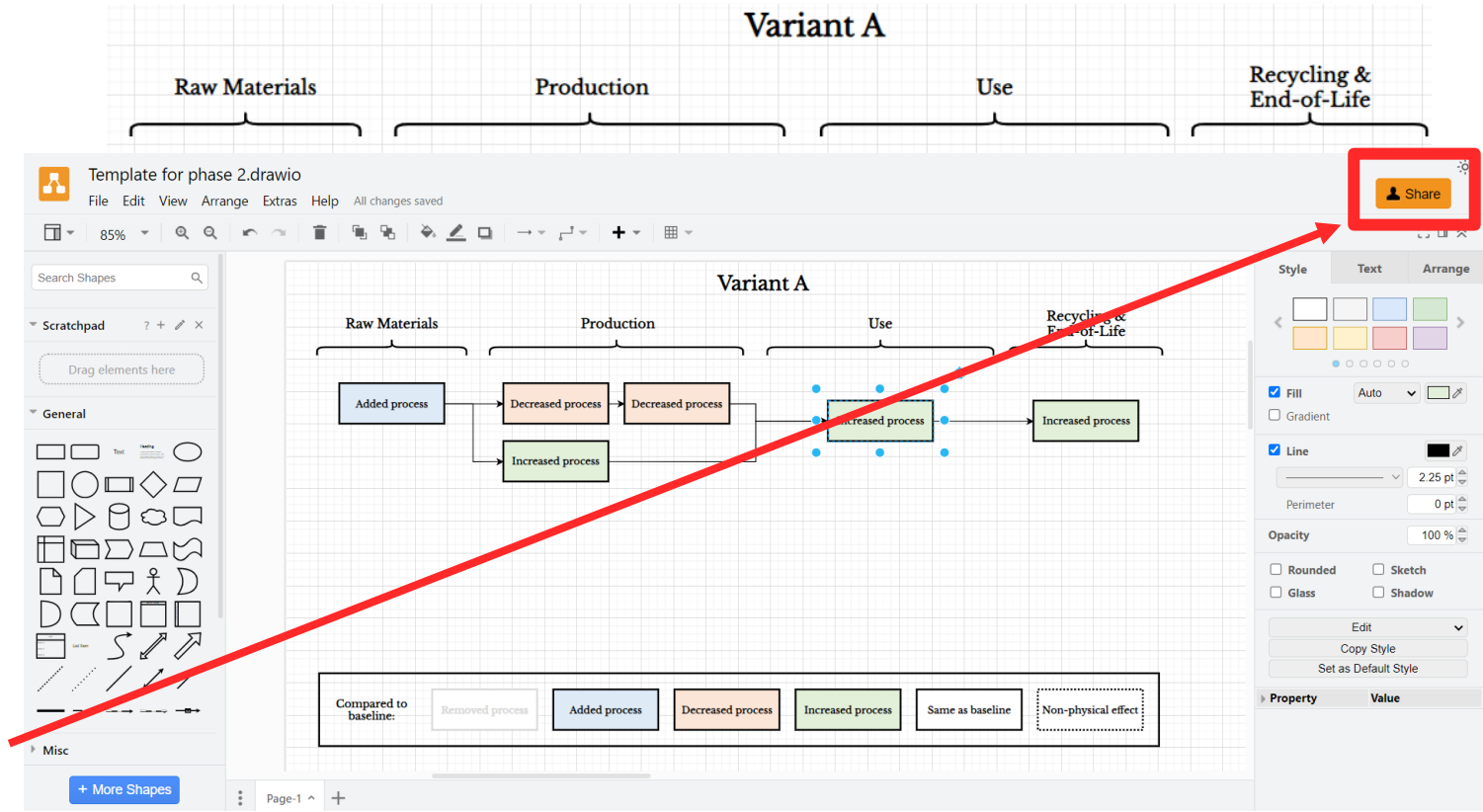
- Queueue
  - How to request help

Phase 2 – The diagramming part

Draw.io / PowerPoint

Draw.io

- Templates uploaded on DTU Learn
  - PowerPoint
  - Draw.io
- Press “Open Existing Diagram”
- Navigate to the file and open it
- “Multiuser” if connected to Google Drive
- This is just one way to do it.
  Feel free to use other tools.



Phase 3 – Inventorying the effects

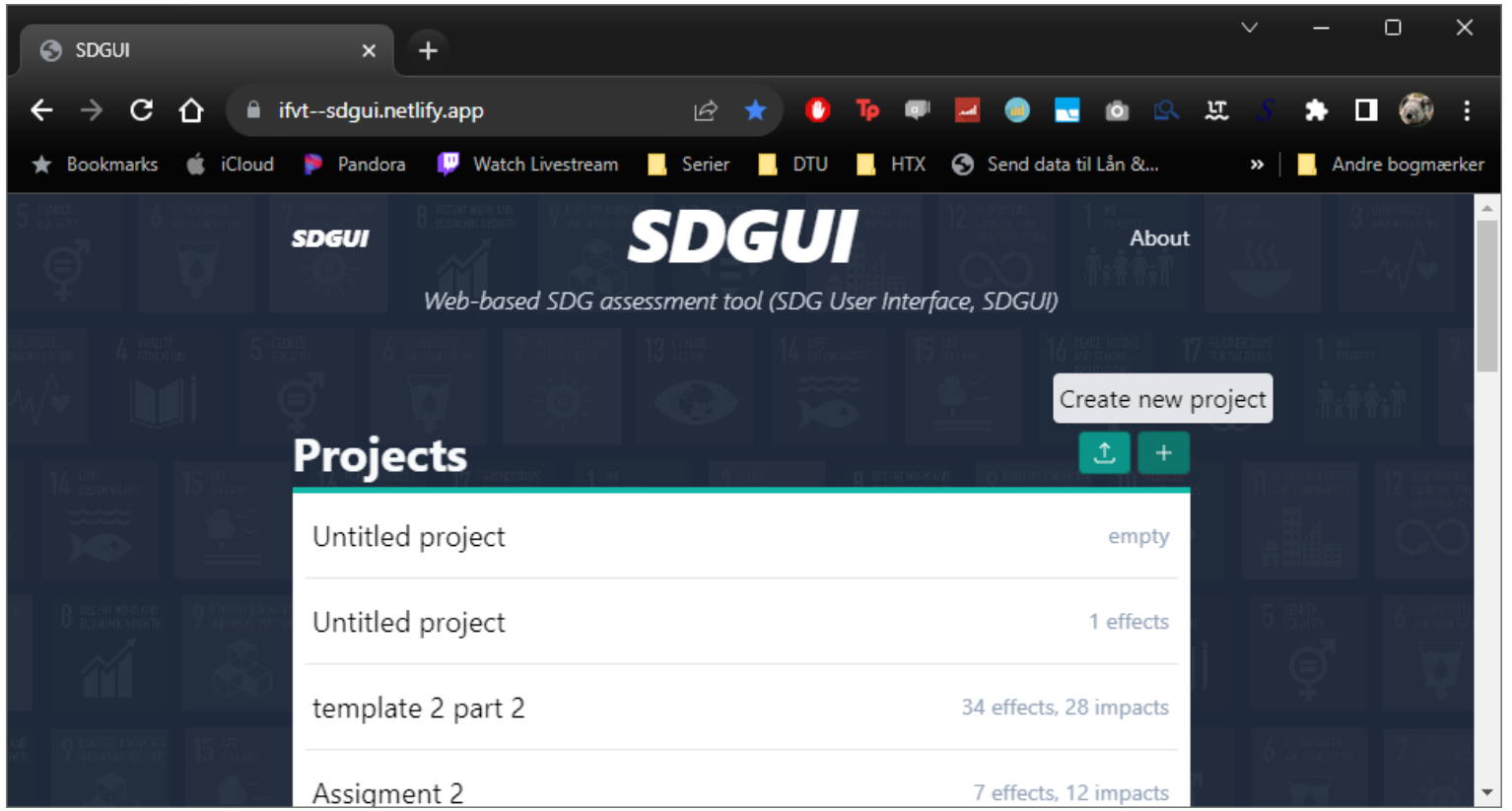
SDGUI

SDGUI

- Link: https://ifvt--sdgui.netlify.app/
- For the best user experience, we propose using Google Chrome.
- Singleuser

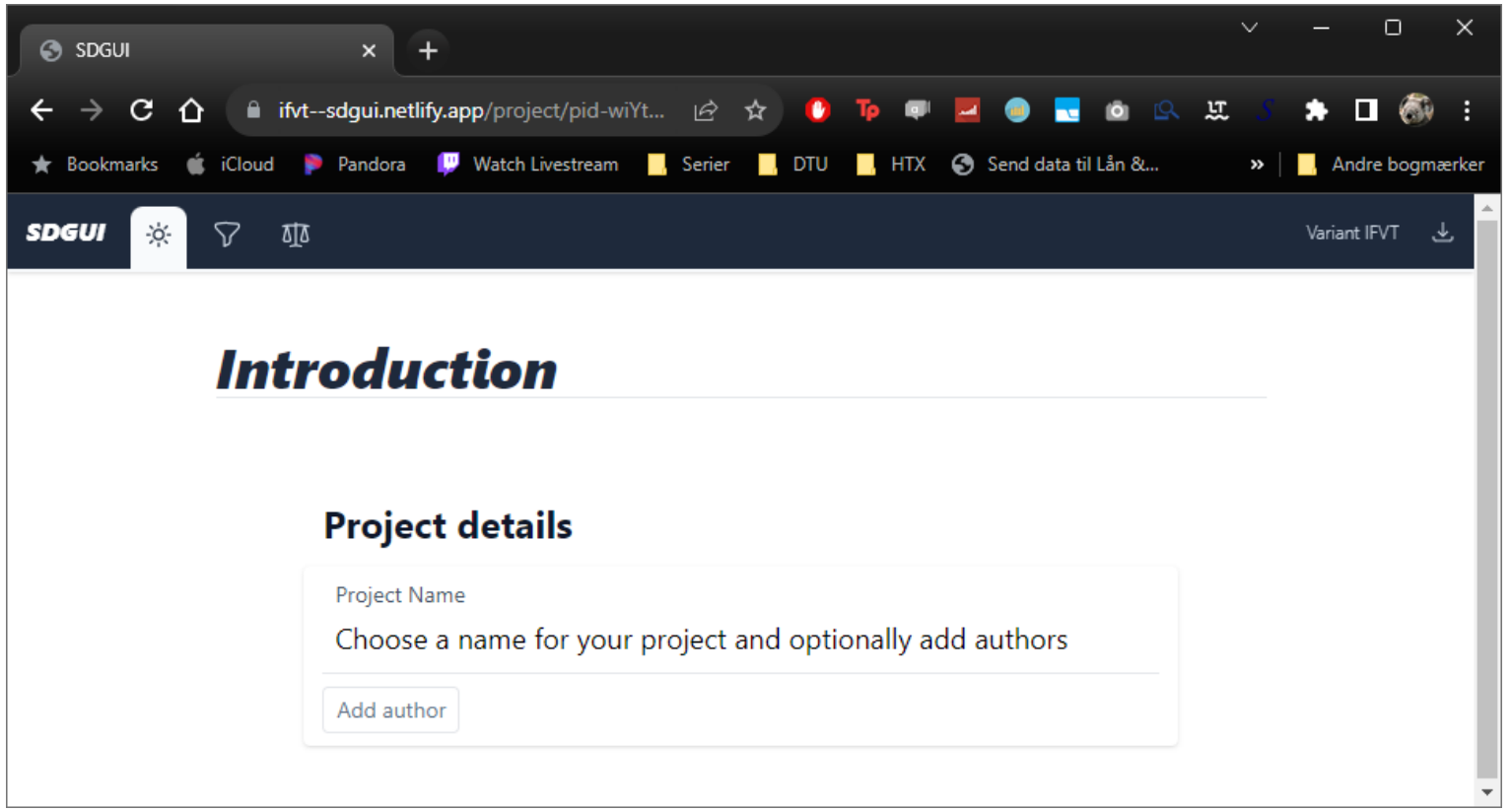
SDGUI

- Step 1: Create new project



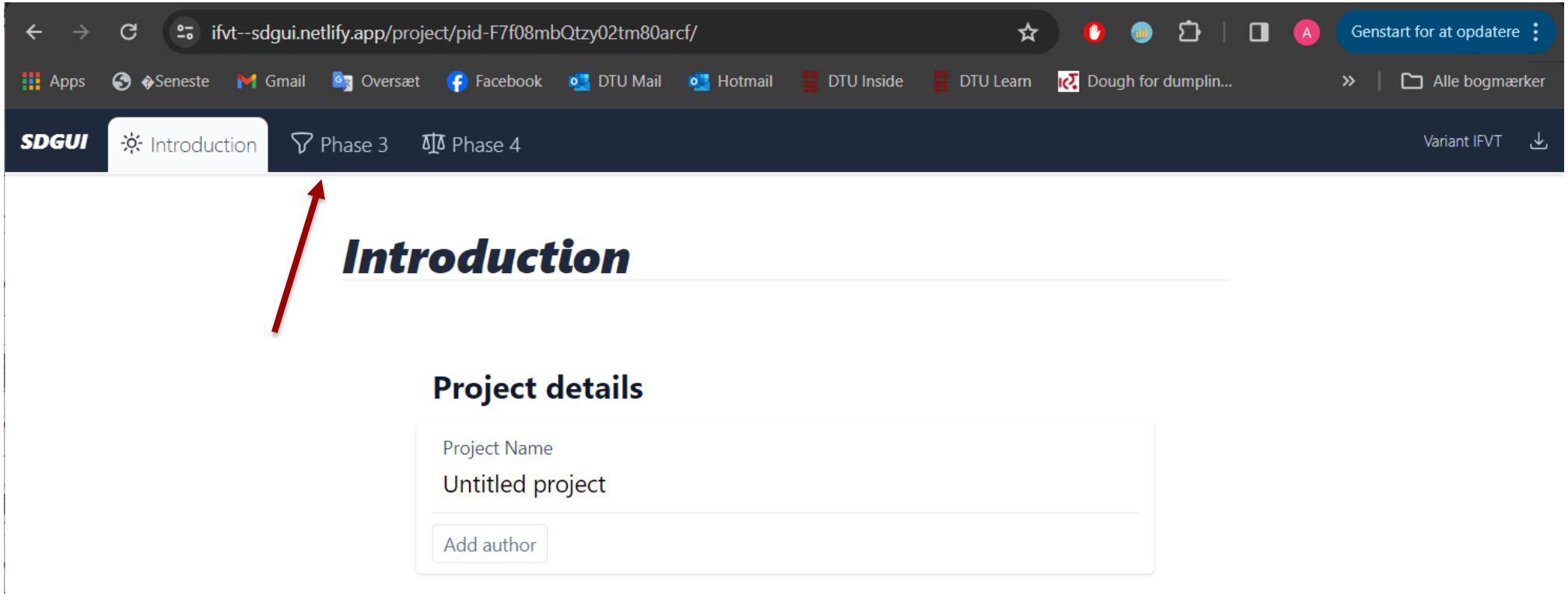
SDGUI

- Step 2: Fill in project details



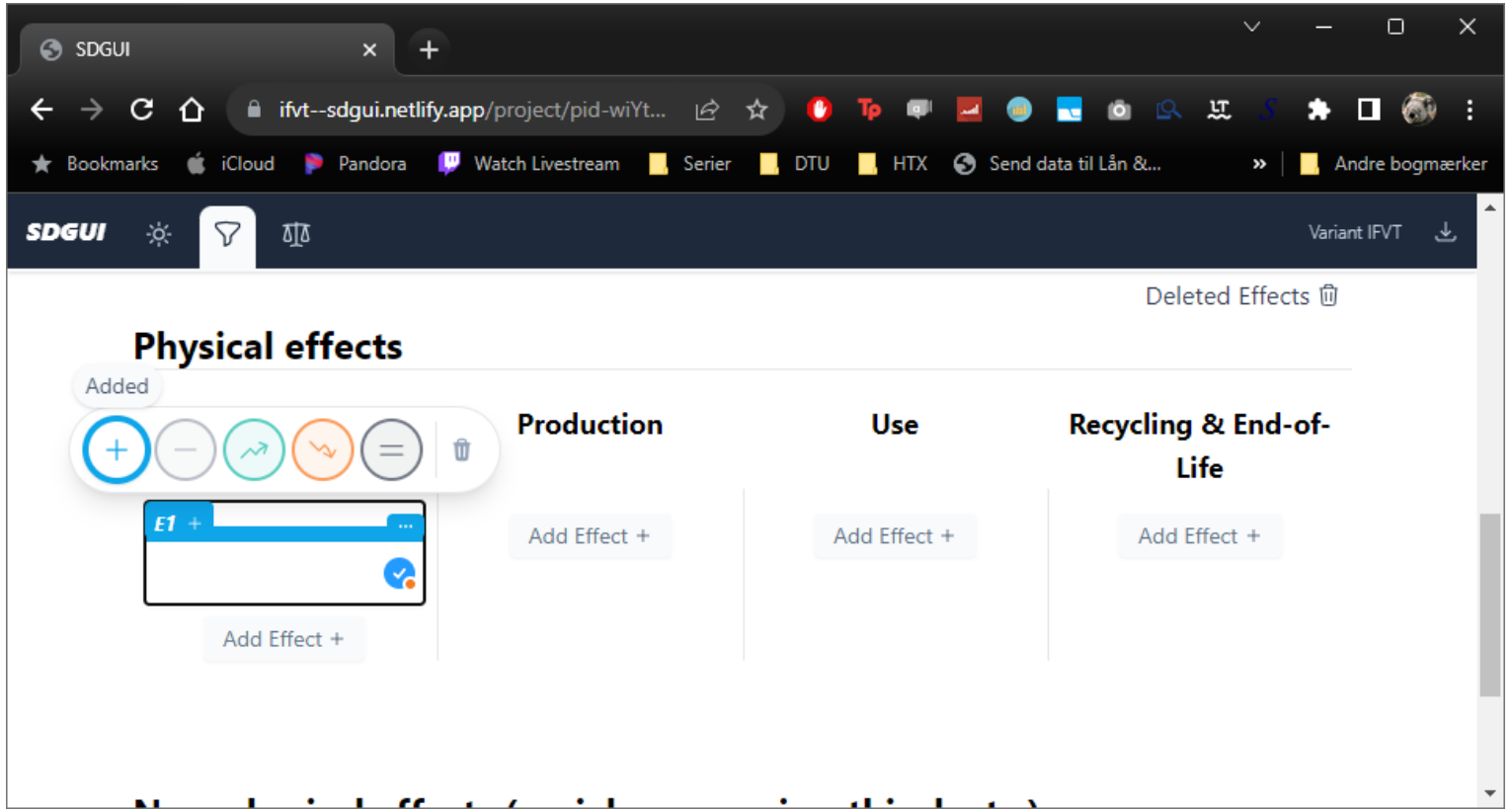
SDGUI

- Step 3: Access Phase 3



SDGUI

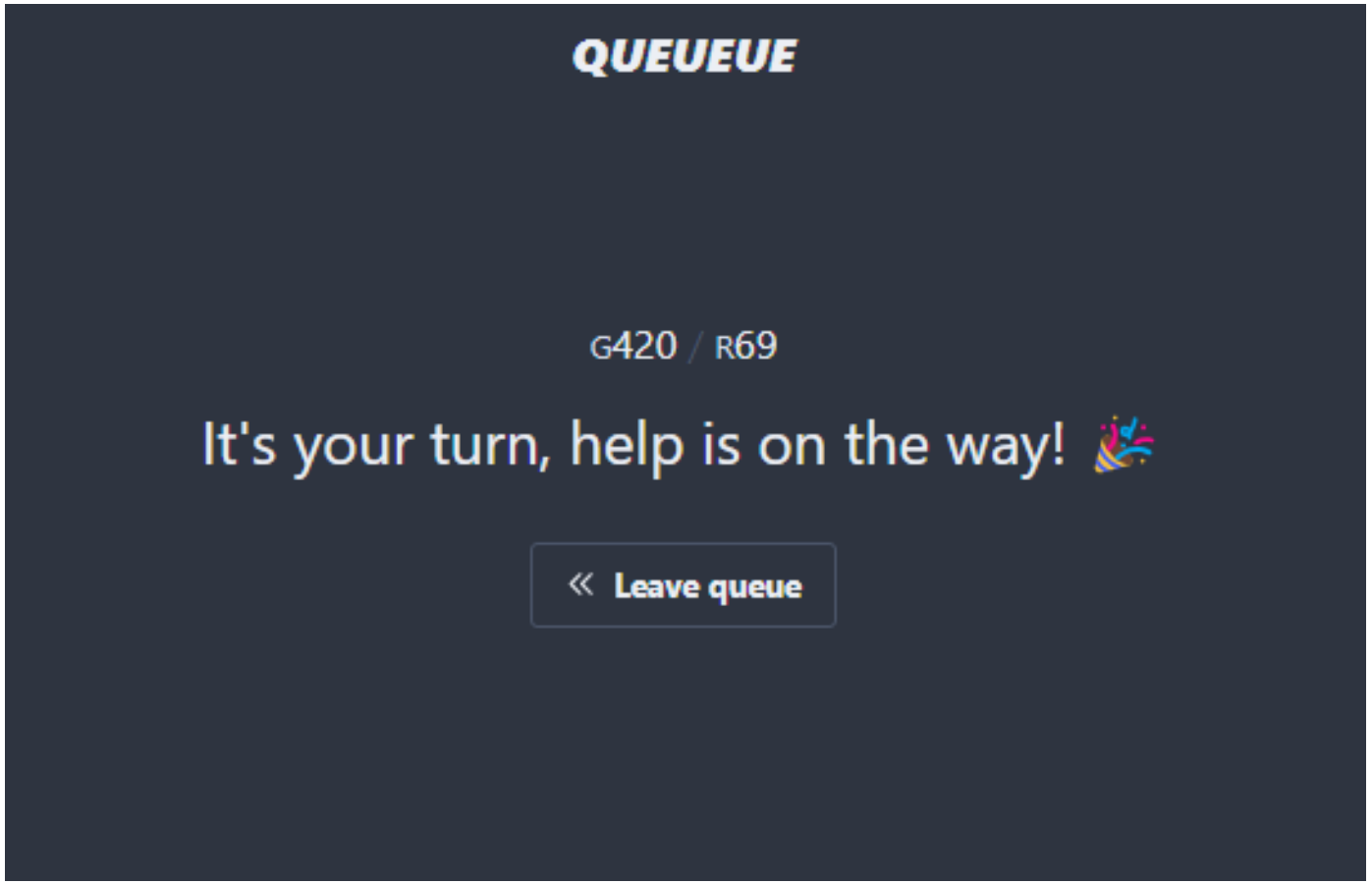
- Step 4: Fill in the effects of going from the baseline system to the new system.



Web-based queueing system

Queueue

Queueueue



Questions?