ECHT
— regie in transitie —

Wind farms and Circularity

Wind Finland Offshore 2025

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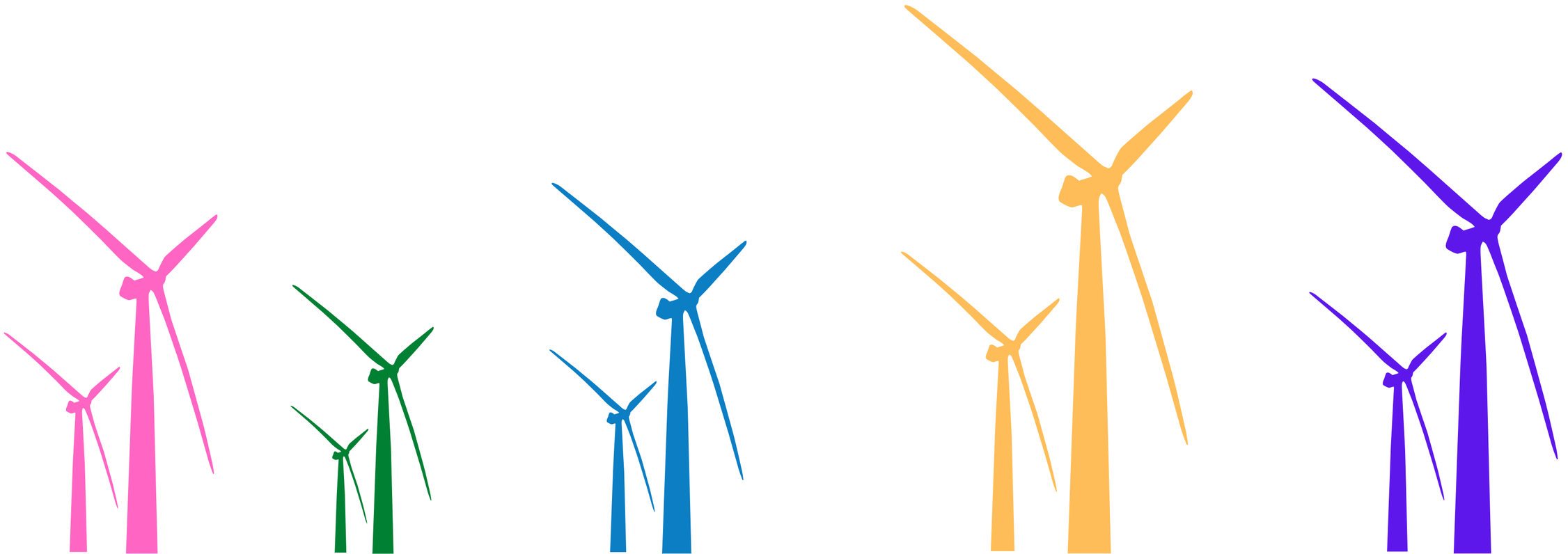
Raise your hand, if you think:

“Wind farms need to make economic sense for the developers"

Let’s build a 1,2 GW wind farm “Unicorn”!



Project “Unicorn"

SCENARIO BAU

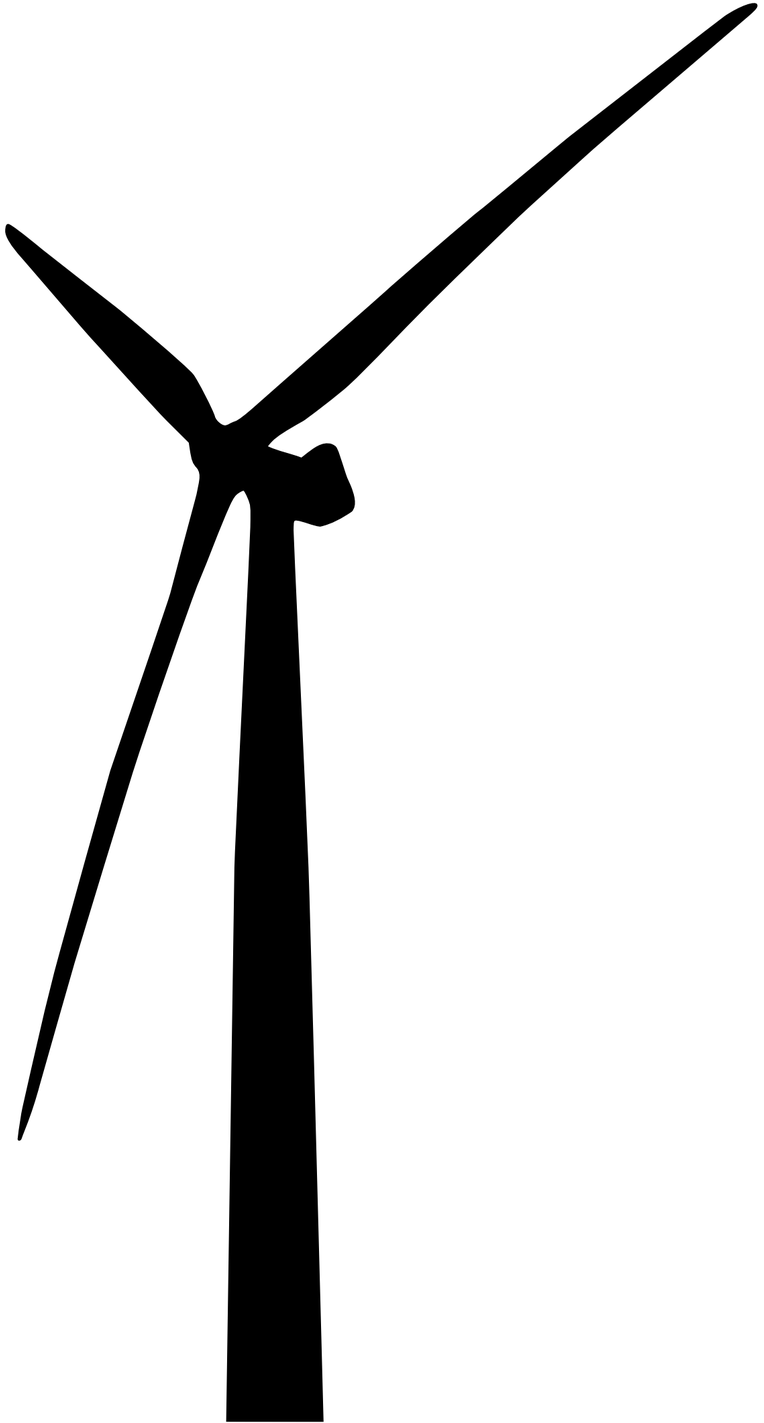
“Bigger is better”
⟶ 48*25MW = 1.2 GW

Linear design

Cost reduction as main driver

non-European manufacturing

COST
X €/MW



Project “Unicorn"

SCENARIO GREEN

“Innovation on sustainability”
⟶ 80*15MW = 1.2 GW

Improved sustainability

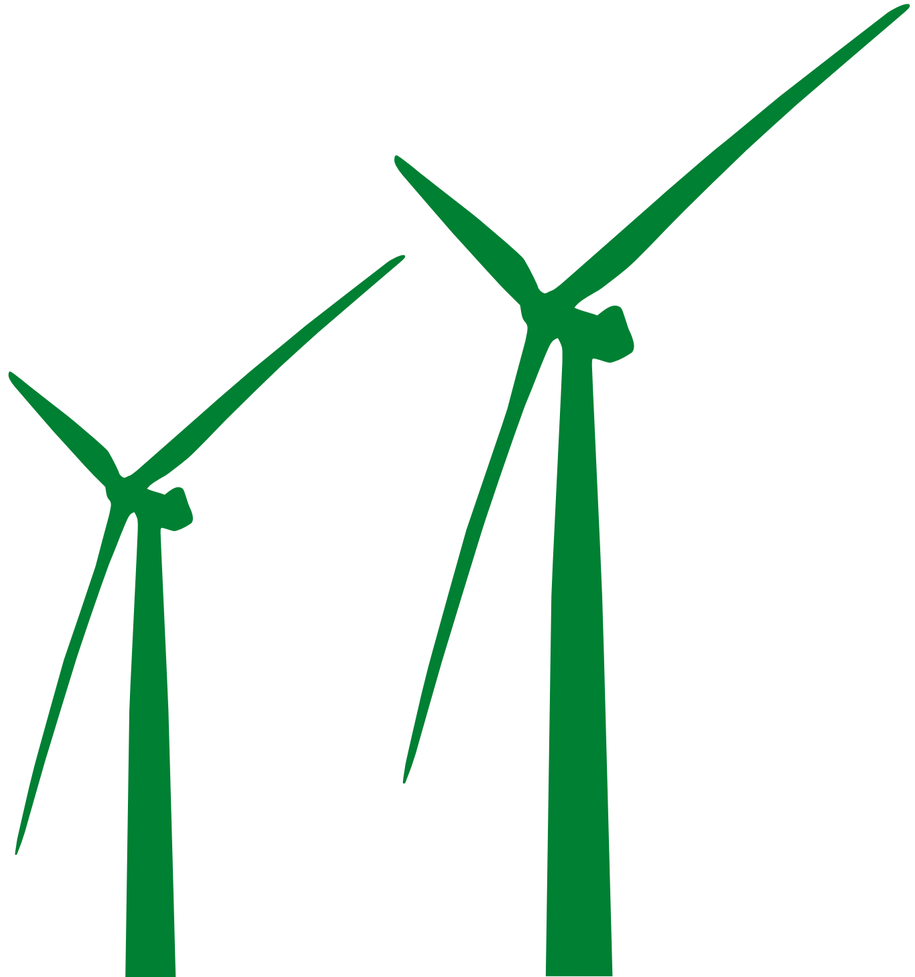
CO2 reduction
⟶ European manufacturing

Material passports

Modular designs

Standardisation

COST
1.1*X €/MW



Project “Unicorn"

Which wind farm will you invest on?

SCENARIO BAU

“Bigger is better”
⟶ 48*25MW = 1.2 GW

Linear design

Cost reduction as main driver
non-European manufgacturing

COST
X €/MW

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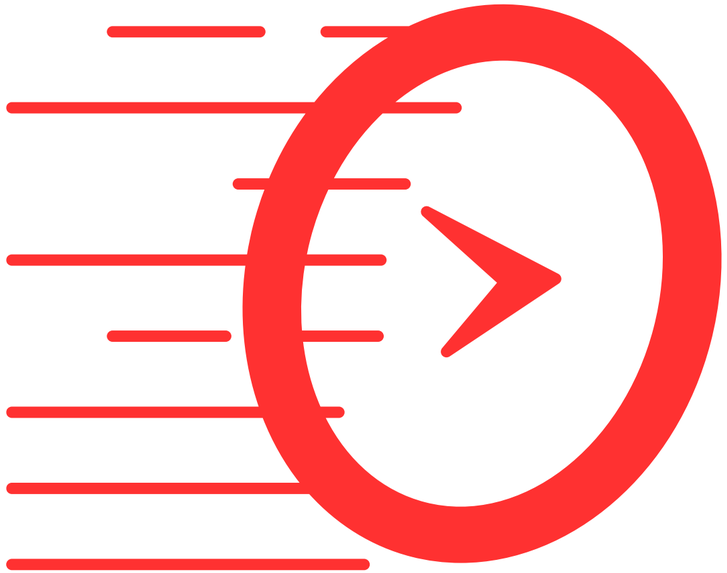
1.1*X €/MW

Fast forward




Drone show
gotten loose
DAMAGE REPORT
5 turbines out of order
2 inter-array cables cut broken
3 blades broken and fallen to sea
4 blades with other damages
2 foundations damaged due
to vessel impact
Vessel with engine
and steering issues

Project “Unicorn"

SCENARIO BAU

“Bigger is better”
⟶ 48*25MW = 1.2 GW

Linear design

Cost reduction as main driver
non-European manufacturing

Damage report and recovery assessment

10,42% capacity out

No components in stock in Europe

Suitable vessel available in 5 years

Foundation manufacturer changed to next generation size

DAMAGE REPORT

5 turbines out of order

2 inter-array cables cut broken

3 blades broken and fallen to sea

4 blades with other damages

2 foundations damaged due to vessel impact

SCENARIO GREEN

“Innovation on sustainability”
⟶ 80*15MW = 1.2 GW

Improved sustainability

CO2 reduction
⟶ European manufacturing

Material passports

Modular designs

Standardisation

Damage report and recovery assessment

6,25% capacity out

Standard components (e.g. blades) stored in Europe (available in stock)

Modularity shortens installation time by 20%

More vessels + personnel available

Who thinks “Scenario Green” gets back to 100% capacity faster and cheaper?

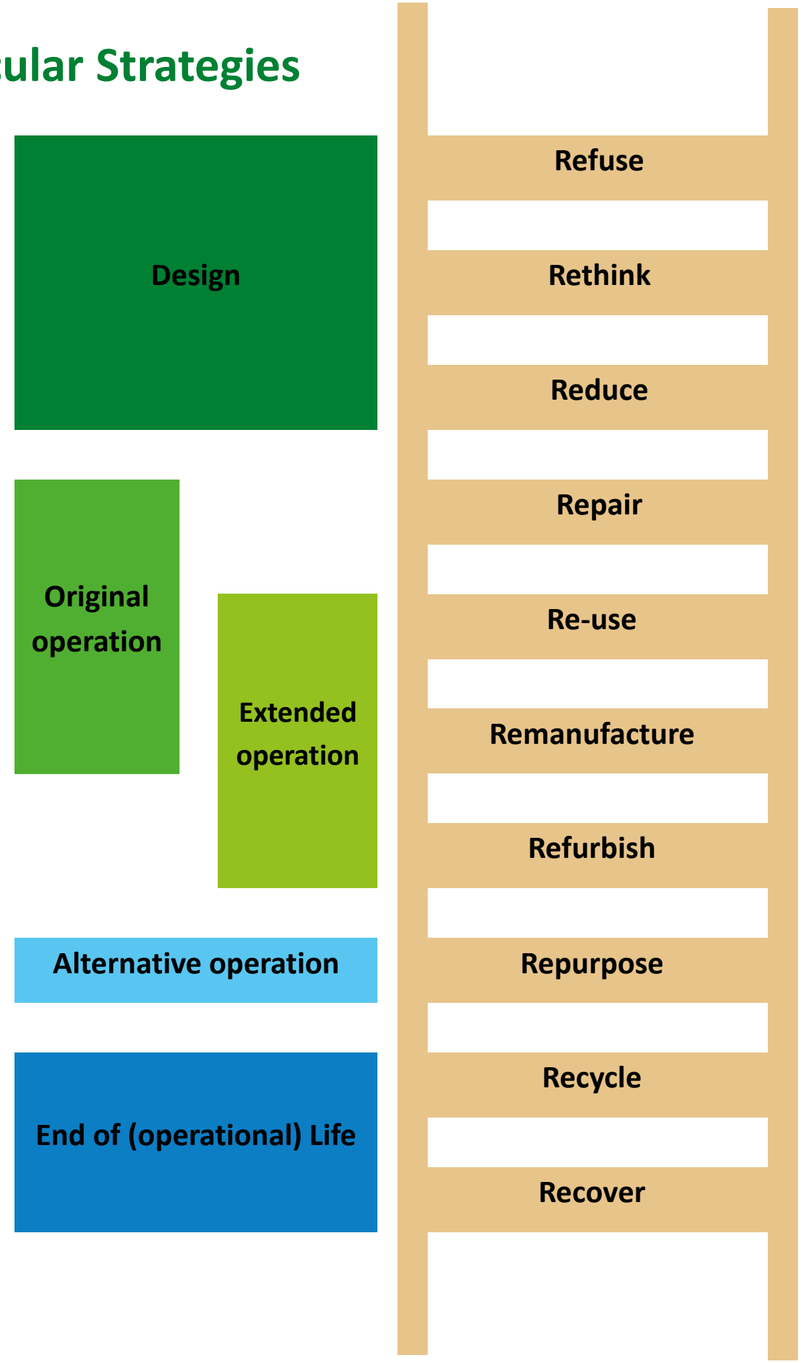
R-ladder of Circular Strategies

Design choices make largest impact on environment through the mining and manufacturing phase

Depending on the product and its original owner, different circular strategies (and their impact) are in their control

Product can enter to alternative function

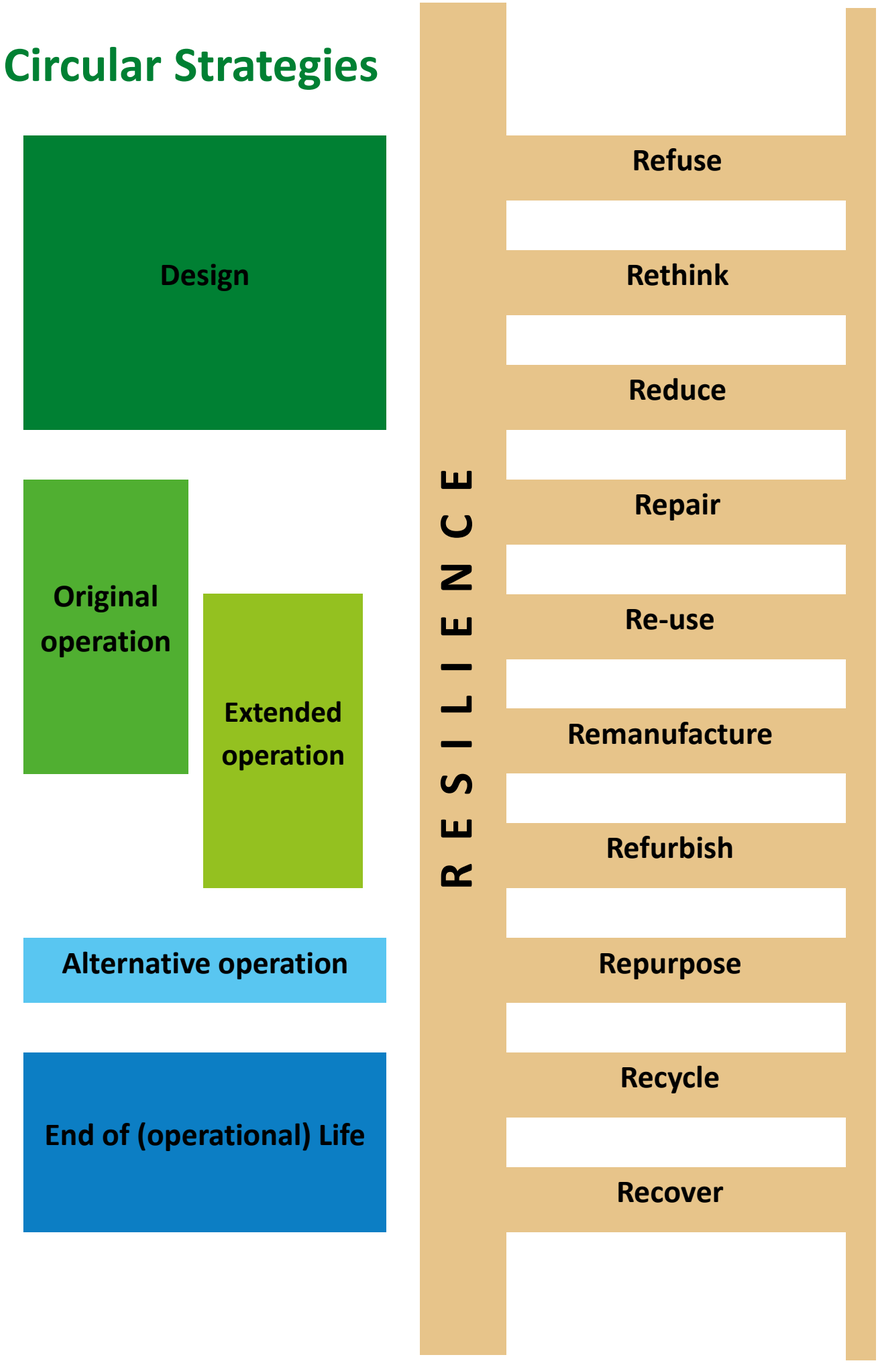
Product has material and/or energy value



Examples

- Not choosing for a product, because it's not essential
- Substituting material A with more sustainable B
- Reducing material use through design changes
- Preventive maintenance plan
- Using product in other location
- Original manufacturer repairs product to original state
- Product repaired to original-like state
- Product's lifetime is extended in alternative function
- Materials are used for new manufacturing
- Product is used for energy recovery (incinerated)

R-ladder of Circular Strategies



Connection points to resilience per lifetime phase

Recognition of design factors that improve the resilience of the product across the lifetime

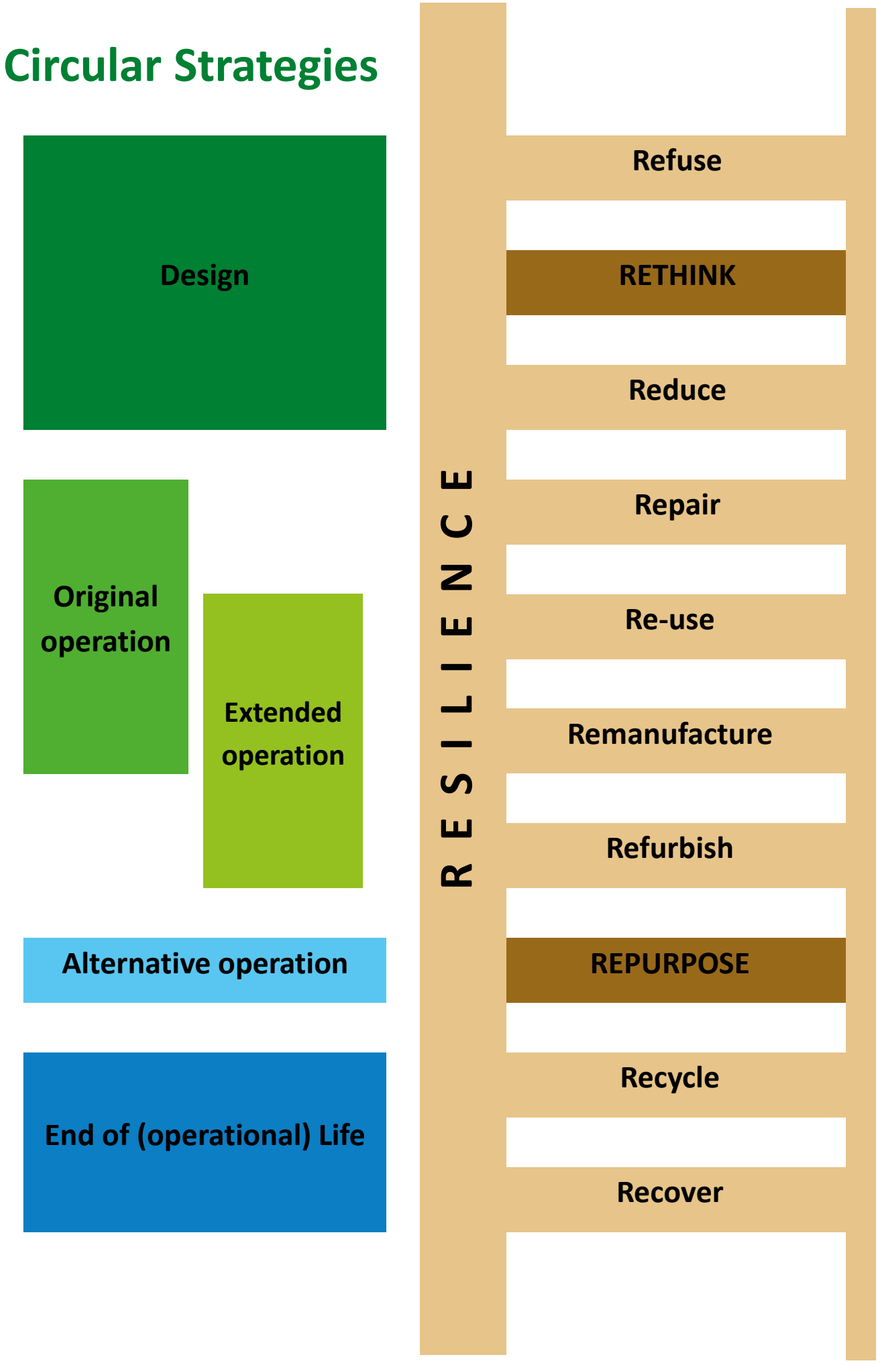
(steering through procurement)

Recognition of operational phase processes that improve the resilience by extending the lifetime of the product and therefore increasing autonomy

(steering through procurement and/or maintenance plan)

Recognition of ways to improve resilience through material and energy recovery *(steering through policy)*

R-ladder of Circular Strategies



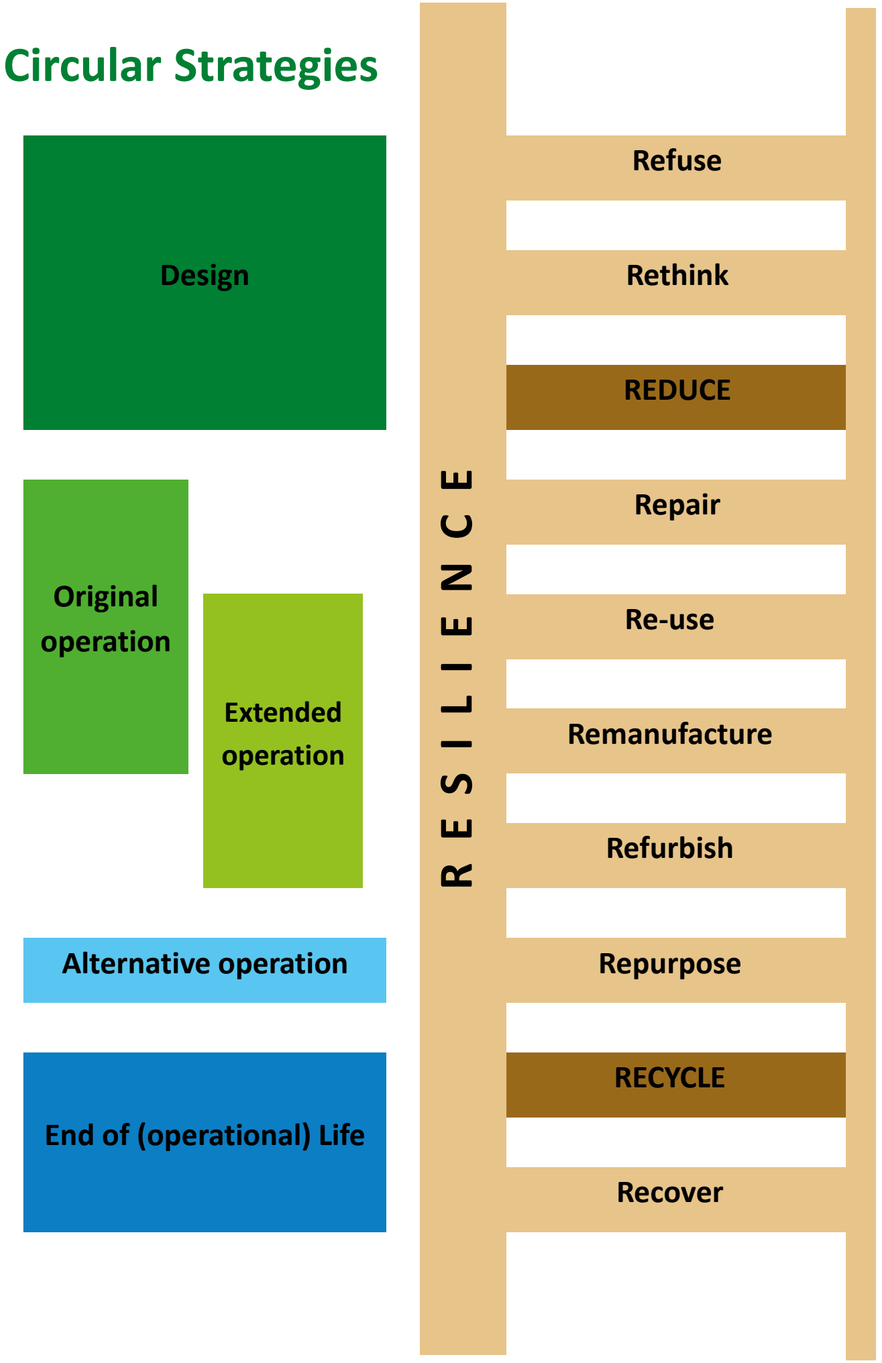
Examples of resilience improvements through circular strategies

Through **rethinking** of the original design, it is possible to ease the **repurposing** of the product or component, making the preferred transition easier and/or faster

What are products or components with highest potential for this?

Are there components in wind farm that can be prioritized to other sector in case of need?

R-ladder of Circular Strategies



Examples of resilience improvements through circular strategies

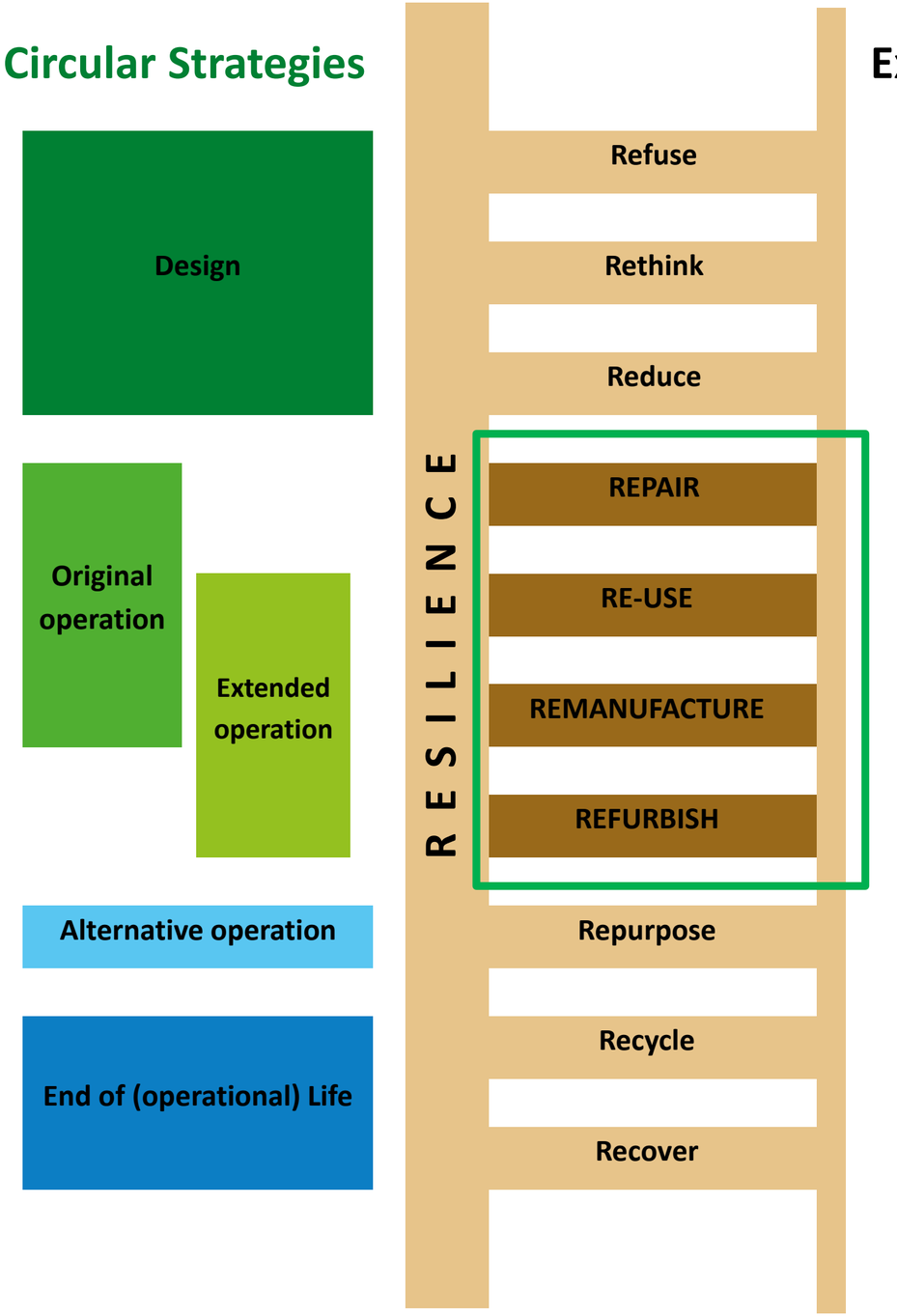
Through **recycling,** need of virgin materials can be **reduced**, which increases the resilience by lowering the needs of material import that can be challenged during disruptions.

Which products, components and materials could and should be processed inside chosen geographical boundaries?

To what extend can this happen inside the same sector or in other critical sector?

What is the current status and what would be a preferred/feasible status?

R-ladder of Circular Strategies



Examples of resilience improvements through circular strategies

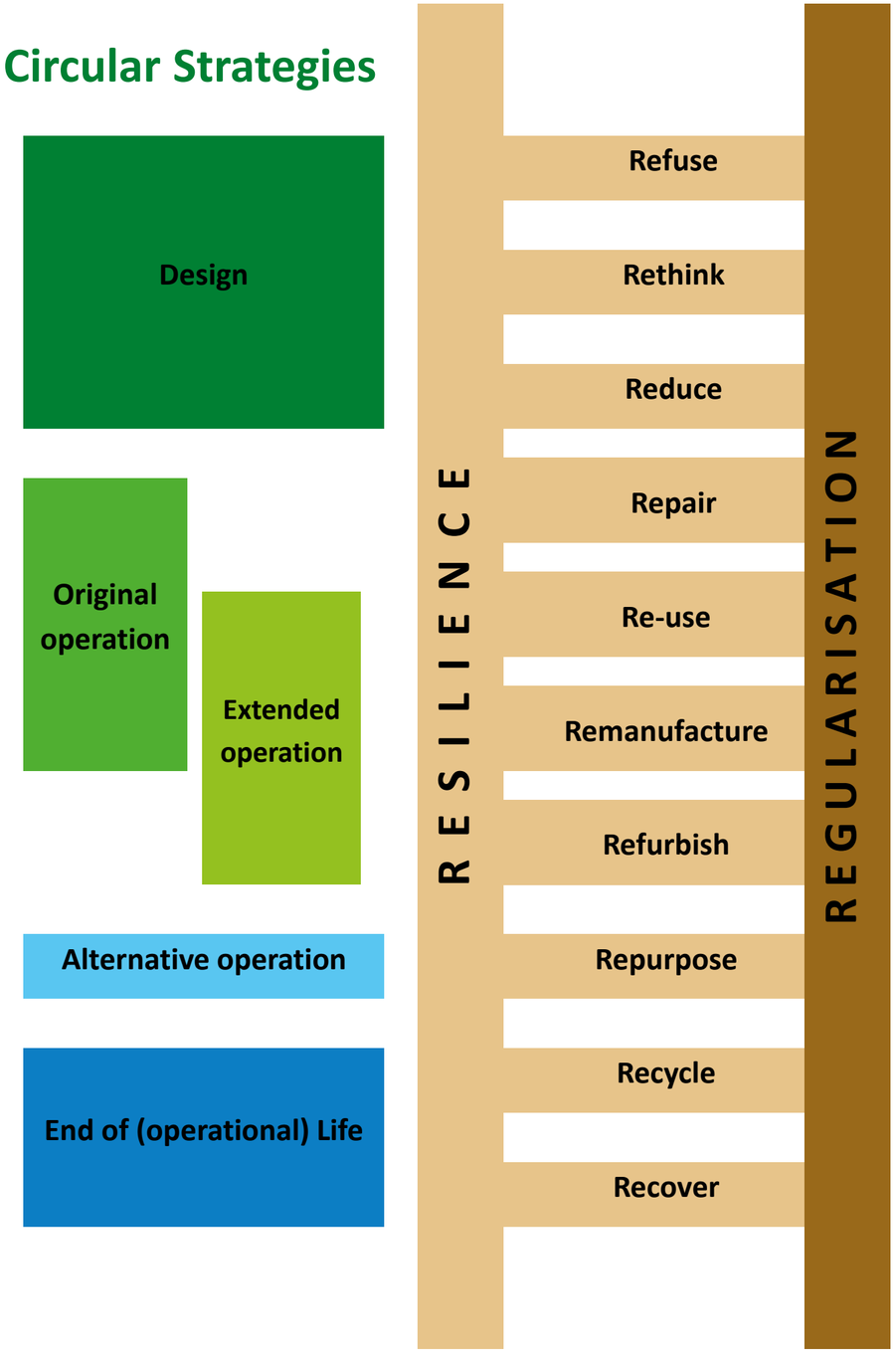
Through **repair, reuse, remanufacturing and refurbishment** the use of products and components can be extended. This increases the resilience as need for new products and components is reduced --> **increase of autonomy.**

For which products and components there should be lifetime extension processes available inside chosen geographical boundaries?

What is the current status and what would be a preferred/feasible status?

Access to human capital in case of disturbances?

R-ladder of Circular Strategies



Improvements through collaboration and alignment

Consider where collaboration creates shared benefits.

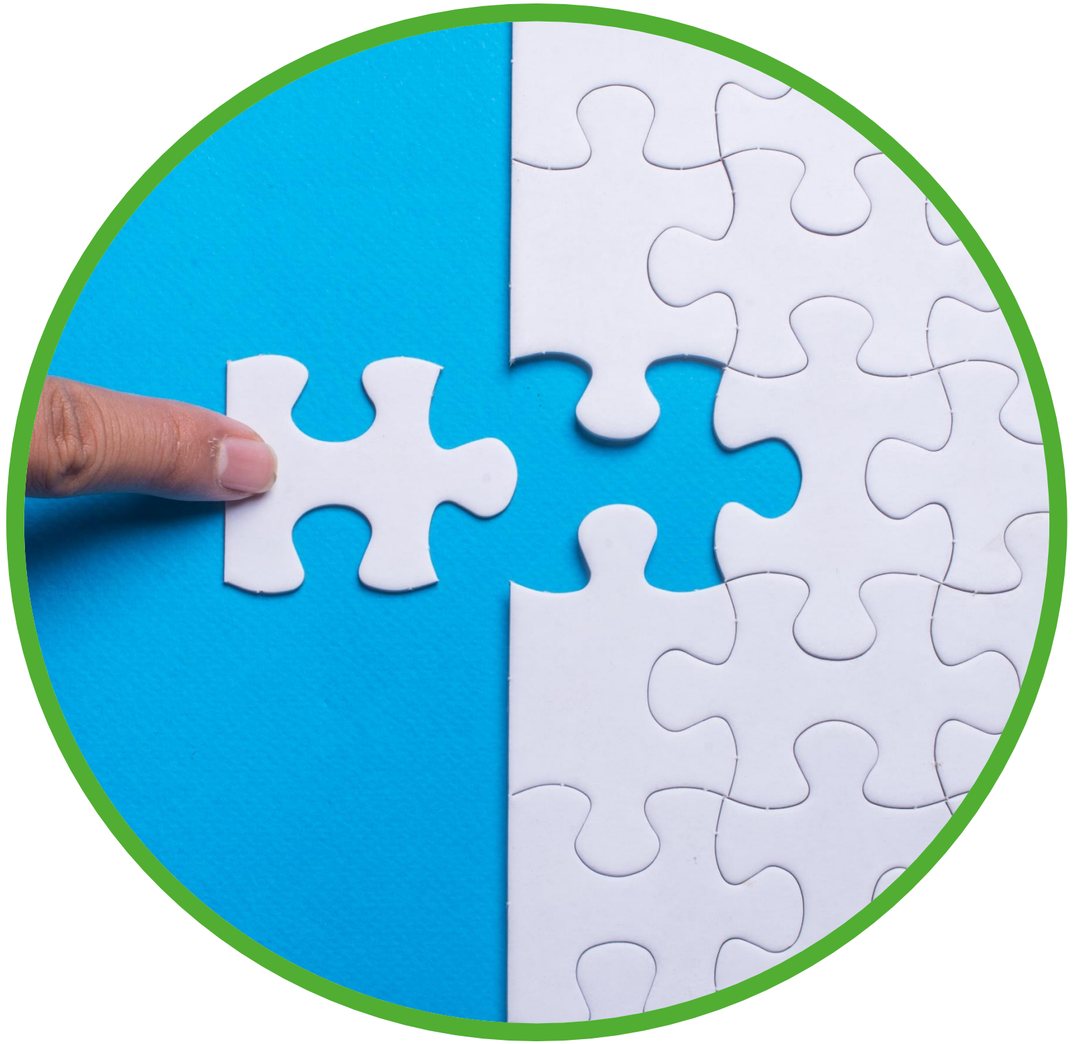
Role of regularization/standardization as cost reduction driver.

- Maximum tip height → moving away from rat race
- Digital Product Passport for materials and impact traceability → supportive to CSRD also
- Keeping level playing field also during transition phases → where should competition actually take place and where is it just increasing project costs?
- Role of predictability in regional investments and job creation

5 conclusions

Circularity includes opportunities beyond environmental protection

1. Supporting resilience in project, organisational and national level (discovery of win-win situations)
   → man-made disturbances and climate change
2. Provides opportunities for long term value creation and jobs
3. Expands innovation beyond “how to make it bigger”
4. Creates opportunities for cost savings through collaboration and alignment
5. Can become competitive advantage of European manufacturers and market



Thank you for sharing the energy!

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