Keynote Address,
EERA DeepWind 2021

Sustainable Development in Wind Energy

Lena Kitzing, Head of Society, Markets and Policy, DTU Wind Energy

SUSTAINABILITY

Meeting the needs of the present without compromising the ability of future generations to meet their needs

Achieving sustainability will

enable the Earth to continue supporting life

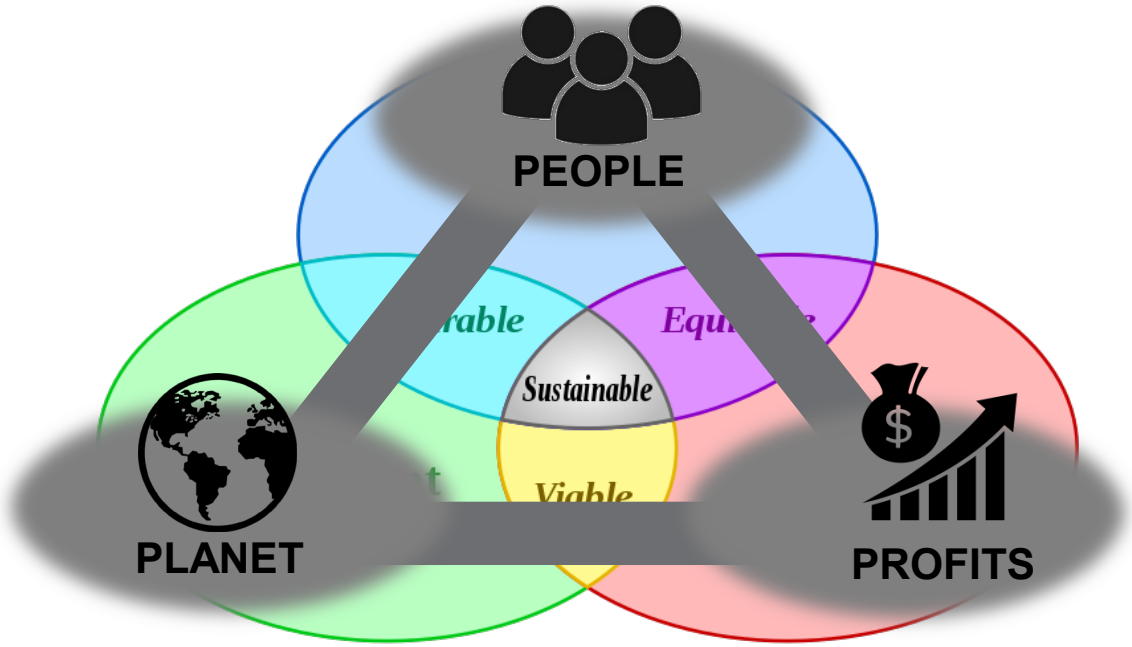
SUSTAINABLE DEVELOPMENT

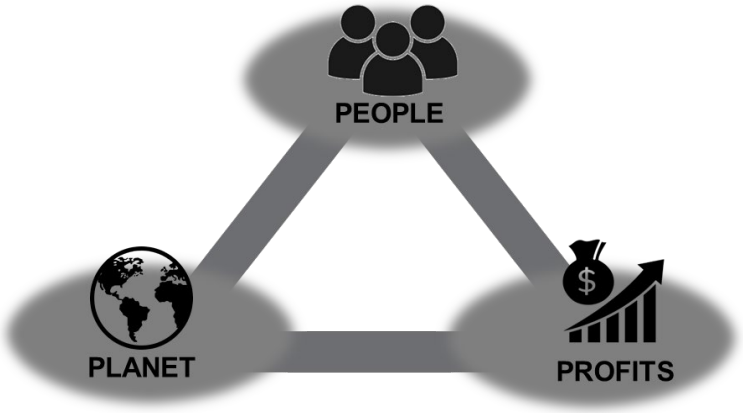
The holistic approach and temporal processes that lead us to the endpoint of sustainability

The **organising principle** of sustainability

Helps to simplify and handle a particularly complicated domain or phenomenon

Concepts, priorities, goals





HOW TO GET FROM THIS….

….TO SOMETHING CONCRETE?

Published 22 June 2020: Regulation (EU) 2020/852 (Taxonomy)

EU Taxonomy on environmental Sustainability

Sets out overarching conditions that an economic activity has to meet to qualify as environmentally sustainable

Six Objectives

- Climate change mitigation
- Climate change adaptation
- Sustainable use and protection of water and marine resources
- Transition to a circular economy
- Pollution prevention and control
- Protection and restoration of biodiversity and ecosystems

Conditions to be met

Source: TEG (2020)

Testing if a wind energy project is environmentally sustainable according to the EU Taxonomy

SUBSTANTIALLY CONTRIBUTE

Objective
Climate change mitigation

Wind energy is deemed a **"best performer"** in the sector

Evidence:
= automatic eligibility

(subject to regular review)

-> Aligned

DO NO SIGNIFICANT HARM (DNSH)

Criteria: noise, composite waste pollution, biodiversity risks, visual impacts (impacts during whole life cycle, incl. construction and operations)

Evidence:
Environmental Impact Assessment (EIA)
Management plans
Recycling ambition stated
Protection measures, incl. monitoring + evaluation plans

MINIMUM SAFEGUARDS

Standards
Minimum standards related to UNGP, OECD Guidelines and ILO* conventions.

Evidence:
Official project documentation / separate due diligence, including screening against controversies

*International Labour Organísation Source: based on TEG (2020)

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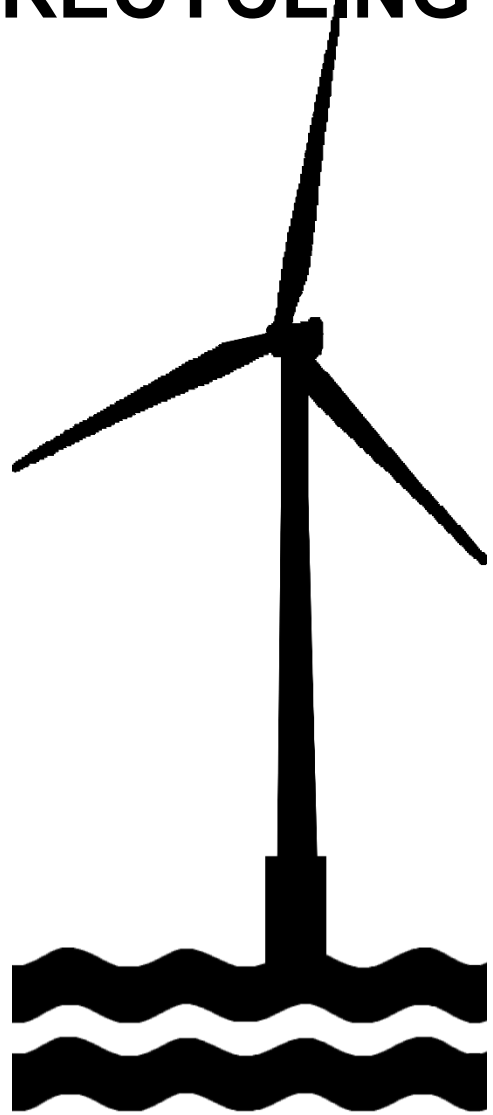
RECYCLING AMBITIONS IN WIND ENERGY DEVELOPMENT



Fiberglass composite blades are challenging

85% of turbine components, including steel, copper wire, electronics and gearing can be recycled or reused

...but is this being done to a sufficient extent?

HANDLING BLADES AT THE END OF PROJECT LIFETIME

Rarely like this…

Pictures by Denis Guzzo, link

More often like this…

U.S.: 50,000 tons of blades in 2023, up to 370,000 tons per year by 2050
approximately 0.025% of current U.S. municipal landfill (2018) *Sources: EPRI, EPA*

NOT A HUGE ISSUE?

Dubbed “Wind’s Dirty Downside” by media

after a photo of a landfill in Wyoming went viral in 2019

“The backlash [by the public] was instant and uninformed”

e.g. “...thought wind turbines were supposed to be good for the environment and how can it be sustainable if it ends up in a landfill?”

Source: Bloomberg (2020)

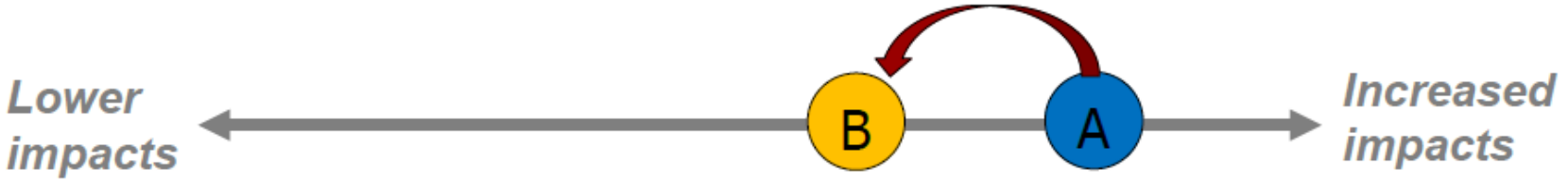
…AND THEY'VE GOT A POINT

RELATIVE TARGET

= BETTER THAN OTHERS

Relative sustainability or **"eco-efficiency"**: product B with lower impacts than product A

→ Life Cycle Assessment (LCA)



ABSOLUTE TARGET

= ACHIEVING A GOAL ON ITS OWN RIGHT

-> e.g. planetary boundaries

[1] *Hauschild, 2015. Procedia CIRP 29, 1 – 7*

WHAT ABOUT THE INTERNATIONAL PERSPECTIVE?

Source: https://www.stockholmresilience.org/research/research-news/2016-06-14-how-food-connects-all-the-sdgs.html

WIND ENERGY DEVELOPMENT AND SDG CONTRIBUTIONS

CONTRIBUTE

7 increase use of renewable energy

13 mitigate climate change

NO HARM

12 minimise waste, responsible waste management

14,15 mitigate impacts on marine and coastal ecosystems

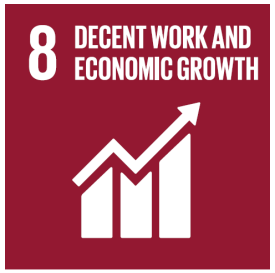
15 minimise negative impacts on forests.

RESPONSIBILITY IN SOCIETY

3 Promote mental health and well-being

11 local job creation, development of local communities

5 Ensure equal opportunities for all and women's full participation



8 Safe working environments

8, 16: ensure labour rights, good business conduct

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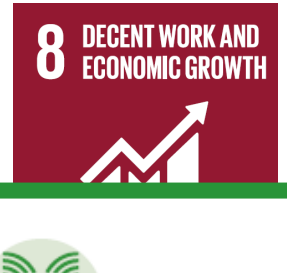

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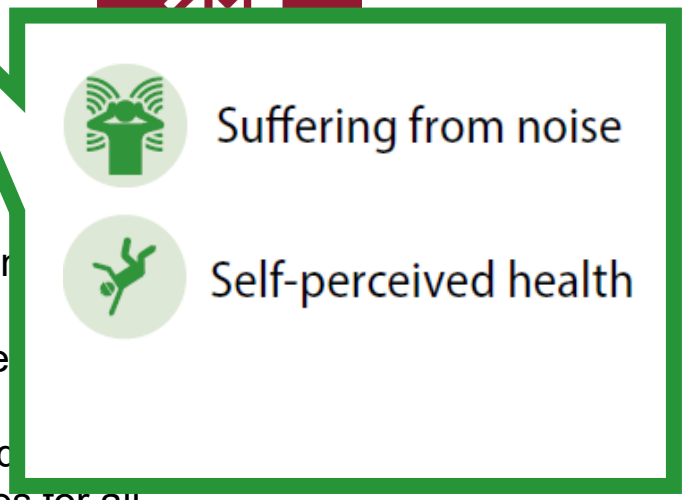

WHAT CAN WE DO TO REACH SUSTAINABILITY?

- R&I efforts to increase durability, reparability, upgradability and reusability, repurposing
- Reduce use of resources (through design and choice of materials)
- Reduce hazardous substances in materials and products
- New business models for circular economy (e.g. leasing of blades?)
- Enhance social benefits of projects

Minimise impacts – but also maximise benefits (environmental & social) in project development and technology innovation

Wind industry

Set company targets and adopt strict policies to reach them

Develop internal company-wide processes for developing environmental management plans

Capacity building of employees

Collaborate with industry partners (e.g. to improve recycling technologies and reusability of products)

Knowledge industry

Provide information, conduct studies, analyse data

Develop metrics and standards for measurement and evaluation

Develop and provide tools

Education for the current and future work force

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THANK YOU!

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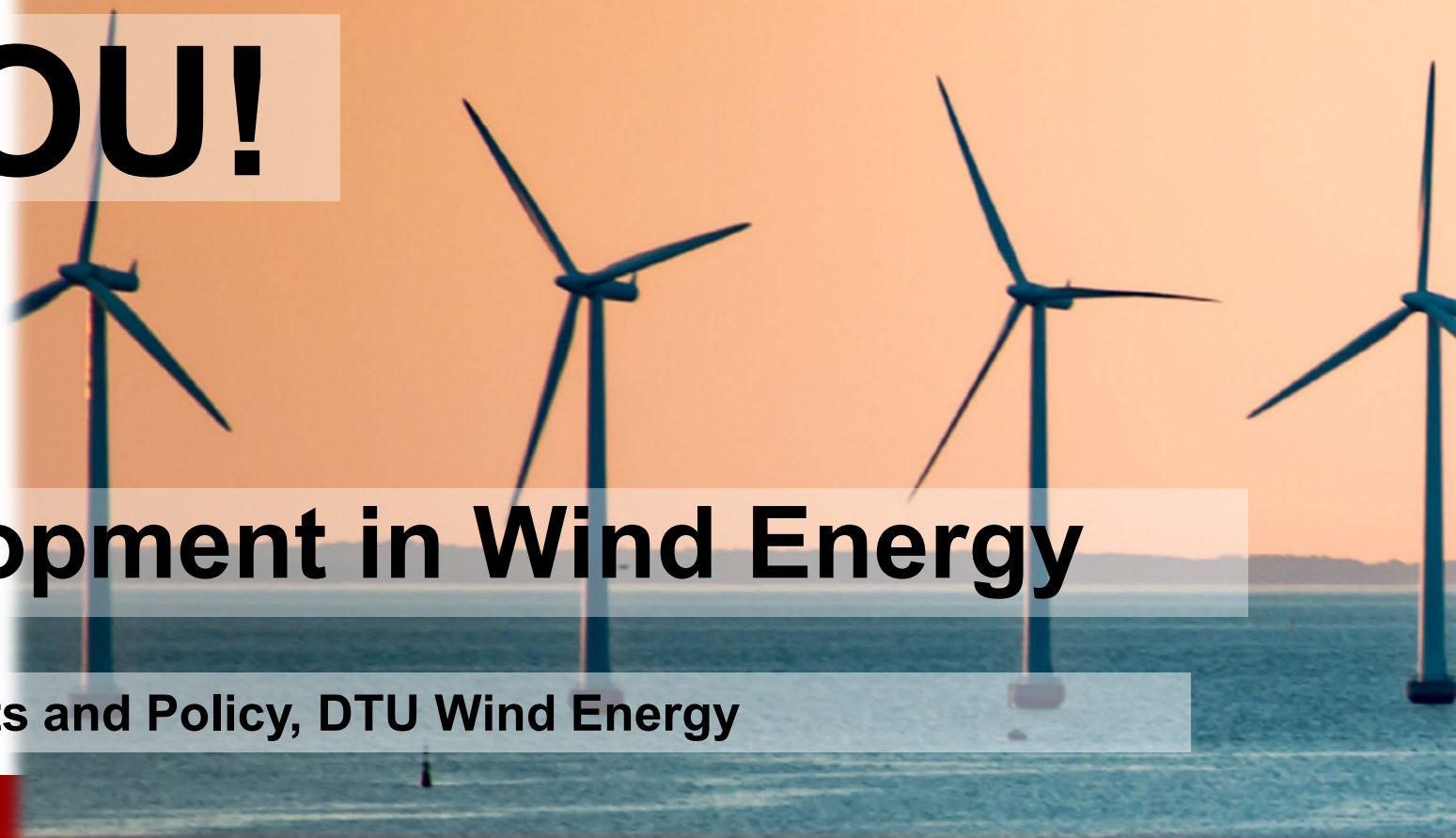

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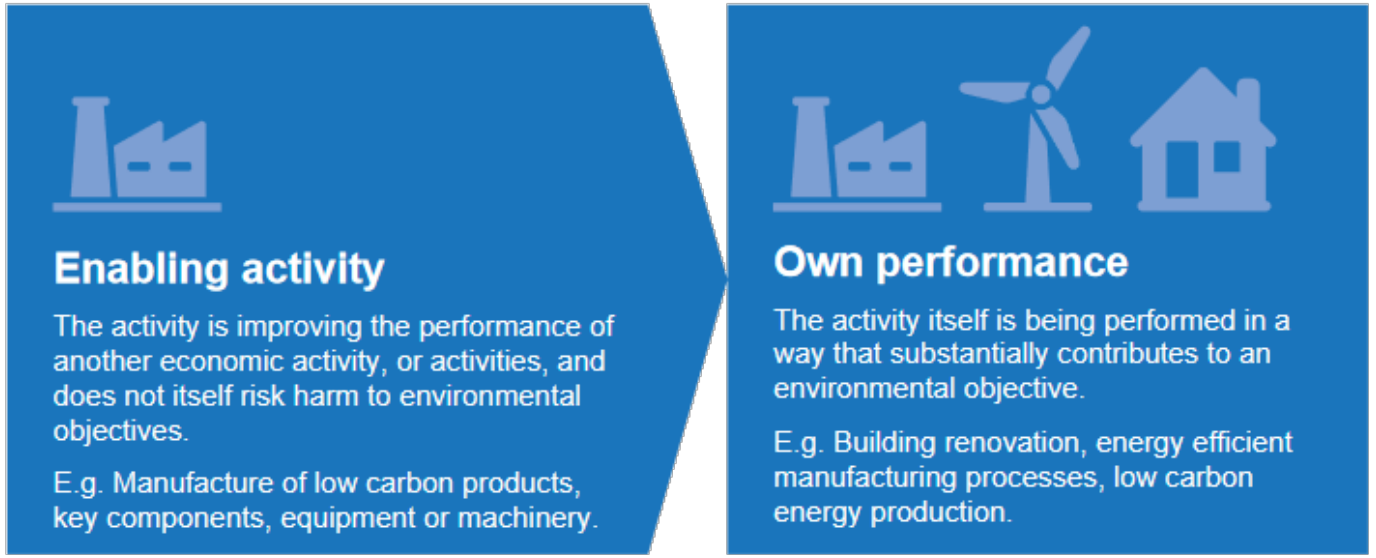
- EPRI (2020), Electric Power Research Institute, Wind Turbine Blade Recycling: Preliminary Assessment (Report No. 3002017711)

Objectives	Potential activities
Climate change mitigation	• **Avoid / reduce greenhouse gas emissions** • Enhance greenhouse gas removals
Climate change adaptation	• Reduce / prevent adverse impact / risk on people, nature or assets
Sustainable use and protection of water and marine resources	• protect water against pollution, toxins and deterioration • enhance quality • remove waste
Transition to a circular economy	• durability, reparability, upgradability and reusability, repurposing • use of resources (design and choice of materials) • reduce the hazardous substances in materials and products 'product-as-a-service' business models and circular value chains
Pollution prevention and control	• enhance quality or air, water, land • protect air against pollution and toxins
Protection and restoration of biodiversity and ecosystems	• protecting, conserving or restoring biodiversity and ecosystems, wild fauna and flora (species and habitats) • e.g. provisioning of food and water; control of climate and disease; providing spiritual and recreational benefits

Enabling activities vs. own performance

Good news: Even ‘brown’ activities can be deemed sustainable in the EU Taxonomy if they are enabling activities.

Includes manufacturing of wind turbines & grid infrastructure development



Source: based on TEG (2020)

SELECTED SDG INDICATORS MONITORED IN THE EU

- Energy productivity
- Resource productivity
- Circular material use
- Consumption of toxic chemicals
- Generation of waste

Domestic material consumption (DMC) as compared to gross domestic product (GDP)

SELECTED SDG INDICATORS MONITORED IN THE EU

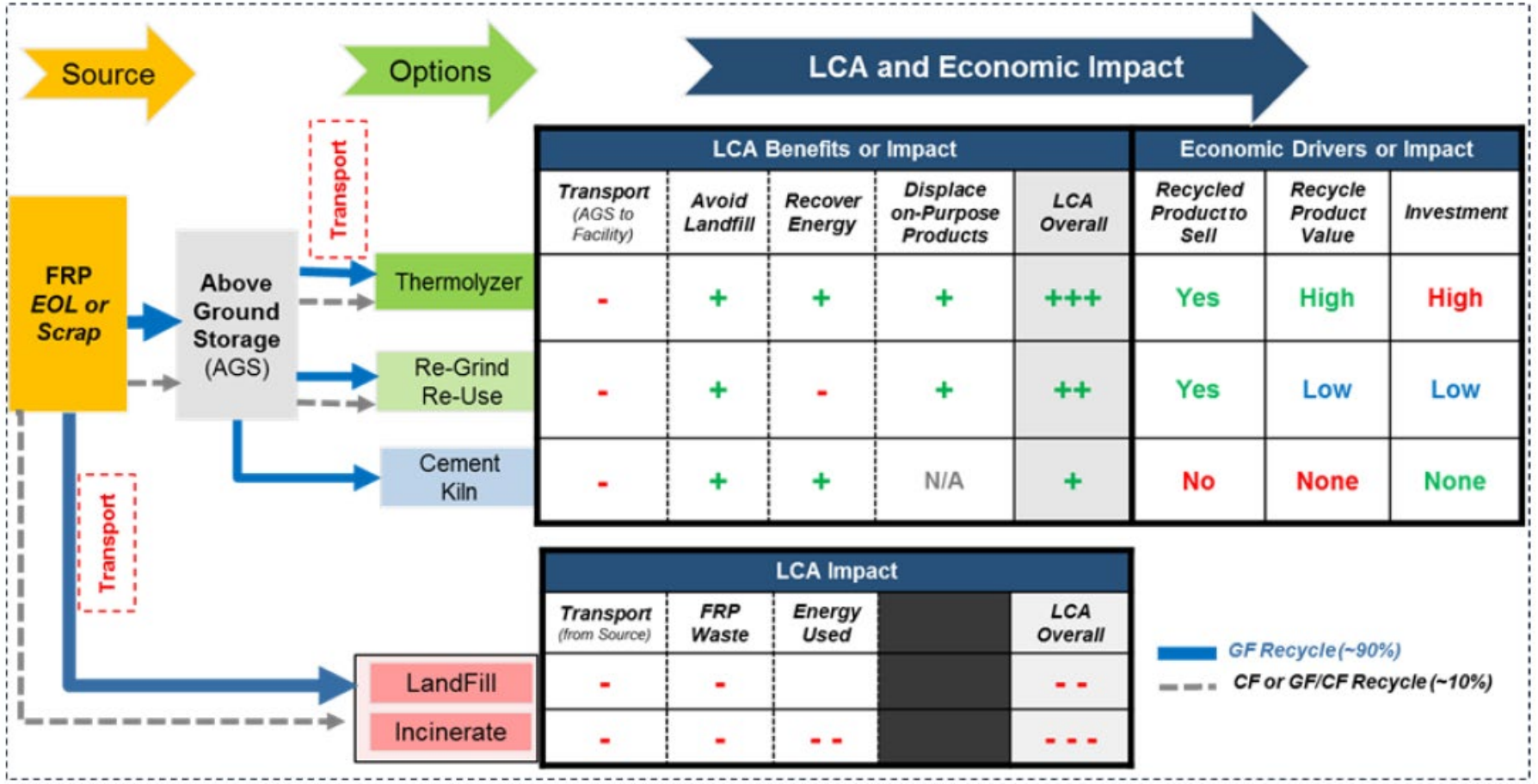
- Suffering from noise
- Self-perceived health

- Water exploitation
- Bathing water quality

- Suffering from noise
- Natura 2000 marine sites
- Bathing water quality
- Mean ocean acidity
- Trends in fish stock biomass
- All common bird index
- Soil sealing index

Life-cycle assessment (LCA) and techno-economic analysis

Composite recycle options and recommendations: EPRI (2020)



Hartman, Dave, and Szegner, John, "NA Composite Recycle Options and Recommendations: LCA & Techno-Economic Analysis," presentation to IACMI on June 22, 2019, in: EPRI (2020)

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European Energy Research Alliance
JP WIND

Sustainability