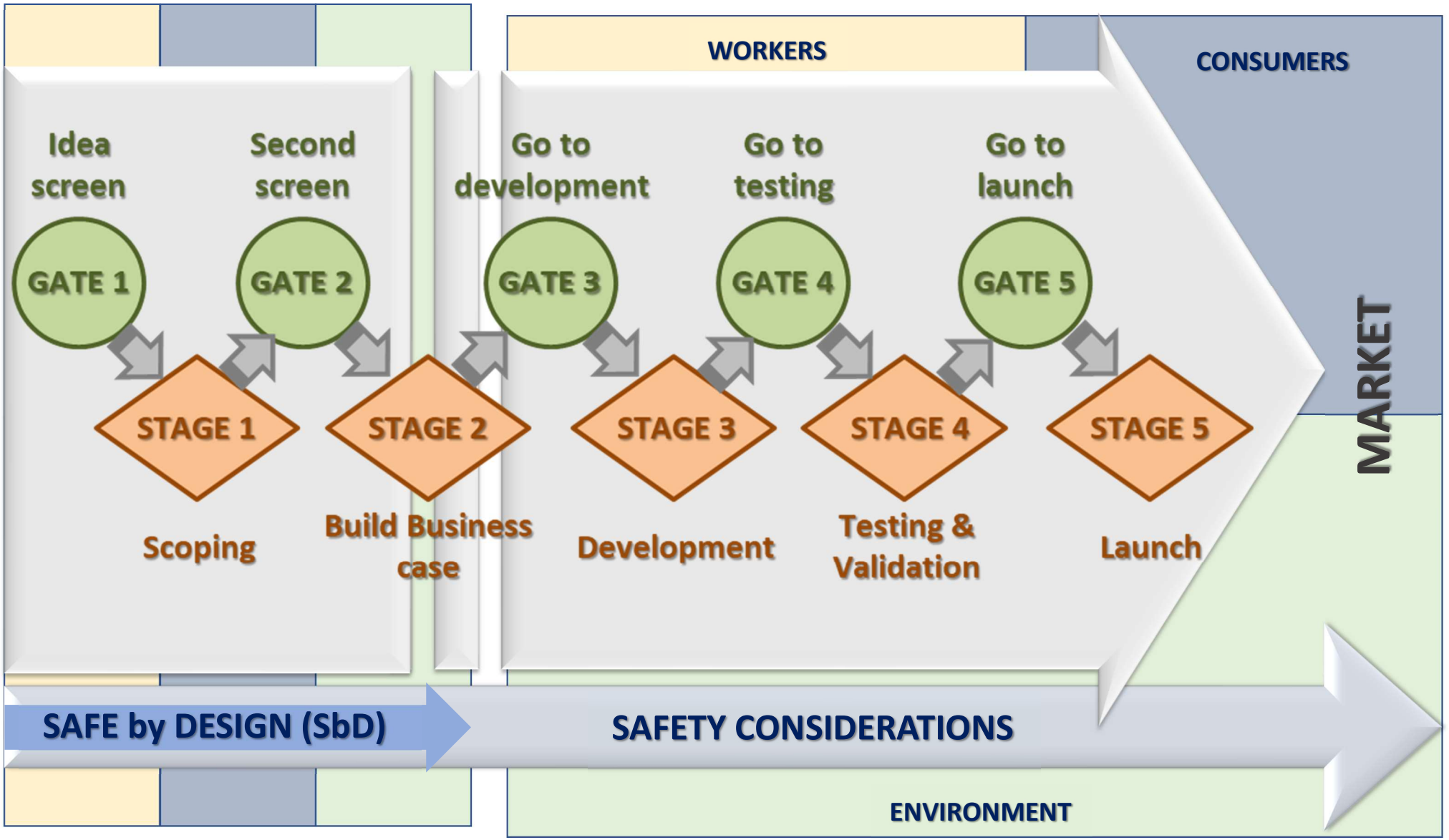
NanoSafety Cluster

Sector-specific Case Study: Nanotecnology-based Polymeric parts produced by 3D Printing


WORKERS
CONSUMERS
Idea screen
Second screen
Go to development
Go to testing
Go to launch
GATE 1
GATE 2
GATE 3
GATE 4
GATE 5
STAGE 1
STAGE 2
STAGE 3
STAGE 4
STAGE 5
Scoping
Build Business case
Development
Testing & Validation
Launch
MARKET
SAFE by DESIGN (SbD)
SAFETY CONSIDERATIONS
ENVIRONMENT

Sector-specific Case Study: Nanotecnology-based Polymeric parts produced by 3D Printing

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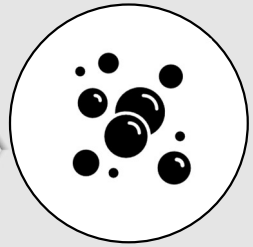
Case Study Description: Functionality: Antistatic parts; NEP: Adjustable fastener; MNM: Polymer nanocomposite; NF: Carbon-based NM; Matrix: Polymer

NEP LIFE CYCLE STAGES

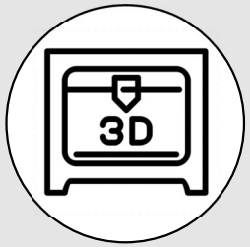


Nanoadditive Production

Weighing
Pouring
Cleaning
Synthesis

Manufacturing Polymer-filament

Weighing
Pouring
Cleaning
Extruding



Manufacturing Plastic parts (NEP)

Printing process
Post-processing
Cleaning

Service Life for NEP

Rubbing
Mechanical stress
Washing

End-of-life (disposal & recycling)

Landfill
Incineration
Mechanical stress
Extruding

SCENARIOS/ ACTIVITIES ALONG NEP LIFE CYCLE

Sector-specific Case Study: End of Life Safety consideration

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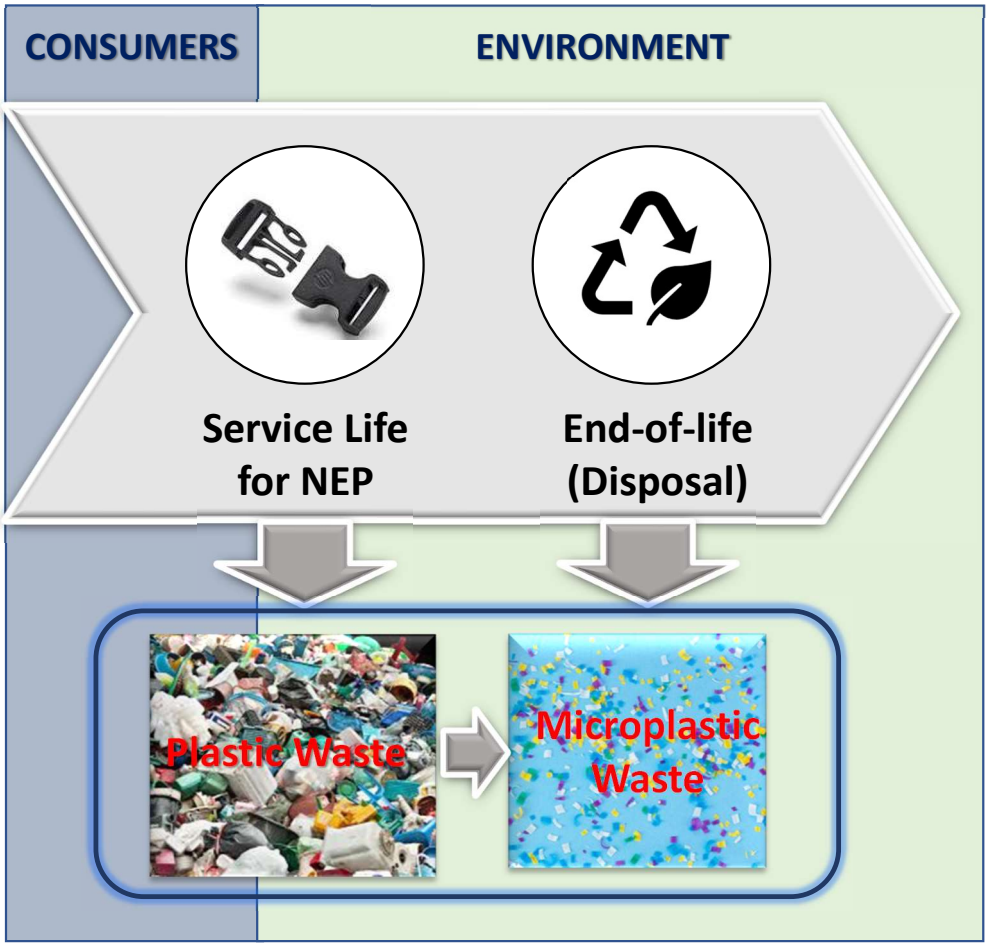

- 300 million tonnes of plastic manufactured each year. Plastic takes 95 years on average to degrade
- Plastics in the environment will accumulate and will eventually accumulate in the ocean
- Lifecycle of plastics: disposal, landfill, soil, rivers, ocean
- Mechanical and chemical abrassion/corrosion transforms macroplastics to microplastics

Questions to the audience

What would be the priorities for implementing a SbD solution for a NEP manufacturer?

1. Product performance
2. Regulatory restrictions
3. Workers/ consumers/ environmental safety
4. Costs
5. Product sustainability
6. All the above solutions will be considered in a balance manner

Questions to the audience

Which are the main needs that a Nanoadditive producer can have to implement SbD solutions?

1. Obtain solutions to produce nanoadditives with reduced toxicity
2. Obtain solutions on how to improve the synthetic process to reduce workers exposure
3. Obtain solutions to improve waste management processes
4. All the above needs will be of interest to cover

Questions to the audience

Which are the main needs that a NEP Manufacturer can have to implement SbD solutions?

1. A list of nanoadditives which allow to maintain the desired performance in the final product

2. Obtain solutions on how to improve the manufacturing process to reduce workers exposure

3. Obtain solutions to improve waste management processes

4. They will only be interested in best practises guidance on how to handle Nanoadditives by their workers

5. All the above needs will be of interest to cover

Questions to the audience

To solve the problem of plastics in the environment do we…

1. Ban all plastic production: Search for substitutes?
2. Modify plastic manufacture to render it biodegradable?
3. Try different disposal options: incineration/ composting/ recycling?
4. Perform LCA and break the cycle at some point?