



**Using new materials and new ways
to enable new design paradigms**

Design:

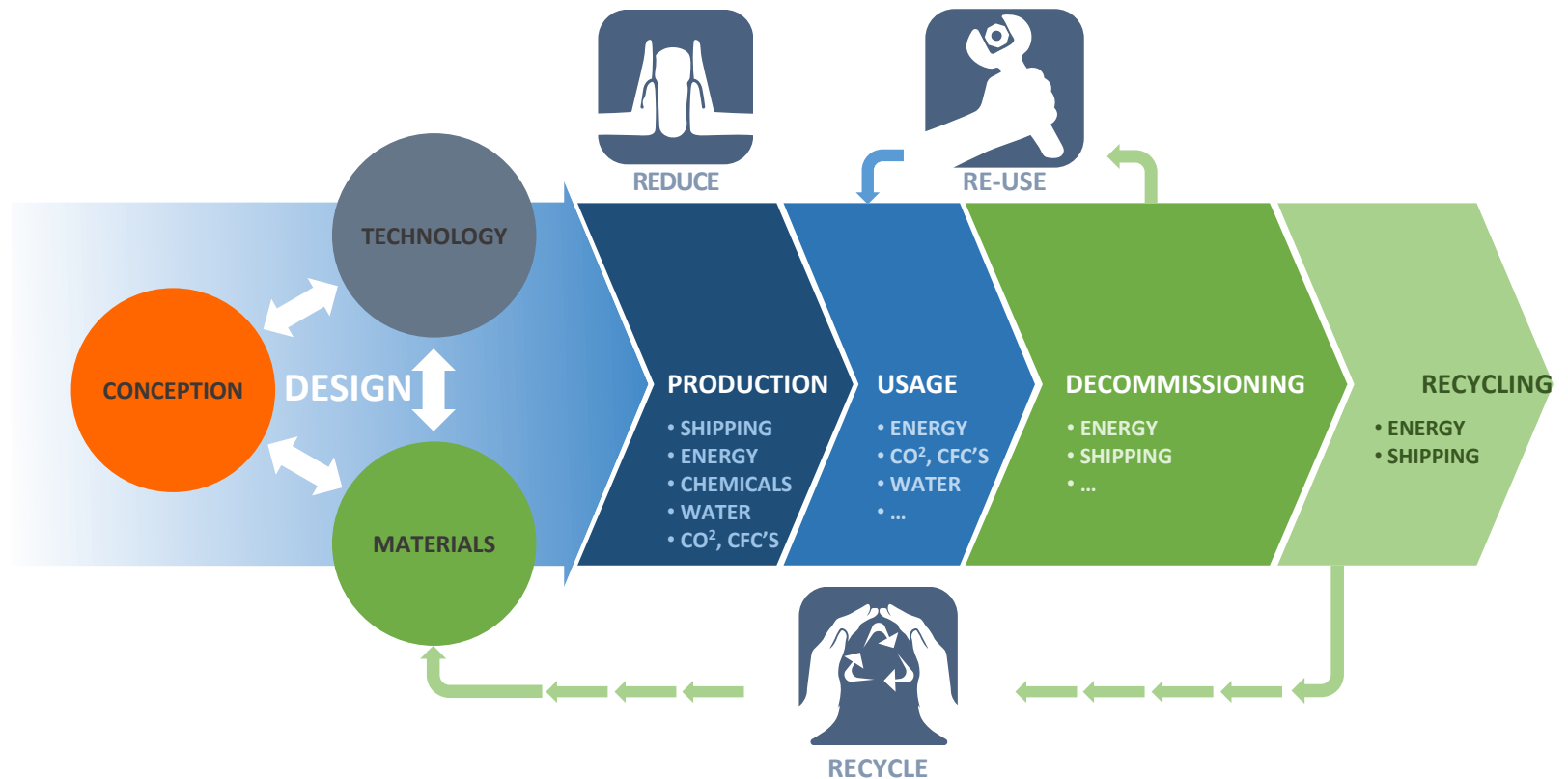
Designing a product is like filling with ideas a frame defined by a set of constraints.



The more constraints you have,
the bigger your frame will be
and the more (or bigger) ideas
you will need to fill it up.

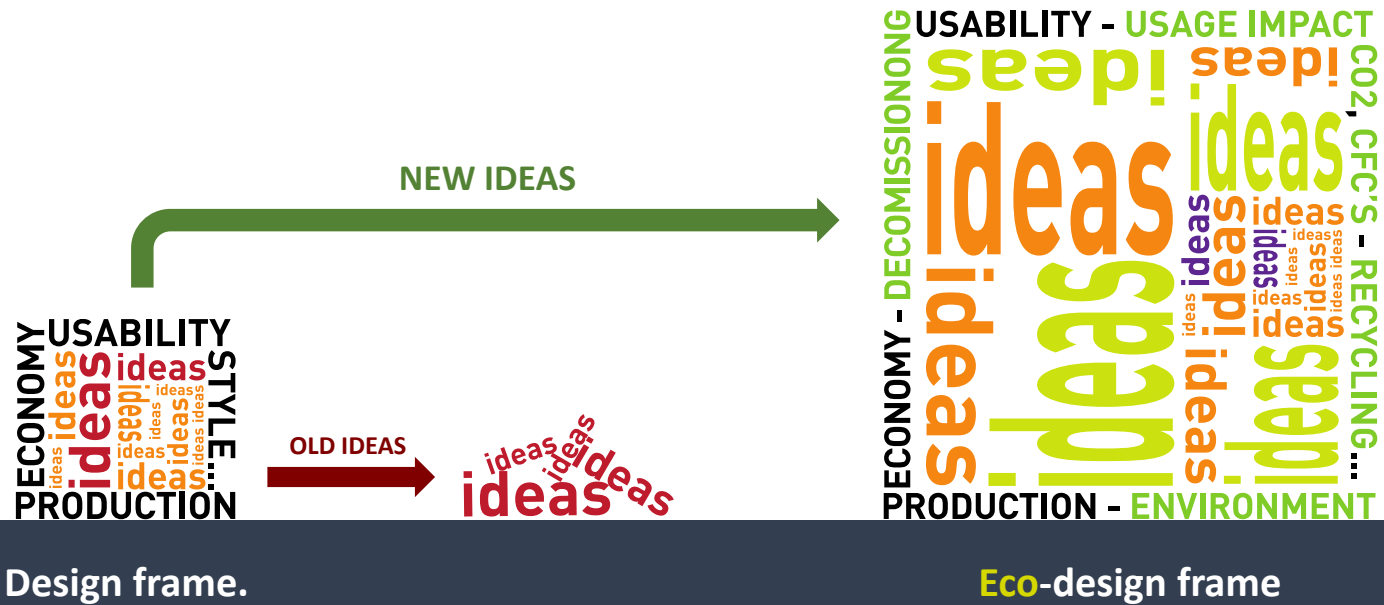
Eco-design:

Design of products that seek to minimize demand on the earth's resources at every step in their life-cycle



new and bigger ideas

By turning ecological constraints into opportunities,
eco-design enlarges the size of the frame, pushing the industry to have new and bigger ideas



Turn **new constraints** into **new opportunities**

New ideas

To achieve new ideas, designers need new materials and/or new manufacturing technologies.

New ideas ...*



- **Reduce carbon emissions in planes and automobiles**

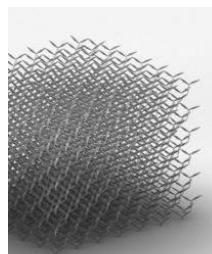


- **Use of more easily recyclable materials in consumer products**



- **Implementation of manufacturing techniques that are less demanding on the environment and require a smaller footprint**

New needs ...**



- **New materials with specific characteristics**
Novel materials can combine the strength of one metal with the weight of another (e.g. Aluminum-Scandium alloys) or can possess novel thermal or conductive properties



- **Technologies to manufacture existing materials that traditional techniques do not permit**
The use of aluminum in industry is held back by its poor formability compared to steel, despite its reduced weight and highly efficient recycling capabilities

* e.g. Fibreglass in airplanes, aluminum in cars, hydro-forming for parts

** e.g. Scandium alloys, aluminium-nickel alloys, hydroforming, 3D printing

New solutions

New materials

- Lightweight steels, scandium alloys, aluminum-nickel alloys, heat-resistant plastics, carbon nanotubes
- Hydrophobic materials, flexible versions of existing materials (conductors, screens), strengthened glass, materials that react to external stimuli, etc

New manipulation and transformation methods

- Computer aided design, simulation of finished parts computer aided process design and advanced control systems
- Rapid prototyping, 3D printing
- Robotics, automation and high-precision assembly and manufacturing
- New material forming technologies harnessing high pressure, high velocity or high temperature processes

