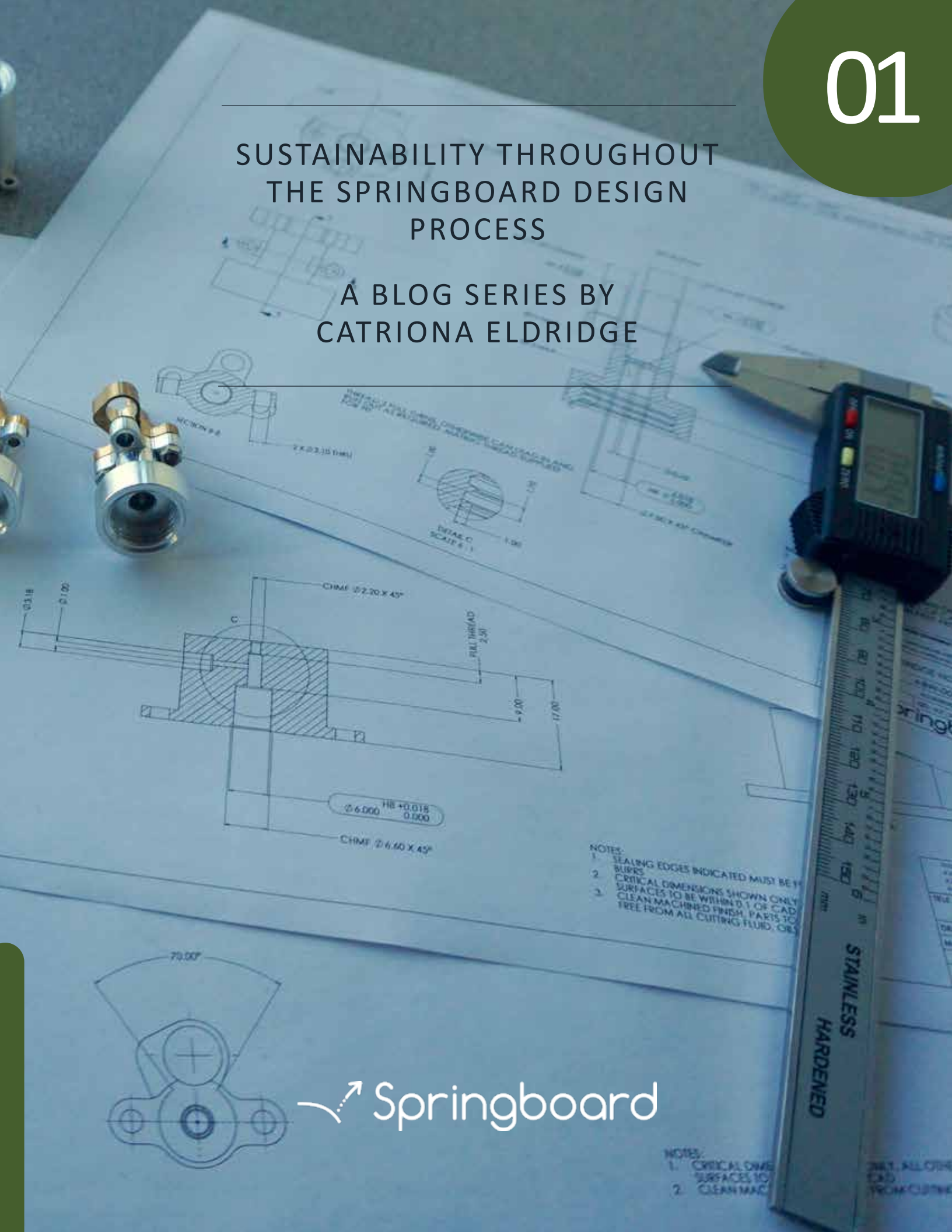
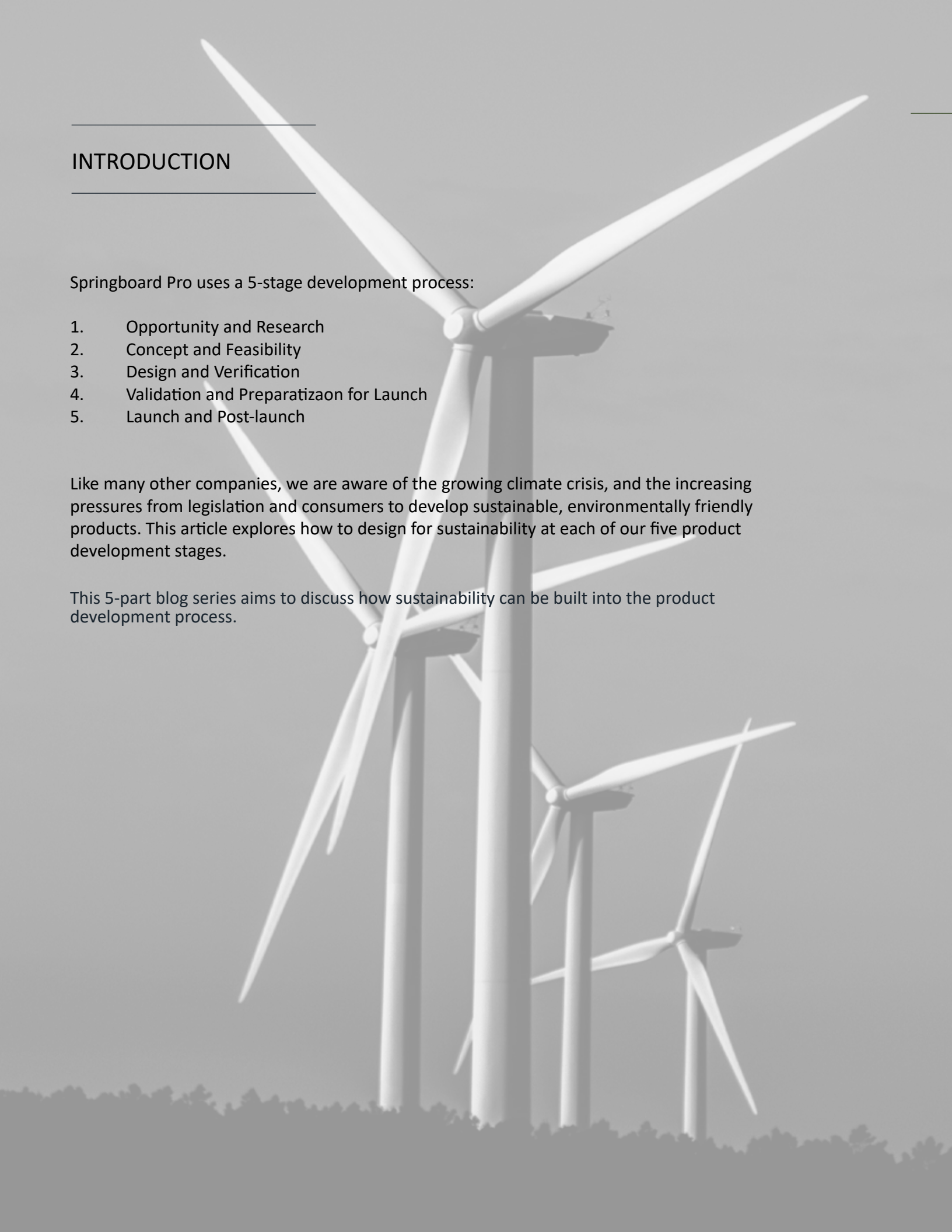
01

SUSTAINABILITY THROUGHOUT THE SPRINGBOARD DESIGN PROCESS

A BLOG SERIES BY CATRIONA ELDRIDGE



Springboard



INTRODUCTION

Springboard Pro uses a 5-stage development process:

1. Opportunity and Research
2. Concept and Feasibility
3. Design and Verification
4. Validation and Preparatizaon for Launch
5. Launch and Post-launch

Like many other companies, we are aware of the growing climate crisis, and the increasing pressures from legislation and consumers to develop sustainable, environmentally friendly products. This article explores how to design for sustainability at each of our five product development stages.

This 5-part blog series aims to discuss how sustainability can be built into the product development process.

SUSTAINABILITY AT STAGE 1: OPPORTUNITY AND RESEARCH

Increasingly, patients, purchasers, users, government bodies and medical device companies themselves are actively seeking to reduce the climate impact of medical devices, and improve their sustainability.

This includes considering sustainability and environmental impact from the beginning of the development process, where the largest changes can be made most easily, rather than waiting until the end of the design process, only to find that months of redesign work would be needed to make a reasonably sustainable device.

The earliest stage of our product development process, for both new devices and improvements to existing devices, is Stage 1: Opportunity and Research. This stage is investigative; the aim is to understand the market, what user needs are not currently being met, and what regulatory or patient-led requirements exist. Here, we could conduct research into what devices are currently in use, into user, patient and clinician experiences, and also into potential concepts.

Based on this research and our own expertise, we can then begin innovating: generating concepts and suggested system architectures, as well as early stage laboratory research and lab-bench concept demonstrators. This allows us to begin sketching concepts and choosing design directions for further development.

At this stage, sustainability is built on a general awareness of the whole lifetimes of the various components that will go into these concepts, before, during and after use by a patient or customer. Brief, broad-stroke assessments of a concept's inherent sustainability should be part of concept development at this early stage. What resources are needed- are any globally scarce, such as lithium, or connected to conflict, such as cobalt? How many times will the device be used before disposal, and what resources re required per use? What waste is generated, in use or at the end of life? For example, consider a single use inhaler that is disposed of after one dose- for every dose, an entire inhaler's worth of material and production energy is required. Compare this to a reusable inhaler, with a disposable refill unit and a core that can be used up to 200 times- each dose requires only the resources needed to make the disposable refill unit and 1/200th of the reusable core.

Could a new or improved device lead to improved outcomes for patients? A device which keeps more patients out of hospital for longer will generally be more environmentally friendly than its less effective alternatives, even if those alternatives have smaller individual carbon footprints. This is because more resources are needed to treat a very ill patient in a hospital than are needed to treat a healthier outpatient . Consider giving a patient a wearable smart glucose monitor- the immediate carbon footprint is likely larger than that of a simpler, non-continuous monitor, but the wearable monitor may be easier to use, and could help patients manage their blood sugar better, using predictions to avoid dangerous hypoglycemia events. Better management leads to better outcomes and fewer hospitalizations, as patients need less acute care .

If one needs to improve a current device, one can look for inefficiencies; are there points where pharmaceuticals are wasted or lost, and could these be improved? Making the device easier for patients to use well is likely to prevent wasted pharmaceuticals and improve patient outcomes. What is the device's working lifetime? Could this be extended with a few small changes, lowering both the cost-per-dose and emissions-per-dose?

A life cycle assessment also prompts us to consider possible alternatives to the linear economy; for example, a circular economy approach of reusing devices- either multiple times per patient, or by introducing a sterilization process and reusing the same device between multiple patients. It also includes broader considerations beyond the device itself- where and how is this device manufactured? How far is it transported during production?

These things are considered in more detail in Stage 3, which will be discussed later, but selecting easy-to-manufacture concepts during Stage 1 allows for more flexibility in selecting manufacturers, and thus more control over emissions.

CONCLUSION

To conclude, Stage 1 involves early research into patient needs and the regulatory environment, alongside top level comparisons of potential concepts.

There is a great deal of freedom at this stage, as a wide range of concepts are considered. Sustainability is part of this, as there are regulatory requirements and patient demands on a device's sustainability, and this early stage is the best time to change concepts, when changing direction is easy and cheap.

Thus, sustainability should also be considered when sketching out concepts in the early stages to avoid locking in unsustainable concept design.

Sustainability should be considered in the early stages to avoid locking in unsustainable concept design.

COMING NEXT:
STAGE 2 - CONCEPT AND FEASABILITY

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