

SHAPING A SUSTAINABLE BIOPHARMA INDUSTRY

In this article, Jimin Han, Director of Sustainability at Samsung Biologics, delves into the intricate landscape of sustainability challenges within the biopharma industry and explores the innovative solutions that are steering drug development toward a greener future.

The biopharma industry plays a pivotal role in global health, but its operations come with distinct sustainability challenges. The industry's carbon footprint is a pressing concern, prompting a shift towards more sustainable practices.

THE SUSTAINABILITY ISSUES OF THE HEALTHCARE SECTOR

Greenhouse gas (GHG) emissions are one of the leading threats to global health, with extensive social and environmental consequences. As these emissions have a direct influence on the trajectory of climate change, the need to identify and mitigate their underlying drivers has never been more urgent.¹

The energy-intensive processes that underpin drug development and manufacturing are major contributors to the healthcare industry's considerable carbon footprint, to which the biopharma industry contributes significantly. The healthcare sector was accountable for contributing 4.6% of global GHG emissions,^{2,3} which would rise further without essential countermeasures. This carbon footprint is predominantly attributed to manufacturing, raw materials and logistics networks within the field. Notably, supply chains emerge as the primary cause of emissions within the healthcare sector, wielding a significant influence that contributes to over 50% of total emissions.⁴

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New ways of working must be introduced to help reduce the biopharma industry's contribution to global carbon emissions. Companies must adopt renewable energy sources and optimise manufacturing processes to actively reduce GHG emissions without compromising quality.

Within the biopharma sector, there are intricate and interconnected sustainability challenges that require urgent attention. By implementing a net zero GHG strategy, opportunities arise for the biopharma industry to emerge as a pioneer of sustainable practices.

BARRIERS TO A SUSTAINABLE BIOPHARMA INDUSTRY

Meeting net zero GHG ambitions requires the successful navigation of challenging adaptations across the healthcare industry within various core aspects of the industry's operations. A successful transition to a sustainable future in the biopharma sector requires strategic solutions to the following key considerations.

Navigating Strict Regulatory Requirements

The biopharma sector operates within a stringent regulatory landscape, which can present a significant challenge to meeting sustainability goals. Balancing compliance with evolving emissions standards while driving innovation forward demands meticulous planning, co-ordination and proactive strategies. In particular, adapting manufacturing and production processes to reduce emissions requires validation testing to ensure that there is minimal impact on the drug's safety and efficacy.

Achieving Net Zero Emissions Across Supply Chains

To attain genuine net zero status, a company must address emissions not only within its own operations, but also within its supply chain from first, second and other



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tier vendors. The complexity of supply means influence over the entire chain is unlikely, limiting control over reducing GHG emissions of the supply chain.

Calculating Emission Factors for Raw Materials in a Complex Network

Network complexity also results in difficulties when calculating the emissions factor of raw materials. Unlike industries with well-established emissions data, the emission factors for raw materials, particularly within the biopharma sector, have not been calculated. Ensuring alignment of sustainable practices and emissions reduction strategies throughout these intricate networks requires diligent oversight by each contributor at each stage of supply.

Addressing the Cost of Sustainable Alternatives

Transitioning to net zero emissions often means adopting sustainable alternatives to existing practices and technologies, which may incur higher initial costs. These expenses can include investments in new technologies, materials and infrastructure, and may even result in companies buying carbon offsets or paying carbon taxes. Considering the rising costs of carbon, offsetting is not a long-term solution. Ultimately, balancing eco-friendly practices with economic viability demands meticulous financial planning and strategic decision making.

Overcoming Geographic Limitations

The global nature of the biopharma industry introduces geographic constraints that influence the feasibility of emission reduction strategies. Differing regulations, resource availability and infrastructure limitations in various regions pose challenges to implementing uniform net zero initiatives. For example, the low availability of sustainable systems in key geographies, such as limited access to renewable electricity in the Asia-Pacific region, results in decarbonisation challenges.⁴ Adaptable strategies are essential to accommodate these geographic nuances effectively.

RESPONDING WITH SUSTAINABLE SOLUTIONS

Although there are challenges, the biopharma industry also has the opportunity to address the need for sustainable practices with proactive initiatives that reshape the drug development landscape.

One such initiative is the Sustainable Markets Initiative (SMI), which is a collaborative health systems task force that aims to accelerate the transition to net zero healthcare. The SMI's primary focus lies in mobilising governments, businesses and organisations to collaboratively shape market systems that drive positive social, economic and environmental outcomes. By fostering co-operation between healthcare providers, policymakers and industry leaders, this initiative seeks to drive systemic change towards sustainable healthcare practices.

The SMI has a particular focus on the following areas:

- **Decarbonising supply chains:** Embracing collaboration across the supply chain to introduce systems that advance decarbonisation, such as renewable energy, responsible sourcing, clean heat and green transportation logistics, is pivotal to reducing the industry's environmental footprint.^{4,5}
- **Rethinking patient care pathways:** Incorporating sustainable practices into patient care pathways not only benefits the environment but also fosters improved patient outcomes and experiences. Driving a reduction in emissions across patient care contributes to lower disease progression and allows for the identification of opportunities for decarbonisation while also improving patient care.^{5,6}
- **Digital innovation in clinical research:** Harnessing digital technologies and data analytics in clinical research can streamline processes, reduce waste and enhance efficiency. This accelerates drug development while minimising environmental impact. Leveraging digital transformation across the biopharma industry supports and accelerates technological progress, which can assist in achieving net zero transitions.^{5,7}

These SMI measures aim to overcome sustainability challenges and reshape patient care, creating a healthcare landscape that is medically advanced and environmentally responsible.

OPPORTUNITIES FOR SUSTAINABLE SUPPLY CHAINS

As the largest driver of emissions within the healthcare sector, supply chains offer a critical opportunity for transformative change. Aside from the efforts being made by the SMI, there are other ways to integrate sustainable approaches within supply chain operations that can yield far-reaching benefits. These approaches can range from reducing emissions and waste to enhancing overall efficiency and resilience.

The path to achieving net zero emissions within supply chains requires a multifaceted approach. Companies can evaluate sourcing practices, prioritising suppliers committed to sustainable practices and reduced emissions. In addition, implementing innovative logistics solutions, such as increasing manufacturing efficiency and integrating renewable energy sources, optimised routing and alternative transportation modes, can drastically minimise carbon-intensive activities.^{4,6,7} Moreover, collaboration across the supply chain, sharing best practices and fostering transparent communication is crucial to the industry's collective impact on GHG emissions.

Strategic investments in technology and data analytics can also play a pivotal role. Advanced supply chain management systems enable real-time tracking, helping companies identify emissions hotspots and areas for improvement. More efficient manufacturing operations can also streamline production and decrease costs, striving for sustainability while overcoming economic barriers to sustainable healthcare.

Aside from improving processes, an alternative approach to address validation challenges in biologics manufacturing is transitioning to 100% renewable energy sources. This can be achieved through various

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strategies, such as adopting zero-emissions energy technologies, including power purchase agreements, renewable energy certificates and eco-friendly transportation options. Collaborative efforts with suppliers to decarbonise the supply chain also offer significant potential for mitigating GHG emissions.

REDEFINING HEALTHCARE FOR A SUSTAINABLE FUTURE

As the biopharma industry navigates the landscape of sustainability challenges and possibilities, redefining the future of healthcare as environmentally conscious and medically advanced, the industry can set a powerful precedent for other sectors. Translating key insights into solutions is crucial for achieving significant sustainability changes, with collaboration and partnership across the healthcare sector vital to reducing GHG emissions. Ultimately, the establishment and disclosure of goals and progress, aligned with set timeframes and specific actions, are key to solidifying a transformation towards sustainable healthcare.

ABOUT THE COMPANY

Samsung Biologics is a fully integrated contract development and manufacturing

organisation offering state-of-the-art contract development, manufacturing and laboratory testing services. With proven regulatory approvals, the largest capacity and the fastest throughput, Samsung Biologics is an award-winning partner of choice and is uniquely able to support the development and manufacturing of biologic products at every stage of the process while meeting the evolving needs of biopharmaceutical companies worldwide.

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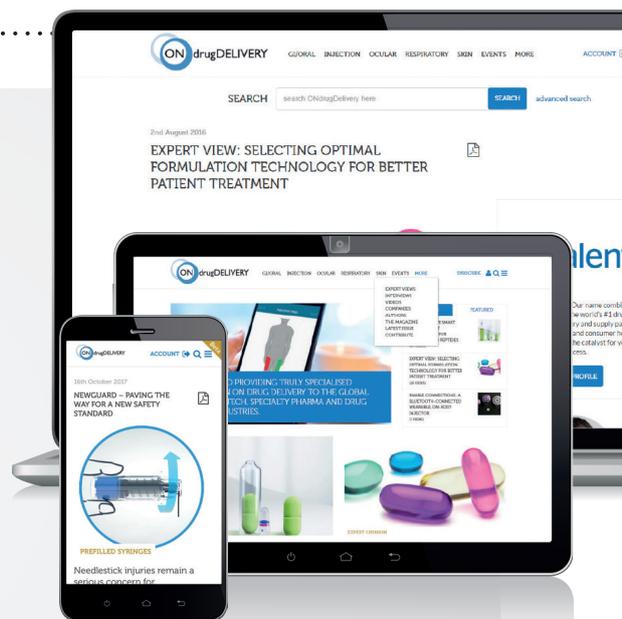
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