

# Developing frameworks that deliver whole-system sustainability benefits for the bioeconomy

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**C3: Maximising Sustainability**

## UK Government Areas of Research Interest (ARIs)

“Enabling technologies and fuels that underpin delivery of decarbonisation across many sectors, **as enablers for transition to, and delivery of, a decarbonised economy, including biomass**”

“**Whole system approach essential** to delivery of net zero, which is a systems challenge”

*Clean Energy Superpower Mission*



Increasing understanding of **non-energy uses of biomass**, such as in chemicals and steel, and identifying opportunities, tensions, and impacted biomass types.

Exploring **biomass sustainability issues**, including forest carbon, soil carbon, indirect land use change, cascading use, and monitoring, reporting and verification in supply chains.

## Bioeconomy Sustainability Indicator Model (BSIM)

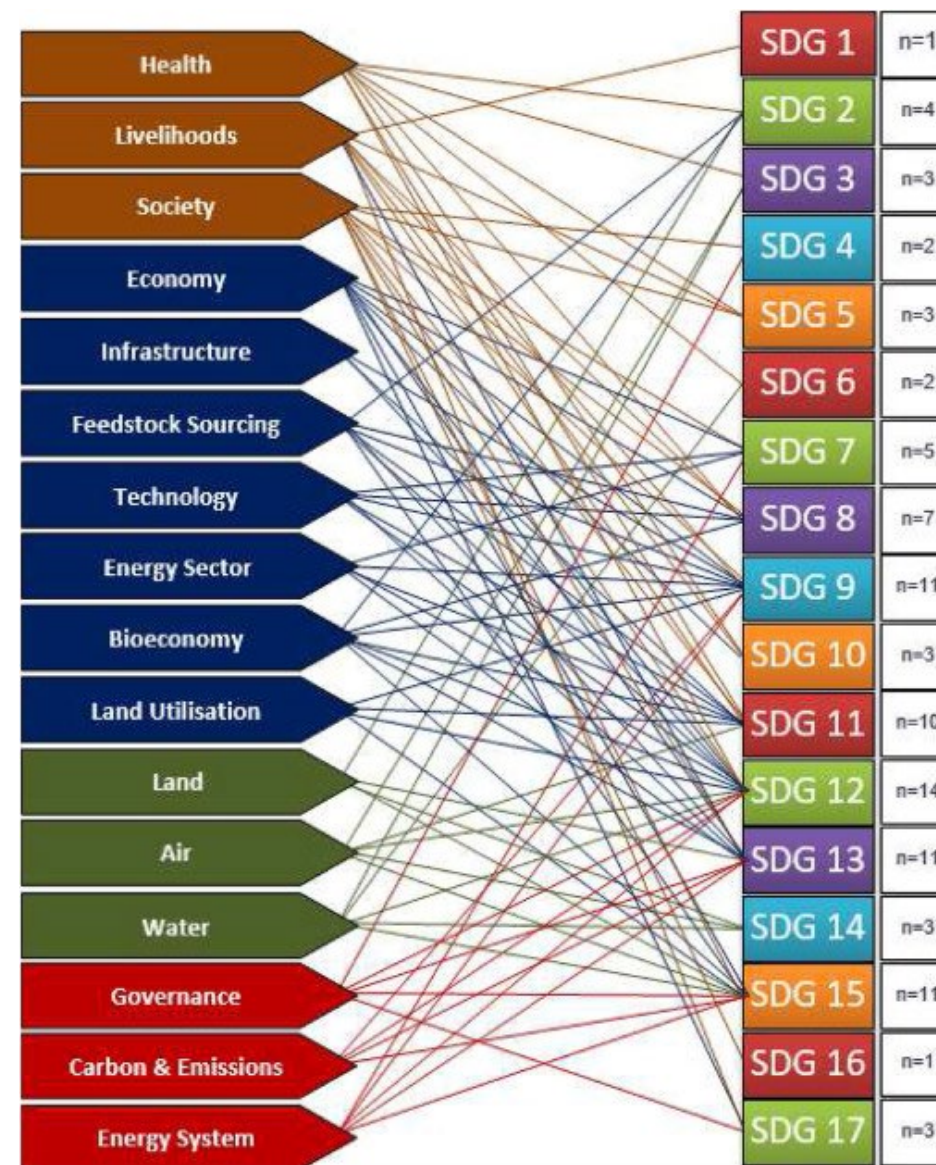
Enabling the user to account **for sustainability risks and benefits against weighted indicators** framed around the Sustainable Development Goals (SDGs).

Develop an understanding of the risks and benefits **across the life-cycle of a project.**



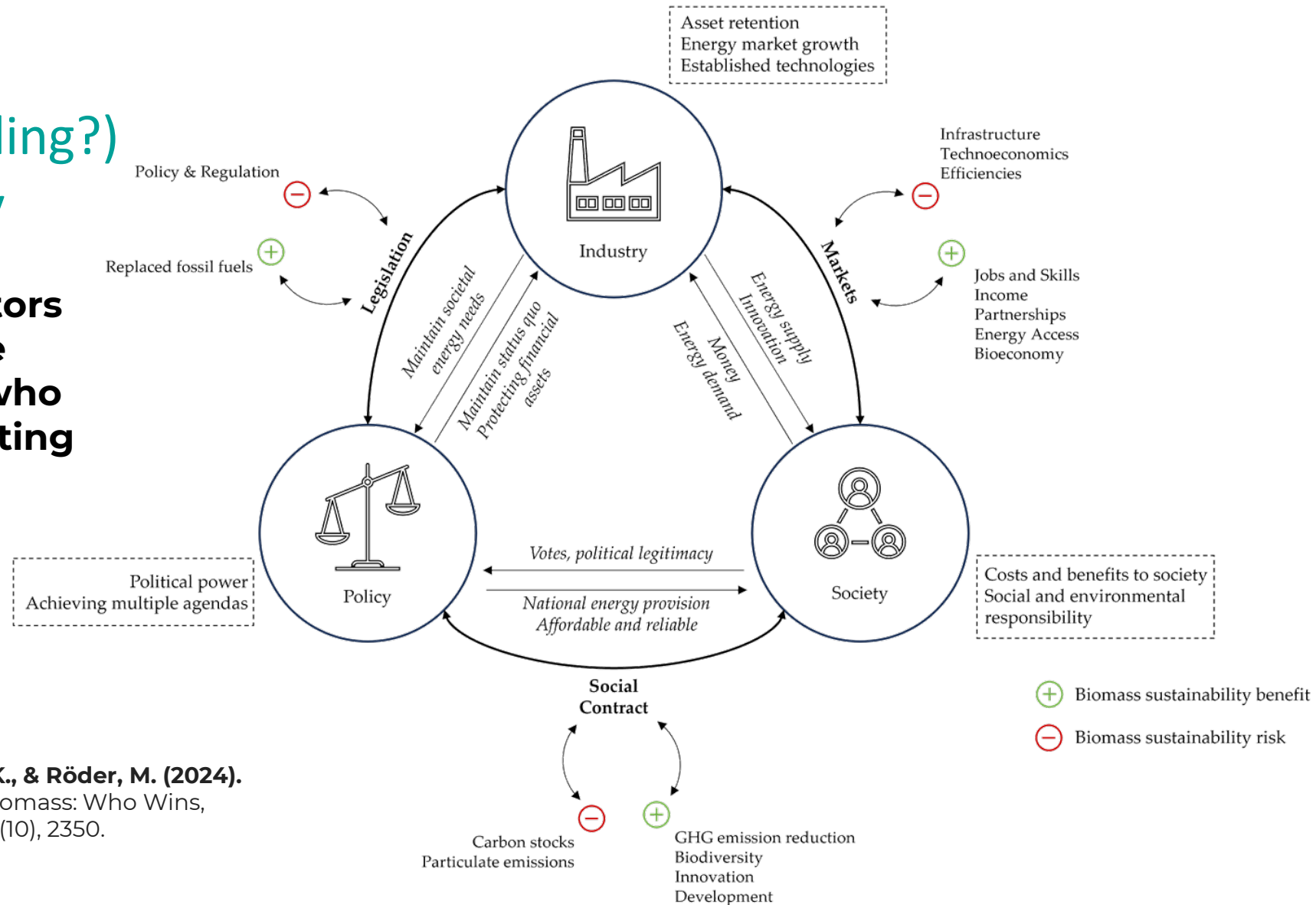
**Welfle, A., & Röder, M. (2022).**

Mapping the sustainability of bioenergy to maximise benefits, mitigate risks and drive progress toward the Sustainable Development Goals.  
*Renewable Energy, Volume 191.*



# The enabling (or disabling?) environment for policy

**Political and economic factors impacting biomass and the bioeconomy, determining who benefits from biomass, setting the rules of policy and sustainability goals.**



Taylor, D., Sparks, J., Chong, K., & Röder, M. (2024). Determining the Benefits of Biomass: Who Wins, and Who Loses? *Agronomy*, 14(10), 2350.



## Areas that need more understanding

### **Impact of competing priorities at different governance levels**

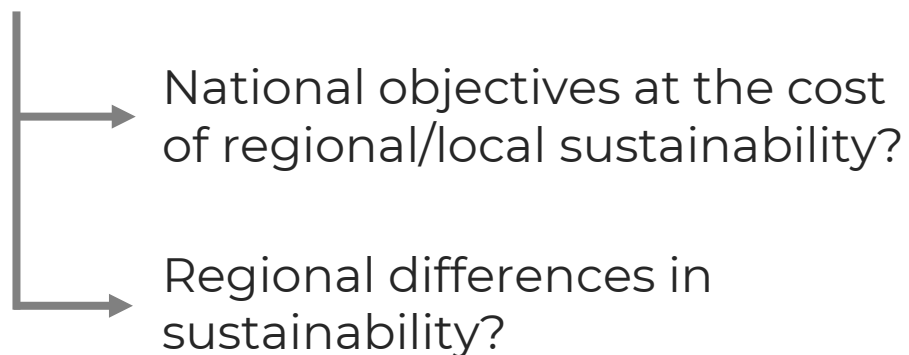


### **Synergies between indicators and inherent trade-offs**



## Areas that need more understanding

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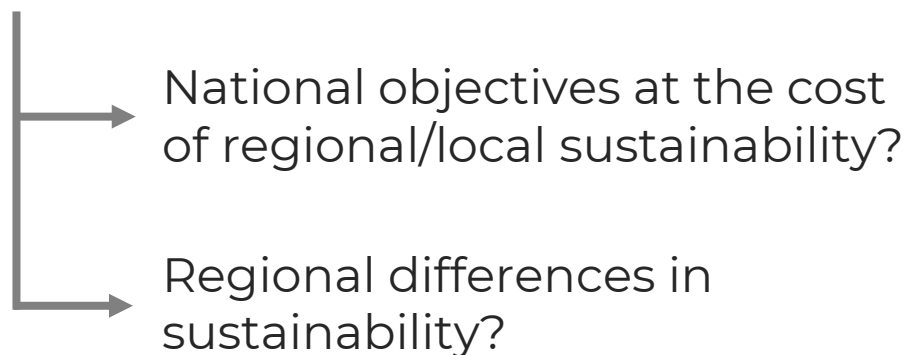


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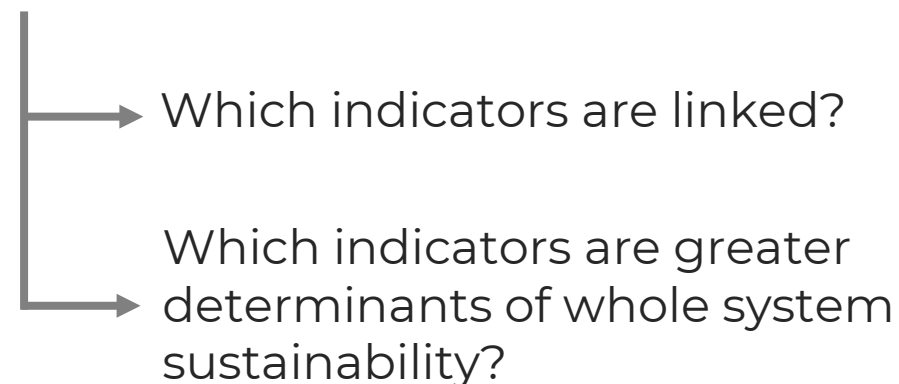


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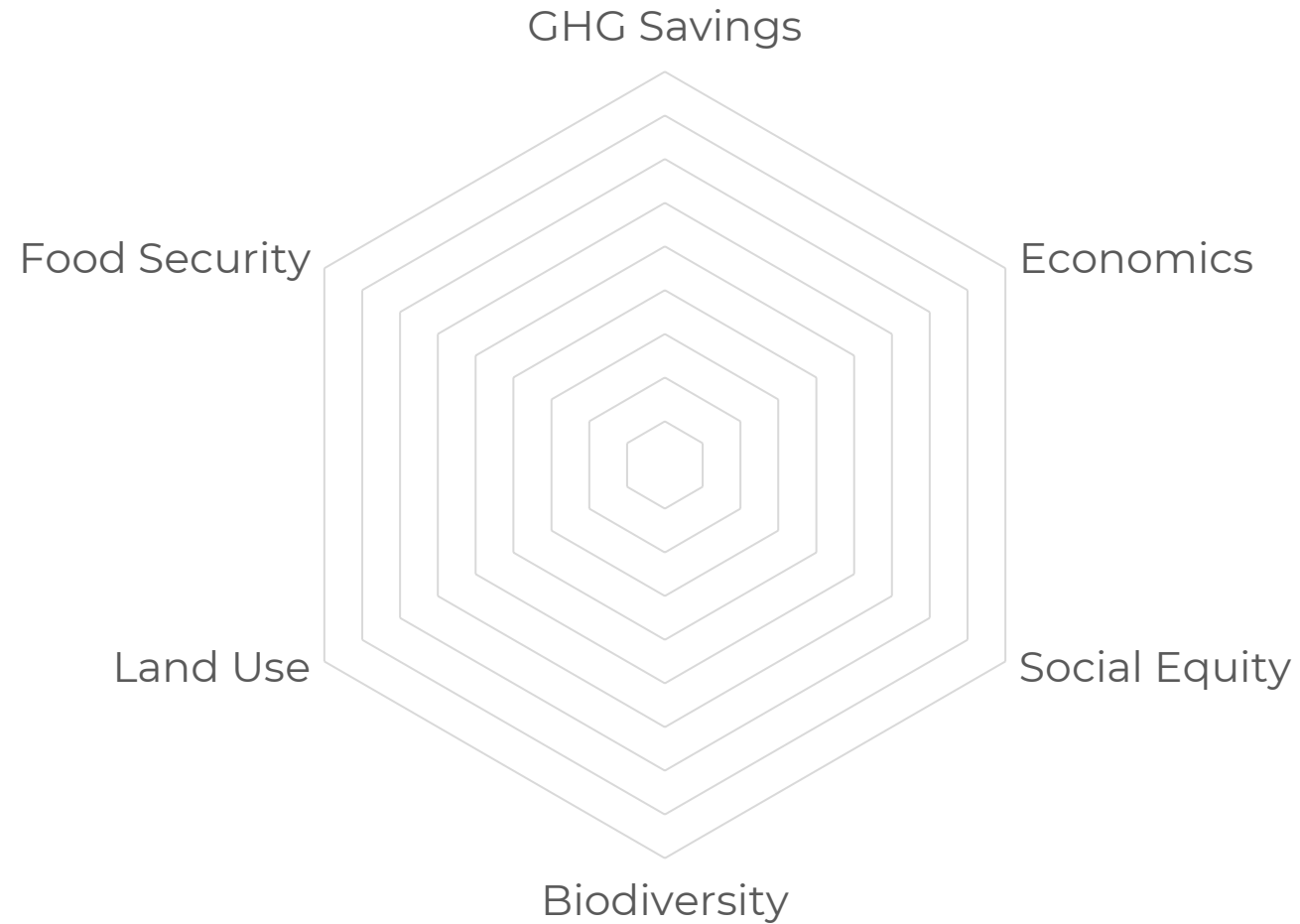
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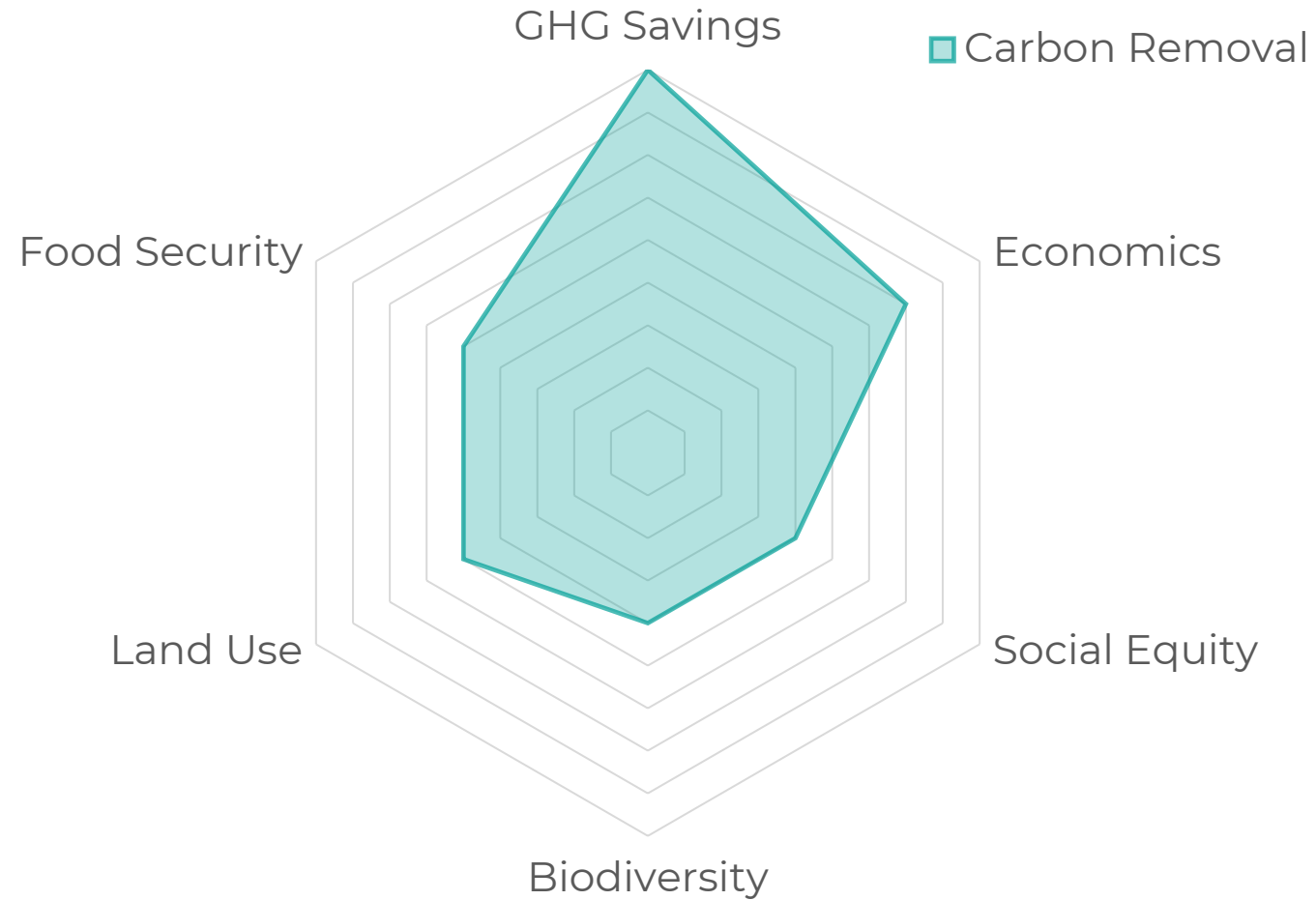
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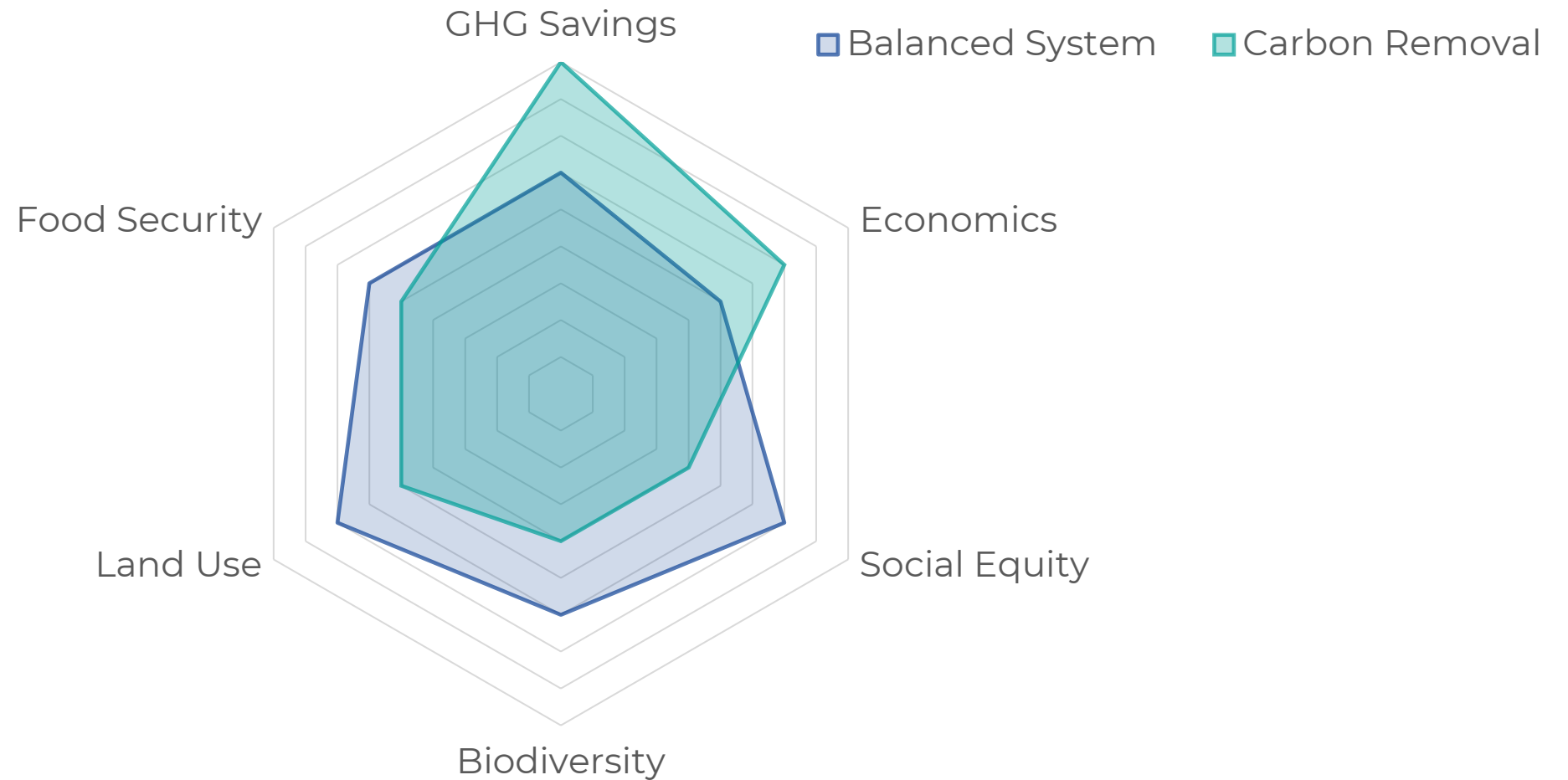
## Policy Scenario Trade-Offs



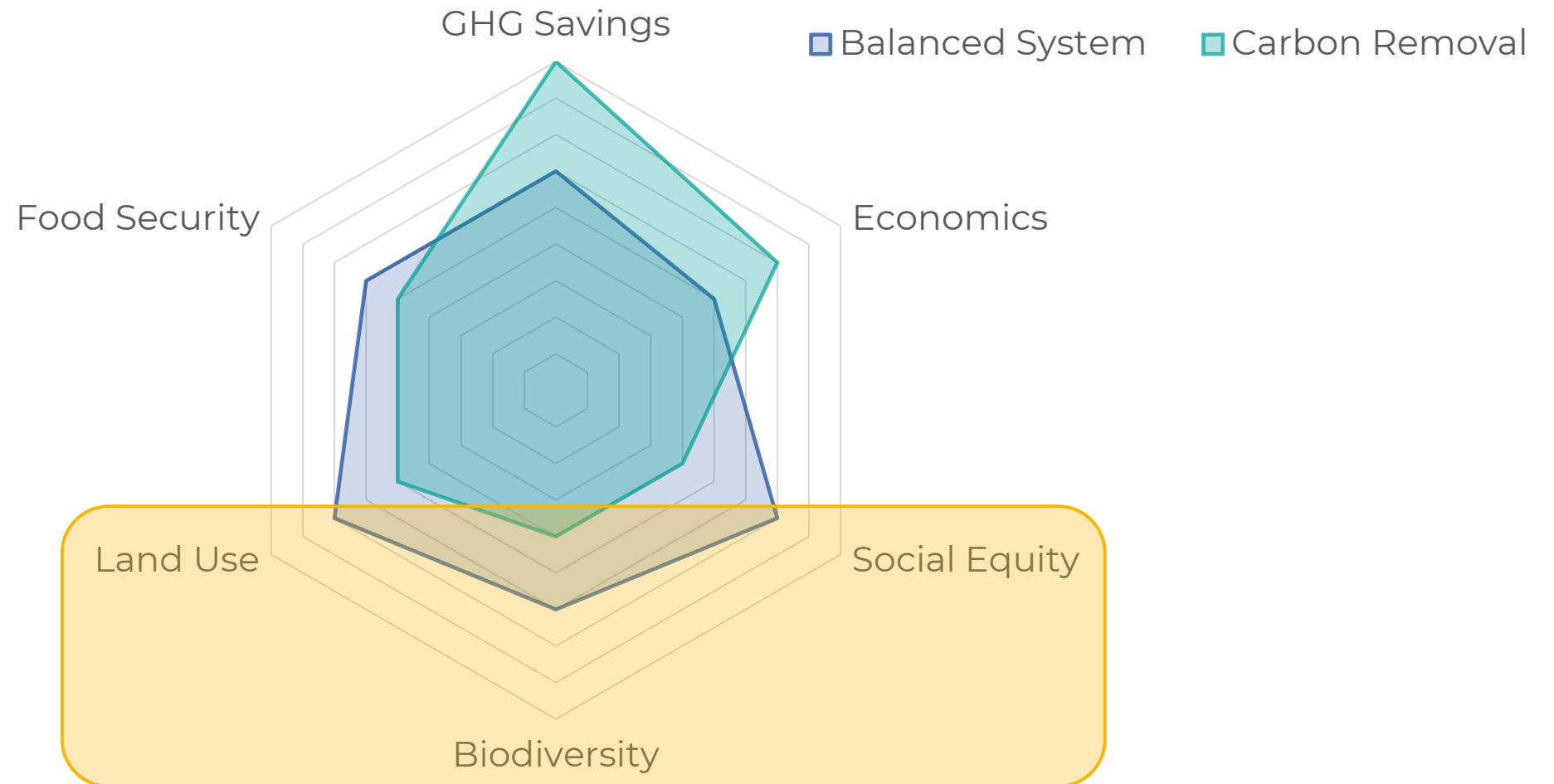
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Help us to create a vision for UK biomass sustainability!

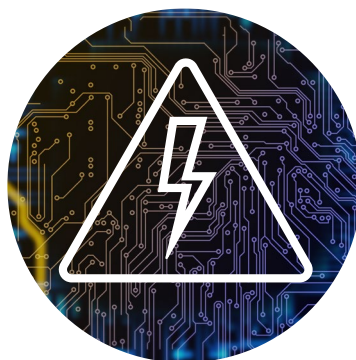
**Removals**



**Heat**



**Power**



**Biogas and  
Biomethane**



**Biofuels  
(including H<sub>2</sub>)**



**Circular  
Bioeconomy**



**UK Biomass Sustainability Scenarios**



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