**Building Bio-Economy Partnerships: 4th Workshop - Backcasting Exercise, 15th December 2016, Technology Innovation Centre, Glasgow**

**1.0 Summary**

Over 40 people from across the sectors attended the final bioeconomy workshop of 2016 at Strathclyde’s Technology Innovation Centre to develop the plans and projects needed to create a flourishing bioeconomy in 2030. Over the day the attendees identified and assessed the biggest drivers of change affecting the emerging bioeconomy and developed a roadmap of actions to mitigate, amplify and create the changes needed to achieve our aim. This note provides brief details of the process, findings and what next.

**2.0 Key Findings**

* There is a lot of macro-environmental uncertainty both political and environmental that is both positive and negative. This can be mitigated to some extent, but needs clear policy direction.
* There is a strong industry requirement for knowledge on the technologies available and location and type of resources needed to drive new business models
* There is a need to develop greater societal understanding of the bioeconomy through the education system and with consumers. Students need to know that there will be careers to aim for in the future and consumers need to know that their actions are critical to future resource use
* Rather than drive large infrastructure projects it was highlighted that the bioeconomy and the circular economy overall could drive disruptive change at the local economy scale, especially rural populations

**3.0 Roadmap of actions**

The workshop attendees developed a single roadmap of action that needs to be taken from now until 2030. This is described below. Each of these importantly is developed in agreement with all sectors and requires everyone’s input.

**2016-2020**

* Materials and resources mapped and publicly shared in 2017
* Develop a Facility/Centre/Body dedicated to understanding the bioeconomy, with open access to industry. Key tenets will be around creating a technology library of available processes that can be applied, sharing understanding from others and public knowledge exchange.
* There is a need to start understanding the messaging around the bioeconomy and make it fit for public consumption. This includes educating Ministers and the Civil Service to drive change and engaging with the education system.
* This workshop has demonstrated the need to develop small, local-scale solutions. Funding and support needs to be identified and coalesced around this need.

**2020-2025**

* By 2020 students will need to know that there are positive pathways to employment and the industry will need to demonstrate careers available. There are some parallels with the renewables sector and government needs to have the same ambition for the bioeconomy.
* By 2020 a single joined up green procurement across the public sector would drive a step change in the success of the bioeconomy. The bioeconomy helps to meet targets in waste reduction and carbon emissions can effectively be pumped into the bioeconomy effectively offsetting damage.
* A supportive regulatory framework such as addressing waste definitions would be needed by 2020
* Cross-government understanding and action is needed. This needs a political imperative akin to climate change and would need to look systemically at the bioeconomy and its impact on all aspects of government.
* Scotland could generate investment from the Breakthrough Energy Coalition partnership and should actively seek this out

**2025-2030**

* By 2030 the bioeconomy needs to demonstrate that high value jobs have been created, built upon the last 10-15 years of investment, political support and public support.
* By 2030 there will be a “bio-preferred” label for products to incentivise consumers and producers. This is akin to the FSC sustainable forestry label and the rainforest alliance approved labels.

**4.0 Biggest Drivers of Change**

The workshop identified 130 drivers of change that could affect the progression to a flourishing bioeconomy in 2030. From these 5 were identified to have the highest impact and the highest uncertainty around their development. These high impact/high uncertainty drivers are typically the creators of systemic change and not always able to be shaped to a sufficient degree. Addressing these Drivers are critical for our success. These are;

**Biggest Societal Driver of Change**

***Engagement and Understanding*** – there is a large dearth of understanding of what the bioeconomy is and how it will be beneficial to Scotland. The bioeconomy and circular economy by extension are much more than efficiency and waste reduction. They are disruptive new industries that allow Scotland to design out and reuse valuable resources that will become more pressured over time. This needs to be communicated at all levels of society to develop the skills, investment and support for the bioeconomy

**Biggest Technological Driver of Change**

Linked to the above is the need for industry to not reinvent the wheel and have ***ready access to the technologies and understanding*** around the bioeconomy to allow the creation of new business models. These should focus at the small and local-scale. This thinking will also be beneficial to the ongoing move to service innovation.

**Biggest Economic Driver of Change**

***Cost of raw materials*** – In a change political world and increasing global population pressure on existing and conventional resources will increase. Scotland needs to know what resources are critical, where they come from and how it can source alternatives and current waste streams. Zero Waste Scotland conducted mapping in 2016 of current resources streams. This should be published as soon as possible. Further to this DEFRA carried out work on critical materials for the Cabinet and this should be explored in greater detail.

**Biggest Environmental Driver of Change**

***Climate Change*** – A changing climate and the disruption to weather patterns, the changing of ecosystems and the increasing extreme weather will have a massive impact on the bioeconomy both positively and negatively. There is a need to look at the latest climate change models, their impacts and map the potential challenges and opportunities for Scotland’s bioeconomy. Potential positive changes are the relative stability of Scotland’s climate going forward and possible negatives are the loss of key resources in other countries.

**Biggest Political Driver of Change**

***Global Uncertainty*** – 2016 has been seen several structural changes to the common political landscape which builds on a decade of tumult. For the bioeconomy this raises challenges such as securing the most skilled students and employees, foreign direct investment and the possibility of isolated trade blocs re-emerging and changing relationships. This is hard to manage but should be mapped. Scenario exercises should be developed and the Scottish Government should work closely with the Foreign Office where possible.

**5.0 Interesting drivers not utilised**

Whilst the drivers above were the most “important” of the 130 there were also some interesting nuggets of information in some of the others drivers. These help to add context to our understanding of the bioeconomy

* *A significant reduction in food imports would drive self sufficiency and increase bioeconomy*
* *How much does culture influence choice?*
* *We must use waste to make food e.g. using as a fertiliser. This will drive uptake*
* *There will be high demand for cheaper raw materials and materials through urban mining*
* *The Bioeconomy is a carbon sink – this is a great selling point*
* *Energy oil based vs renewables – there should be work done to see where the bioeconomy can replace existing fossil resources such as heating*

**6.0 Process**

The workshop utilised several standardised Futures Analysis methods to look at the desired future and to backcast to see how this may be achieved. The HMG guide to the use of Futures Analysis is here:<https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/328069/Futures_Toolkit_beta.pdf>. The author of this guide facilitated this workshop if further details are required.

Briefly the process was;

1. Before the workshop the government’s preferred vision of the future of the bioeconomy was circulated to attendees. This was then validated by the group as the first action of the workshop
2. Drivers Analysis – in groups of 6 to 8, the attendees discussed and noted the drivers of change that could affect the move to a flourishing bioeconomy in 2030. Each group looked at a different macro-environmental factor. There were 130 in total
3. **Impact-Uncertainty** – attendees at each table then prioritised the drivers with the highest impact and highest uncertainty. There were 18 in total
4. **Voting** – over lunch, attendees voted independently on the highest impact, highest uncertainty issues that are the most important. This is qualitative but based on the expertise in the room and previous development.
5. **Driver roadmaps** – for each driver tables of 6 to 8 discussed what actions are needed over the next 10-15 years to either mitigate or amplify the driver’s impact to enabling a flourishing bioeconomy
6. **Community Roadmap** -  the last exercise was to combine all of the actions from the 5 driver roadmaps into coalesced themes or groupings of action out to 2030. This is section 3