CIRCULAR BIOECONOMY VALUE-CHAINS

Harnessing Opportunities

Version 1

2022

D.T4.3.1: CE Value Chains

A.T4.3 Develop a transnational CE strategy

Issued by:	**Partner Nr. 8 – E-zavod**
Reviewed by:	**all partners**
Version date:	**17.01.2022**
Version. Revision	**1.0**
Circulation	**Restricted to Project Partners**

Document History

Date	Version	Description of Change
17.01.2022	v. 1.0	Document issued by PP8

Contents

1. INTRODUCTION

The CITYCIRCLE project aims to bring innovation and sustainable economic growth to peripheral regions of the European Union through implementation of circular economy practices.

This *Circular Bioeconomy Value-chains: Harnessing Opportunities* report builds on the Innovation Agenda already developed through the CITYCIRCLE CECOMs process. This Innovation Agenda concluded that *cities should work intensively towards a mission to create integrated bio-economies that are circular, regenerative, resilient, non-wasteful and healthy.* Four key value-chain areas were identified for focussed effort within this mission:

   a. Shorten local food chains by working on both supply and demand

   b. Integrated primary production and manufacturing to close organic cycles between local agriculture, food, and forestry

   c. Regenerative bio-industry clusters that maximise use of biomass resources

   d. Zero-impact energy systems that fully utilise local bio-resources

This document further elaborates on how urban communities can take forward the overall mission and these value-chain opportunities, and start to make them real (note: opportunities b. and c. have been combined in this document).

The purpose of this document is to support and inform the development of Local Action Plans by each city team under the CITYCIRCLE project, which will form part of the final project Transnational Circular Economy Strategy. It should also be relevant and interesting to any other community changemakers wanting to create a circular bioeconomy in their place.

This document is organised into the following sections:

   1. Background – Covering: the CITYCIRCLE project, circular economy in context of Sustainable Development and support for circular bioeconomy development in Europe

   2. Bioeconomy Value-chain Opportunities – Further discussion of the potential of value-chains focussed on local food systems, integrated bio-industry clusters and bio-energy systems.

   3. Designing for Action – Guidance for city teams' action planning process, including: taking the value-chain opportunities and turning them into a local mission and action portfolio, establishing Action Centre models able to activate and steer the needed radical change processes, substantively designing-in enablers of change, and ensuring ongoing collective learning.

   4. Appendix 1 – A selection of relevant Case Studies: Växjö, Ghent, Loški Potok, Common Unity Project, EkoDizajn

2. BACKGROUND

a. CITYCIRCLE Project

The CITYCIRCLE project aims to bring innovation and sustainable economic growth to peripheral regions of the European Union through implementation of circular economy practices.

One key stream of work under the CITYCIRCLE project is to advance work on circular value-chains with transnational relevance. To support this process, transnational circular economy innovation communities (CECOMs) were established during the latter part of 2020 on three themes:

- Agro and Bioeconomy
- Energy and Environment
- Public Health, Medicine and Life Sciences

The results of the CECOM collaborations were captured in an Innovation Agenda report, which concluded that the adopted sectorial approach was helpful for gap and trend analysis, but less so for forward action planning.

A convergence of gaps and innovative action ideas was identified in the Innovation Agenda and summarised in the recommendation that: *cities should work intensively towards a mission to create integrated bio-economies that are circular, regenerative, resilient, non-wasteful and healthy.* Four key value-chains were identified as having high potential for focussed development effort towards this mission:

- Shorten local food chains by working on both supply and demand

- Integrated primary production and manufacturing to close organic cycles between local agriculture, food, and forestry

- Regenerative bio-industry clusters that maximise use of biomass resources

- Zero-impact energy systems that fully utilise local bio-resources

This *Circular Bioeconomy Value-chains – Harnessing Opportunities* report further elaborates on a) these value-chain opportunities (Section 3), and b) how urban communities can take these conceptual opportunities and start to make them real (Section 4), to harness real benefits for their citizens as a result.

This document will help to inform the Local Action Plans and final Transnational Circular Economy Strategy that will be further developed under the CITYCIRCLE project.

b. Circular Economy in Context of Sustainable Development

A circular economy is a means of sustainable community development, not an ends in itself. Frameworks for considering the outcomes that a circular economy might help to achieve include the seventeen Sustainable Development Goals adopted in 2015 by United Nations member states under the 2030 Agenda for Sustainable Development,[1] And the 'doughnut' diagram developed by Kate Raworth shown below.

---

[1] 2030 Agenda for Sustainable Development; UN (2015) - https://sdgs.un.org/2030agenda
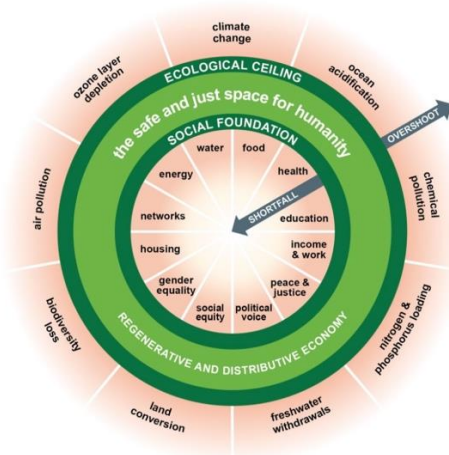
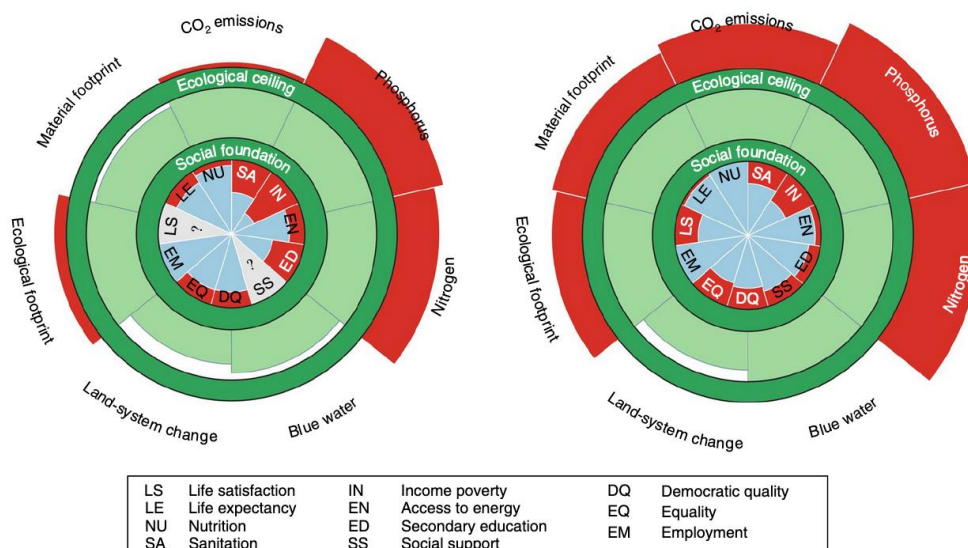*'Doughnut' diagram of sustainable development developed by Kate Raworth (Doughnut Economics Lab)*

In the 'doughnut view' of sustainable development, communities need to work towards living in the 'safe and just space for humanity' highlighted in green. The upper limit to this space is defined by critical planetary boundaries including climate, biodiversity, air, water and soil resources (though many of these are already in a dire state). At the same time, the goal should be for communities to ensure that all citizens have access to a 'social foundation' of the means to live well, including: food, peace, education, health, income and meaningful work, political voice, housing and so on.[2] The 'doughnut' image highlights how we need to ensure a holistic approach to sustainable community development and the Doughnut Economics Action Lab provides communities with further guidance on how to use the doughnut model for planning and evaluation at a local scale.[3]

Unfortunately a recent study shows that there is still an alarming lack of global progress in addressing these dual challenges of meeting the needs of all people within the means of the planet. Currently all countries remain on a path that is driving ecological breakdown, while delivering slow and insufficient improvements in living standards for citizens, as shown in the image below comparing the global picture between 1992 and 2015.

LS	Life satisfaction	IN	Income poverty	DQ	Democratic quality
LE	Life expectancy	EN	Access to energy	EQ	Equality
NU	Nutrition	ED	Secondary education	EM	Employment
SA	Sanitation	SS	Social support		

Global performance relative to the doughnut's safe and just space in 1992 (left) and 2015 (right) – source: Fanning et al.

---

[2] Doughnut Economics Action Lab website - https://doughnuteconomics.org/

[3] Creating City Portraits; Thriving Cities Initiative - https://doughnuteconomics.org/Creating-City-Portraits-Methodology.pdf

Despite decades of sustainable development rhetoric, countries with high levels of social achievement have levels of resource use far beyond anything that could be sustainably extended to all people, and their ecological overshoot has generally been increasing. While low-income countries have made progress reducing social shortfalls, they have generally been transgressing biophysical boundaries at a faster rate. The overall slow rate of social progress and ecological overshoot at the global scale is overwhelming the regenerative capacity of the biosphere while creating recurring socio-economic crises. This is a continuing downward spiral that desperately needs to be unwound.[4]

While climate is just one of the 9 planetary boundaries shown above, it is one worth specific consideration. In 2018 the International Panel on Climate Change highlighted that limiting global warming to 1.5°C would require "rapid, far-reaching and unprecedented changes in all aspects of society".[5] Now, in 2021, they made it clear that humanity is almost out of time to properly shift onto such a path of rapid decarbonisation.[6] Humanity's current path most likely leads to cascading ecological and climate tipping points and a radically changed environment. It is not clear what sort of human society would be viable in this scenario. It increasingly seems that we are approaching these tipping points faster than had previously been estimated.[7] There is still a small window to avoid the worst impacts of climate change. But only through radical and transformational changes across human societies that creates a full shift to zero-carbon as soon as possible, while systematically restoring forest, land and ocean ecosystems and their carbon absorbing capacity.

These critical climate and sustainable development challenges facing humanity have been clear for some time. So far, our collective action in response has been insufficient. We now need radical change that is fast, big and holistic enough to change paths. This is important context against which communities must place their work on developing local circular economies.

The concept of the circular economy responds to the challenges facing humanity – holding promise for systemic transformation of our society. The core tenants of circular economy are to design out waste and pollution, keep products and materials in use and regenerate natural systems, with social impacts that extend far beyond resource efficiency. Nevertheless, the gap between concept and reality remains huge. A full circular transition requires much more expansive creative innovation in systems design, rigorous redesign across value- chains, plus deep collaboration among multiple stakeholders. Change may be difficult, but it is necessary.[8]

The challenge now is for communities to make the practice of circular economy respond to the challenges facing humanity, not just the concept.

c. Urban Circular Economy in Europe

The good news is that Europe is committing to radical climate and sustainable development action as a clear priority for this decade - through the European Green Deal. The EU Green Deal puts the concept of circular economy at the centre of efforts to transform the European Union into a fair and prosperous society, where economic growth is decoupled from resource use and environmental harm.[9]

The European Commission has adopted a new Circular Economy Action Plan, which sets out initiatives along the entire life cycle of products, targeting for example their design, promoting circular economy processes, fostering sustainable

---

[4] The Social Shortfall and Ecological Overshoot of Nations; Fanning et al; Nature Sustainability (2021) - https://rdcu.be/cBzvG

[5] Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Summary for Policymakers; IPCC (2018) - https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_LR.pdf

[6] IPCC, 2021: Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change - https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

[7] Hot House Earth, talk; Will Stefan professor of Earth System Science at Australian National University (2021) - https://www.youtube.com/watch?v=wgEYfZDK1Qk

[8] The Circularity Gap Report; Circle Economy (2021) - https://www.circularity-gap.world/2021

[9] A European Green Deal, Website - https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

consumption, and aiming to ensure that the resources used are kept in the EU economy for as long as possible. The overall goal is a cleaner and more competitive Europe where flows of materials and energy within cities and regions reduce the pressure of human settlements and activities on natural resources and promote sustainable growth. The Commission's expectation is that a circular economy will harness the potential of research, innovation and digitalisation; generate new sustainable services, innovative jobs and upgraded knowledge and skills; as well as high quality, functional and safe products that are efficient and affordable, last longer and are designed for reuse, repair, and high-quality recycling.[10]

The EU Bioeconomy Strategy also provides a strategic framework for shifting the economic resource base in Europe to a circular model that is grounded on renewable and bio-based materials. With a turnover of €2.3 trillion and accounting for 8.2% of the EU's workforce, the bioeconomy is already central to the success of the EU economy. Expansion of a sustainable European bioeconomy is projected to create 1 million new jobs by 2030, especially in coastal and rural areas.[11]

The EU is also encouraging local administrations, industry, business and other local stakeholders to develop Local Green Deals that bring the ambitions of the EU Green Deal down to an implementable local level. These should be local agreements based on action plans to make sustainable change happen locally – ie. that clearly identify a vision/ambition, direction of travel and key actions that local stakeholders commit to leading, the support for action offered by relevant actors, governance and implementation models, and timeframes for delivery.[12] Local Green Deals can be a useful mechanism for capturing and formalising local circular bioeconomy and value-chain development ambitions and collaborations.

Cities will play a key role in accelerating climate, sustainable development and circular economy transformations. According to the European Circular Cities Declaration, launched in 2020, a circular city is one that promotes the transition from a linear to a circular economy in an integrated way across all its functions in collaboration with citizens, businesses and the research community. This means in practice fostering business models and behaviour which decouple resource use from economic activity by maintaining the value and utility of products, components, materials and nutrients for as long as possible, in order to close material loops and minimise harmful resource use and waste generation.[13]

Nevertheless, communities will not manage to create circular bio-economies by focussing only on distinctly urban areas. Food, nature, energy, water, mobility and air systems are deeply interconnected between urban, semi-urban and rural areas. In many areas, pollution, urbanisation and rural depopulation are also undermining this synergy. Success will lie in cohesive regional development where cities play an essential role in driving systemic change, as part of a regional whole.

There are now number of strategic EU initiatives that can also be drawn on to help to support cohesive regional circular economy and sustainable development missions and actions. These include:

- **Climate Resilience Mission.** This EU mission targets turning the urgent challenge of adapting to climate change into an opportunity to make Europe resilient, climate-prepared and just. The mission is focussed on supporting 200 regions across Europe to accelerate their transition to a resilient future through action co-created by communities and citizens. The Mission Board recommended that new 'mission implementation platforms' be established locally to: mobilise investment, manage portfolios of innovation and action, and facilitate participatory processes.[14] Funding targeting this mission is expected to be made available through a number of programmes, especially Horizon Europe.

---

[10] Circular Economy Action Plan; EU Commission (2020) - https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en

[11] EU Bioeconomy Strategy - https://ec.europa.eu/info/research-and-innovation/research-area/environment/bioeconomy/bioeconomy-strategy_en

[12] Local Green Deals: A Blueprint for Action' EISMEA and DG GROW (2021) - https://www.intelligentcitieschallenge.eu/news/local-green-deals-blueprint-action

[13] European Circular Cities Declaration - https://circularcitiesdeclaration.eu/

[14] EU Mission: Adaptation to Climate Change - https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/missions-horizon-europe/adaptation-climate-change-including-societal-transformation_en

- **From Farm to Fork.** This initiative aims to re-balance food systems, nature and biodiversity in Europe through much wider organic farming, among other priorities. This initiative highlights that making European food famous for its sustainability can give a competitive advantage and open new business opportunities for European farmers. Developing sustainable food production systems is an opportunity for every region, and those that can rapidly transition to regenerative food systems will reap the benefits of being at the forefront of this growing market.[15]

- **Soil Health Mission.** The *Caring for Soil is Caring for Life* mission aims to ensure that by 2030 75% of soils are healthy for food, people, nature and climate (while today 60–70% of EU soils are assessed as unhealthy). This mission will have a wide-reaching impact not only on soil health but also on practices in agriculture, forestry and urban areas. The mission will help to improve the functioning of food and bio-based value-chains, biodiversity and the capacity to mitigate and adapt to climate change.

- **Mission on Climate-Neutral and Smart Cities.** This mission aims to mobilise local authorities, citizens, businesses, investors as well as regional and national authorities to achieve at least 100 climate-neutral and smart cities by 2030, and ensure that these cities act as experimentation and innovation hubs to enable all European cities to follow suit by 2050. A central feature of the mission will be Climate City Contracts that will be co-created with local stakeholders and citizens and set out plans for a city to achieve climate neutrality by 2030. Embedded investment plans should identify how the EU Commission and Member States will align investment support for the city mission under the 2021–2027 funding framework, so cities need to be getting onto a 2030 climate-neutrality pathway in order to take advantage of this.[16]

- **Just Transition Mechanism,** which aims to ensure that the transition towards a climate-neutral economy happens in a fair way, leaving no one behind. The mechanism supports regions in Europe that are most affected by the transition to a carbon-neutral and sustainable economy, with aims for mobilising at least €150 billion of investment between 2021 and 2027 through three key funding streams. These are generally going to be regions that have a concentration of high-carbon energy production and/or industries (eg. cement, steel, aluminium, fertiliser or paper production). Each EU country is required to fully identify these priority regions in Territorial 'Just Transition Plans', and outline pathways for transition by 2030.[17]

- **Mission Starfish 2030: Restore our Ocean and Waters.** 60 percent of EU surface waters are currently not meeting required standards for protection of habitats, drinking and bathing water — with little improvement seen in the last 15 years. The mission on healthy oceans, seas, coastal and inland waters aims to rectify this by protecting and regenerating rivers, lakes, seas and oceans. The mission sets the task of restoring water systems for our community's health, ensuring water security, supporting climate mitigation and adaptation, and restoring biodiversity. Every region has vital freshwater resources and 40% of Europeans live near the coast.

- **Renovation Wave** - in 2020 the Commission published the strategy "A Renovation Wave for Europe – Greening our buildings, creating jobs, improving lives" to boost renovation in the EU. It aims to double annual energy renovation rates of buildings in the next 10 years, with 3 focus areas: tackling

[15] From Farm to Fork Strategy - https://ec.europa.eu/food/horizontal-topics/farm-fork-strategy_en

[16] EU Mission: Climate-Neutral and Smart Cities - https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/missions-horizon-europe/climate-neutral-and-smart-cities_en

[17] Just Transition Mechanism website - https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transition-mechanism_en

energy poverty and worst-performing buildings, public buildings and social infrastructure, and decarbonising heating and cooling.[18]

- **New European Bauhaus** - This initiative aims to connect the European Green Deal to local living spaces, building a sustainable and inclusive future that is beautiful for eyes, minds, and souls. Improving quality-of-life and citizen co-creation and management of the built environment are key goals.[19]

- **Strategy for Financing the Transition to a Sustainable Economy** - This strategy aims to support the financing of the transition to a sustainable economy by proposing action in four areas: transition finance, inclusiveness, resilience and contribution of the financial system and global ambition.[20]

EU funding programmes in the 2021-27 EU funding period can be expected to increasingly target the goals of the EU Green Deal and these initiatives. This is an excellent opportunity for leading communities to secure catalysing initial investment, and for national governments to align policy and public investment support to help accelerate change.

---

[18] A Rennovation Wave for Europe - https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en
[19] New EU Bauhaus - https://europa.eu/new-european-bauhaus/about/about-initiative_en
[20] Strategy for Financing the Transition to a Sustainable Economy https://ec.europa.eu/info/publications/210706-sustainable-finance-strategy_en

3. CIRCULAR BIOECONOMY VALUE-CHAIN OPPORTUNITIES

According to the EU Bioeconomy strategy a bioeconomy:

> *covers all sectors and systems that rely on biological resources (animals, plants, micro-organisms and derived biomass, including organic waste), their functions and principles. It includes and interlinks: land and marine ecosystems and the services they provide; all primary production sectors that use and produce biological resources (agriculture, forestry, fisheries and aquaculture); and all economic and industrial sectors that use biological resources and processes to produce food, feed, bio-based products, energy and services.* [21]

Ideally a circular bioeconomy would use renewable organic materials from forests, soil/crops and the sea to create products such as food, paper, packaging, fuel, furniture and houses/buildings, displacing products currently made from high-carbon fossil oil.

A bioeconomy therefore captures the focusses the organic (green) side of the below Ellen MacArthur Foundation representation of a circular economy:
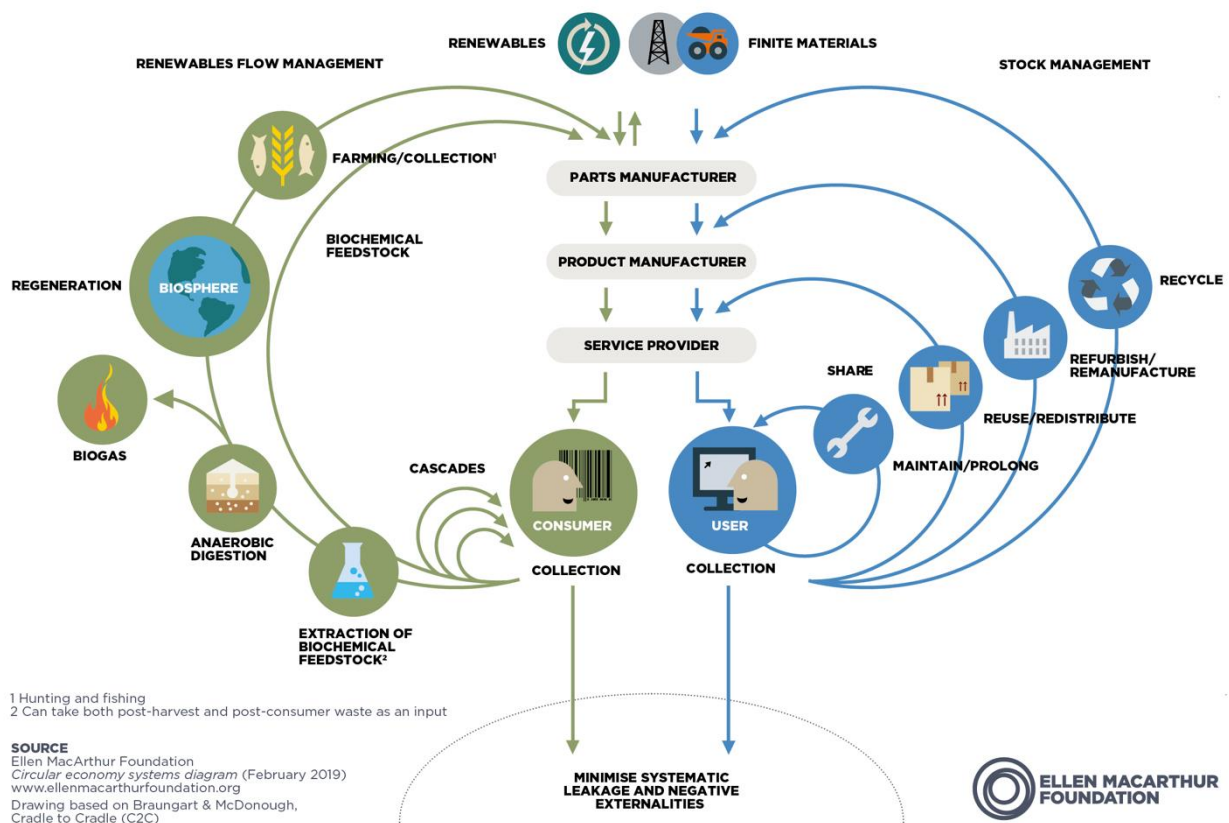
Illustration of a Circular Economy (Ellen MacArthur Foundation)

In this view of the world, a local urban bioeconomy should ensure that organic resources flow in closed-loops. Production and consumption of organic-based products and materials should be localised to the extent possible. Soils, forests and bio-diversity should be consistently regenerated, along with water resources. Chemical pollution should be eliminated.

---

[21] EU Bioeconomy Strategy - https://ec.europa.eu/info/research-and-innovation/research-area/environment/bioeconomy/bioeconomy-strategy_en

Organic waste and by-products would be recovered and recycled as feedstocks for production of other products, then energy generation and later returned to the soil.

Under the CITYCIRCLE project, the CECOMs Innovation Agenda identified four key circular bioeconomy value-chains for urban communities to work on redesigning and developing towards the overall mission of creating integrated bio-economies that are circular, regenerative, resilient, non-wasteful and healthy:

a. Shorten local food chains by working on both supply and demand

b. Integrated primary production and manufacturing to close organic cycles between local agriculture, food, and forestry

c. Regenerative bio-industry clusters that maximise use of biomass resources

d. Zero-impact energy systems that fully utilise local bio-resources

In this section the possibilities of these value-chain opportunities are further discussed, to help inspire the development of community bioeconomy missions and implementation action plans (on which further guidance is provided in Section 4). Points b. and c. have been combined in this document into a single section on 'integrated bio-industry clusters'.

Ideally communities should not be choosing between these value chains, work is needed in all three in service of the overall mission, and there are many synergies between them as part of a overall local circular economy.

The allure of starting with simpler-looking energy projects should also be avoided. Recent work by Material Economics looking at the big picture of biomass use across the EU economy highlights that regenerative biomass is a scarce resource that needs to be prioritised into higher value material applications such as timber, fibre, and chemicals, while energy uses for biomass are likely to become less competitive in many sectors. Current EU scenarios would demand much more biomass than can reasonably be supplied (see diagram to the right). Material Economics therefore recommend a course correction for bioeconomy plans in the EU. This reinforces the need for cities and regions to take an integrated and future-focussed approach to developing highest possible value local circular bio-economies.[22]
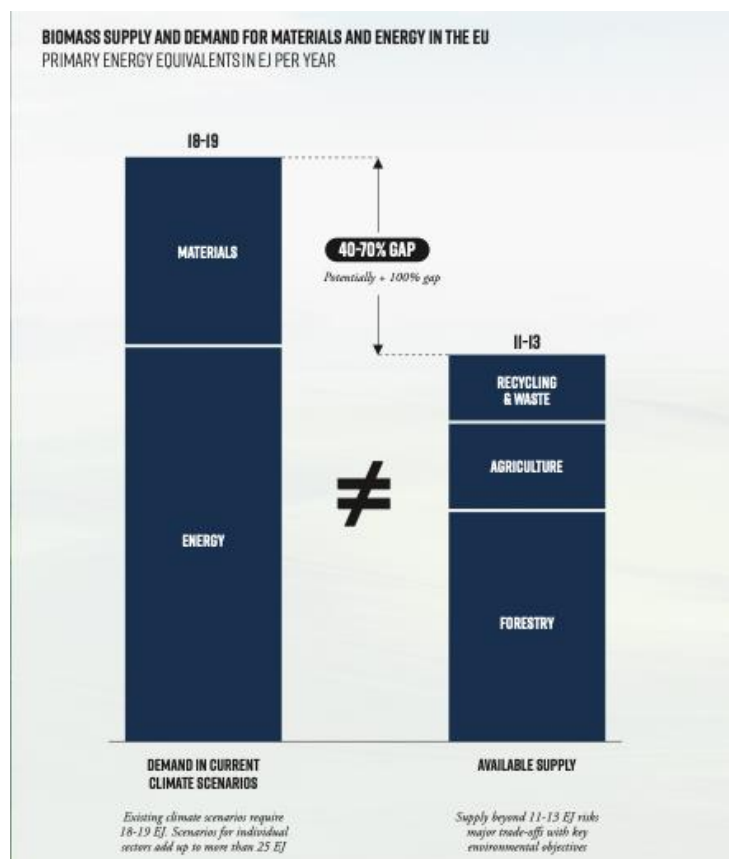
Current EU strategic plans for biomass use are likely to far exceed sensible supplies (Material Economics)

---

[22] EU Biomass Use In A Net-Zero Economy - A Course Correction for EU Biomass; Material Economics (2021) - https://materialeconomics.com/publications/eu-biomass-use

a. Local Food Systems

Changing food systems to be based on circular economy principles is a powerful potential strategy to tackle climate change, build biodiversity and provide healthy nutritious food for all. Nutrition is one of the human needs with the greatest demand for resources and high-carbon inputs. The current food system clearly doesn't work for everyone, and it certainly doesn't work for the environment. Industrial farming has turned agriculture into a major source of greenhouse gas emissions and pollution that is also driving biodiversity loss. Almost a third of food produced is wasted while nearly 10% of the world's population still go hungry.

Much of today's modern food system is also extremely unhealthy. Rising obesity is a direct cost of poor diets and food options for many people. At the same time, food production is causing health issues including air pollution, water contamination, poisoning from pesticide use, and increased antimicrobial resistance. The covid-19 pandemic has then brutally demonstrated the health risks of biodiversity loss and resulting increase in risks of pathogens crossing over from animals to humans. Designing circular local food systems is an opportunity to also rebuild healthy and regenerative local food systems that improve the health of communities and environment (this was reinforced by the CITYCIRCLE CECOM working group on Public Health, Medicine and Life Sciences).

Transitioning to a circular and regenerative local food system means growing food in ways that generate positive outcomes for nature such as healthy and stable soils, improved local biodiversity, improved air and water quality; while ensuring that nutrients are recycled back through this regenerative system.

However, the flow of materials in the current food system is overwhelmingly linear. A very high proportion of food flows into cities, being where most people live, where it is processed or consumed. Organic wastes result - in the form of discarded food, food by-products or sewage. Less that 2% of these valuable nutrients in organic resources discarded in cities gets actively looped back to productive use, see diagram below.
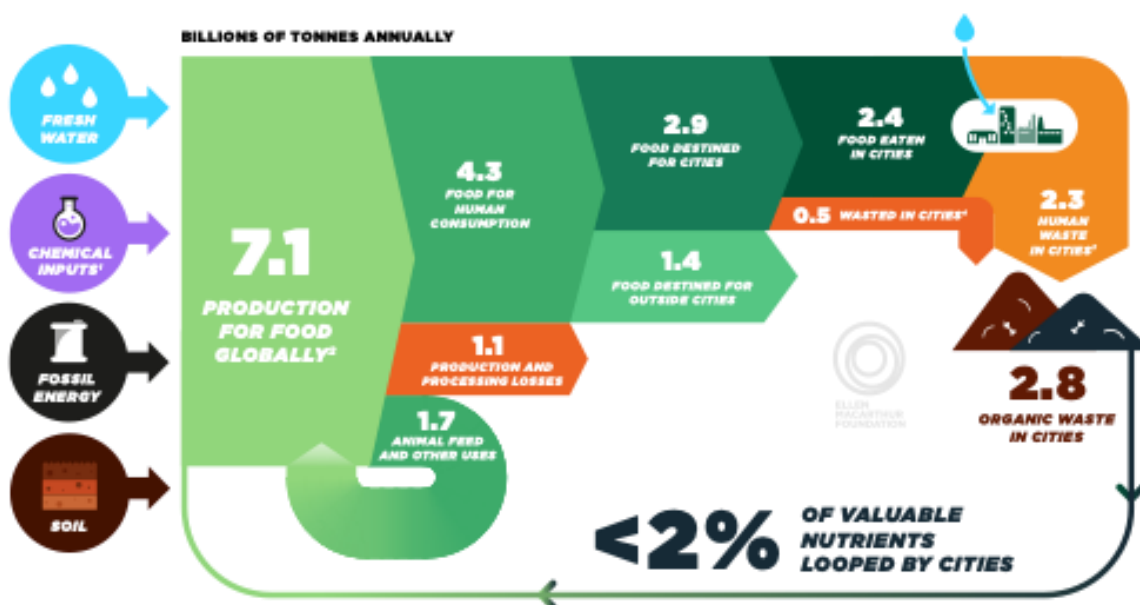
The current linear urban food economy (Ellen MacArthur Foundation)

The Ellen MacArthur Foundation shows how cities and regions can focus on working to redesign and shorten their local food value-chains as much as possible. With 40% of the world's cropland already located in peri-urban areas (within 20

km radius around urban boundaries), cities communities can become powerful demand centre that help to encourage peri-urban farmers in their region to adopt more regenerative practices.[23]

Three key areas for growing a circular city food economy (Ellen MacArthur Foundation)

Food industries can also play a significant role in creating demand for regenerative and circular foods. Four strategies recommended by the Ellen MacArthur Foundation include: diversifying ingredient sources from a much wider range of plants and their varieties; shifting from high impact sources of animal products and crops to lower impact ingredients, using up-cycled ingredients that would otherwise be wasted, and moving to regeneratively produced ingredients. Their analysis shows that taking advantage of all four of these circular food design opportunities together has the potential to generate substantial environmental, food output, and farmer profitability benefits versus business-as-usual.[24] The public sector can also support this demand side of the equation by adopting procurement guidelines that also align to these sourcing principles.

On the supply side, agricultural practices need to shift radically, while being tailored to local contexts by using appropriate approaches such as diverse crop varieties, farm practices, rotational grazing, aquaculture and agroforestry. Regenerative agriculture results in agricultural land that more closely resembles natural ecosystems like forest and native grassland, providing habitat for a wide range of organisms.[25]

Urban farming also has significant potential for growth as part of circular local food system. Theoretically many cities could produce up to one-third of the food they need by using high-yielding indoor urban farming methods such as vertical farms, aquaponics and lab-like aeroponic systems; along with community gardens and orchards. Intensive high-tech urban farming has tended to focus on crops such as leafy greens, herbs, vegetables, and fruit, as these foods require less space and their quality also suffers from long transport times and processes. For example, Grow Up urban farms have been pioneering controlled environment urban food production in London since 2013.[26] Also BIGH's Femme Abattoir in Brussels is a rooftop facility that combines aquaculture with hydroponic vegetable growing to create virtuous cycling of nutrients while producing 35 tonnes of high-quality fish per year.[27] High-tech soil-less farming solutions do generally require highly specialised synthetic liquid fertilisers, use limited urban space and demand high-energy inputs for lighting and heating.

---

[23] Cities and circular economy for food; Ellen MacArthur Foundation - https://ellenmacarthurfoundation.org/cities-and-circular-economy-for-food

[24] The big food redesign: Regenerating nature with the circular economy; Ellen MacArthur Foundation (2021) - https://ellenmacarthurfoundation.org/resources/food-redesign/overview

[25] A circular economy for food will help people and nature thrive; Ellen MacArthur Foundation - https://ellenmacarthurfoundation.org/topics/food/overview

[26] Grow Up website - https://www.growupfarms.co.uk/

[27] BIGH website - https://bigh.farm/farm/

So, in order for these systems to be circular they would need to run on renewable energy, recycle water, make use of otherwise marginal urban space and use regenerative nutrient inputs and pest controls. Designing urban food production around significant sources of otherwise wasted heat in the urban environment is an interesting opportunity space in this respect.

Together, better overall outcomes from urban and peri-urban food production need to be achieved through a holistic redesign of regional food production and retailing systems. This needs to be done in partnership with farmers and entrepreneurs to ensure that the realities of evolving farm and production systems are taken into account. Collaborative food design has greater potential to realise the value of regenerative farming systems that are nature-positive; while maximising total food output and profitability. This sort of collaborative process to strategically design and develop a regenerative regional food system will require significant work and sustained effort.

Building a mosaic of better food retail and dining options is also an important way to build community demand for better quality and low-impact food. Many communities have established their own co-operative food stores, especially out of frustration of being left living in 'food deserts' with no real food stores, and/or being exploited by the narrow interests of corporate supermarkets. A dominance of fast-food chain restaurants and even public institutions serving low-quality unhealthy foods is also pushing communities and local entrepreneurs to develop a range of better dining, shopping and local market systems. In many cases these efforts are closely tied to community education, health and waste reduction efforts. However, the impact of these community initiatives is often uneven - parts of cities may have a number of local food initiatives, while other areas have none. More support is needed for broadening the diversity, reach and impact of social enterprises focussed on the demand-side of healthy and local food systems.

Food is generally a great area to focus on as a path to wider community development goals, as it is so important to all people's social life, quality of life and health. Common Unity Project Aotearoa (CUPA) in New Zealand demonstrates how the latent energy and assets within communities can be effectively unlocked by a socially-focussed local urban farming initiative. CUPA recognises that today's economy throws away many people, as well as material waste. When people feel valued they are much more willing to get involved in local change. CUPA have achieved this by focussing on healthy food for children and families in need, and expanding to create urban farms to produce this food at the nearby prison and in social housing residents' back gardens – along with a multitude of other local food enterprises (see case study in Appendix 1). This demonstrates the intertwined social, health, ecological and economic benefits that local food initiatives can realise.

Community gardens and outdoor urban farms do use more land and are less directly productive than high-tech urban food production, but they tend to also deliver greater social benefits while improving the urban environment and increasing urban green space. EkoDizajn in Mostar (Bosnia and Herzegovina) also works as a food-oriented social enterprise that includes the community through 'knowledge for farm work' exchanges that improve citizens' wellbeing and work opportunities (see case study in Appendix 1). Since 1973, the Green Guerrillas have been transforming communities in New York (USA) through 'radical acts of gardening' – creating more than 600 community gardens, may of which are now protected and provide valuable green space in the city while supporting food and environmental justice.[28]

As well as building community demand and regenerative food production systems, communities also need to ensure that food and nutrients never go to waste. Surplus edible food should be redistributed to people who need it and inedible food by-products and human waste need to become inputs for new cycles of value production.

As most food eventually ends up in cities, it is in and around cities where the inevitable inedible food by-products, human waste, and green waste can be used at their highest value. This means transforming these organic materials into new products ranging from organic fertilisers and biomaterials to medicine and bioenergy. This means that using food system by-products should be a focus of bio-industry innovation (see following section).

---

[28] Green Guerillas - https://www.greenguerillas.org/history

In Ghent (Belgium) the municipality launched 'Ghent en Garde' in 2013 - a food policy to pave the way towards a sustainable local food system with a shorter and more visible food chain. Reduction of food waste was a priority under this initiative, and in 2019 their Foodsavers project distributed 1,700 tons of food surpluses from retail and hospitality to about 50,000 Ghent residents in the form of about 987,000 meals (see case in Appendix). This is an example of not letting food 'waste' become waste, and instead diverting food products directly to more productive use within the community.

Careful collection of organic by-products is also essential to enable maximum value from their reuse in bio- refineries, urban farms or for energy production, with residues returned to soils. This is a critical role for municipalities, and their waste utility companies and/or contracts, where urban waste collection is generally managed. Clean organic waste can be recovered through processes including composting and anaerobic digestion. For instance, in Helsingborg, Sweden, the municipal waste treatment company produces biogas from organic municipal waste. The digestion residue is then transported by pipelines out to local armers to be used as biofertilizer. This shows how cities can close a loop to support regenerative food producers in their peri-urban areas by returning in the form of organic fertilisers derived from urban food by-products.

In some cases local community-managed collection and processing of organic waste may prove a better option that large centralised municipal systems. Clearly the infrastructure of collection and processing needs to be carefully managed to avoid nuisance from pests and smell; but then benefits in terms of efficiency, links to local producers and citizen-engagement can be realised. In vessel composting systems are a useful technology option to activate local organic treatment systems, that ensure composting takes place in an enclosed environment, with accurate temperature control and monitoring.[29]

There are clearly a wide range of potential innovation and actions that urban communities can develop to help deliver on the potential of sustainable circular local food systems. The challenge is that few of these can be successfully advanced by lone actors and entrepreneurs, nor will one or two things make much difference on their own. An ambitious, collective, and strategic approach is required to turn the potential into reality. This will require a new mission and new efforts and ways of working, which are discussed in Section 4.

*

For reference against the above discussion of opportunities, the CITYCIRCLE Innovation Agenda identified the following opportunities for improving and shortening local circular food value-chains that the CECOM working groups found most appealing:

- *Working on both supply drivers such as how food is produced and labelled, and demand side actions such as public awareness raising, procurement, policy development and localising food system infrastructure*
- *Reinforcing local food systems by activating the EU Farm-to-Fork initiative locally with local food infrastructure, digital platforms etc; and co-shaping solutions with local actors (including trainings for farmers and public procurers, and promotion towards citizens).*
- *Involving youth in a meaningful way was seen as essential to lasting economic development in this area.*
- *Developing circular foods systems procurement criteria with local public entities with significant purchasing power*
- *Mapping organic waste streams and identifying utilisation opportunities.*
- *Creating a digital library of innovative case studies and outreach programmes aimed at building engagement and enthusiasm for local action*
- *Supporting Managing Authorities of EU funding to offer investment programmes interlinking circular local agriculture and water management*
- *Influencing development of the EU Common Agriculture Policy to move away from subsidising environmental damage and restructuring to incentivise new sustainable and circular food production.*

---

[29] What is in-vessel composting?; Zero Waste Scotland - https://www.zerowastescotland.org.uk/content/what-vessel-composting

b. Integrated Bio-Industry Clusters

Cities, and their surrounding regions, have an enormous economic opportunity to create bio-based industry and manufacturing networks. Strategic 'clusters' of 21st century bio-industry can generate high economic and social value from closed loop organic cycles that are net-regenerative of local ecosystems.

Bio-industry Opportunities

The core of bio-industry is using biological feedstocks to produce products and goods that benefit society. Currently many of the things that modern society relies on are produced from fossil-fuel feedstocks. Hence a key goal of bio-industry should be to replace fossil fuels with sustainable feedstocks from forestry, agriculture and aquaculture that are produced in ways that regenerate rather than degrade natural ecosystems. Material Economics have projected that bio-based materials production will be the application area where biomass resources typically have the highest value in a net-zero context. Therefore, cities would be wise to focus here to maximise long-term social value from bio-resources.

Woody biomass is generally the core feedstock for bio-based industry, followed by agricultural residues. For example, the Bioeconomy Region project in Norway and Sweden demonstrates progress in the development of a forest-based bioeconomy. This means innovatively using the forest as a raw material source and producing things like paper, packaging, fuel, furniture, construction and composite materials, chemicals (eg. for coatings, resins and adhesives), textiles, beauty products and bio-plastic.[30] Between biomass and bio-products, advanced bio-refineries are needed.

The development of biorefineries is therefore a next horizon opportunity for bio-based industries. Bio-refineries use industrial biotechnology to turn renewable raw materials, such as agriculture and forestry residues, into lignin, cellulose and advanced bio-polymers that can then be used to make essential everyday products. With some processes having the potential to also capture carbon dioxide from the atmosphere using plants and algae, biorefineries offer the tantalising potential of carbon-negative industrial production. The EU Bioeconomy Strategy identifies a potential market demand for hundreds of bio-refineries in Europe by 2030. This includes 185 biorefineries producing second-generation ethanol, 50 for bio-based jet fuel, 30 for bio-based chemical building blocks and 45 for bio-based plastics. These will require strategic planning and development, alongside massive public and private investment. This represents a large economic opportunity for early-moving cities.

Growing an urban bio-industry sector therefore presents an enormous economic opportunity for nearby forest owners and managers. In many places forestry management is decentralised and relatively uncoordinated, and as a result only relatively low value wood products are produced, processed and exported to other places where they are used in higher value (but not necessarily circular) manufacturing. If bio-industries can displace the non-sustainable raw materials currently being used in construction, packaging, textiles, furniture, and chemicals; then this opens the door for much higher value products and business models that are based on forest resources. This ultimately means more value for forest owners, who should be the biggest champion of bio-industry development (but are usually not well placed to lead it).

Cities communities can shift this dynamic by providing strategic regional leadership on innovation and economic development, core markets for products and construction materials, spaces for production and manufacturing, and cleanly segregated organic feedstock streams from urban bio-waste (particularly from food systems as described above). It is also essential that bio-industries can access clean energy and water from municipal utility supplies. At the same time, a new cleaner and healthier 'face' can be created for bio-industries that generate well-paid jobs while regenerating local bio-resources including water, oceans, soils, forests, biodiversity and agriculture systems. This will give greater social licence to bio-industry operators.

---

[30] Bioeconomy Region webiste - https://bioeconomyregion.com/en/home/

This means that the development of bio-industries in cities needs to be built on strong regional collaborations with forest and agriculture sector stakeholders, and bio-industry systems should equally be designed to maximise value to both urban and surrounding communities.

Cities are increasingly investing effort and money in the development of urban forests. Urban forests and green areas can provide multiple direct benefits for city inhabitants, including improved mental health and wellbeing, cleaner air and cooler micro-climates. At a basic level some cities have also connected municipal bio-waste from urban parks and forests into local heating supply systems, rather than only composting it. This is a start, but there is also potential for well-managed forests and natural systems to also provide local feedstocks for bio-industry, which in turn would generate greater revenues to support the development and maintenance of more nature in cites.

High-value construction materials and systems are a direct opportunity for many cities to boost local bio-industry manufacturing. Housing and buildings have a massive demand for materials and resources, and thus are a natural early target demand for urban bioeconomy development. Advances in architectural and engineering applications for regenerative wooden materials allow for broader use of locally-sourced and renewable timber, even in high-rise buildings. Developing a wider range of bio-based construction materials will be essential to circular construction, with very large economic potential for successful solutions. This is a large space for supporting bio-industry innovation and enterprise development, covering new products, design, installation and maintenance.

Making the most of existing space in the built environment is also an important foundation for enabling more circular material systems. Where the built-environment culture is based on build-cheap then demolish and replace, it is difficult to really nurture circularity. With slower turnover of construction and demolition, and more value therefore being derived from existing buildings, the business case for renovations and adaptation is improved. This then supports greater demand for regenerative building products based on local bio-resources, which might cost more up-front while delivering greater value over time.

For seaside communities, there are also significant bioeconomy opportunities in ocean farming and production of algae as a feedstock.

The Value of Clustering

The potential value of bio-industries is clear, but it is also clear that they will not be realised by current industry actors and organisations behaving in the same ways as they typically have.

Changing mindsets, building capacities, developing new business models, securing investment and developing the new products and services needed for a circular economy is a complicated task that requires partnerships between multiple community actors. This is hard work, and in many places, it is not clear who will take a lead on this strategic work. Development of clusters is a proven way to solve this impasse locally.[31]

Clusters are defined by a group of social entrepreneurs and companies joining forces with research and knowledge institutions, public stakeholders, investors and public authorities and start-ups with the aim of collaborating on change and innovation within a focussed topic area. Often a cluster will also have a geographic starting point at local or regional level.

Circular Bio-industry clusters should be focussed on capturing the opportunities of building a circular bioeconomy, rather than being based around traditional production sectors. A successful bioeconomy will be based on unlocking the scientific and technological expertise and collaborations needed to develop new products and processes. This means linking different industrial sectors that have probably not co-operated deeply before. Clusters actively support matchmaking between community actors, searching for synergies between holders of bio-resources, innovation ideas, policy and investment support, knowledge and implementation partners.

---

[31] Clusters in the Circular Economy -
https://clustercollaboration.eu/sites/default/files/news_attachment/clusters_in_circular_economy_0.pdf

Clustered companies might also be located in a defined industrial area in order to match industrial symbiosis connections where residues, by-products or waste heat/water generated by one company can be used by another, thereby saving feedstock costs for one company and waste management costs for the other. Such direct symbiosis connections might define some clusters, while being a subset of other models.

Clusters do also have to be organised and resourced to mitigate the likely resistance from some actors and industries that might have nothing to gain from a bioeconomy (there are doubtless some industries that must become obsolescent due to their dependence on non-renewable resources and a linear disposal economy). So, while circular bio-economies offer a big contribution to the creation of sustainable, low carbon societies; their success could be jeopardised by narrowing: the actors involved, problem/solution framings, and types of value prioritised. Therefore clusters need to adopt memberships and working practices that diversify ideas, expertise, stakeholder input, visions and the values that shape strategic direction and choices.[32] They should also actively engage the energy, ideas and creativity of young people who have the most to gain from building better systems.

Paper Province is one example of a world-leading business cluster in the forest-based bioeconomy. The cluster is owned and operated by more than 120 member companies and based in Karlstad, Sweden. Paper Province helps new and established companies to develop and launch sustainable ideas related to the forest.[33]

Overall, there may be an opportunity for numerous bio-clusters in any community. Some focussing on specific technical areas and value chains, others might have a more geographic, industrial symbiosis, or strategic focus. In this case numerous overlaps should be expected, and a cluster-of-clusters model may be needed to ensure overall strategic co-ordination (which can also match the Action Centre models for driving circular bioeconomy development as discussed in Section 4).

c. Bio-Energy Systems

Development of zero-impact energy systems that fully utilise residual local bio-resources should be a key part of any local bioeconomy. At the same time, energy systems should not be the central element, they should be the use-of-last-resort after the higher value economic cycles such as the food and bio-industry value chains discussed above.

Energy infrastructure should be designed to utilise low-grade by-products, residues and waste heat to supply urban heating, cooling and electricity – before the final bio-residues from energy systems are returned to nature.

Key bioeconomy urban energy system development opportunities include:

- Heat and power co-generation from biofuels, including woody-biomass residues, agriculture residues and biogas that is produced from organic food waste and wastewater.
- Low temperature district energy systems as key infrastructure for utilising the heat generated from biofuels as well as diffuse low-temperature waste heat resources in the community. These sources can be integrated with use of geothermal resources and heat-pumps running on renewable power
- Solar power generation, along with wind power where appropriate. While technically not 'bio' these natural energy sources are essential in supporting the energy demands of bio-industries and wider community energy needs. They are also likely to be more economic sources of power than biomass for most applications.
- Clean biomass-fuelled heating systems for homes that cannot be serviced by district energy systems or heat pumps.
- Models to systemically improve building energy performance, using bio-based construction materials

---

[32] The Sustainable Path to a Circular Bioeconomy; Kershaw et al (2020) - https://www.cell.com/trends/biotechnology/fulltext/S0167-7799(20)30292-4

[33] Paper Province (Sweden) website - https://paperprovince-com

Developing these systems will require working with public energy utilities to shift their business models and most likely the development of community energy models to more fully involve citizens in decentralised energy systems and to supplement what utility companies are willing to do. Bioeconomy clusters could evolve to hold some of these energy assets within local utility models.

Digestate residues from biogas production can also be piped to nearby farms to support local food production systems. Ash residue from clean biomass fuels can ideally also be returned to forests as a nutrient source.

A good example of a place that has been developing bio-energy systems and a bioeconomy for many decades is Växjö' in Southern Sweden. While initially more energy and climate led, a key success factor in Växjö' has been sustained political agreement on their fossil free goal for over 20 years. As a result, the municipality has had a strong mandate to lead radical change on behalf of the community. Collaboration amongst universities, local companies, the municipality, organisations and residents for a common goal has also been essential. Today Växjö' has turned off their last local sources of fossil-fuelled heat, and they have built a strong bioeconomy innovation system based on construction. Next Växjö' is moving into bio-refining of aviation fuels, supported by their existing clean energy infrastructure (See case in Appendix 1).

The small Slovenian community of Loški Potok also shows how any community can establish a viable local model of collaboration (a local co-operative) to maximise value from local forest resources, generate renewable energy, grow innovation and reduce carbon emissions. Their example also shows how leveraging available public funding for capital costs can reduce the time before such an enterprise is cashflow positive and returns are available to invest into other community projects. (See also the case in Appendix 1).

4. DESIGNING FOR ACTION

This Section is dedicated to designing for action to realise the potential of any, or ideally all, of the circular bioeconomy value-chains discussed in Section 3. The recommendations in this section are also equally applicable to planning for systemic change towards other circular value chains, and indeed in other sectors.

Reflecting back to the wider context set out in Section 2, it is clear that awareness of the problems, challenges and opportunities captured by the ideas of sustainable development and circular economy are not new. Much effort has already been made by many cities and communities in response. Despite these efforts we have all still failed to sufficiently build the prosperous, resilient and circular communities that we should have.

While we essentially know what we need to do, at least approximately, we have to acknowledge that we have not yet learned how to make these needed changes happen effectively. How we have been working on sustainable development is generally still not up to the challenge. The potential of the circular bioeconomy value-chains illustrated above will therefore not be realised through more of much the same work (the same applies to other areas beyond circular bio-economies). To succeed, communities will need to organise, resource, plan and manage change differently. This section outlines suggestions for how this can be done, organised around:

- Mission Development
- Action Centres
- Process and Portfolio Management
- Enablers
- Collective Learning

These sections also map the parts of the Local Circular (Bio)Economy Action Plan template that has been developed as guidance for preparation of these local action plans under the CITYCIRCLE project.

Realistically the remainder of the CITYCIRCLE project will not provide sufficient time and resources for project partners to work deeply with their community through all of the steps discussed here, to develop and plan implementation of bioeconomy development. CITYCIRCLE project teams should therefore undertake a light version of this process, with a close group of local stakeholders, to develop a first-version mission, initial portfolio and Action Centre design to include in their first version of a Local Circular Economy Action Plan that will be developed under the CITYCIRCLE project. They should then aim to seek additional resources to further test and refine this initial mission and plan through a wider and deeper community engagement and co-creation process. Also, these will be iterative processes and the best way forward is starting to put an initial plan into practice, learning by doing and improving along the journey.

a. Mission Development

Taking a mission-led approach is an important tool to help communities to create the significant shift needed in current culture and ways of working – from incremental change to radical and holistic change.

Taking a mission-led approach forces us to focus on doing what must be done in our communities, rather than limiting to presumptions about what we think can be done. This reframing from an incremental approach is essential, given the gap between the speed and scale of changes that are really needed and the current rate of progress on sustainable development, climate action and circular economy.

A mission should be sufficiently ambitious that nobody is quite sure how to achieve it, while still having a strong sense that it could be possible. The end goal of the mission should reflect an ambition that has strong community support - ideally being co-created through an inclusive process. The timeframe for the mission should not be too long - around decade is common.

The often-used example of a mission-led approach was when the USA committed to landing a person on the moon and returning them home safely 'before the decade is out.' As John F. Kennedy presented this mission in 1962:

> *We choose to go to the Moon in this decade... not because (it is) easy, but because (it is) hard; because that goal will serve to organise and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one we intend to win.*

This quote defines the fundamental ideas of a mission very well. A key difference to today is that, as Kennedy said, the moon mission was chosen. Given the challenges facing humanity today, the need for radical community missions that lead to prosperity, resilience, health and sustainability cannot be postponed. Communities that ignore this and continue with incremental-change-as-usual are in fact choosing a pathway towards a future of great risk and challenges. So local missions need to be informed by this global context. In order to thrive into the future - communities must embrace today's reality, turn addressing these challenges into locally-relevant missions and get to work on achieving them.

As noted in Section 2, the EU has recently launched a series of new innovation missions. These EU Missions acknowledge that societal challenges need a comprehensive, all-in approach that cuts across boundaries of policies, programmes and governance.[34] While there is not yet a circular economy mission at an EU level, there can be great synergy between local community development missions, a local circular economy mission, and the EU missions on climate neutral cities, resilient regions, soils and water.

So, how can cities start following the recommendation of the CITYCIRCLE Innovation Agenda to work intensively towards a mission to create integrated bio-economies that are circular, regenerative, resilient, non-wasteful and healthy?

Firstly, a mission needs to be 'owned' by a community. It can be informed, but not imposed from outside. So, the general suggested mission will need to be turned into a locally meaningful bioeconomy mission. This section outlines recommendations for achieving this. The recommendations here can of course be adapted to other mission topics as well.

As circular economies are a means to achieve the wider goals that a community is aiming for, a bioeconomy mission should ideally be nested within a communities' overarching vision and mission that targets their full sustainable development challenges and opportunities. Where communities are already clear on their overall mission, it will most likely be easier to develop a more specific bioeconomy-focussed mission. In other places (most likely many) that are still not clear on their overall community mission, working on a bioeconomy-focussed mission can be a valuable experiment into the process of developing of community missions. Other community missions can subsequently be developed along with a 'headline mission' for the community'. In a similar way, within the bioeconomy mission it may also be helpful to develop embedded missions for specific value-chains.

As described above, the main purpose of taking a mission-led approach is to help to create an essential cultural shift from working only on incremental (insufficient) change to tackle at speed and scale the radical and holistic change that is really needed. Developing and framing the mission is an important first part of this process. Missions should be co-created through inclusive community processes so that in the end they reflect an ambition that has strong community support. Such processes take significant time and resources to run thoroughly, starting with awareness raising and engagement, and moving into deeper iterations of co-creation.

The recommended steps for developing a community bioeconomy mission are as follows:

1. Undertake awareness-raising on issues and opportunities relating to the mission area with local citizens, organisations and businesses; focussing especially on young people. This should ideally include development and distribution of information materials, events and capacity-building trainings. Communications and events should highlight bioeconomy opportunities and examples of successful cases, as well as the EU Green Deal priorities,

---

[34] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on European Missions; European Commission (2021) -
https://ec.europa.eu/info/sites/default/files/research_and_innovation/funding/documents/ec_com_heu_randi_missions_29092021.pdf

relevant circular economy policy and funding opportunities. The main goal of this process is to get a wider network of people in the community engaged and interested.

2. Invite interested people to get involved in the ideation, innovation and co-creation process to help develop ideas and a mission for a circular local bioeconomy. Establish simple collaboration agreements with the individuals who volunteer to join this bioeconomy mission co-creation processes. These are a tool to help confirm commitment and alignment of expectations, and it is better to do this at the beginning than to have many people disengage with the process part way through. The agreements should capture what participants believe they can contribute to the process and what they hope to get out of it.

3. Undertake a collaborative process of further horizon and futures scanning for trends, ideas, methodologies, tools, processes and solutions connected to circular bio-economies and that are interesting and relevant to local context. This will help to bring in global ideas and experiences to inspire thinking on what could be done locally, which builds confidence in bigger ideas. The above value-chain concepts have been prepared as a starter for this process. The CITYCIRCLE Knowledge Base is also a useful asset.

4. Collaboratively develop 'Mission Propositions' – being strategic narratives that help to illustrate what an ambitious circular bioeconomy could look like in the community, and the benefits it could generate. This process of story development and telling helps to bridge current barriers in thinking and imagination, and to shift focus to what is really needed and could be possible. These stories also help to communicate possibilities with others in the community who are not yet involved in the core process, and to encourage their feedback and ideas. These stories are meant to be radical, so take the time to push beyond the constraints of today and work with imagination, optimism and idealism. Most people find this remarkably challenging.

5. Synthesise the common potentials captured in the mission proposition stories into a simple framing of the core community bioeconomy mission. Test this mission with a wider group of community stakeholders, and further refine as appropriate.

6. Create a brand and visual identity to help communicate the agreed mission and to help identify work that is aligned to the mission.

Developing an inspiring and ambitious community mission is a challenge, but also only the beginning of working out how to deliver on it.

b. Action Centres

Turning a bioeconomy mission into broad and systemic enough change is an enormous task, and one that almost certainly falls outside the current mandate or business model of any existing companies or organisations, including municipalities.

An organisation or team will need to be established and empowered with a mandate for activating and incubating collective change towards achieving the bioeconomy mission – i.e.. they need to be the 'backbone' of creating radical change in the community. Let's call these Circular Economy Action Centres.

The purpose of these Circular Economy Action Centre models is not to centralise and take over all of the work needed to develop circular systems and values chains. Consider them more as hubs of a wheel. They play a central role in connecting different parts of the whole, and they develop and maintain the shape without which the wheel would fail, but they are still only part of the whole. In the same way, many other actors in the community will have important roles to play, but the Actions Centres help them to see and perform their roles more effectively as part of a strategic whole.

These models should be made up of three layers, nested within the wider community:

- A core team comprised of the people who are fully involved in leading and activating change processes

- A suitable leadership and governance structure that is made up of committed community leaders. Their job is to keep a safe space for the core team to function effectively. An organisational model is needed to align leadership and governance with the core team.

- A network of community allies - people who can be called on as needed to help, either professionally or as volunteers.

These are described further below. This model is illustrated in the following diagram:
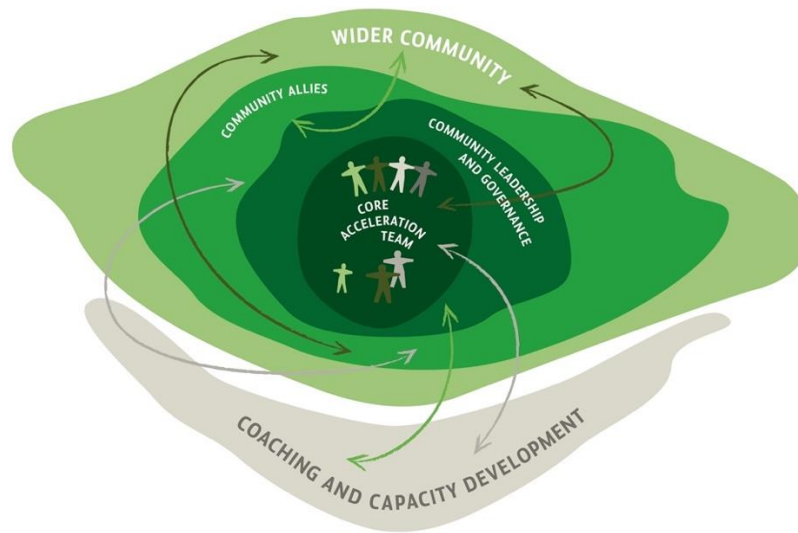
Key layers of an Action Centre model (Thriving Communities)

Key steps in the process to design and establish Action Centres should include:

1. Social systems mapping of actors in the current local system, their key work areas and responsibilities, and potential to contribute (or resist) – with a focus on individuals as well as organisations.

2. Design and activate the Core Team structure, including: role definition, selection/recruitment of key team members, matching to available resources, and defining ways of working.

3. Design roles and select the people who will be part of Leadership and Governance. Define their working model and principles of working together and with the Core Team.

4. Extend communications and invitations to develop a network of Community Allies to get involved in supporting the mission work, and set up suitable local channels for their ongoing engagement.

5. Develop and execute local Mission Contracts to help bind together stakeholder commitment to the mission and Action Centre model.

Core Teams

Circular Economy Action Centre core teams need to be made up of entrepreneurial and passionate individuals with the energy, capacities, capabilities and skillsets to catalyse, drive and sustain complex change work. They will be critical in incubating ideas and actions for systemic change in the community, while being responsible for keeping a view of the big picture rather than being pulled right into the detail of delivery. They must be able to creatively push through existing barriers and inertia to get things to happen - through facilitation, brokering connections, advocacy, and leading the design and development of circular economy actions and new business models. They also need to be able to build partnerships and agreements so that that implementation responsibility gets taken up by other actors in the community (the Core Team keeps growing the portfolio of further actions).

It is important to have a well-enough resourced core team. Activating radical change towards a circular economy is not a job for one or two overworked people, though this is still what can be commonly found in many places. The diagram below illustrates an indicative team design that could be sufficient to really accelerate delivery of a local circular economy mission. It may look like a large team at a glance, but it is not really in context of the work that is honestly needed to create such change. This is not meant as a fixed model, but as an illustration to support local design discussions on what form and roles might be needed in the team.

Indicative Action Centre Core Team structure (Korimako)

A viable funding model is needed to support the ongoing resourcing and work of this team. This can be achieved in the near-term through a mix of partnerships, secondments, and public grant funding. In the longer term returns from a community investment fund could be used to cover investment in the Core Team. For a community the investment in such a team should be seen as relatively small when compared to the value of the change that they are tasked with unlocking. Communities still inevitably find this an abstract business case, but this is a hurdle that will have to be overcome. Without a team of people who are empowered to work to create change, nothing much will change.

Even with funding, most communities also find it challenging to recruit and retain talented people to fill all of these roles. Capacity development, mentoring and incubation support will be needed to support these social entrepreneurs and changemakers to be as effective in their work as possible. Everyone will have much to learn, and much effort is needed to improve our collective skills for managing complex systems change. In some cases it is needed to also 'unlearn' behaviours that keep taking us back to the fractalised and short-term ways of working that are so common, but that undermine our own ability to deliver on our mission ambitions.

Engaging and building the skills and experience of younger people to join the team and work effectively is also an important opportunity to harness new energy and enthusiasm from those who have the greatest stake in the future (and therefore the team's success).

In theory this core team design could plug into any organisational and governance structure, a municipality or not, and there are different options for this.

Governance and Organising Models

It is often assumed that municipalities should take the lead on strategic change for their community. From this it is assumed that teams to drive change should sit within the municipality or linked municipal organisations. This can work, municipalities do play a key role, and in some places are being very proactive in leading change. Yet in reality most municipalities still struggle to move beyond their current mandate of regulation, maintenance and management; and therefore find it hard to engage and empower sufficient staff with the capabilities to drive radical change. Improving this 'organisational readiness' of local government is a key enabler (see following section), while at the same time communities generally need existing municipal models to be complemented with other innovative development-focussed organising and governance models to activate radical change. This is reinforced in the mission report for 100 Climate Neutral Cities by 2030, which says: "The present silo-based form of governance, designed and developed for traditional city operations and services, cannot drive an ambitious climate transition." The same can be said of an ambitious circular economy transition.[35]

This means that communities need to design and activate an appropriate a cross-community governance, leadership and organisational model that can support the core team to maintain transformational work and processes over time.

The model of Leuven 2030 is a good example, described by the city's mayor Mohamed Ridouani as follows:

I was deputy mayor when we started on this journey. Despite our best efforts in the city administration, I could see that efforts by the municipality alone would never be enough. So the idea grew for a governance model that could bundle all the city's creativity and ambition together behind one vision. The model itself, Leuven 2030, didn't come down from heaven. It emerged out of an 18-month process of discussions. As you'd expect, there was lots of back and forth between our five main stakeholders; the city government, citizen groups, knowledge institutions, companies, and investors.[36]

In Finland the concept of 'humble policy-making' is being explored. Rather than conventional policy-making that is built on confidence in government's ability to sufficiently learn from the past and successfully anticipate and steer the future, humble policy making accepts government's fallibility and need to experiment and learn. This approach is being embraced because it is recognised that, while traditional top-down steering works well for maintaining operative and routine functions of the state, the current governance system is often incapable of successfully solving complex societal problems such as shifting economic structures and systems circular or solving for climate change. A humble approach is fundamentally about building trust, which is a prerequisite for substantial change that can yield beneficial long-term outcomes.[37] Such an approach can be embedded in organisational models and/or ways of working.

Cross-community governance models can be organised in different ways, as steering groups, organisation boards, advisory groups and hybrid models between these. Regardless of the model there needs to be an agreement that ties the members of the governance group to fundamental principles and ways of working that are consistent with the mission – including transparency, independence, creativity, positivity and trust. The details of how governance groups are organised and defined does then link to the organisational form used to host the core team.

One option is to set up a new legal entity, for which the core team will work and the governance group will be the board. This then becomes a new social enterprise working for the community. In this case the new organisation will also need to develop clear partnership agreements with other actors in the community, to clarify expectations, resource sharing and delineation of efforts to encourage collaboration rather than competition.

An alternative is to form a distributed model bound together with partnership agreements. In this case the core team works for a 'virtual' organisation, ie. their employment contracts might be with different organisations with an agreement that they work for the collective effort rather than their employing organisation's interests. The same applies to the

---

[35] EU Mission: Climate-Neutral and Smart Cities - https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/missions-horizon-europe/climate-neutral-and-smart-cities_en

[36] Cities in a 1.5 degree world: What is there to learn from Leuven's Mayor Ridouani?; Climate-KIC (2020) - https://www.climate-kic.org/community/what-is-there-to-learn-from-leuven

[37]Humble Government: How to Realize Ambitious Reforms Prudently; https://tietokayttoon.fi/documents/1927382/2158283/Humble+Government.pdf/efbd7017-8546-7996-e249-c6f2008fe2d4/Humble+Government.pdf?t=1605254807206

governance group. It is important that it is clear that the governance group will steer the core team's work, not their employing organisation.

Both the new social enterprise and virtual organisation model options have their pros and cons. The fundamentals of needing clear partnership agreements, excellent people, and funding for the core team to work effectively do not change, so it is just a matter of designing the best model for each circumstance. As highlighted for the Leuven case, this should take some time and iteration.

The CITYCIRCLE CECOM groups also highlighted the important role that municipal Public Utilities should play in creating integrated circular models in their community. Especially in the creation of zero-impact energy systems that prioritise the use of waste heat and local biomass resources, regenerative water systems and shifting from 'waste management' to material flow management. It is essential that the design of the governance and organisation models of the Action Centres pays careful attention to synergies and alignment with public utilities. The WCycle model in Maribor (Slovenia) attempted to resolve this with essentially an Action Centre organisation design where governance and ownership came from the municipal utilities and the core team was funded through their contributions and project funding. Ultimately this model still struggled to get enough independence and traction, and WCycle was being folded into the regional development agency in 2021. This highlights how challenging it can be to turn good intentions into a really robust Action Centre model that can genuinely accelerate radical change.

Community Allies

Creating radical change needs more than a core organising model, it needs to become a movement.

To help build a wider movement, the core team and leadership need to be able to collaborate with a network of community allies. These are people who do not work at the core of the mission activation and shaping day-to-day, but who can be called on as needed to help in different ways. They might provide their inputs professionally through specific contracts, as volunteers or both.

Constantly developing this allies network should be part of the Core Team's workplan.

Mission Contracts

Mission contracts can be a valuable tool to help bind together many elements of the mission development and Action Centre designs discussed above. These are more likely to be Memoranda of Understanding than legally binding contracts. Either way they should be written agreements that secure commitment to delivering the local mission from a range of key regional/local government leaders, community actors and supporting organisations.

The form of these contracts should be tailored to the local context and needs in each community.

A useful example is that City Climate Contracts that have been developed through the Viable Cities programme in Sweden. In December 2020 nine of the first Climate City Contracts in Europe were signed. A similar model will be used as part of the next phase of the EU Climate Neutral Cities mission.

Another model the EU is encouraging is for communities to develop Local Green Deals. Local Green Deal agreements are expected to be tangible action plans with commitments to make sustainable change happen locally – ie. that clearly identify a vision/ambition, direction of travel and key actions that local stakeholders commit to leading, the support for action offered by relevant actors, governance and implementation models, and timeframes for delivery. Using this structure for local agreements can help to align a local circular bioeconomy mission and implementation plan with the wider EU Green Deal and associated EU investment.

c. Process and Portfolio Management

Putting a mission-led approach into practice requires a significant reframing in ways of working and a commitment to strategic process and 'mission portfolio' management over incremental project management, combined with rigorous and continuous learning.

Doing this work well means committing to strategic planning and action over a longer timeframe, transcending shorter-term projects or funding structures. This is why it make sense to focus on a mission and radical change process over at least a decade.

This is complex work, which is why a well resourced Action Centre core team and model is needed to hold, shape and accelerate the change process and portfolio development towards the community's circular bioeconomy mission.

Taking a portfolio approach to designing and managing action ensures that projects are developed and integrated as part of a strategic portfolio that clearly serves the overall mission. Developing community transformation portfolios makes sense from 3 different professional perspectives:

- Project managers use portfolios as a way of organising large amounts of projects and programmes that need to be delivered in parallel. Community missions demand such alignment of action at scale;

- Investors invest in portfolios of assets because, even with good analysis, they do not know exactly what will be really successful so they 'spread their bets'. Communities need to approach mission portfolios in this way too, as not everything will work as we hope. Portfolio investing builds resilience and learnings;

- Designers create portfolios to demonstrate and disseminate their creations to others. This is also important, as creatively sharing the breadth of action communities have underway, successes and learnings helps to build a wider movement for transformative community change.

In the process of portfolio development and management the Action Centre team should work iteratively through these steps:

- Mission Proposition extrapolation: develop strategic concept designs for how the community mission propositions (already drafted under Mission Development work) could be achieved. This should be advanced through developing potential delivery pathway scenarios that are based on backcasting from what is described in the mission proposition stories. These scenarios should further build in ideas from the horizon-scanning and gathering of global inspiration undertaken during the mission-development process, as learning and adapting ideas from others is an important way to ensure that the design of portfolios is starting from the leading edge of what others have tried and learned from. In developing these scenarios the goal should be to identify more clearly:

    o What must happen in the next few years in order to achieve the mission - what is on the critical path to the mission?

    o Are there 'conventional' things a community is currently planning to develop and invest in, which are actually incompatible with the mission and therefore would soon become stranded assets if they proceed (eg. building a waste incineration facility in context of a circular economy mission.)

- Systems Analysis: undertaking deeper local systems and risk analysis to better understand the status quo and systemic intervention opportunities with the greatest potential for change. Work to better understand networks of local assets, current actions, policy, interests and actors; to create a picture of the current platform that the communities can build from, and to help identify gaps and

shortcomings. For building circular economy portfolios a number of cities have also started to develop urban metabolism studies that map all resource flows through the community, as a basis for identifying actionable circular economy synergies and potential bio-industry clusters. Develop scenarios and economic analysis that helps to support the case for change, and to prioritise actions.

- Near-term Portfolio Building: work with local stakeholders to identify and prioritise the most promising ideas and plans for projects that already exist in the community and have systemic change potential aligned with the above scenarios, but that are stuck in pre-implementation for some reason. Work on identifying ways to overcome the current barriers holding these actions back, and thus accelerate their near-term implementation, while learning more about the dynamics of systems dynamics in the community in the process.

- Strategic Action & Experiment Design: Develop detailed plans for mission-aligned actions and experiments that build on the developed scenarios and systems analysis, and also robustly cover key enablers of change (see next section). Remember that designing for experimentation and social innovation actions are just as critical as implementing technical actions, and that sticking only to seemingly 'safe' action is likely to limit learning and opportunities for more radical change. Co-creation is essential for designing robust actions that have consistent stakeholder support. Commission technical analysis and design inputs as needed.

- Finance Planning: design financing mechanisms to channel the needed public, private and community capital needed into action implementation. Engage with national government on potential investment of EU recovery and cohesion funds. Consider opportunities for collective community investment as well. Establish appropriate project funding and financing agreements.

- Implementation: Finalise plans for developed projects to advance into implementation, including, detailed design, final financing, contracting, construction/delivery and evaluation. Ensure that agreements are in place that clearly identify the role and contributions that each local stakeholder commits to make during implementation. The idea is that by this stage the Action Centre team should have planned and secured commitment from other community actors to manage implementation – so that the Action Centre team can continue broadening portfolio development. At the same time, they should keep a role in monitoring implementation progress and lessons learned.

d. Enablers

One of the issues with how many communities are approaching change, is generally to focus too much on technically 'what' needs to change, and not enough on the 'how' to really make change happen. As a result, many good ideas for things that should happen do not reach reality, or only a limited impact is achieved.

How things are done has an important bearing on the ultimate impacts and community benefits. For example, how a solar panel installation is developed has a huge bearing on its impact. Technically a system will generate the same renewable energy, which is one benefit. But if for instance it is owned by a community co-operative that is citizen-financed then the financial returns will flow back to the community, reinvesting economic value over its life-time. If it is owned by a foreign corporation then these returns will disappear offshore. These things really matter and need careful consideration and planning.

The framework of 'enablers of change' illustrated below can help to shape and plan the 'how' of making change happen. This structure is drawn from much collective experience of what needs to be done well for any community to create a really successful and transformational change – such as developing viable circular economy value-chains.
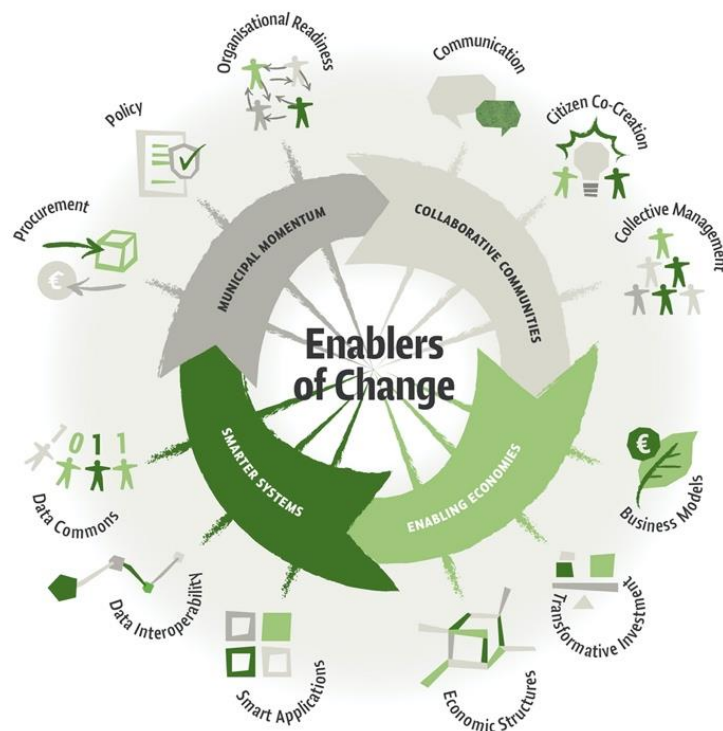
Enablers of Change (Korimako)

In summary this framework covers these four areas:

- Collaborative Communities - Collaboration across the community is a critical foundation for agreeing on goals and implementing the most effective ways of achieving them.

- Enabling Economies - focused work on improving how the economy and investment supports transformational and equitable change.

- Smarter Systems – using data and associated digital technology systems bring about change more effectively and for the shared benefit of all.

- Municipal Momentum – local government can, and must, use key tools at their disposal to play a critical role in enabling change

There are of course, a multitude of interconnections between these enablers, and organising them into four areas and 12 elements can suggest artificial delineations where the reality is more complex. Nevertheless, this structure can provide a useful frame for thinking about the 'how' along with the 'what' when developing, designing, implementing and evaluating impactful change initiatives. The elements under these areas are elaborated in more detail below.

Enablers should be built into the design of each specific action to help ensure success and impact– for example including meaningful community co-creation processes, arranging to strategically use public procurement, or developing an appropriate business model for long-term operations management.

Specific actions should also be developed to target certain enablers in cross-cutting ways – such as developing a community co-creation space, local investment fund, new policy or digital twin city model. These need to be projects in their own right, as part of the overall mission portfolio, as they will support many other actions once the results are in place.

During the CITYCIRCLE Innovation Agenda development process participants explored common gaps that need to be addressed in their communities by such cross-cutting enabler projects - if systemic changes

towards circular value-chains are really to be achieved. Priority enabling areas for urgent attention were identified as:

- Public procurement and policies as drivers of systemic change

- Development of new business models that embed the cross-community collaboration needed to make circular systems a reality

- Capacity development of municipalities, so they are more able to organise around playing a leadership role

- Helping more citizens to understand the opportunities and play an active role in co-creating and managing solutions.

- Creating fit-for-purpose investment vehicles

- Maximising opportunities from data and digitalisation to support innovative actions

It can be easily seen how this list maps to the above enablers framework.

CITYCIRCLE project teams should therefore ensure that they carefully consider designing for enablers of change while developing their Local Action Plans and portfolios.

More details on the enablers are described below, along with ideas on connecting them to community development initiatives (including circular bioeconomy development).

Collaborative Communities

Community Communication

Communication is the foundation of collaboration. We have more communication tools than ever, and yet communities are increasingly struggling to communicate effectively between citizens, different social groups, organisations, businesses and governments. When communication fails, collaboration fails, and conflicts grow, undermining community resilience. Better communication, starting with really listening to each other, is essential for other forms of collaboration to develop.

Work is needed to develop improved and new forms of community communication that really enable people to meet, listen to each other, understand each other better, and thus modify their ideas and opinions. To start with it is valuable to explore creatively with different members of the community which communication means they mostly use, where they do feel heard, and where they do not feel represented - including an evaluation of local media channels. Based on this initial evaluation of the current communication context, plans can be developed for experiments and actions to develop more inclusive and representative places, spaces and tools for community communication that will help to build movements for positive change.

Citizen Co-creation

Co-creative processes are essential for the process of designing missions, strategies, change processes, actions, management models and indicators for evaluating progress. Sporadic citizen engagement can never deliver the long-term participation and engagement needed to deliver radical change. The purpose of co-creation is not just to design outcomes. The goal must also be to strengthen and connect civic networks into a movement that will provide an important foundation for change over time.

Co-creation needs to go far beyond typical top-down consultation and engagement, into processes that are fully inclusive and that really share long-term ownership of plans, designs and outcomes. There are many good practices that can be brought to this work such as citizen co-creation labs, citizen assemblies, civic city-monitoring, bottom-up policy labs, public service co-design, participatory campaigns and public space 'placemaking'. A strong focus on youth involvement in co-creation processes is needed, as sustainable

development is ultimately all about their future and often their voices are often not well heard in community development discussions, designs and decision-making.

One challenge for effective co-creation that should not be overlooked, is a general crisis of collective imagination that is blocking many communities from envisioning what they want for their future (before then being able to make a mission to achieve it). The Transition Movement highlight that to rebuild this capacity to imagine a better future, and then design it together, there is a need to create safe and playful spaces for citizens and communities to come together and explore the assets they have and how to use these to create new possibilities. This requires sustained effort to make and activate these spaces, whether they be temporary street closures, imagination labs, co-construction workshops or other models. The goal must be to involve citizens from all parts of the community and support them to feel like they can contribute creatively and with trust to ideas for a possible future. Regenerating collective imagination capacity can be seen as part of the co-creation process, or even as a necessary precursor.[38]

Collective Management Structures

Communities everywhere need to find more effective models for collectively managing: a) the process of mission led change; b) a portfolio of projects and actions to create the change; and c) the social and physical assets that are created through projects so that these deliver maximum value to the community for the future. These models need to better prioritise equity and inclusiveness - redistributing power, responsibility and value to achieve the mission of much more just and climate-resilient communities.

The Action Centres model already described above is designed to address a) and b). The question of how to collectively manage civic assets long-term is discussed further here.

For example, one model for management of a small city park is that the land and landscape infrastructure is built and owned by the municipality, and the municipality manages the maintenance of the space and infrastructure. In this case the collective management model is a typical municipal structure, where the assets are ultimately governed by elected officials on behalf of the community and administered by public employees and contractors. The problem is many communities is that this model leaves citizens entirely uninvolved with the public spaces next to their homes, which are important to them but rather insignificant to centralised municipal administration. This is often unsatisfying for citizens, as they see potential for these spaces to be better, but struggle to communicate and agree changes with the municipality. An alternative collective management model could be that the municipality continues to own the land, and invests in landscaping construction in accordance with a design that is co-created by the surrounding community. Then 80% of the neighbouring households agree to enter into a neighbourhood association agreement with each other and the municipality, under which they commit to maintain the park and use some of the space for a community garden. The municipality agrees to pay for materials and plants and deliver them to the neighbourhood association, which only costs them 40% of the previous maintenance contract. This new collective management model proves more satisfying and beneficial for the local community, while also saving everyone money.

In some cases work on how to better collectively manage civic assets will then evolve into the development of new Business Models under the Enabling Economies area, so these are closely linked. But it is important to first start with questions of how to manage assets collectively, and then establish business models where required.

Enabling Economies

Too often, the economy is treated as an ends in itself, rather than a means to help us all to collaborate, prosper and live well. A mission-led approach demands that communities find ways to harness the power of

---

[38] From What Is to What If: Unleashing the Power of Imagination to Create the Future We Want; Hopkins, R (2020); Chelsea Green Publishing

financial capital at a new speed, scale and purpose; while working to ensure that economic systems support transformational change, justice and prosperity. This will require new and better business models, transformative investment approaches and economic structures.

Business Models

Sound business models are needed to enable successful project delivery, maximise the benefits to the community, secure investment and ensure equity and prosperity from community assets long-term. Where current models are not doing this, they need to be challenged, redesigned or replaced - taking advantage of opportunities for maximising social and natural capital.

The wider impact of a technical 'solution' can be highly dependent on whether it is built and owned by private corporations, a municipal utility company or community co-operative. Different models make sense for different needs and actions, but often the breadth of opportunities are not carefully considered, and presumptions are made about the preferred business model that then later undermines the success of the change that is trying to be achieved.

For example, in Christchurch, New Zealand there was technical potential for a modern new district energy system to be developed after the 2011 earthquakes. Key stakeholders had a strong assumption that it should be designed and financed by a private developer. But this model was never fit for purpose to sufficiently resolve the complexity of aligning strategic stakeholders, investment, technical possibilities, and reconstruction timing. In the end the potential for change was not realised because not enough work was done on designing the business model through which to advance and manage the change. Largely because there was not enough honest reflection on current convention that energy should primarily be delivered though private sector businesses.

So when planning actions, it is important to carefully consider what would be the implications of different business models in terms of costs to the community, where financial returns flow, efficient deployment and operations and environmental impacts.

Transformative Investment

A very critical enabler of mission-led change is the need for communities to harness financial investment a much greater speed and scale than they have managed before - generally billions of euros over the next decade.

An important first step in developing transformative investment models is to understand the potential economic value to be harnessed by achieving a mission. This need can be met by developing a 'top down' economic case for the change a community wants to achieve – for example developing bioeconomy value-chains. This analysis work will be an upfront investment, but it them helps to reframe what might often be seen as costs into understanding action as essential investments. This can help to empower political leadership.

For example, analysis undertaken by Material Economics for cities across Europe, and also Slovenia, highlights that there would be significant economic returns to communities that take on a radical mission to decarbonise by 2030.[39] For Slovenia an almost 300% return could be generated on €10 billion of decarbonisation investment by 2030, and this is just based on estimated energy and health benefits. More than 10,000 annual jobs could also be created for the next decade, especially in complex areas like retrofitting buildings. This assessment was based on a scenario of deep reductions across the sectors that

[39] Understanding the economic case for decarbonising cities; Material Economics (2020) -
https://materialeconomics.com/publications/decarbonizing-cities

produce half of Slovenia's current emissions – leading to a 76% reduction in those emissions or 43% of total emissions.[40]

Equipped with a better understanding of the economic potential, communities also need to develop mission-aligned financing mechanisms that are able to unlock and manage the investments needed to achieve their mission. These mechanisms must be of enough diversity and scale to facilitate a suitable stack of public, community and private finance that matches to the stack of action needed in the community. This means designing for investment in specific actions, as well as developing more integrated local fund models.

Important sources of finance might include:

- Public and European investment programmes – as in the context of the pandemic recovery, smart investment and leverage of public stimulus investment will be especially critical
- Impact investment - private capital that seek to balance return with impact objectives
- Green Bonds - including newer forms of performance bonds that better link outcomes to payments

Development of regional/city fund models can potentially harness these potential forms of finance through more effective blended project and finance structures with different 'class' levels of risk and return. This can help to attract private capital against community and public capital. Therefore it is important to design such fund structures with robust governance and systems that will be classified as 'bankable' by the institutional investor market.

One strand of financing that should also be carefully considered is collective community investment. Crowd-investment models enable citizens and businesses to invest in initiatives that deliver both social impact and moderate financial returns. Across Europe such collective investment is being used to enable community-led action in areas such as renewable energy installations, car sharing and mobility cooperatives, building retrofit work, housing initiatives, sustainable food production and other community benefit projects. Crowd-funding is also a quite widely used model, through this is essentially based on donations for which contributors may get a small reward. The potential for crowd-investment and funding to contribute to circular economy development is a space with much potential for further development and experimentation.

Economic Structures

There is generally still a large disconnect in our communities between real value and what is monetised in economic terms. There are also significant issues relating to who gets to create and accrue money, and therefore gains a monopoly on deciding how to spend and invest it. These issues are both a driver of inequality, and a handbrake on progressive action that still struggles to find investment.

As a result, economic systems need to be reshaped to better enable scaling of transformational change activities over time. In many cases the benefits of change, and thus value or potential monetary revenues, would not accrue to those actors in the community who would bear the most costs in today's economy. This undermines opportunities for both investment and viable business models.

Innovations in the structural economic context that respond to these issues might include:

- Shifting taxes from good things like income and economic activity to problems like greenhouse gas emissions, pollution and excessive wealth.

- Stopping public subsidies for negative activities like fossil fuel extraction, and instead supporting beneficial activities like employing people and renewable energy.

---

[40] The Economic Case for Decarbonisation in Slovenia December; Material Economics (2020) – see summary article - https://medium.com/thriving-communities-of-south-eastern-europe/the-economic-case-for-decarbonising-slovenia-7a63d9a55f6c

- Universal basic incomes, shorter working weeks, and making volunteering a recognised/standardised economic activity.

- Local banking and/or local currencies.

Supporting entrepreneurship skills, enterprise innovation and business growth is also important for nurturing new jobs and supply chains in a local economy. To support a circular economy shift, a specific focus will be needed on opportunities to develop mutually reinforcing enterprise and industrial clusters that accelerate employment and circular material flows (as elaborated on in Section 3).

Smarter Systems

Like economic growth, 'smart' is often used with the sense that it is an ends rather than a means - with a wide push for 'Smart Cities' as if technology-laden cities automatically bring progress. Generally, the value from 'smarter' data and associated digital technology systems comes from helping communities to manage local systems in the present more effectively, including improving resilience by supporting faster and better targeted crisis responses. Smarter systems also help us to analyse and plan better design actions for the future. Key enablers to help get the most out of such digital innovation include:

Data Commons

Developing citizen-centric ownership and management approaches is needed to ensure that the systems making collective data available to the community safeguard privacy and maximise equitable value distribution. This builds the trust needed for useful data sharing. Development steps include 1) identifying what data a community has, and/or would like to have available to meet their needs; 2) designing how to make this data available to the community; and 3) deciding how data will be managed and governed as a community asset in commons.

Interoperability

Communities need to set standards for data systems that help to ensure efficient sharing and use of data across the community. Generally, communities will find that currently there are many different data 'languages spoken' by various existing devices and data platforms in their area. This undermines the potential value from integrating this data. If can be easily 'translated' into a common and easily accessible form that is 'understood' right across the community, then it can be made much more accessible.

Communities should develop platform systems that allow multiple actors to share data from both existing and new sources, and make this data available for wide use and analysis. Such a system maximises opportunities for 'smart application' innovation and thus value-creation. Integration of this platform with development of a digital-twin representation of the city/region is a further opportunity to improve data access, usability and application potential.

Smart Applications

To use available data to help optimise strategies, actions, information sharing, real-time guidance and operations management requires applications. With data made readily available through management in commons and interoperability standards, an almost infinite space for application development then opens up. Development of applications aligned to priority use-cases is therefore important. Use-cases should be mapped to target needs of actions and portfolio implementation. For example, applications can support improved future scenarios analysis and visualisation, operational efficiency, climate and disaster resilience, community co-creation processes, monitoring and measurement of progress, and maximising value and impact from European climate data.

Applications can also support creative analytical approaches to plug gaps in conventional data sources. For example: automated analysis and classification of remote sensing imagery to analyse existing patterns of development, or analysis of crowdsourced datasets such as community mapping or pollution measurements.

Municipal Momentum

Government can, and must, play a critical role in enabling change. Key areas where government can consistently enable change include procurement, policy and getting themselves organised to support radical change. The role of municipalities in the Action Centre models additionally needs to be carefully considered and agreed.

Procurement

Using public sector buying power is a key opportunity for local government to nurture innovation and accelerate the investment flows and models needed for transformational change in their region. In most contexts, where public investment goes, the local economy will follow. While often somewhat overlooked, large private sector organisations can also exert similar market influence, ideally in partnership/alignment with local government. Public procurement innovation can be approached on a variety of levels – policies, processes, selection criteria, e-procurement platforms, and monitoring.

Public sector procurement actors need be supported through capacity development sessions to understand opportunities connected to whole-of-life costing, ecological footprints, and internalising 'externality' costs in the current economic system that are real costs to their community. The goal is to encourage them to be more innovative in how they approach procurement processes, recognising that there will be legislative constraints that remain.

The Action Centre team should work with both public and private sector actors with significant procurement power, to highlight the influence that they can have and to design procurements to better support portfolio actions in strategic ways.

Policy

Local government policies can and must play a critical role in enabling change. Improvements are needed in strategic policy, spatial planning and local regulations will help to accelerate innovative actions, enable new business models, reduce risk for capital partners, ensure transparency and influence necessary behaviour changes. Often community actors see local policies as barriers rather than enablers, and this must be changed.

Traditionally, policymaking has been characterised as a rational process involving a linear path from problem definition to the analysis of options and development of policy solutions. Increasingly, this view is being contested due to the inherent complexities facing the public sector. In complex systems, well-intended interventions often have unintended consequences. Co-creative policy development processes are needed to ensure early engagement with stakeholders and to transcend organisational and procedural silos. The 'Humble Governance' approach being developed in Finland can provide valuable inspiration for this. In the end, changing policy practices and implementation can matter as much as changing written policies and legislation. Policy innovation labs can be facilitated as an approach for nurturing this shift in policy approach.

Learnings and recommendations should be captured and promoted to also influence national and European policy-making as well.

Organisational Readiness

Most municipalities today are not set up, or sufficiently empowered, to nimbly drive transformative action in their communities. Municipalities need to consider how they can reprioritise and reorganise their human resources and decision making processes to play the strongest leadership role they can, while also supporting wider cross-community leadership, organising and management models. This links closely to the role that Local Government will play in the Action Centre models, in which municipalities may be more or less involved depending on what suits different communities.

In many cases local government will also benefit from negotiations with central government to secure greater freedom to act and drive transformation at a local scale over time.

e. Collective Strategic Learning and Evaluation

Mission-led change pushes us to work in new and sometimes uncomfortable ways. An adaptive approach is vital, and we must expect that we will make mistakes. What is critical is that a continuous process and culture of collective learning is established - to allow experiments to happen, mistakes to be made, lessons to be learned and improvements made quickly.

Practice-based learning is essential to this process - an approach not based on 'teaching' but on 'learning by doing' and creating reflective, collaborative and honest spaces for synthesising lessons and implications for future work.

To make space for this reflective on-the-job learning, Action Centre teams will need to organise regular 'learning lab' sessions with a focus on community learning that supports gathering of important insights and rapid capacity development as a result. Generally these processes should include a mix of relevant local stakeholders. It is important to constantly ask 'why didn't we already manage to do what we know we need to do, and dig into the hard answers to this question to identify the real barriers to change in communities and learn how to overcome them.

Outcome impact indicators are also important for evaluation and learning. Communities should develop an impact evaluation frame that is tailored to their mission. Also critical to helping us learn are indicators for how change is advancing and progress that is being made on enablers of change - eg. assessing change in the 'maturity' of things such as the pace of innovation, institutional models, policy, finance models etc.

f. Summary for Local Action Planning

In this section, guidance and a structure has been provided to help communities to design and plan for action to develop local circular bio-economies. This has included suggestions on:

- Why and how to develop a meaningful local mission (and subsidiary missions where appropriate)

- How to design and establish Action Centres that are resourced, governed and organised to manage a process of radical change towards the mission

- Process and portfolio development and management to connect the mission with action at the speed and scale needed.

- Designing for enablers of change that help to improve the success and impact of transformative community actions.

- The importance of planning for constant collective and strategic learning

This guidance is then mapped to a Local Circular (Bio)Economy Action Plan template to support city teams in completing initial Local Circular Economy Action Plans under the CITYCIRCLE project - and then for further development, planning and implementation into the future.

5. APPENDIX 1 – CASE STUDIES

a. Växjö Bio-Community

Location: Växjö, Sweden

Lead Organisation: Växjö Municipality

'Växjö - the Greenest City in Europe' is the ambition shared by the municipality, citizens and local companies alike for Växjö city, in Sweden.

In the 1960's Växjö launched a successful effort to clean the surrounding lakes that had been heavily polluted, mostly from urban wastewater, and were unsafe for swimming. Lake Växjö is now the pride of the city - with its lush green areas offering lakeside cafes and fabulous recreational spaces. This experience proved to the community that they could make major transformation possible.

To build on this experience, the municipality formed a partnership with the Swedish Society for Nature Conservation to run a three-year programme of training, consultation, discussion and participation across the community. The result was development of a local Agenda 21 plan, and unanimous municipal council support in 1996 for using their local renewable resources to become fossil fuel free.

Växjö is indeed now predicted to become the first city in the world to fully abandon fossil fuels. This transformation is being achieved through a collaborative approach that includes partnerships between the municipality, industries, transport companies and citizens. A culture of sustainability has been created that permeates the city at every level and has transcended changes in political leadership.

In the 1970s oil was the main fuel used to generate heat for the city district heating network. In 1980 the municipal energy company became the first in Sweden to start switching to using biomass from the surrounding forests, primarily to use available local resources to stabilise prices and maintain security of supply. Over the years since a large, biomass-fuelled combined heat and power plant and a 350km district heating and cooling network has been developed. Since 2020 only renewable fuels are used for heating and this system meets more than one-third of the city's power demands. The next challenge is to increase local power production to match total demand, primarily with wind and solar.

A national investment fund for environmental protection launched in 1997 helped to provide a framework for bringing together different actors from the community to create investment plans and turn their big idea into actions. With the municipality acting as a co-ordinator, during this period further bioeconomy demonstration projects were launched: eg. for construction of highly energy efficient housing and wooden buildings, biogas production and absorption chilling.

Eventually however, it was realised that a more coherent long-term action plan and cross-community delivery model for implementation would be needed to achieve the fossil free goal. The Växjö Climate Commission was established in 2007 to develop this plan, composed of major public and private stakeholders including: the municipal administration, the university, the municipal energy company, the Swedish Society for Nature Conservation and transport companies. The commission identified priority actions, who was responsible for them, and established an annual monitoring plan to assess progress.

In 2010 the Växjö community officially set a deadline to become fossil fuel free by 2030. Having made significant progress on energy supply, more attention was turned to the transport sector. The municipality led with urban planning and infrastructure investment approaches to enable sustainable mobility choices. Växjö now has more than 170km of bike-paths, a bus fleet running on biogas produced from local waste, less than half of residents own a car, and 26% of transport energy already comes from renewable sources. Nevertheless, the transport sector today accounts for approximately 95% of Växjö's remaining local greenhouse gas emissions. Local emissions of carbon dioxide from fossil fuels were 132,800 tonnes in 2020,

which corresponds to 1.4 tonnes per inhabitant, which can be compared with the Swedish average of about 4 tonnes/capita. Compared with 1993, local carbon dioxide emissions have decreased by 59% in total and by 70% per inhabitant.

For Växjö, becoming the greenest city in Europe has proved to be a competitive edge that helps to make the city more attractive to investors and entrepreneurs. The city's business environment is rich and diverse with some 8,000 businesses in a dynamic mix of size and sectors.

Växjö is seen as a leader in timber construction in Sweden, thanks to a focus on wooden buildings as well as energy since the 1990s. A target of 50% of all new buildings being timber framed has been met, and many Swedish companies have set up timber construction demonstration sites in Växjö. The local university has developed centres of excellence on forestry and wood, wood building and product technologies, algae, and sustainable built environment. This transition to an economy focussed on local wood resources supports many jobs in the local forestry industry and energy system, which in turn generate additional tax revenues for the municipality that is used to fund transformational investment.

As the Växjö community continues to push into the harder 'last miles' to fossil fuel freedom, residences not connected to the district heating network are offered support to convert their home heating systems to renewable alternatives, intensive building retrofitting is being progressed, and wooden passive homes are the primary type of new construction. Work has started to better understand the dynamics of how to tackle greenhouse gas emissions that result from consumption in Växjö but production elsewhere. Plans are also advancing for a world-leading aviation bio-fuels refinery integrated with the city energy plant that aims to start production in 2027.

How action is organised in Växjö builds on a strong Swedish culture of community collaboration, concern for the common good, and government decentralisation. Local municipalities have responsibility for a wide range of services and receive income tax directly to pay for these services, rather than distributions from the state. As a result municipalities are relatively well resourced and they share generally high levels of trust with wider community. In this context, the main catalyser of action in Växjö has been the municipality, working closely together with community partners. The municipal energy company was instrumental in taking early innovative actions towards a biomass-based energy system. The sustainable development department is highly active in initiating conversations and ideas, brokering partnerships and monitoring changes. But sustainable development is not just left to them, it is part of the core business of all municipal departments and entities.

A rather unique factor in Växjö has also been reaching unanimous support for the fossil-free goals across the spectrum of local politicians. They might differ on ideas on how to get there, but the commitment to the end goal has been consistent across a number of administrations.

Växjö is now part of the Swedish 'Viable Cities' initiative that is targeting the mission of climate-neutral Swedish cities by 2030, and in 2020 they developed and signed their first Climate City Contract to add further weight and commitment to this mission.

Over the years, the Växjö community has advanced from actions focussed on water and a local energy transition into a wider ecological transition integrating all aspects of local resource management and sustainable development. Building a bioeconomy based on their extensive local forest resources has been a consistent core of this work. The process so-far has already transformed the city, while much hard work still remains ahead.

*

Even if you can't do everything at a local level you can do a lot. Knowing that we as a municipality cannot reach all the way by ourselves, it is in our responsibility to start and support radical changes together with the whole community. These changes ultimately make it as smooth as possible for our citizens to live high-quality and sustainable lives.

- Henrik Johansson – Miljösamordnare, Växjö kommun

References

- Växjö kommun website - https://vaxjo.se/sidor/politik-och-demokrati/english/sustainable-development.html

- Sustainable Växjö 2030 - https://vaxjo.se/download/18.35d6e9ef173d516f49758b6/1597041882155/ENG_H%C3%A5llbarhetsprogrammet%20H%C3%A5llbara%20V%C3%A4xj%C3%B6%202030_antaget%20av%20KF_final.pdf

- Växjö Climate City Contract - https://static1.squarespace.com/static/5dd54ca29c9179411df12b85/t/5fd9d3683e884d70d5ea3bbc/1608110955437/Vaxjo_kommun_PDF-A.pdf

- The Energy Transition Chronicles; Energy Cities (2016) - https://energy-cities.eu/wp-content/uploads/2019/01/chroniqueste_complet_en.pdf

- Green Growth in Nordic Regions; Nordregio (2016) - https://archive.nordregio.se/Global/Green%20growth%20in%20Nordic%20regions%2050/NordicGreenGrowth-pages.pdf

- Växjö a frontrunner towards climate neutrality article - https://www.ubc-sustainable.net/news/v%C3%A4xj%C3%B6-frontrunner-towards-climate-neutrality

- The Greenest City in Europe presentation by City of Växjö mayor Bo Frank - https://www.ubc.net/sites/default/files/171025_bo_frank.pdf

- Green City Times: Fossil fuel free Växjö article - https://www.greencitytimes.com/vaxjo/

- New York Times: Wooden Buildings Reach for the Sky article - https://www.nytimes.com/2021/07/30/todaysinyt/wooden-buildings-reach-for-the-sky-in-vaxjo-sweden.html

- Project start for bio aviation fuel from forest residues at Sandviksverke press release - http://www.veab.se/om-oss/press/pressmeddelanden/2021/projektstart-for-bioflygbransle-av-skogsrester-vid-sandviksverket/

- Local politicians on timber house safari article- https://www.sodra.com/en/se/om-sodra/pressrum/press-releases/local-politicians-on-timber-house-safari

- Linnaeus University website - https://lnu.se/en/

- Viable Cities website - https://en.viablecities.se/

- Kommuninvest website - https://kommuninvest.se/en/vision-and-basic-concept/our-history/

- Interview with Henrik Johansson - miljösamordnare på Växjö kommun

b. Ghent en Garde Food Council

Location: Ghent, Belgium

Lead Organisation: City of Ghent

In 2013 the City of Ghent launched 'Ghent en Garde', a food policy with five strategic goals to pave the way towards a sustainable food system in Ghent, Belgium:

- A shorter and more visible food chain

- More sustainable food production and consumption

- Creation of more social value from food systems

- Reduction of food waste

- Optimum reuse of food waste as raw materials.

These goals were decided on through community stakeholder discussions, input from the city administration and political agreement.

To make the process inclusive and relevant across the community, the City of Ghent set up the Ghent en Garde Food Policy Council - consisting of about 30 members from various sectors such as: agriculture, associations, knowledge institutions, hospitality and commerce. The Food Policy Council has five roles: developing a local food strategy; building networks and exchanging ideas, sharing knowledge and enthusiasm, providing input for the urban policy and supporting new and existing projects. The Food Policy Council meets in its full form four times a year, but different working groups have flexible meetings. The Food Policy Council acts as a sounding board for the city's policy on food - proposing new ideas, issuing recommendations on new or existing projects, discussing the city's strategic vision and acting as a major ambassador to help promote the city's vision on sustainable food production and consumption. The Food Policy Council has enabled communication between different stakeholders to ensure necessary action and progress on sustainable food in the community.

As a result of the food policy and work of the Food Policy Council, a number of small-scale projects in the Ghent community have developed into fully-fledged initiatives. Thursday Veggie Day has become a household name and approximately 4,500 pupils of Ghent's municipal schools eat a vegetarian meal every Thursday, which amounts to 775,883 meals a year. From 2021 all school meals contain at least 50% plant-based proteins.

The most successful example is Foodsavers, which has provided a way for more healthy and fresh food to reach people in poverty, while avoiding significant CO_2 emissions and providing extra social employment. Foodsavers has three objectives:

- Climate: lowering CO_2 emissions by recovering food surpluses;

- Social employment: employing 10 to 12 employees with difficult access to the labour market

- Poverty reduction: that food surpluses end up helping people in poverty

In 2015, the municipality Employment Department and Environment and Climate Department joined forces to work on the issue of food surpluses with the Ghent Social Action Centre and Komosie, an organisation focused on the crossroads between social economy and the environment. In 2017 the Ghent Public Welfare Centre also joined to coordinate food distribution among several organisations. This partnership, nurtured under the Food Policy Council, eventually led to Foodsavers.

Foodsavers has created and enabled: a distribution platform for the redistribution of food surpluses, 'leftover factories' to make new products from said food surpluses and by-products, social grocers that want to make

high-quality food products accessible to people in poverty, and social restaurants that offer meals at diversified and accessible prices.

The most interesting part of Foodsavers is the platform that aims to provide more efficient connections and logistics for distribution of food surpluses from farmers, processing companies, supermarkets and local shops. These surpluses are collected at a central point to be redistributed from there to social organisations and social economy companies that can use them. Foodsavers is gathering 24 retailers, 58 charities and social restaurants and to achieve its objectives.

One big leverage used by the municipality is publicly-owned agricultural land. In one pilot project the city of Ghent allowed local farmers to use 10 hectares of land free of charge, for local production and social employment. This pilot will allow farmers to produce more food close to the city and increase the number of socially employed citizens on the farm.

The estimation is that total food related greenhouse gas emissions have gone down by 3,168 tonnes of CO_{2e} between 2018 and 2020. Although the total CO_2 reduction realised through Ghent's food policy is difficult to estimate, the city of Ghent monitors the climate impact of several key parts of its policy e.g. since the start of the Foodsavers project, a total of 2,322 tonnes of food has been saved from incineration and 6,038 tonnes of CO_2 emissions reduced. Also, $C0_2$ emissions per 1000ckal of food purchased through public procurement (eg. for schools, day-care, schools) have gone down by 17%.

In 2019 Foodsavers reached about 50,000 Ghent residents through more than 100 social organisations by distributing 1,700 tons of food surpluses (about 986,775 meals).

<div align="center">*</div>

A food policy can get you political support more effectively than individual projects and make it less possible to 'overturn'. Involving the organisations and the community gives such policies more leverage. It's important to invest (time and money) in people and meetings that shape such change.

- Lieta Goethijn, City of Ghent

With the Food Council, we can help steer policy and include CO_2 impact in the setting of priorities for the coming years. Some examples of this are initiatives to limit food waste and initiatives to promote vegetarian and vegan food. By giving the Food Council room to participate, you have more impact as a city and you can continue to be a pioneer.

- Jasmien Wildemeersch , member of the Ghent Food Council

References

- A Ghent en Garde operational manual - https://stad.gent/sites/default/files/page/documents/20160913_PU_Gent%20en%20garde_operationele%20doelstellingen_Engels_web.pdf
- A manual for Foodsavers -https://stad.gent/sites/default/files/media/documents/Foodsavers%20handleiding%20ENG.pdf
- Foodsavers website - https://foodsavers.be/
- Ghent en Garde website - https://gentengarde.stad.gent/
- Video on Foodsavers - https://youtu.be/X5R9bafwpzA
- Video on Food Council Partner Day - https://youtu.be/c55cXVsxm9k
- Video on Food Policy Council - https://youtu.be/zyky_fxgGAY
- Online interview with Lieta Goethijn, employee of Environment and Climate department, City of Ghent

Interreg
CENTRAL EUROPE
European Union
European Regional
Development Fund
CITYCIRCLE

c. Lesna Zadruga Loški Potok

Location: Loški Potok, Slovenia

Lead Organisation: Lesna Zadruga Loški Potok

- **Overview**

Lesna Zadruga Loški Potok (the Loški Potok Wood Cooperative) aims to help provide a higher quality of life for the people of Loški Potok, in the southern Slovenia province of Notranjska.

The beginnings were in 2012, when the municipality commissioned a feasibility study on converting the heating systems in key Loški Potok public buildings from fuel oil to a district energy system using local wood biomass. The business case was positive and a tender process was started for a commercial energy provider, but this initial process was never concluded.

In 2014, under a new administration, the municipality revived the technical potential that had been identified for a new energy system. Through further assessment of their options, it was concluded that a community co-operative model would be the most appropriate option to advance a collective effort towards sustainable resource management and a zero-carbon future for Loški Potok.

Founded in 2016, Lesna Zadruga Loški Potok focusses on maximising value to the local community from use of their forests, other natural resources and cultural heritage resources. Their core initial business is operating a local district heating system running on wood biomass. The system has 13 connected customers, including the municipality, health centre, home for the elderly, primary school, cultural and tourist centre, some private businesses and residential buildings. The cooperative generates stable revenues from the sale of heat, thus enabling current operations and generating funds for investment into further projects. In 2020 a total of 907 MWh of heat was supplied.

Lesna Zadruga Loški Potok operates as a not-for-profit co-operative. In the General Assembly each member has 1 vote and cooperative rules, business plan, annual report are adopted, and the president and board members are elected. The president of the cooperative chairs the management board, prepares the annual business plan and appoints the director. Additionally, a supervisory board oversees the work and operations of the cooperative. There are currently 24 co-operative members representing the municipality, local micro-businesses and individuals. The mayor currently represents the municipality on the co-operative board.

The co-operative manages local sustainable forest management practices and collective licenses for timber harvesting from state forests on behalf of its members. It also manages other local assets such as the post office and a tourism facility (up until 2020).

In 2020 the co-operative completed a 33 kW solar PV installation on the roof of a municipality carpark. This was integrated with purchase and charging of an electric vehicle that is used as part of the Slovenian Prostofer scheme through which a municipally-owned vehicle is used by volunteers to transport older citizens where they need to go, managed through a centralised platform.

The co-operative is now working further towards the goal of making Loški Potok energy self-sufficient with development of Slovenia's first community-owned wind turbine.

*

Throughout my mandate I was thinking about how to lower the price of heating and how to replace fossil fuel with renewable sources. Because of that we have then decided to establish the cooperative Loški Potok.

Ivan Benčina, mayor of Loški Potok

References

- Letno Poročilo Lesne Zadruge Loški - https://www.loski-potok.si/wp-content/uploads/2021/06/2_Letno-porocilo-Lesna-zadruga-2020.pdf

- Občina Loški Potok website - https://www.loski-potok.si/za-obcane/lesna-zadruga-loski-potok-2/

- Dovolj za Vse: Lesna zadruga Loški Potok - https://dovoljzavse.si/praksa/lesna-zadruga-loski-potok/

- Kisik website - https://kisik.si/

- Prostofer website - https://prostofer.si/

- Interview with Tomaž Zver from Kisik

d. Common Unity Project Aotearoa

Location: Lower Hutt, New Zealand

Lead Organisation: Common Unity Project Aotearoa

Common Unity Project Aotearoa is taking a strengths-based approach to regenerating community capacity and wellbeing in Lower Hutt, New Zealand. Their mission is to 'ensure that every child has a village' – in other words, to take a collective community approach to meeting the needs of children now and into the future. Their motto is to 'look to each other to strengthen our community from the inside out'.

Their work started in 2012 with a pilot initiative to convert an unused soccer field at Epuni Primary School into an urban garden that would help to feed the school children. From there Common Unity Project Aotearoa has grown into an umbrella organisation that supports and manages a network of 14 social enterprises, including:

- Urban Kai Farms – transforming backyards, schools and institutions into intensely productive urban farms across the Hutt Valley. There is now a network of 12 urban gardens – 4 inside Rimutaka prison, 1 in Epuni school, another in a youth justice facility and 6 in people's backyards. Produce is used by the Remakery Café, Urban Kai Kitchen, and the Common Grocer.

- The Remakery Café – located at Common Unity Project Aotearoa headquarters, is a classic kiwi café keeping locals provided with great food and coffee, while generating revenues to support other enterprises.

- Unity Kitchen and Catering – is an off-grid, purpose-built community kitchen that provides beautiful, globally inspired food made of produce from Urban Kai Farms. Meals are sold individually and through a catering service, and thousands of meals (of equal quality to what they sell) are provided to schools and community members in need

- The Common Grocer – The Epuni area was a modern food-desert with no accessible proper supermarket, so Common Unity Project Aotearoa set up Wellington region's first low-cost, member-owned, plastic-free grocery co-operative. Co-operative members collectively run the store and pay a small fee to access food and household items at wholesale prices. There are more than 300 members.

- Recycled Rides Community Bike Kitchen – is running bike repair and making workshops, producing a fleet of rescued and refurbished bikes that are then lent to community members in return for their volunteering efforts. This helps to bridge the mobility challenges many local families face.

- One Small Piece – a knitting group using all rescued and reused wool

- Sew Good Cooperative – classes, workshops, a rescued fabric library and collective production of products for sale.

- Unity Exchange Timebank – a complementary currency system where community members exchange hours of service/work on the principle that the value of everyone's hours of effort are equal.

- Project Sunshine Aotearoa – schools grow sunflowers and post the produced seeds to other schools, donations from this initiative raised funds that the children decided to invest into starting the honey collective.

- Beeple Honey Collective – citizens can pay to have a maintained beehive located on their property. The focus is on supporting the ecosystem services of bees and local jobs, while honey is shared with hive hosts, schools and sold for revenue. There are now more than 80 active hives and more than 3 tonnes of honey has been produced.

Each of these enterprises is supported by staff facilitators and activated by a much wider network of local volunteers. The Common Unity Project Aotearoa focus on collaborative creativity and practical productivity helps to attract volunteers who are experiencing fatigue, isolation or on-going trauma in their lives. After some time working on Common Unity Project Aotearoa initiatives, community members highlight the benefits to their mental wellbeing from being involved in helping to create something valuable for their community. The reciprocity-based approach taken to sharing, teaching and learning means that participants can contribute skills and knowledge that they find is often not highly valued in other aspects of their life, such as waged work. This value is further reinforced through the timebank system. The Common Unity Project Aotearoa model of approaching change as a constant collective learning process is proving to be an inclusive way of steadily improving the wellbeing and collective capacity of the Lower Hutt community.

Most of the Common Unity Project Aotearoa social enterprises promote practices that enable people to live more sustainably and reduce their environmental impact. Citizens describe a positive, empowering, and often joy-filled experience of learning how to sew, garden or knit, while re-thinking personal consumption and how to live more sustainably. The result is an evolving, yet holistic, approach to socially and ecologically sustainable development in the community.

Lower Hutt has some of the best soils in New Zealand, and at the same time some of the hungriest citizens. The Common Unity Project Aotearoa focus on solving this disconnect through intensive, organic farming is empowering citizens to make a productive contribution through food growing, while providing thousands of nutritious meals for those in need in the community. This is directly improving community health and education outcomes.

About 50 inmates working on the farm at Rimutaka prison produce about two-thirds of the total food produced through the Urban Kai network. Being involved in creating value for the wider community from 'behind the wire' is helping when people leave and go through the difficult process of reintegrating into society, an important benefit when 60% of former prisoners in New Zealand end up reincarcerated within 3 years. This is one important example of the difficult social spaces where Common Unity Project Aotearoa is making a difference.

Common Unity Project Aotearoa is a registered charitable trust. It functions as networked community organisation that initiates, umbrellas, and supports local social enterprises. The organisation is supported by an active Board of Trustees with diverse backgrounds and skills, who all volunteer their time to deliver better outcomes for the community. Over time the role of the board has needed to evolve with the organisation's growth - from being very active in early initiatives to providing more strategic and business development support. This evolution has been challenging at times and needed new board members with different skillsets to join.

Co-creative community processes are the heart of the Common Unity Project Aotearoa approach. They focus on developing people's practical skills and knowledge through hands on collective action and education across multiple generations. On any given day at The Remakery there may be families, a group of teenagers doing community service work, or a regular elder helping with the odd job. The different social enterprises appeal to community members of different ages, skillsets and availability, thus in total they offer an inclusive range of options for citizens to participate in local change.

A really important co-creation approach has been to focus on assets and making the most of what is abundant in the community – to overcome a widespread mindset that the community is too poor to take meaningful action. Focussing on using local resources effectively, and especially what would otherwise be wasted, allows amazing amounts to be achieved for relatively little financial cost. The timebanking model has been an important mechanism for this - trading with time rather than money breaks the constraints of financial poverty and opens up a richness of what people are actually able to offer.

Common Unity Project Aotearoa also make it clear that they tackle the fact that New Zealand society is throwing away people as well as material things. Collaborations with Rimutaka prison and Housing New

Zealand (the national social housing organisation) help them to get to work in 'hard places' in the community, where a really important difference can be made. Some of the best ideas for new initiatives have also come from careful listening and co-creation with inmates at the prison, because their experience is at the sharp-end of local challenges.

Individuals and organisations also support Common Unity Project Aotearoa by donating goods, cash and resources, or by purchasing products from the various enterprises. One interesting aspect of resourcing is that many of the 12 urban farms are located in people's back gardens, which means that these citizens are effectively donating use of their land for community food production (a significant contribution given land prices in New Zealand today). Revenue from the cafe and other enterprises is used to support other enterprises in the network. Funding is then also secured from a range of philanthropic and community grants, as well as corporate donations. When activities outgrew their initial space in Epuni school, Common Unity Project Aotearoa was able to move to a nearby unused factory and create what is now the ReMakery, where the owners invest a significant rent discount.

About 40% of Common Unity Project Aotearoa financial resources now come from earnings from sales, services and rentals, and the remaining from donations and grants. They have not yet managed to quantify the value of what they are also donated in kind, but this would most likely significantly exceed what is accounted for in monetary terms.

*

I think with climate change occurring … you'll need to learn how to mainly produce your own food, which I think builds loads of resilience. Because especially with this organisation … people are learning to do skills that back in the day, most people would have known. But you know, no offence to modern society and younger people, we don't know how to garden.

- Emily, a younger Common Unity Project Aotearoa participant

We wanted to really have a go at changing this narrative, that just because many of us are on really low incomes, that we have to eat the worst food.

- Julia Milne CUPA Founder

Gardening on the inside meant I could feel connected… I was part of something important. It was scary to leave prison after so long, but I felt safe and part of the community that I had already begun to work with.

- Former Rimutaka prison inmate

References

- Common Unity Project Aotearoa website - https://www.commonunityproject.org.nz/
- Community-led initiatives for climate adaptation and mitigation (2019); Simon et all - https://www.tandfonline.com/doi/full/10.1080/1177083X.2019.1652659
- 'Strengthening community from the inside out': Transformative possibility for climate change resilience and adaptation in Te Awa Kairangi-Hutt City thesis; Kaitlyn Coury Simon; Victoria University School of Geography, Environment and Earth Sciences (2019)
- Julia Milne presentation to University of Otago video - https://www.youtube.com/watch?v=qyN8RP84wbI
- Housing New Zealand – Launchpad (Tracy) video - https://www.youtube.com/watch?v=pEM_N36HqKo
- Interview with Carolyn Watts, Director of Quigley and Watts Ltd and former Chair of Common Unity Project Aotearoa

e. EkoDizajn

Location: Humilišani (Mostar), Bosnia and Herzegovina

Lead Organisation: Citizens Association 'Nešto Više'

The Citizens' Association 'Nešto Više' has created the social enterprise EkoDizajn and a farm based on regenerative agriculture near Mostar in Bosnia and Herzegovina.

Nešto Više promotes positive changes in society by offering opportunities to individuals and groups for formal and informal education and training, networking, internships, volunteering, work experience and community service. Their overarching goal is to develop and nurture competent and responsible leaders who believe in themselves and others, and foster openness in society.

EkoDizajn operates a 1.1-hectare farm in Humilišani near Mostar. The farm serves as a place to work, for education, as a regenerative agriculture demonstration site and a place to socialise. The farm operates on permaculture principles without the use of any herbicides, pesticides, fertilisers or chemicals. EkoDizajn also provides landscaping services exclusively according to ecological principles, sells organically grown food, organises events and conducts promotional campaigns related to agriculture and rural development. The idea of founding EkoDizajn came from a wish to offer practical solutions to people who want to eat and provide delicious local food, not treated with any harmful substances, and for which it is easy to determine how and where it is grown.

On the farm they have two large greenhouses of 500 m^2, two orchards with 200 different trees, an apiary, a composting room, an automated hatchery, and a solar electric dryer with a capacity of 300 kg. The farm facilities also consist of a building with office space, a classroom for 20 people, conference and meeting rooms, a kitchen, a garage, and a guest room. All rooms in the building are fully accessible for people with disabilities. The building housing the offices has a green roof that serves as a collector and purifier for rainwater. In the auxiliary building there is a cooling chamber installed with a capacity of 10m^3 powered by their 4.5 kW solar photovoltaic power plant. In order to have clean water in sufficient quantities for daily use and watering of plants, water is pumped from a 90m deep well using solar power. All of these adaptations at the farm were done to make it more resilient to different conditions and climate change.

Regenerative agriculture, which is the main idea behind EkoDizajn's work, encourages biodiversity and soil health by using garden design and management principles that provide food abundance in a much smaller area and without use of chemical. This reduces total land use, and turns soil degradation by industrial food production into regeneration. Throughout the farm there can be found a lot of medicinal and spice herbs and a number of beehives, not for the primary purpose of honey production, but to ensure pollination on the farm and support the local eco-system.

Through the EkoDizajn model, they are also enabling more money to keep circulating within the community. The social enterprise seeks to generate profits that are then used to fund local social and environmental programmes.

*

Small producers will become the future, globally. We don't need acres and acres of land to be successful growers because permaculture encourages diversity and garden design that will give good outcomes in a completely different way, in a much smaller space.

-Sanja Đermanović, manager

Our goal is to maintain indigenous domestic varieties and to involve as many small local producers as possible in the production of organic food, because health is the most important thing. For the time being, we market our products, from organic orchards and greenhouses, at the local level, according to the principle of trust.

-Maid Maksumić, Nešto Više association

References

- EkoDizajn website: http://www.ekodizajn.ba/index.html

- Article about 'Nešto Više' by N1: https://ba.n1info.com/vijesti/a121854-udruzenja-nesto-vise-iz-mostara/

- Video about EkoDizajn https://youtu.be/P8wsYtbT-LA

- Videos showcasing educational activities on 'Nešto Više' farm: https://youtu.be/jl3MrZ_xDko https://youtu.be/coUjKj6a_Z0

- AgroClimate website: http://agroclimate.org/