

The Relevance of Sustainable Practices in the Development of a Bio-economy as Canada Transitions To a Low-Carbon Economy.

Biomass North Forum 2018

“What’s the use of a fine house if you haven’t got a tolerable planet to put it on.”

—Henry David Thoreau

“The environment is where we all meet; where we all have a mutual interest; it is the one thing all of us share.”

-Lady Bird Johnson

Biomass

- ▶ Biomass can be defined as living and recently dead biological/renewable materials from agricultural (plant or animal), aquatic or forestry resources including those from industrial and/or municipal wastes (source: The Manitoba Bioproducts Strategy).

Sources of Biomass



Bioeconomy

- ▶ Bio-economy is the use of renewable biological resources sustainably to produce food, energy and industrial goods. It also exploits the untapped potential stored within millions of tons of biological waste and residual materials. It is an important sector encompassing agriculture, forestry, fisheries, food, organic waste

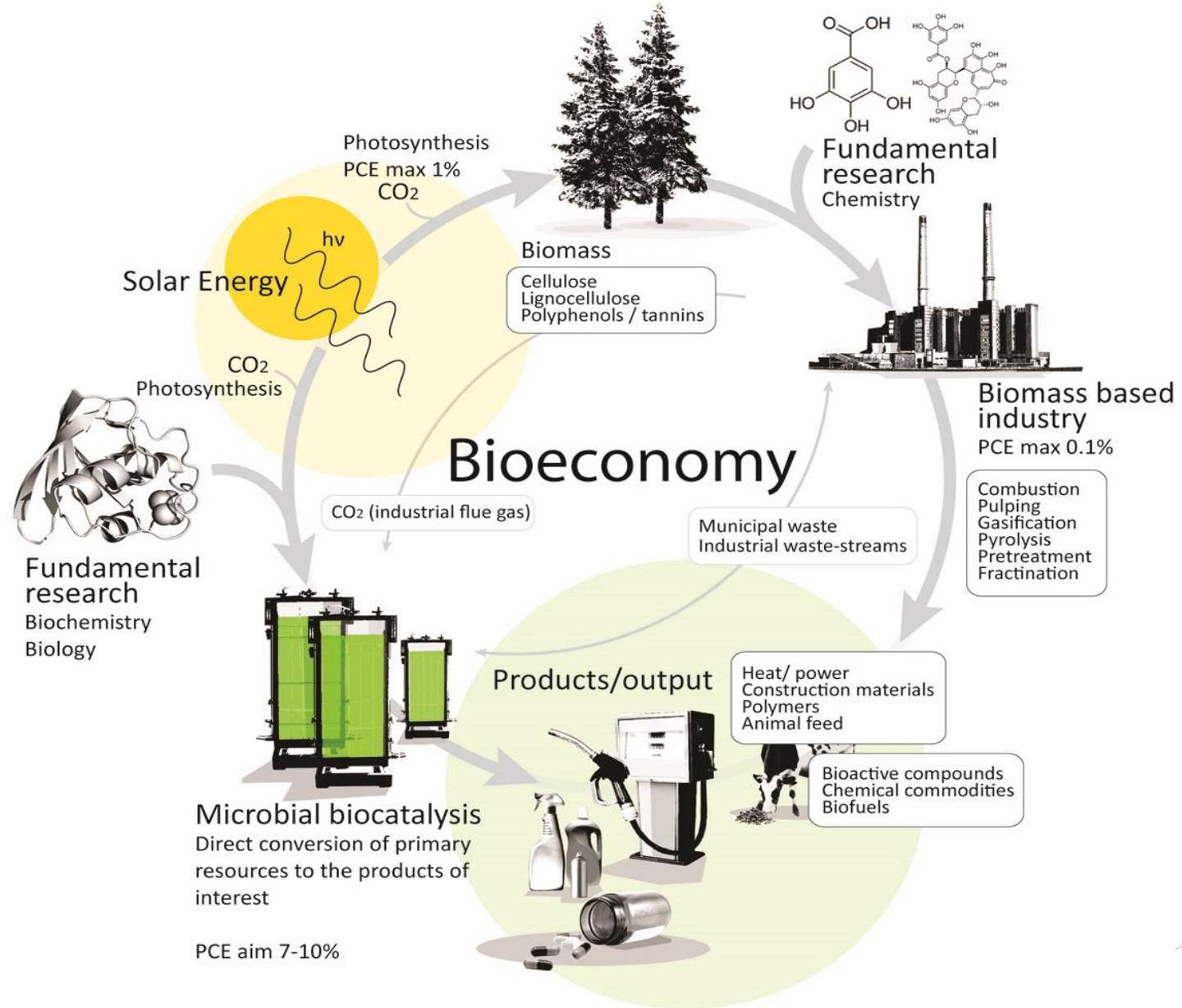


Diagram from University of Turku , Finland -<https://www.utu.fi/en/sites/Advanced%20Bioresources/bioeconomy/Pages/home.aspx>

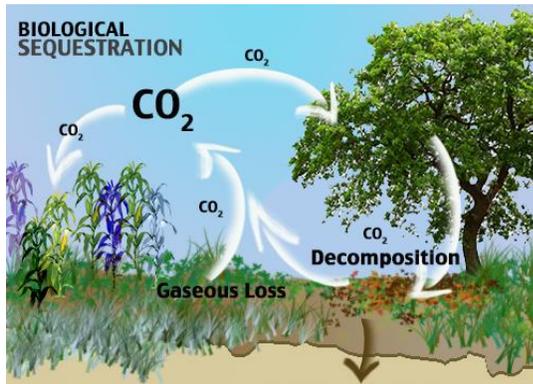
Climate change



- ▶ Climate change is already having a significant impact on ecosystems, economies and communities in Canada.
 - ▶ Violent Storms
 - ▶ Wild Fires
 - ▶ Rising average Temperatures
 - ▶ Drought
 - ▶ Desertification
 - ▶ it will affect water resources around the world. Water is intimately tied to other resources and social issues such as food supply, health, industry, transportation and ecosystem integrity.
 - ▶ It affects the vulnerable in our society
 - ▶ And many more

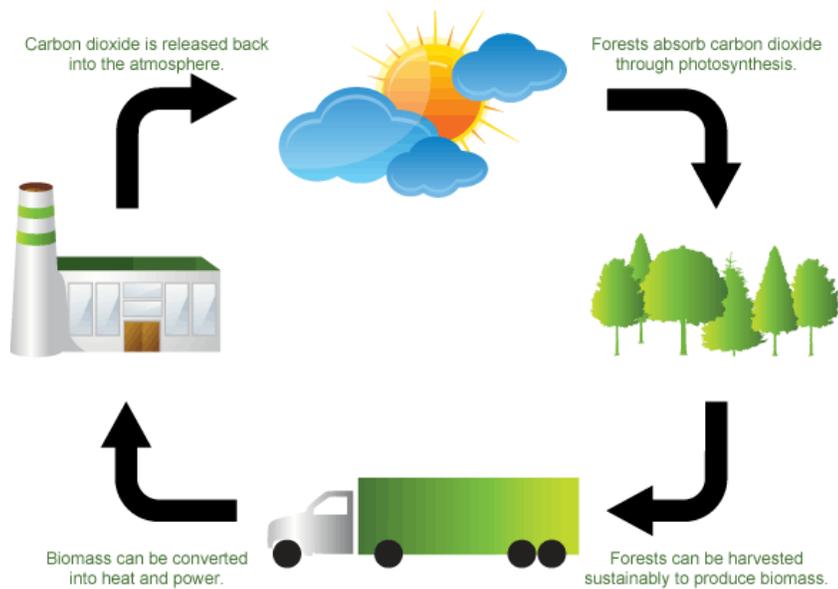
- ▶ Renewable biological sources can be either a carbon source or a carbon sink.
- ▶ Carbon is stored in all organic matter including plants and animals and is slowly released when they die and start to decompose.

Carbon Sequestration



- ▶ Capturing Carbon dioxide from the atmosphere or capturing anthropogenic (human) CO₂ from large scale stationary sources like power plants before it is released to the atmosphere. Once captured, the CO₂ gas (or the carbon portion of the CO₂ gas) is put into long term storage. It can be in a liquid or solid form
- ▶ <http://www.undeerc.org/pcor/sequestration/whatissequestration.aspx>

Carbon Sinks



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- ▶ Bio-economy if done sustainably has the potential of reducing our dependence on fossil fuel and reducing our carbon dioxide emissions by being carbon neutral

Canada's Climate Mitigation Status

- ▶ Canada has missed two separate emission reduction targets (the 1992 Rio target and the 2005 Kyoto target) and is likely to miss the 2020 Copenhagen target as well. In fact, emissions in 2020 are expected to be nearly 20 percent above the target.
- ▶ Actions taken by governments to date to address climate change across the country have fallen short of the governments' commitments.

Commissioner of the Environment and Sustainable Development, Office of the Auditor General of Canada - Spring 2018

- ▶ Canada's growing bio-economy can only do so much

Sustainable Practices

▶ Guiding Principal

- ▶ "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." ~ The Brundtland Report, UN

“Sustainable practices are the actual application or use of an idea, belief, or method that is done to address the needs of the present without compromising the ability of the future generations to address their own needs” ~ Obie Agusiegbe

Some of the sustainability questions to ask

- ▶ How do we plan to balance use of agricultural land for food versus use for industry and export? Especially, if it is perceived to make more economic sense to export bioproducts to other countries?
- ▶ Is it justifiable to export wood pellet to Europe rather than it be used in Canada just for economic reasons?
 - ▶ Considering the following:
 - ▶ Wood pellet may be better used by the Canadian people.
 - ▶ It is needed by the territories and indigenous people as feedstock for heat and power.
 - ▶ Replacing fossil fuel with the wood pellets will reduce the health impact on Canadians and the environment.
 - ▶ It will help Canada meet our targets. (work towards a low carbon economy)
- ▶ How do we ensure that we do not degrade our eco-systems vital to plants and animals for the production of a robust bio economy?

Sustainable Practices

- ▶ The Sustainability of Forest biomass is being reviewed under the Bio-Pathway Project.
- ▶ Report from other countries portrays replacement of fossil fuel with biomass as an effective way of reducing both CO₂emissions and a country's energy dependency.
 - ▶ It is a powerful driver for rural development, diversification of economy, value creation in rural areas, job creation and green growth in general
 - ▶ The biomass value chains has potential socio-economic benefits

Sustainable Practices

- ▶ The challenge will be ensuring that biomass production in Canada is sustainable and to achieve that equal consideration will be given to the social, economic and environment aspects.
- ▶ An option to ensure the sustainability of biomass production is the application of certification systems. Such systems have already been introduced for other products, such as e.g. for wood (FSC1).

Linear Economy = The Status Quo = Wasteful



Diagram from <http://www.allaroundplastics.com/article/sustainability/1898>

The Circular Economy - New thinking

OUTLINE OF A CIRCULAR ECONOMY

PRINCIPLE

1

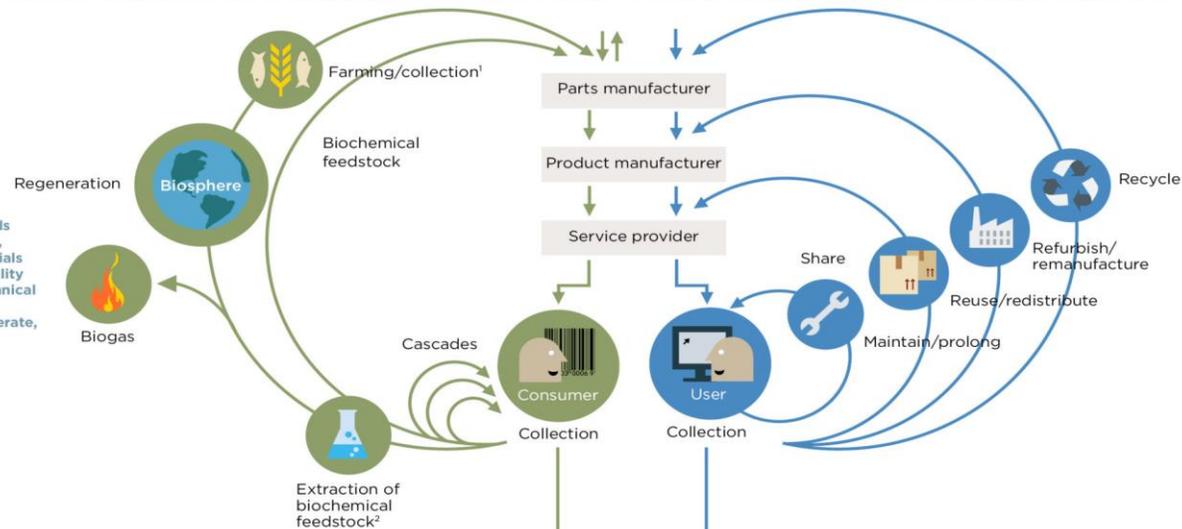
Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows
 ReSOLVE levers: regenerate, virtualise, exchange



PRINCIPLE

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles
 ReSOLVE levers: regenerate, share, optimise, loop



PRINCIPLE

3

Foster system effectiveness by revealing and designing out negative externalities
 All ReSOLVE levers

Minimise systematic leakage and negative externalities

1. Hunting and fishing
 2. Can take both post-harvest and post-consumer waste as an input
 Source: Ellen MacArthur Foundation, SUN, and McKinsey Center for Business and Environment; Drawing from Braungart & McDonough, Cradle to Cradle (C2C).

Linear Economy = Linear Equation = Gross Domestic Product (GDP)

$$GDP = C + I + NX + G$$

X - M
export - import

wiki How to Calculate GDP

Expenditure Approach -
Consumer Spending,
Investment, Net Export,
Government Spending - Most
used

$$GDP = W + R + i + PR + BT + d + F$$

indirect
business
taxes

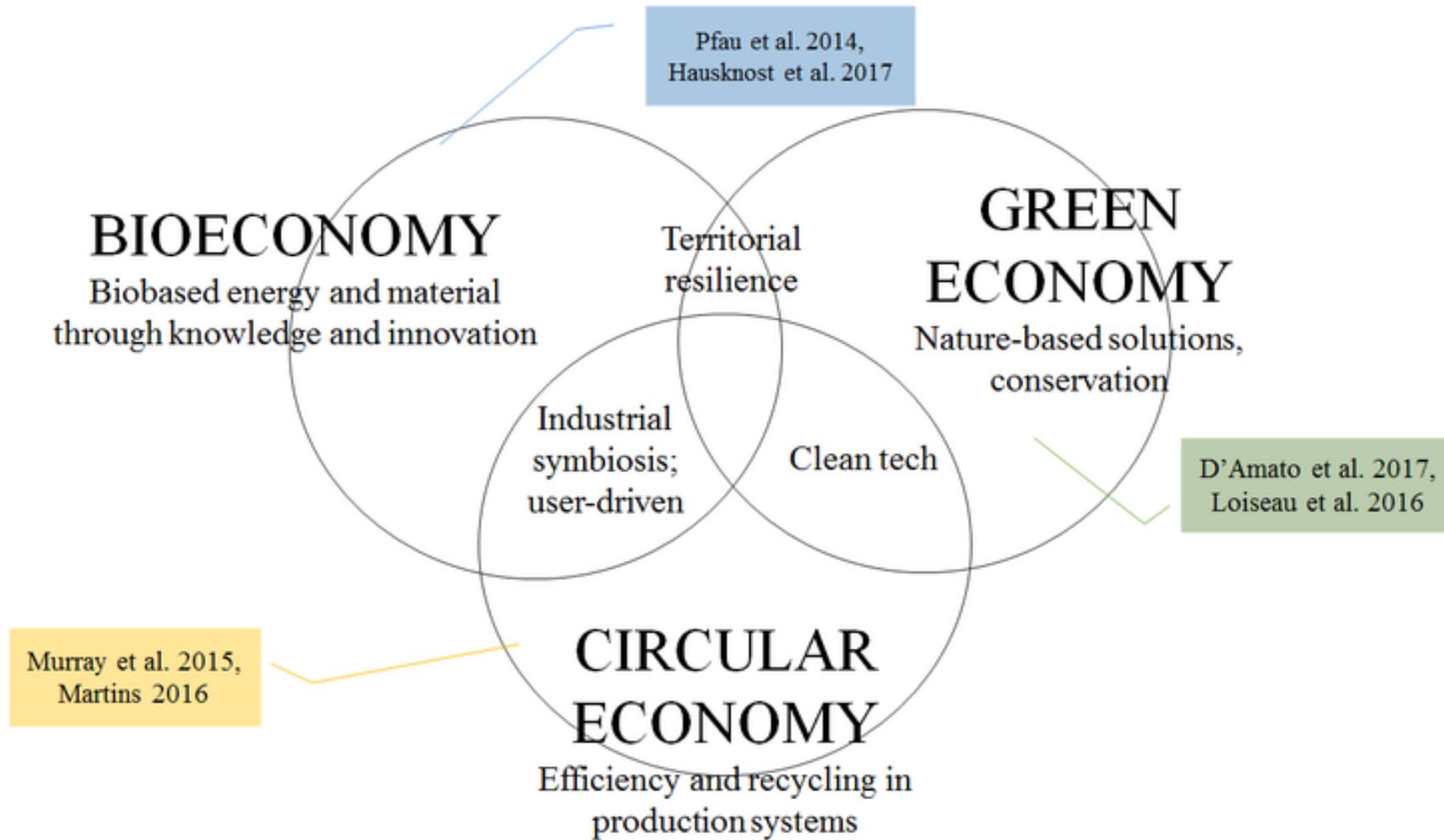
wiki How to Calculate GDP

Income Approach: total of all salaries,
wages, benefits, pensions and social
security contributions.

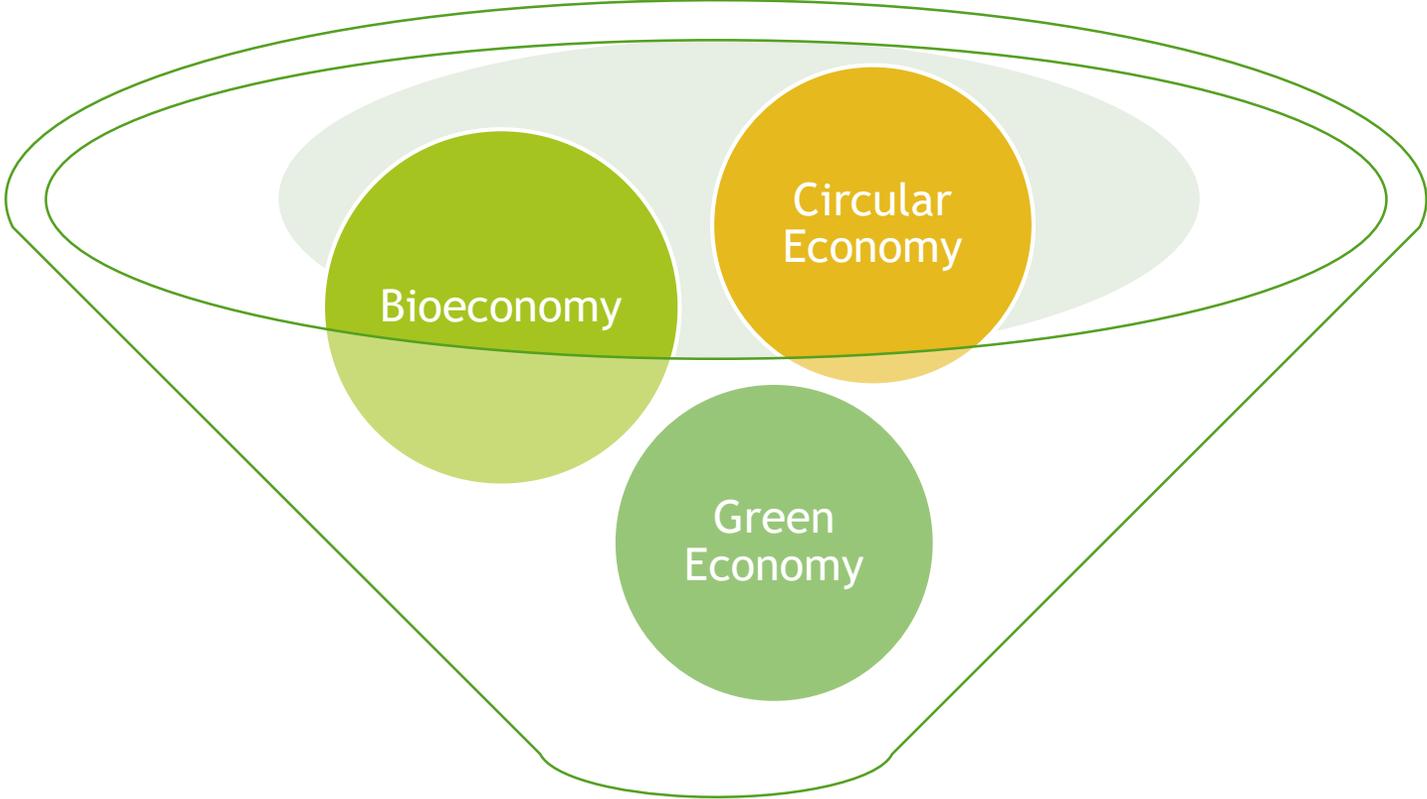
Diagram from <https://www.wikihow.com/Calculate-GDP>

Could we say:

- ▶ Linear Economy = Gross Domestic Product
- ▶ Then what is Circular Economy + Reduced spending/conservation = ?



<https://www.sciencedirect.com/science/article/pii/S0959652617320425>



GDP Update

Finally....

The growth of a sustainable and circular bio-economy using sustainable practices contribute to the mitigation of climate change. This will help Canada transition to a low-carbon economy ensuring its businesses are competitive globally.

Thank you

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