



# Biomasse et carboneutralité

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# Biomass and Carbon Neutrality



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# Bioenergy supply and demand outlook in a net-zero Canada

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Régie de l'énergie  
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Canada

# Bioenergy Demand and Supply Outlook in a Net-zero Canada

## Canada's Energy Future 2023



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February 2024



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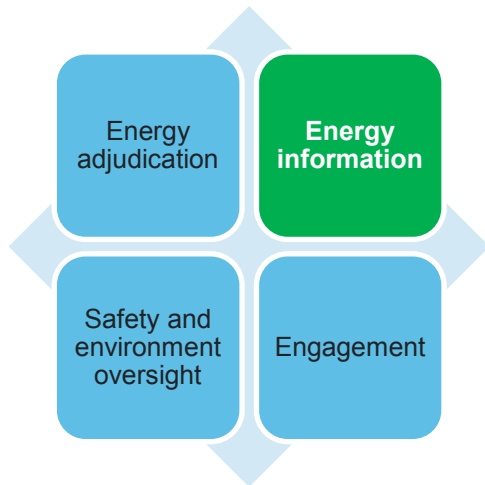
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# Canada Energy Regulator (CER) & Canada's Energy Future (EF)

**Mission:** Regulating infrastructure to ensure safe and efficient delivery of energy to Canada and the world, protecting the environment, recognizing and respecting the rights of the Indigenous peoples of Canada, and **providing timely and relevant energy information and analysis**

## Core Responsibilities



The Canada's Energy Future series explores how possible energy futures might unfold for Canadians over the long term.

EF2023 focuses on the challenge of achieving net-zero greenhouse gas (GHG) emissions by 2050.





# EF2023 Study Design, Scenarios and Assumptions

EF2023  
Scenarios

Global Net-Zero

Canada Net-Zero

Current Measures

	Pace of Climate Action	
	Canada 	Globally 
Global Net-Zero	Consistent with Net-Zero	Consistent with 1.5°C outcome
Canada Net-Zero	Consistent with Net-Zero	Increasing action but slower
Current Measures	Only measures currently in place	Limited future action

## Assumptions

Current Measures Scenario

Both net-zero scenarios

### Policies

Only those federal, provincial, and territorial climate policies that are currently in place

- In place federal, provincial, and territorial climate policies
- Announced but not yet implemented policies
- Hypothetical future climate policy assumptions to achieve net-zero

### Technologies

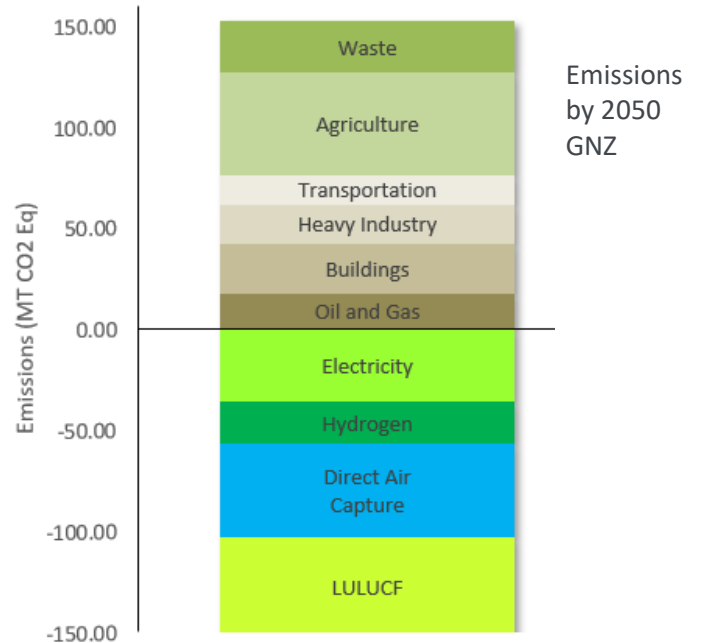
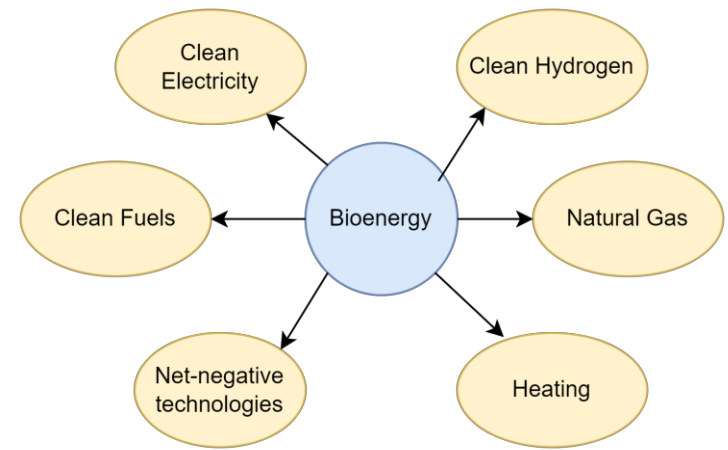
Modest technological progress

Continued technological progress, including commercialization of many emerging technologies that can support a net-zero future



# Bioenergy's Role in Net-zero Scenarios

- An impactful industry
  - Provides clean fuels
    - A main resource to meet clean fuel standards
  - Provides clean electricity
  - Provides clean hydrogen
  - Combined with CCS technologies (BECCS) provides negative emissions solutions
    - Electricity generation with BECCS negative 35-36 MT of CO<sub>2</sub>eq
    - Hydrogen production with BECCS negative 21-25 MT of CO<sub>2</sub>eq
  - Interconnects different economic sectors both energy and none-energy



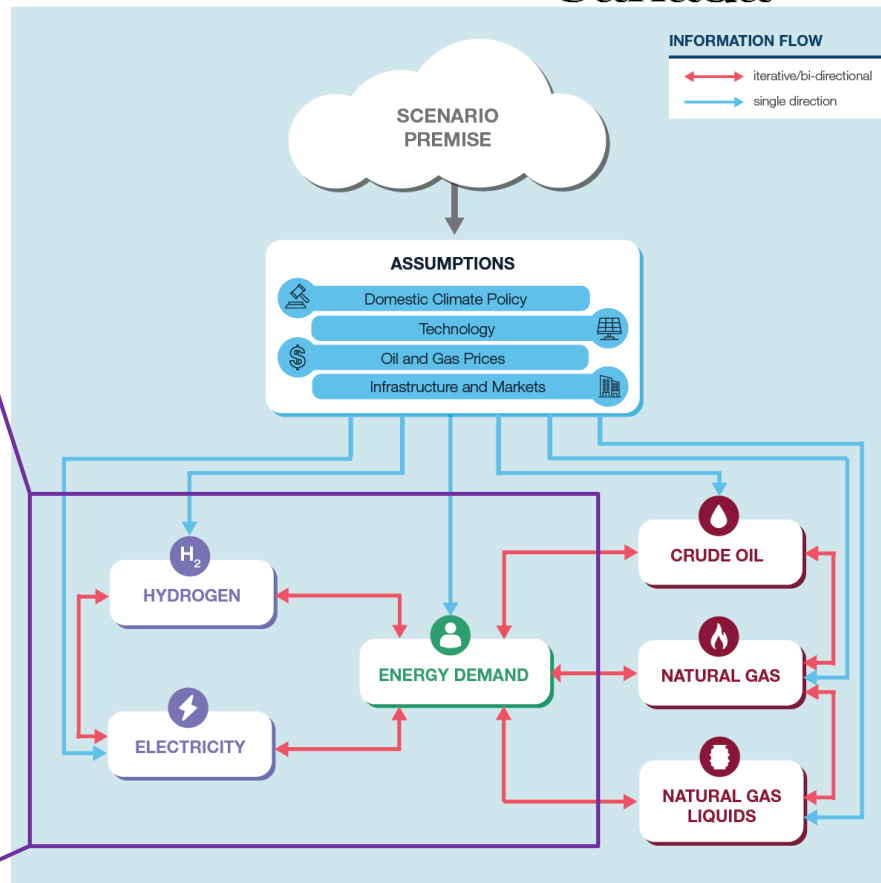
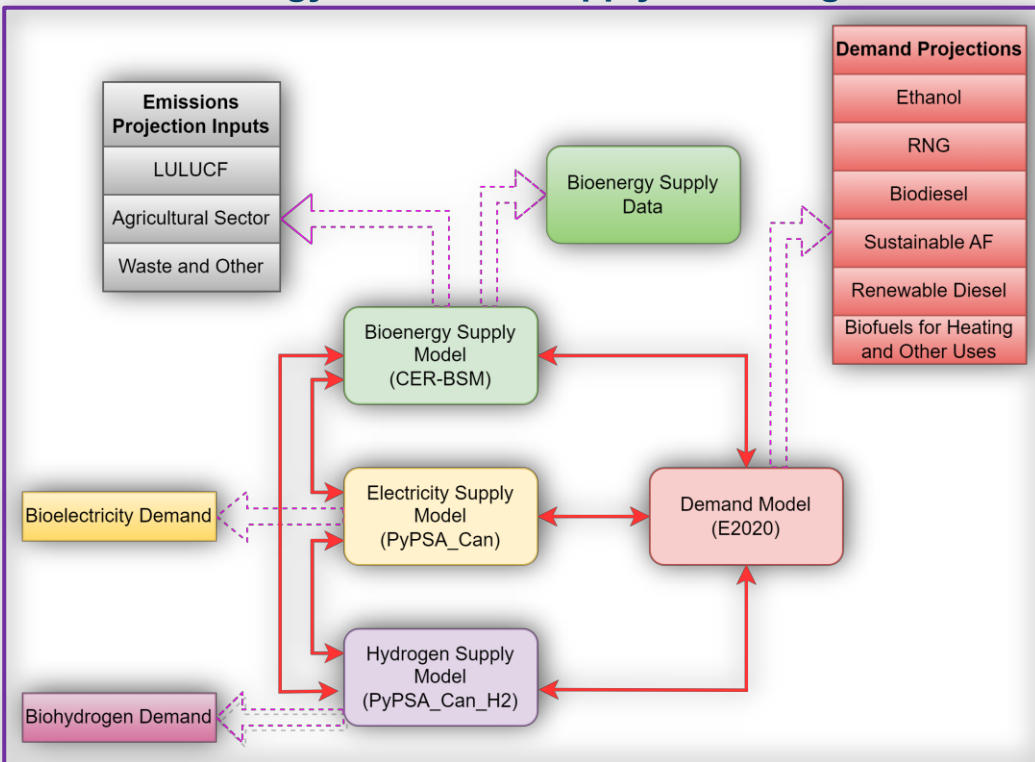




# EF Modelling Suite



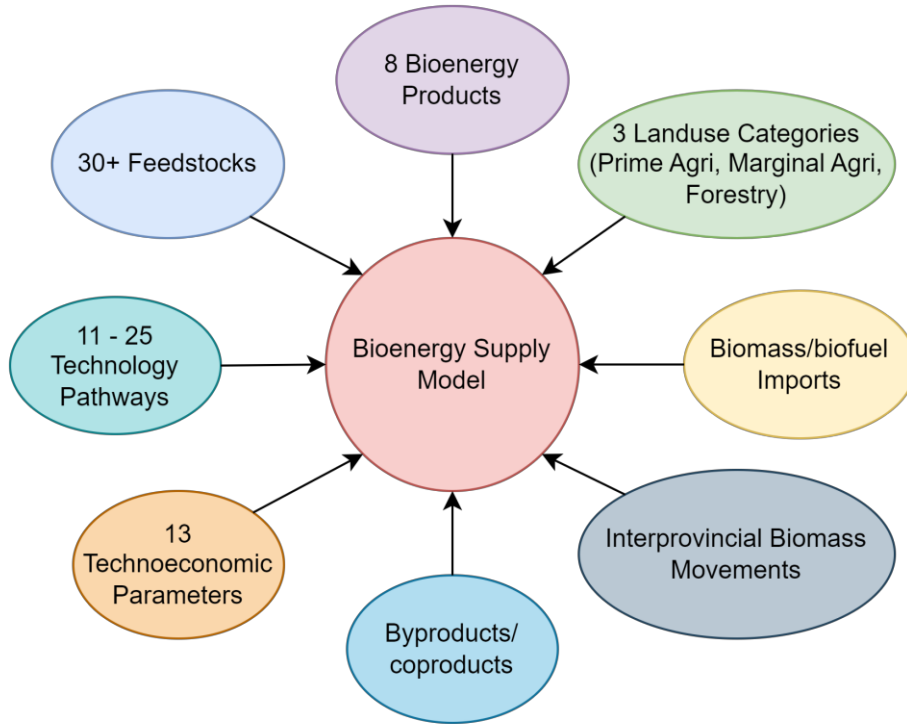
## Bioenergy Demand & Supply Modelling





# Bioenergy Supply Model (CER-BSM)

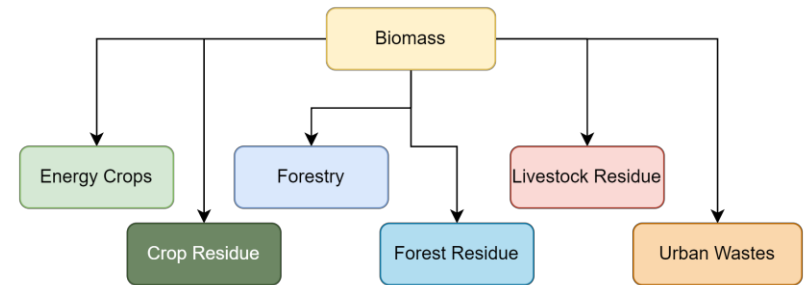
A many to many model that provides an integrated solution to bioenergy supply



## BSM Deliverables

Answers the following questions

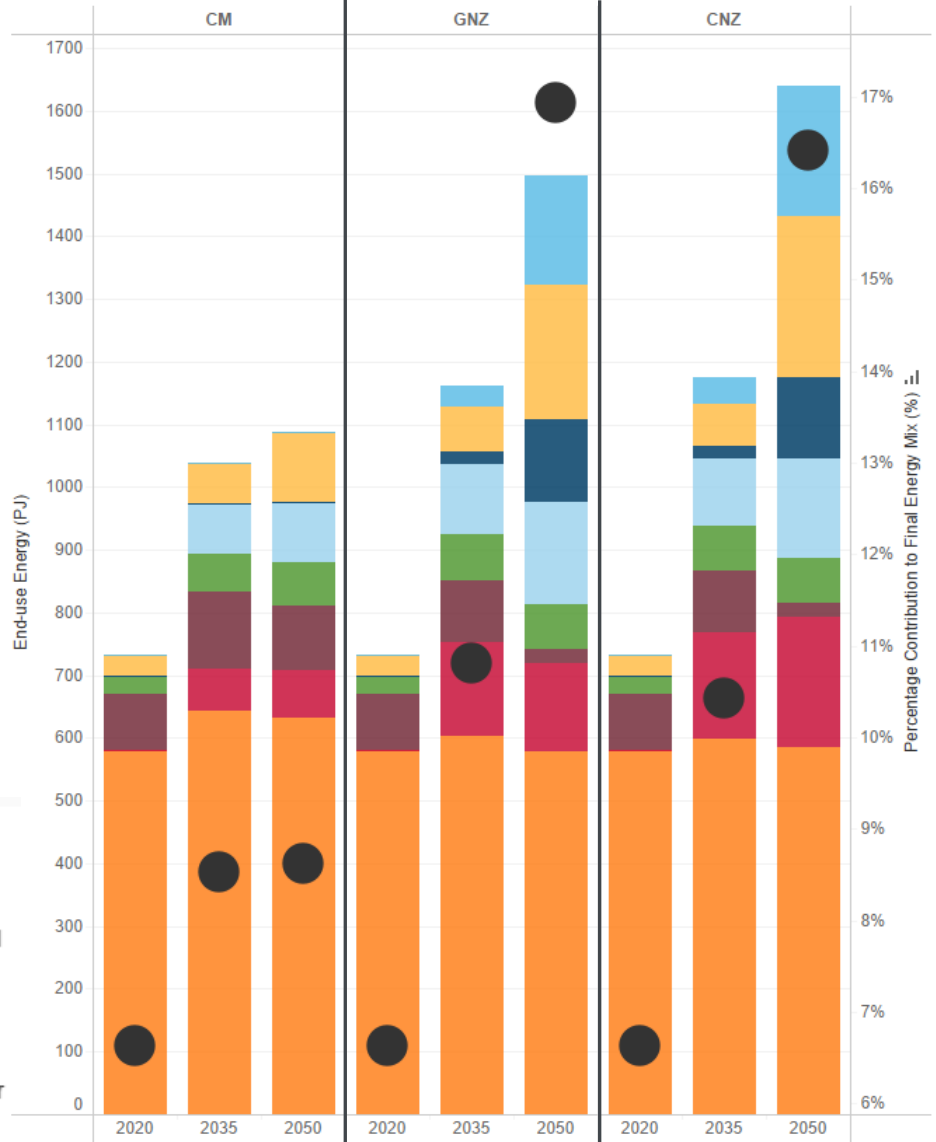
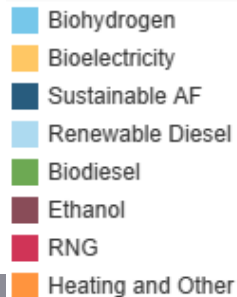
- Availability - How much energy can be produced from available biomass (national/provincial)?
- Supply - Do we have enough biomass to meet our future bioenergy demand?
- Use - Type of feedstocks used by different bioenergy types?





# Bioenergy Demand Outlook

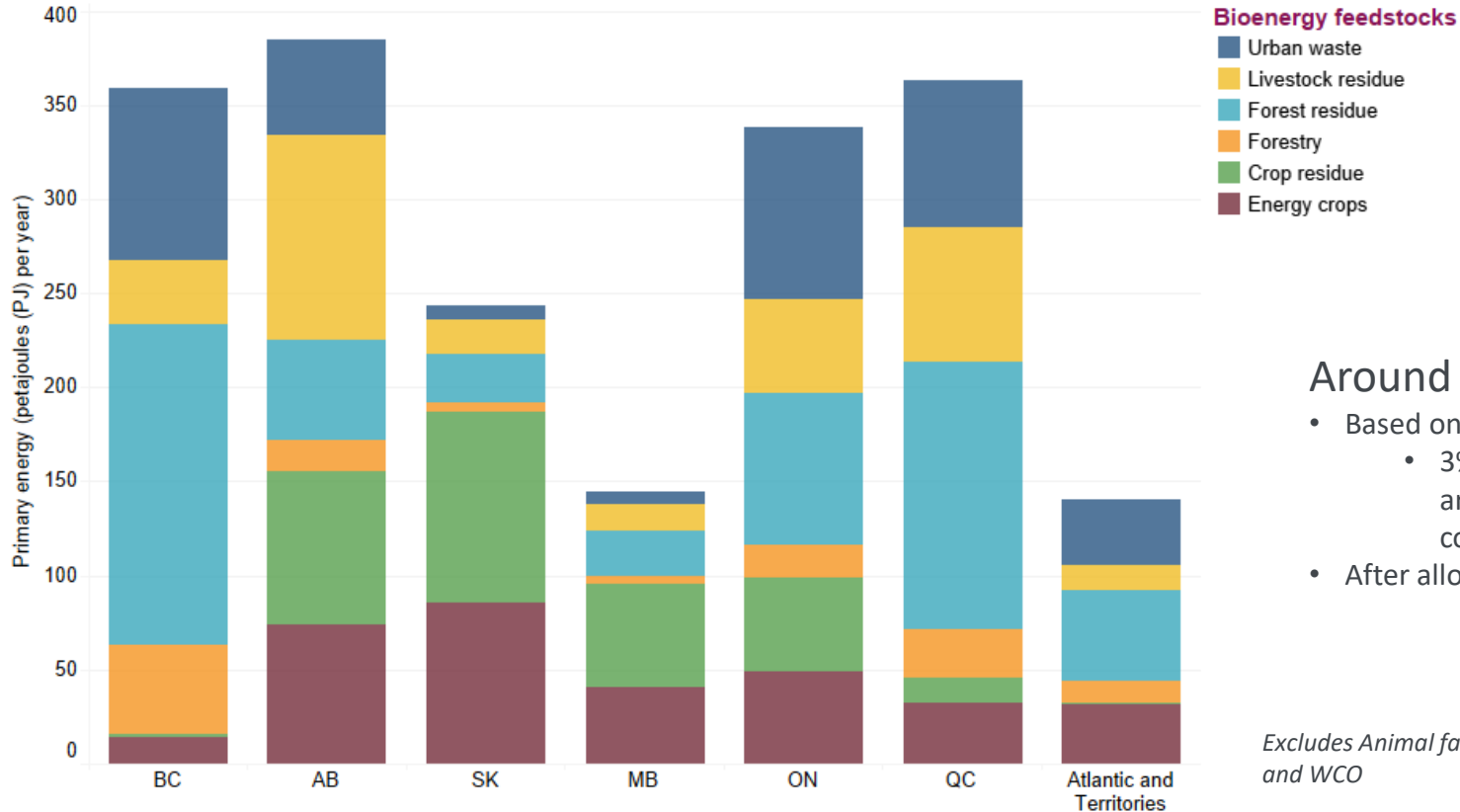
- Bioenergy Demand increases in all 3 scenarios
  - CNZ scenario sees the largest increase in terms of end-use energy required (1645 PJ) by 2050
  - GNZ scenario sees the highest percentage contribution (17%) to final energy mix
- Key trends in net-zero scenarios
  - Bioelectricity and Biohydrogen demand increases significantly after 2035
  - Ethanol and Biodiesel demand reduces
  - SAF and Renewable Diesel demand increases





# Bioenergy Availability

## How much biomass do we have in Canada for energy production?



### Around 1950 PJs of Energy

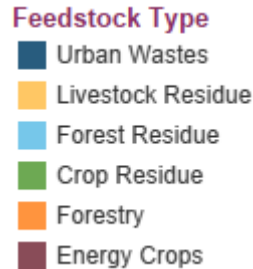
- Based on land-use assumptions,
  - 3% prime land-usage and around 5% of wood-supply contributing to energy
- After allowances for non-energy uses

*Excludes Animal fats  
and WCO*

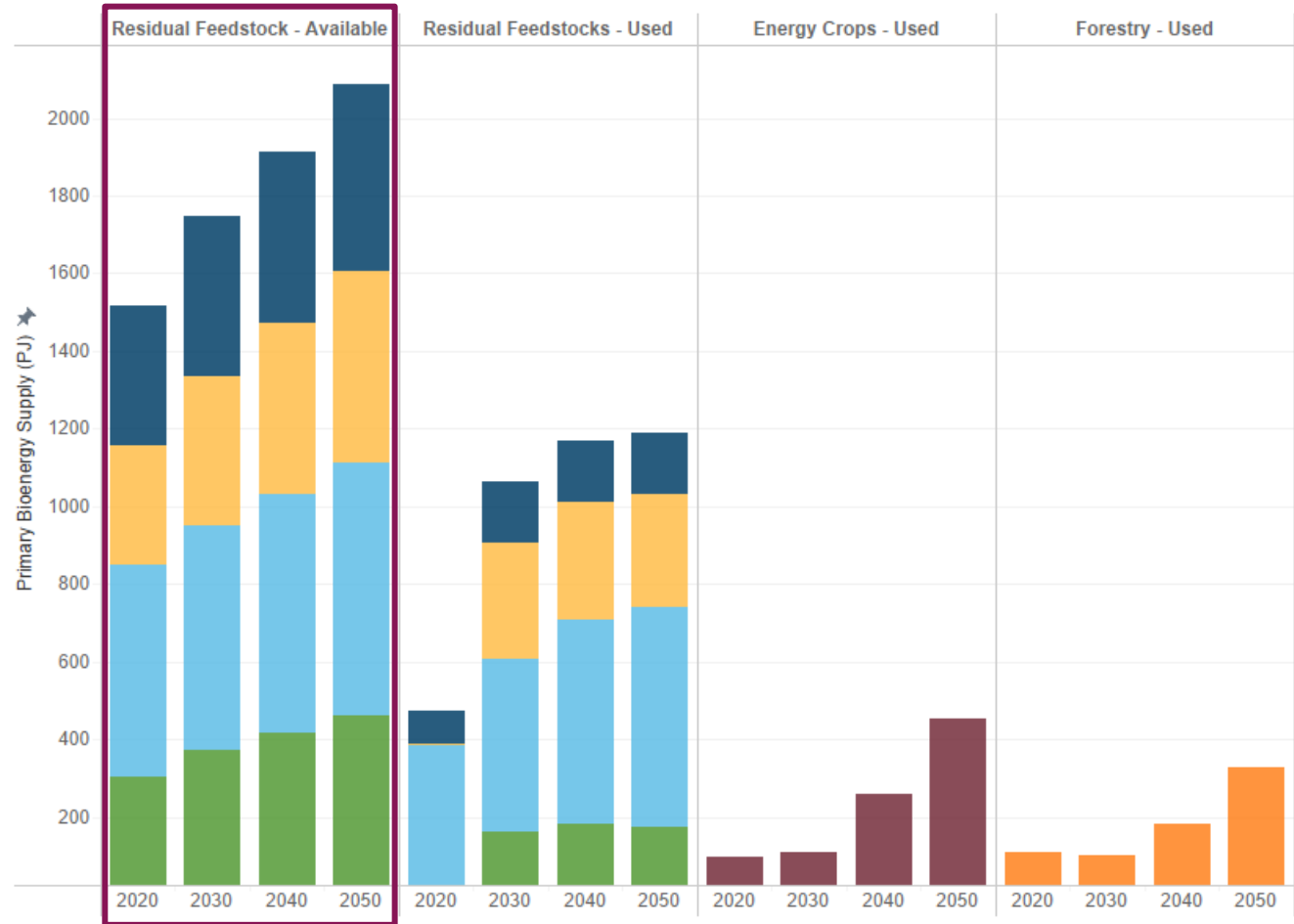


# Biomass Supply

- Key Observations
  - 57% of the available residual feedstock used in GNZ by 2050
  - Around 86% of the available forest residue is used by 2050 in GNZ
  - Energy crops and forestry use increases by around 350% and 200% in GNZ



*Excludes Animal fats and WCO*



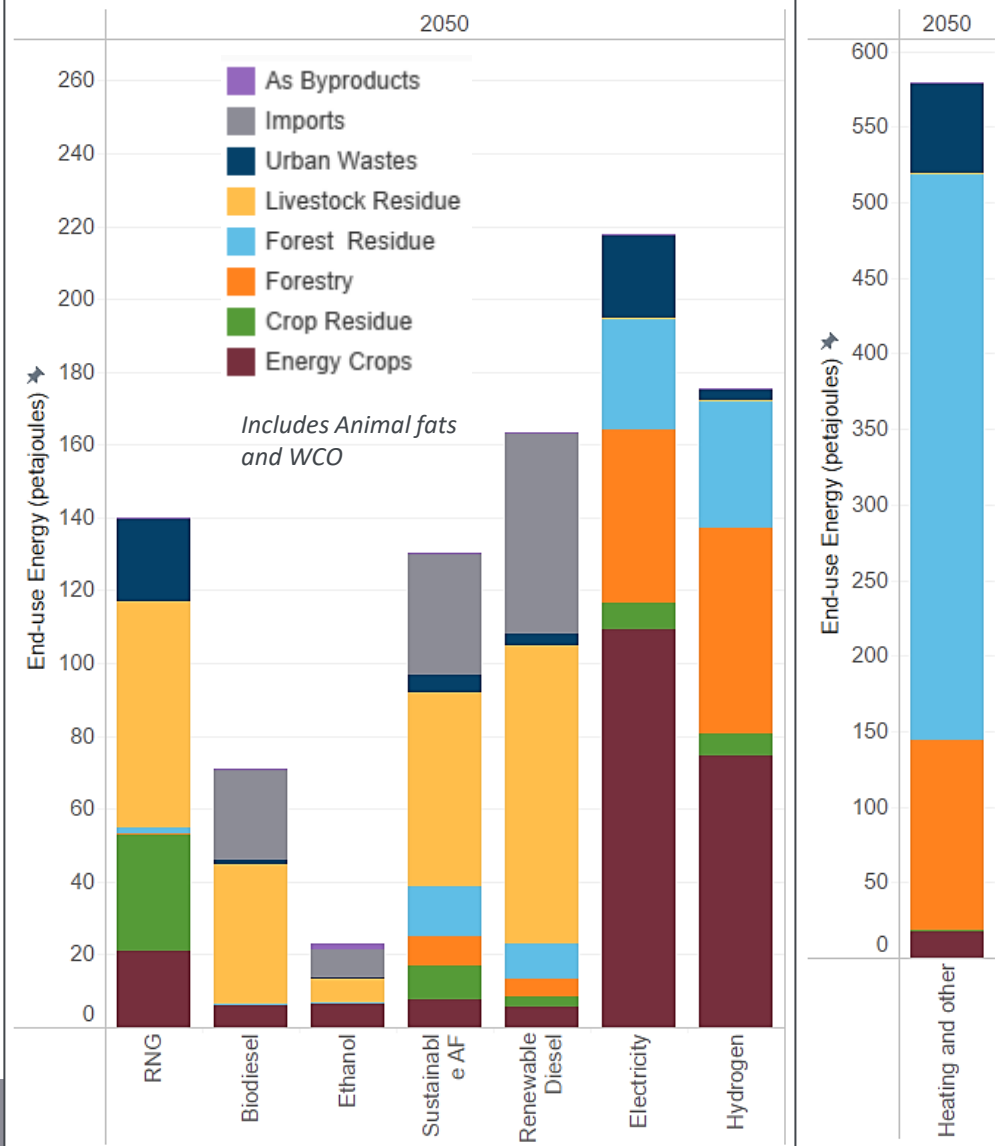


# Biomass End-use

## Type of feedstocks used by different bioenergy types

- Livestock residue is a technically and economically feasible feedstock for many biofuels
- Bioelectricity, biohydrogen, and heating depend on forestry industry and agriculture industry
- Liquid biofuel imports reduce in total contribution from 47% to 31% in GNZ by 2050. However, the total imports increase.

End-uses of biofuels (excluding electricity and hydrogen) includes transportation, residential, industrial, and commercial sector uses. (Data available in EF2023 data supplements)





## Key Findings and Key Messages

- Bioenergy is a versatile critical component of Canada's net-zero goals
- Current and future anticipated policies needed to achieve net-zero goals will result in a higher demand (more than double) for bioenergy
- There are adequate biomass resources to satisfy bioenergy demand in a net-zero future
  - A combination of greater use of residual feedstocks, forestry, and energy crops are needed to satisfy bioenergy demand



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