AGRINOVA

RECHERCHE ET INNOVATION EN AGRICULTURE

Review of R&D activities at TAC-Biochar (Quebec, Canada)

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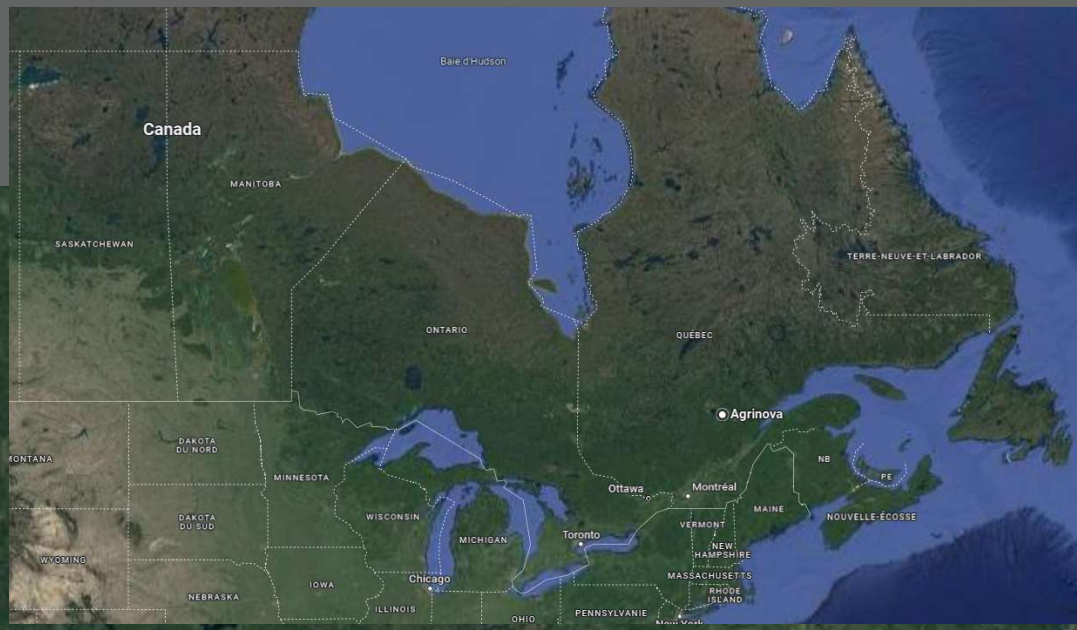
August 2022

CONFERENCE OUTLINES

- **Location**
- **Context**
  - Agrinova
  - BioChar Boréalis
  - The Biochar Showcase
  - TAC-Biochar
- **Research Capacities**
- **Research Activities**

LOCATION

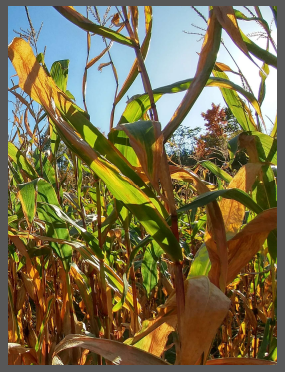
Quebec, Canada



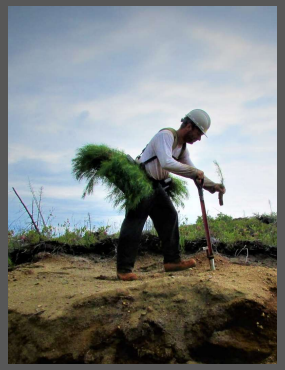
LOCATION

Benefits

- Many types of biomasses available in abundance nearby
- Multiple possible valorizations
  - ✓ Agriculture
  - ✓ Livestock production
  - ✓ Reforestation
  - ✓ Local industries (aluminum, metallurgy, concrete)
- Nearby port facilities for export







AGRINOVA

In a nutshell

- Collegial Center for Technology Transfert (CCTT = 59 in Qc)
- Affilited with Collège d'Alma, Qc
- Expertise : **Agriculture**
- More than **1,500** projects completed since **1996**
- **20** members Research Team/ About **10** students each year
- Headquarter in Alma
- Office in Quebec City
- Biochar Technological Showcase in Mashteuiatsh community
- R&D Showcase Potatoe storage near Quebec City

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Fields of expertise

Northern Agriculture and emerging productions

Energy efficiency and renewable energy

Berries

Livestock production

Potatoes

Field crops

Agronomic services for industries

International cooperation

BIOCHAR BORÉALIS

Origin in 2016

First Nations of Quebec
Forestry Network

Study on production and marketing of biochar and derived products

Final report

Mars 2014

WSP FPInnovations PPC

Pekuakamiulnuatsh Takuhikan
RMC Domaine-du-Roy

Our purpose

- Promote innovative initiatives for **forest residues valorization**, encourage a **high value-added industry** and provide **financial leverage;**
- Contribute to the creation/development of a **network of companies** for production and marketing chain of biochar and derived bioproducts;
- Financial partner in the acquisition and implementation of specialized equipment for the establishment of a **Thermochemical Conversion Center**

Innovation Development Valorization

THE BIOCHAR SHOWCASE

Thermochemical Conversion Center

- **Partnership BioChar Boréalis/Agrinova**
- Operated by Agrinova
- Dedicated to the **research and development of biochars** and bioproducts derived from the pyrolysis of forest and plant biomasses
- **Accompanying companies** for product development up to market launch
- Facilitating access to **research support programs**

TAC-BIOCHAR

Recognition as a Technology Acces Center (TAC)

Tech-Accès Canada

Biochar

- **Goal**

  Strengthening the innovation capacity of the biochar production sector

- **Area of expertise**
  - ✓ Agricultural use of biomasses
  - ✓ Biochar engineering
  - ✓ Biochar characterization
  - ✓ Soil aggradation

RESEARCH CAPACITIES

Equipment: Pyrolyzers in demonstration

SPECIALIZED PYROLYZERS

	BENCH-130	BGR-600
TEMPERATURE RANGE	Pyrolyse 450° - 800°	Pyrolyse 450° - 550°
MAXIMUM **MASS FLOW**	18 kg/h	800 kg/h
RESIDENCE TIME RANGE	10 - 40 minutes	10 - 40 minutes
BIOMASS **MOISTURE**	Max 10 %	Max 10 %

E T I A
ECOTECHNOLOGIES

RESEARCH CAPACITIES

Equipment: Laboratory capacity

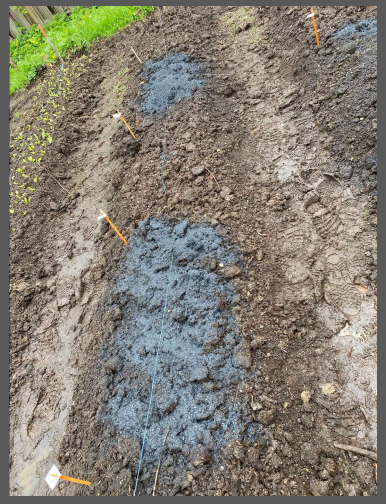
- ✓ Elements, CHNO (MP-AES, Elementar)
- ✓ Density, Moisture (UltraPyc-1200, Hyprop)
- ✓ Gaz (Micro-GC)
- ✓ Surface area (NOVAtouch LX2)
- ✓ Calorific power (Parr 6200)
- ✓ Particle characterisation (ROTAP RX-29 & UltraSiever GILSON)
- ✓ BMP Reactor (Anaero Tech)
- ✓ Grinder-Dryer (KDS Micronex)
- ✓ Growth chamber (Enconair)

RESEARCH CAPACITIES

Field trials





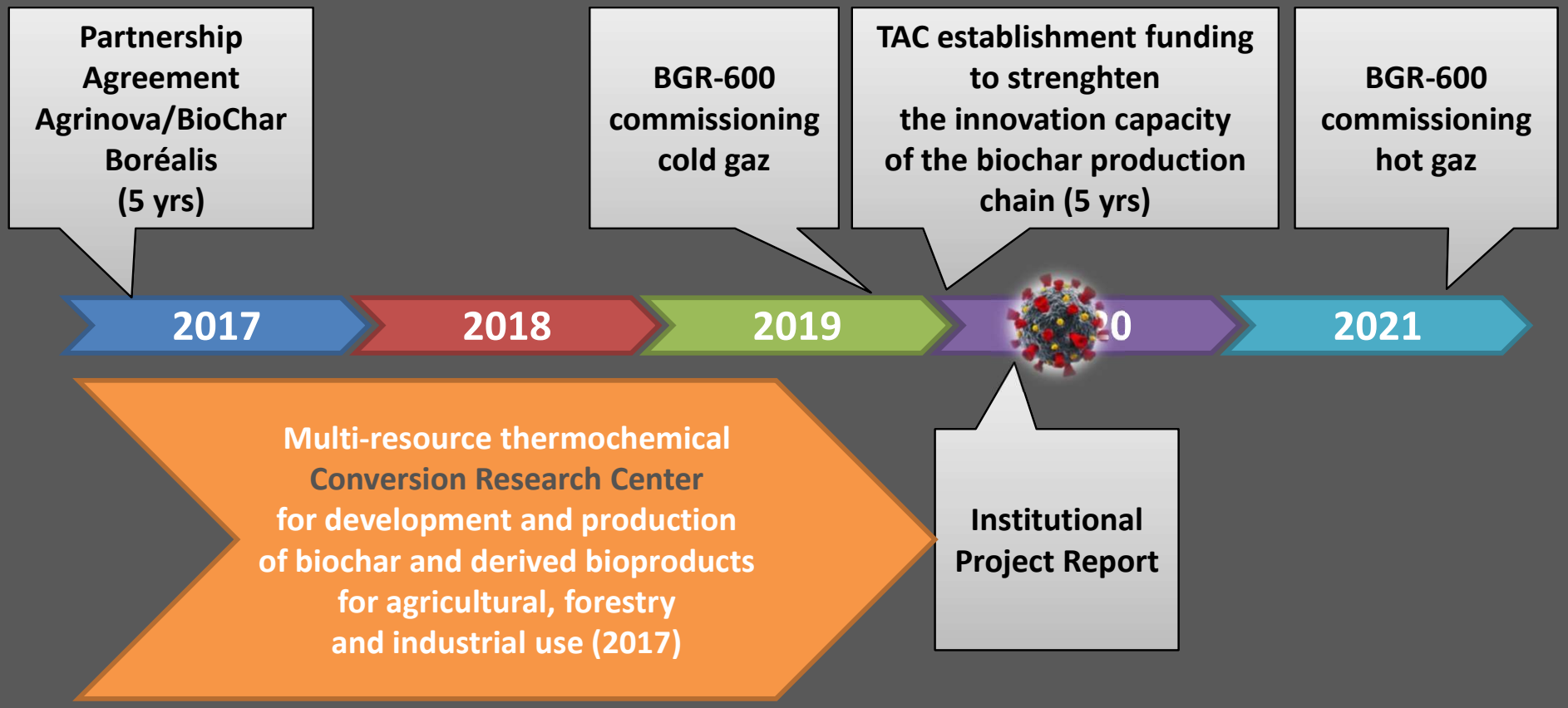






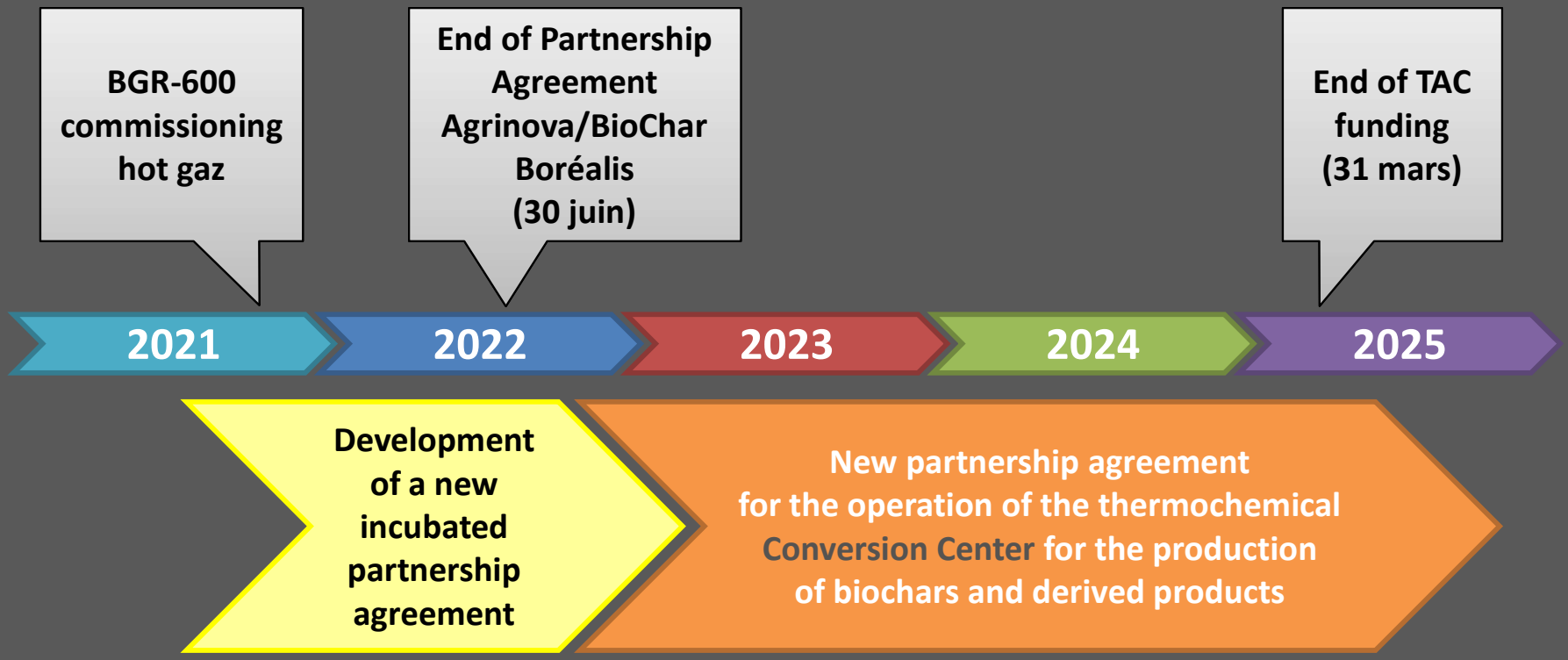
RESEARCH ACTIVITIES

Time line



RESEARCH ACTIVITIES

Future prospects



RESEARCH ACTIVITIES

Summary of activities – Since 2017

- **85** projects developed with more than **50** partners
- **26** projects completed
- **18** projects in progress
- Partner contribution of **$ 1.1 Million**
- Public funding of **$ 10.3 Million**

Développement économique Canada pour les régions du Québec
Canada Economic Development for Quebec Regions

Global Affairs Canada
Affaires mondiales Canada

Agriculture, Pêcheries et Alimentation Québec

Mitacs

NSERC CRSNG

BioChar Boréalis

Économie et Innovation Québec

CRIBIQ
Consortium de recherche et innovations en bioprocédés industriels au Québec

RESEARCH ACTIVITIES

Biomasses tested

- **Wood biomasses:** Chips, shavings, sawdust, micronized, pellets, bark residues
- **Wood species:** Black spruce, Jack pine, Balsam fir, Larch, Cedar, Aspen poplar, White birch
- **Agricultural biomasses:** Oat husks, grain center screening, Miscanthus, corn and cereal straws, Hemp fiber, poultry litter
- **Coffee pod residues**
- **Algae biomass**
- **Municipal biosolids**
- **Paper biosolids**

RESEARCH ACTIVITIES

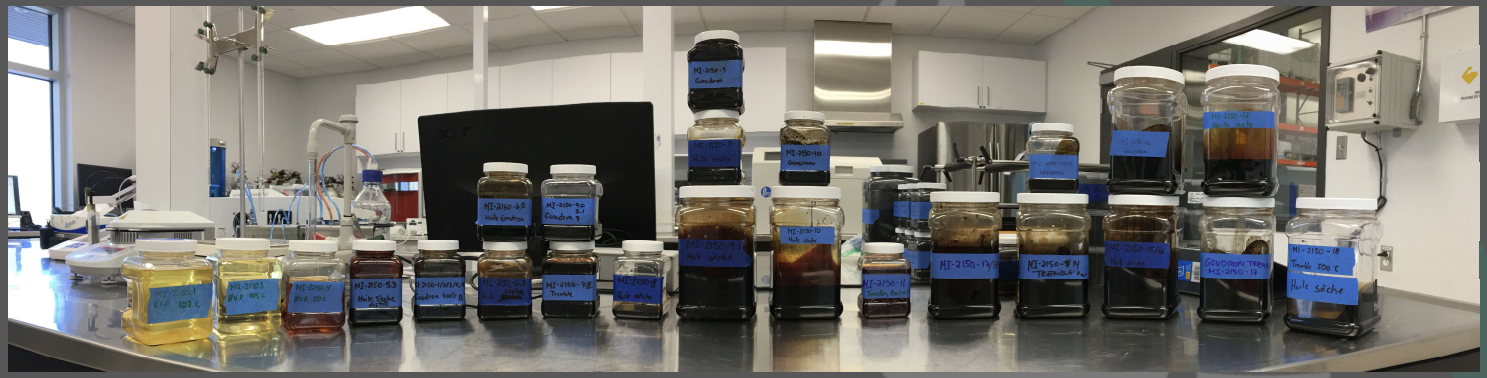
Applied Biochar Valorization

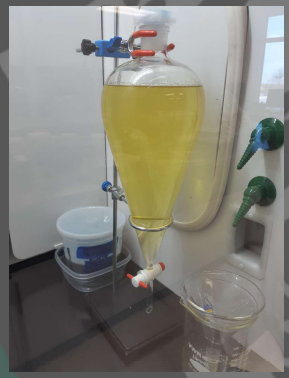
- Biofuels
- For metallurgy
- Manufacture of concrete
- Air purificatrion
- Deodorification of organic fertilizers
- Additive in ruminant feed
- Additive in animal litter
- Horticultural soil based on biochar
- Production of forest seedlings
- Soil amendment
- Additive in composts
- Soil remediation
- Soil carbon sequestration

RESEARCH ACTIVITIES

Applied Bio-oil Valorization

- **Antibiotic** and **anti-inflammatory** potential from wood residues
- Tar for ecological surface **coating**
- Wood vinegar as **biostimulant** or **bioherbicide** for plants
- Dry oils for **transformer oil** replacement
- Dry oils for the production of **liquid smoke**
- Inoculated **wood pellets** for BBQ cooking





THANK YOU FOR YOUR ATTENTION!

QUESTIONS

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