# From waste stream to value-add

## Establishing an Alberta platform for biofuels

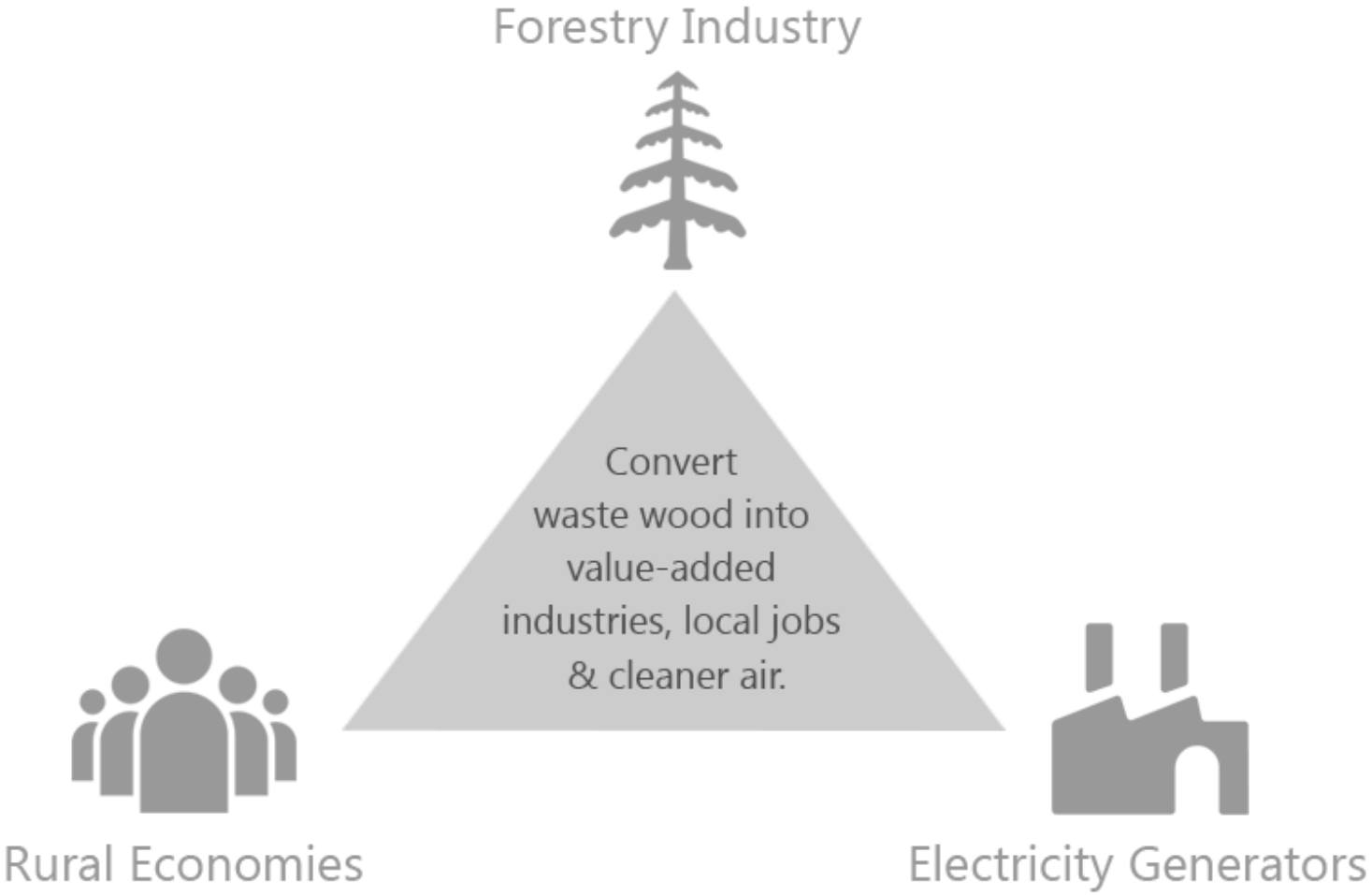
Capital Power

# Setting context:
# Alberta Climate Leadership Plan

- Phase out coal-generated electricity by 2030
- Replace coal generation – 2/3 renewable energy; 1/3 natural gas by 2030
- Implement a new carbon price on greenhouse gas emissions

# Defining the initial opportunity

**Alberta mills produce enough wood residuals to replace ~10% of the coal used in power generation**



# Establishing a platform for biofuels

**Co-firing with wood residuals can be the first step in the successful transformation of solid-fuel power generation pre-2030**

**Biomass Blending**

- Immediately reduces coal use by up to 13%

**Extended Biomass**

- Reduces coal use by 13 – 20% before 2020

**Advanced Biomass**

- Advanced biomass sources developed (pelletization)
- Economic gaps are closed.
- Biofuels become 30 – 50% of the fuel mix at a Genesee unit

**NextGen BioFuels**

- Additional agricultural and municipal waste streams converted into value-added fuels
- Long-term sustainable fuel supply

# Four fuel conversion options

## Critical to identify the optimal fuel source for each unit

Solid Fuel Blending (direct injection)

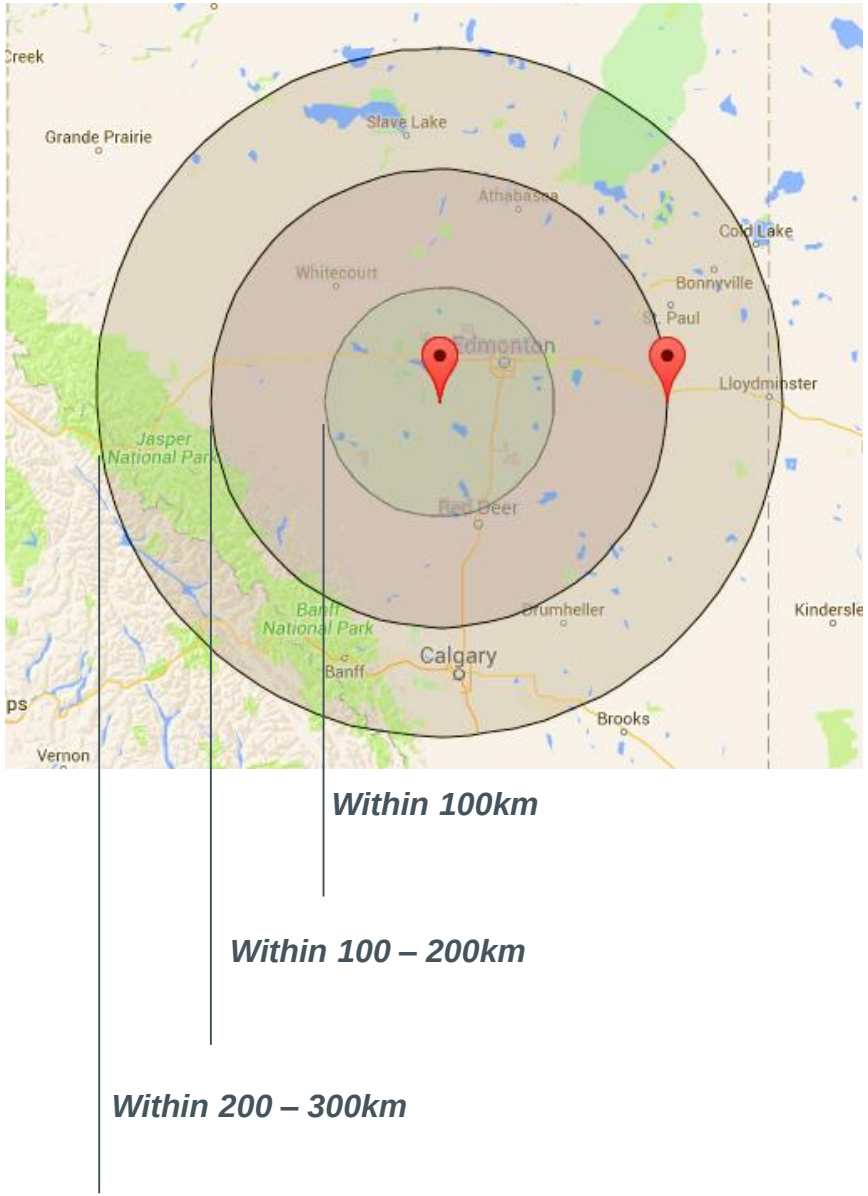
Advanced pelitization

White wood pellitization

Gasification

# Economic and policy gaps


- Economic gap to co-fire with up to 13% biofuel is between $20 - $30 per MWh if the supply is sourced from within 200 km of the generating station
- *A biomass offset protocol (no cash outlay for government) would make it economic to co-fire with wood residuals within 200km of Genesee.*



# Filling the gaps

- **An offset protocol will make blending of nearby wood residuals into sub-critical coal boilers economic.**

- Issue **credits for the avoided methane emissions** from biomass decomposition
- Existing treatment of biomass emissions continues (no levy applies)
- **No additional credit issued for reduced coal use** (preventing double-dipping on credits)
- **Emissions from transportation fuels** already subject to or exempt from carbon levy payments would be **excluded from biomass credit** (preventing double-taxation of transportation emissions).

# Innovation at work

## Testing biomass at Genesee Generating Station

# Technical findings

**Capital Power's research has quantified the scope of the opportunity and narrowed the range of preferred fuel options**

1. Sub-critical coal boilers at Genesee 1 and 2 can be safely and reliably operated with 20% to 30% of the fuel supply coming from wood residuals, using solid fuel blending

2. There is a substantial but limited supply of wood residuals near Genesee that can be used for solid fuel blending

Operational testing is underway to identify physical issues and confirm the capital investment required.

# Genesee Direct Injection Test

# Power forward.

## Opportunity. Benefits. Sustainability.

- Opportunity
  - for different industries to come together creating large-scale solutions

- Benefits & Sustainability
  - contributes to the sustainability of mill operations
  - creates new jobs in rural communities
  - reduces pre-2030 emissions by partly substituting for coal combustion

- Need
  - to match fuel type to generator attributes
  - an offset protocol to make an initial project economic and additional supports to move to advanced sources