

BIOMASS CLEAN ENERGY



WELCOME TO OUR OPEN HOUSE

- Learn about the Biomass Clean Energy Project proposed to be developed on the GTH site
- Share your views and ideas with Project representatives

PLEASE

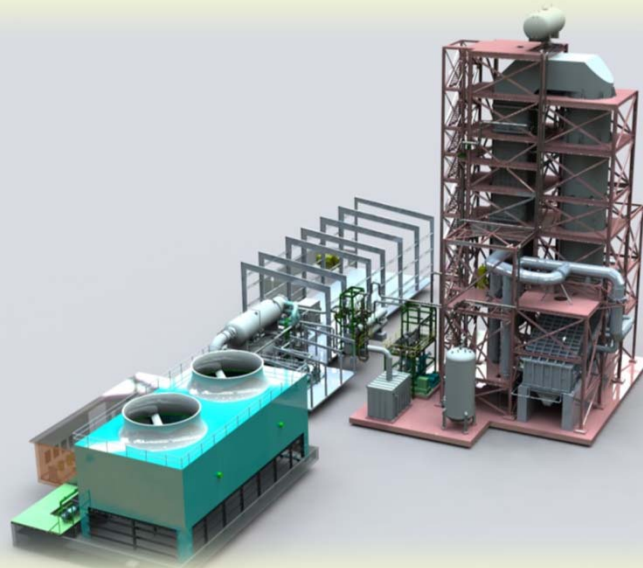
- Sign in at the registration table
- Share your comments and questions with our representatives
- Fill out the comment sheet provided
- Your participation and input is appreciated



BIOMASS CLEAN ENERGY



- A 6MW biomass energy facility fuelled by **woody biomass**
- Biomass provides clean, steady, baseload renewable power to the grid.
- Biomass Clean Energy will generate electricity to be sold to SaskPower
- Biomass Clean Energy contributes to Saskatchewan:
 - Renewable Energy Infrastructure
 - Net zero carbon emissions
 - First Nation economic partnerships
 - New jobs, New investment
 - Potential economic value-add to GTH tenants



WHO ARE THE PROJECT PARTNERS?



Project Team

- **First Nations Power Authority.** First Nations governed, not-for-profit power development company, creating new opportunities for First Nations-led projects
- **Global Transportation Hub.** Canada’s premier inland port located west of Regina. Fueling trade through world-class rail and highways, competitive real estate, and superior service
- **WGL Technical Inc.** A diversified energy business with demonstrated expertise in GHG management, waste reduction and biomass energy solutions
- **Bastion Power Inc.** Worldwide biomass clean energy experience including 15 projects and ~ 3,000 MW of capacity in construction & operation including > 100 MW of biomass

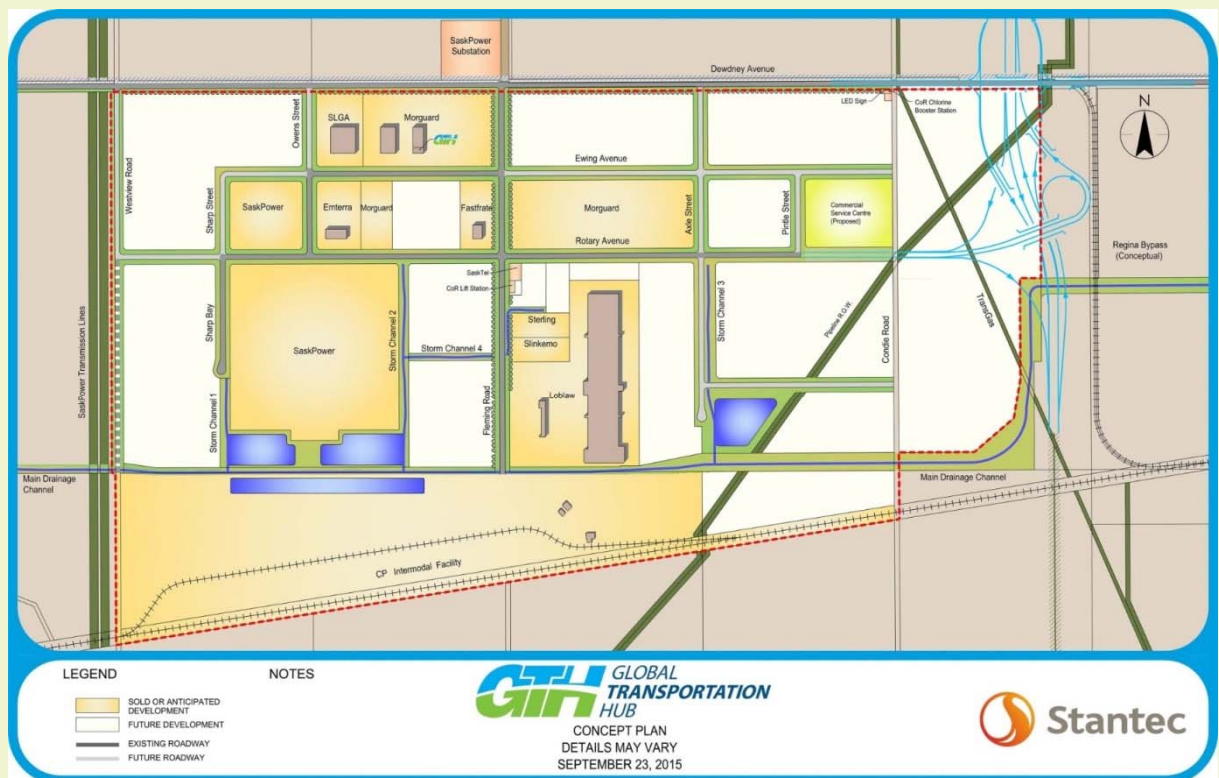
Collectively, the Project Team works with the power industry to reduce greenhouse gas emissions by improving solid wood waste management and providing viable electric and thermal solutions



WHERE WILL THE PROJECT BE LOCATED?



- The Project will be located on +/- 40 acre site zoned for industrial. Current plan is for a location at the southwest corner of the GTH property (details provided on following storyboards)
- The site is configured with rail load/unload capabilities with the ability to build a spur line into the facility directly adjacent to the plant site. Truck access is also highly efficient
- The Project has Power Interconnect capability at Condie substation, (within 5 km from the GTH site and close to a large load center)



WHAT ARE THE LOCAL PROJECT BENEFITS?

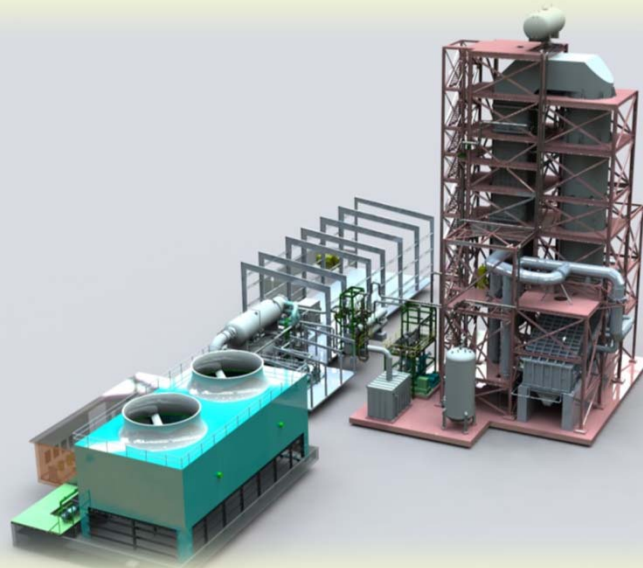


- Estimated investment of **\$80 million**
- **Local procurement** opportunities worth an estimated \$35 million
- Economic spin-offs including **local jobs** and **First Nations opportunities**
- Approximately **60 employees** during construction, plus **21 full-time positions** at full operation
- As many as **40 indirect employees** will be needed to collect biomass fuel; construction waste and power poles
- Incremental **property taxes** estimated at \$250,000/year
- Baseload, **clean renewable energy** – carbon neutral

WHAT ARE THE KEY PROJECT COMPONENTS



- A 6MW biomass energy facility fuelled by **woody biomass** with an **advanced** air cooled reciprocating grate de-ashing furnace system
- Natural gas fired, start up burner
- Hot thermal oil used as a **heat transfer medium** to Organic Rankine Cycle (ORC)
- A multi-cyclone and electrostatic precipitator (ESP), **limits particulate emissions**
- The power generation and cooling system requires no water
- A **fully enclosed fibre storage building** and negative pressure conveyor system **eliminates fugitive dust emissions**

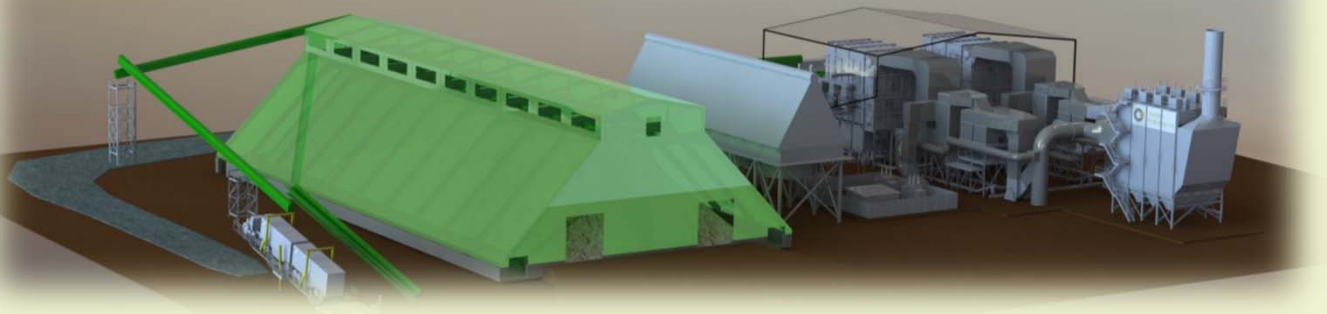


PLANT DESIGN BENEFITS



Key features of the power plant will be:

- Simple design, fully enclosed
- Reliable
- Low operation and maintenance costs
- Low emissions
- Fully automated operation





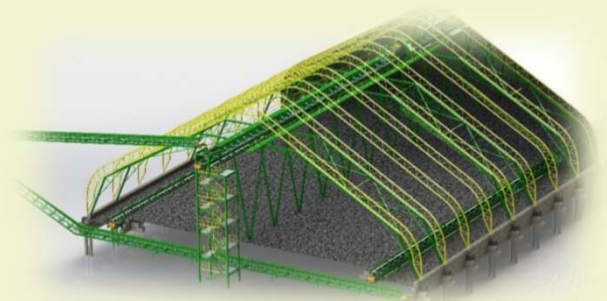
WHAT ARE THE SOURCES OF FUEL?

- **Diversified Sources:**
 - Railway, replaced cross ties – 350,000 + / annum
 - Construction and demolition (C&D) waste, primarily from the City of Regina (consolidator for the greater region)
 - SaskPower, used power poles
- **Fuel Handling:** either on-site, with fire suppressants/water lagoons or off-site storage (integrating direct rail unloading) or a hybrid of both

HOW WILL IT BE STORED?

Automated Fibre Storage Building

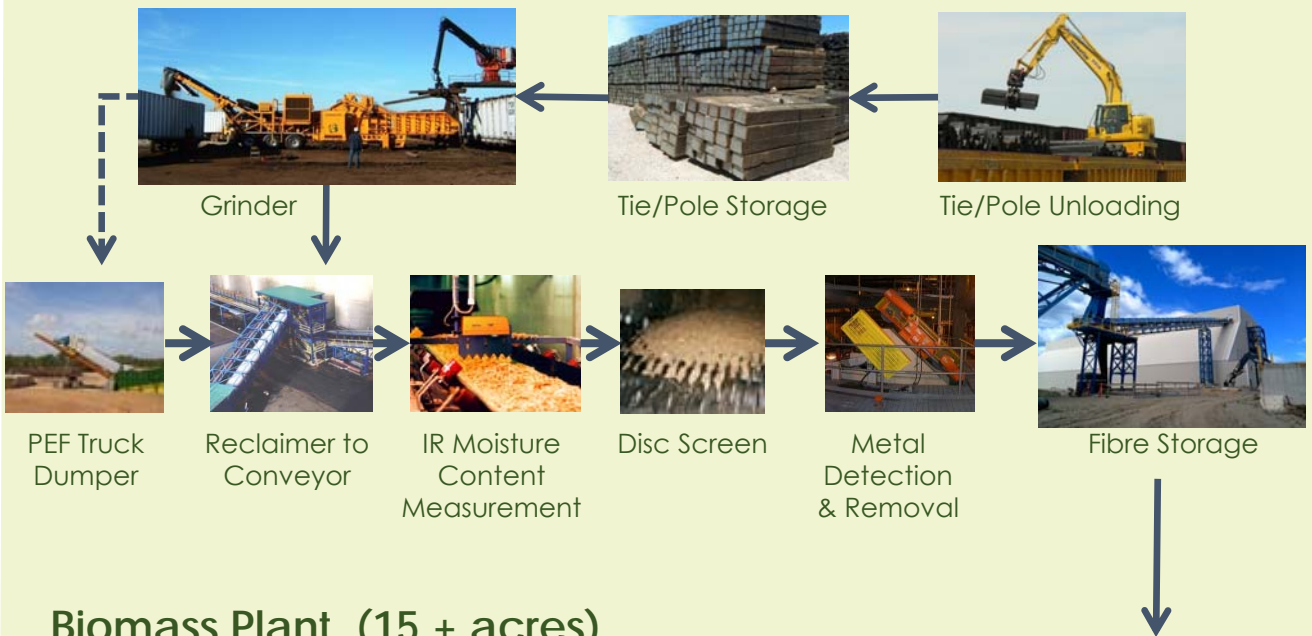
- Eliminates dust created from large outdoor storage piles
- Consistent feedstock moisture (no rain or snow)
- Proven design



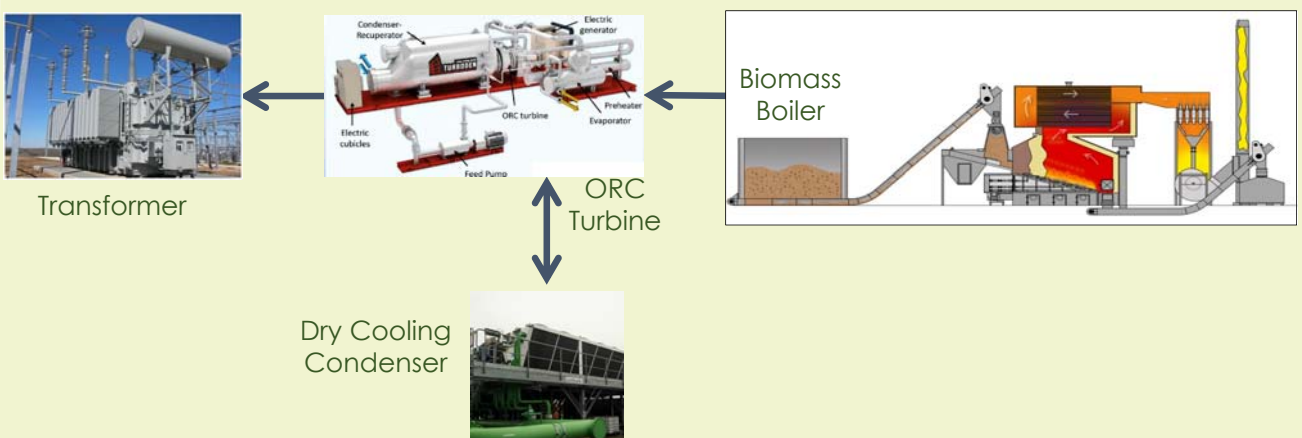
FACILITY OPERATIONS



Fuel Management (20 + acres)

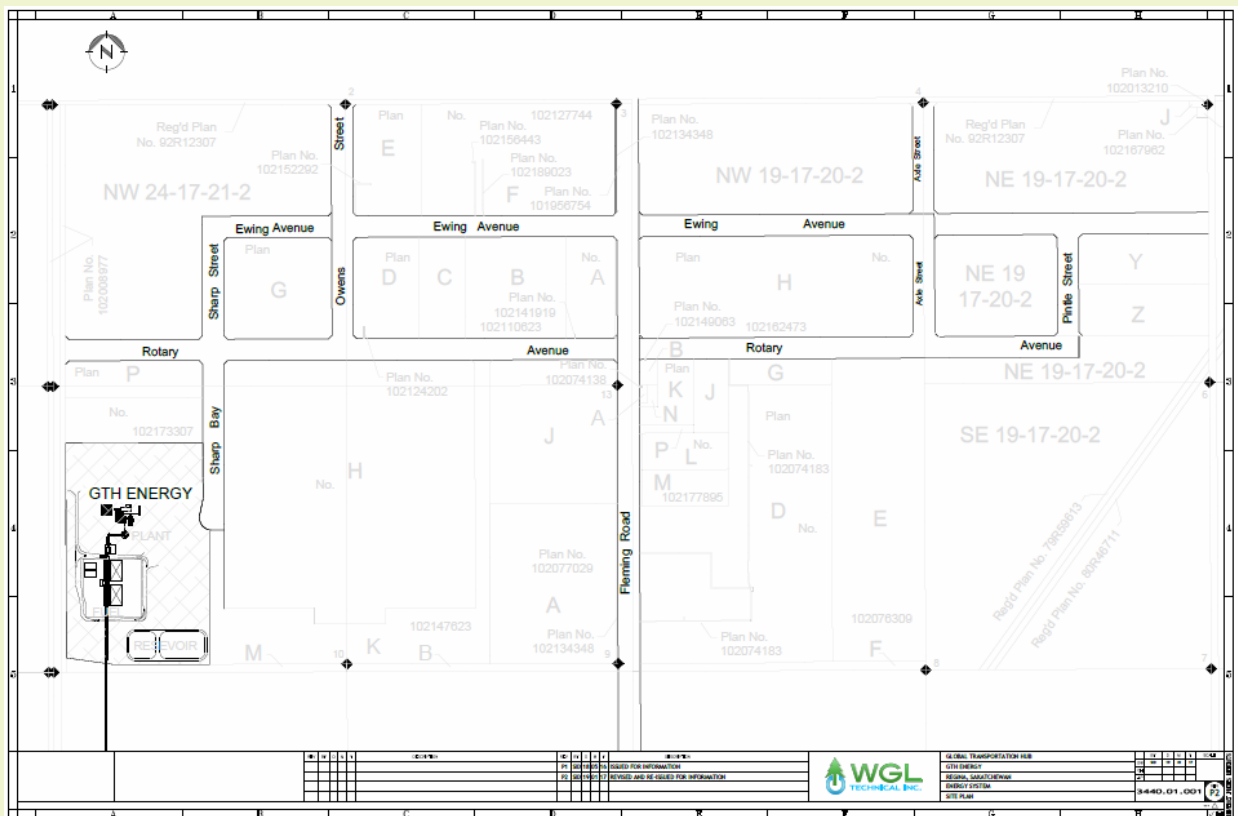


Biomass Plant (15 + acres)



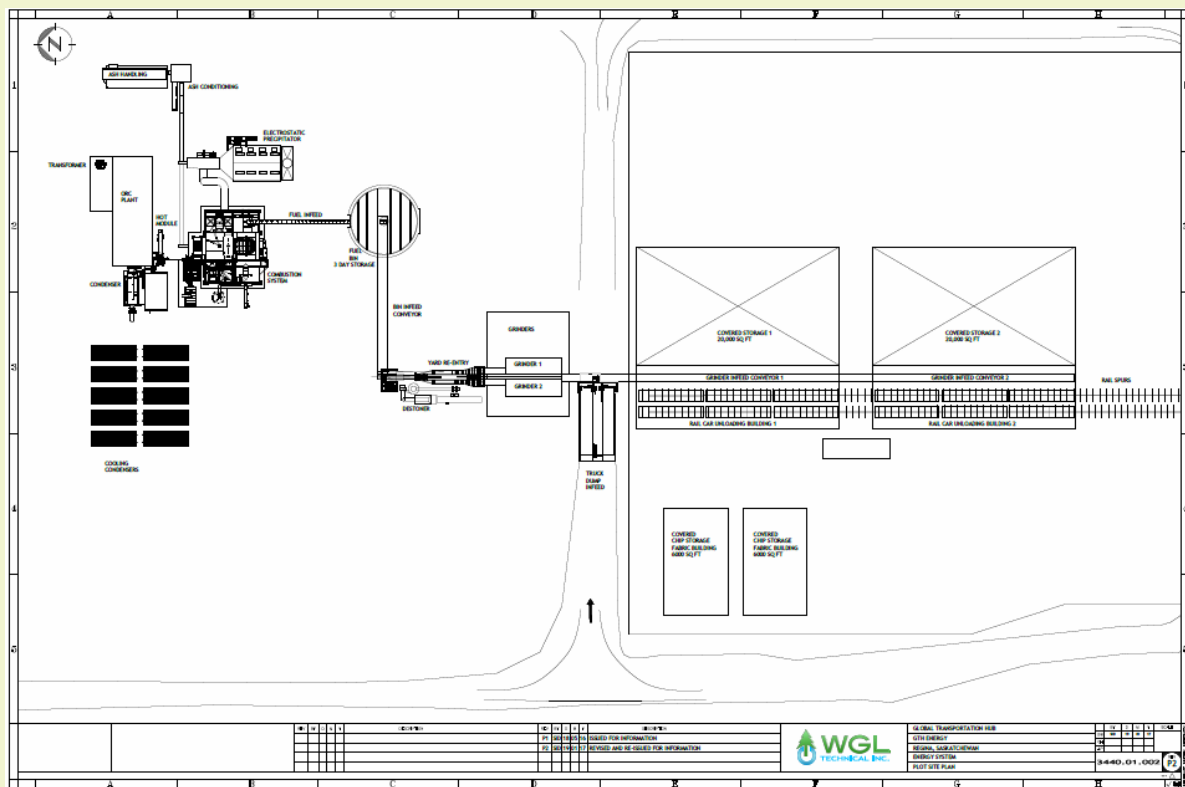


SITE CONFIGURATION WITHIN GTH



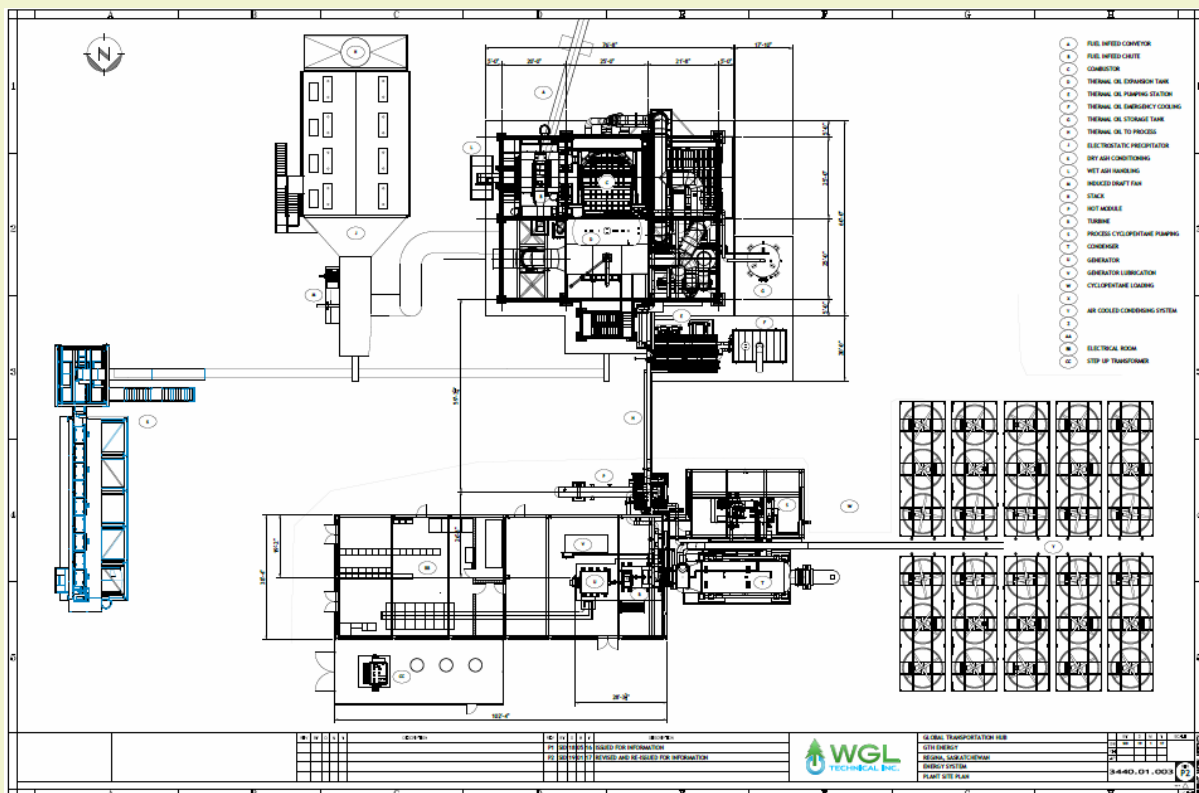


SITE LAYOUT





SITE PLAN





WATER USE & WASTE WATER

- Water use is anticipated to be minimal as the power generation and cooling system does not require water. Water solely needed for dust abatement and domestic use only.
- Project will need up to # litres/hour of water for these activities, which is equivalent to flow through 2 to 3 garden hoses.
- Waste water will be minimal, primarily generated from the washing of plant floors

WATER VAPOUR EMISSIONS

- Largely invisible, except on the coldest days.
- Fuel feedstock (dry wood) has a very low moisture content when compared to other alternatives (natural gas). Exhaust from the proposed biomass plant contains 40% less water vapour compared to using natural gas
- Steam plume dispersion can be modelled and will be mitigated using the model CALPUFF



BIOMASS PLANT EMISSIONS

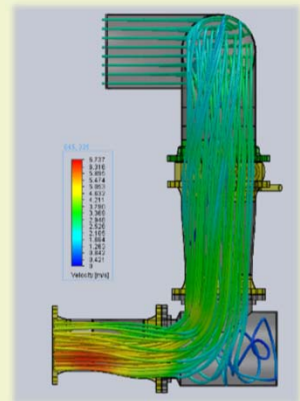
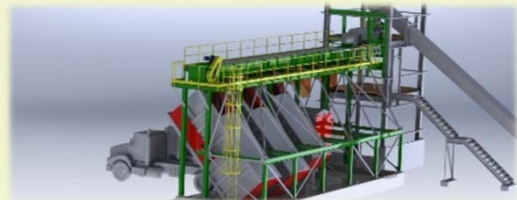
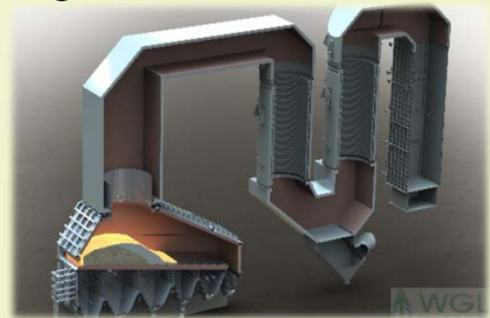
1. Plant emissions well below environmental emission standards.
2. Wood burns to provide clean renewable power.
3. Woody biomass conversion at ultra-high temperatures, incinerates wood preservatives.



EMISSIONS SOURCE AND CONTROL

Biomass Clean Energy plant will use best available technology to control emissions including:

- Specialized fibre grinding building with dust recovery and air filtration
- Dry fogging moisture injection system used for fibre unloading – water droplets capture dust particles
- Wind fencing will be designed using CFD analysis of wind patterns
- Covered Fibre Storage area, fibre grinding inside building (low noise)
- Multi-Stage combustion chamber and electrostatic precipitator meets the most stringent air quality guidelines
- Enclosed Fibre and Ash handling Conveyors operated with negative air filtration system
- Specially designed fully enclosed Ash storage truck bins
- Bag-house filtration system to filter fugitive dust
- Storm-water runoff and two cell lagoon treatment design
- CFD* and Distribution computer modeling used to predict emission concentrations, impacts, and design verification



* Computational Fluid Dynamics



AIR QUALITY

- Guaranteed 20 mg per standard m³ of particulate corrected to 8% oxygen
 - Has been approved by Saskatchewan Ministry of the Environment
- CO₂/NO_x – the suspension burner combustion chamber would feature staged combustion zones and recirculated flue gas to lower NO_x levels
 - Dioxins/Furans: Wood materials have not been exposed to pentachlorophenol, so processing these ties will NOT result in the formation of dioxins or furans. Furthermore, the heat and residence times of the furnace would be configured to prevent the formation of these substances.

ASH HANDLING

- Fully enclosed ash handling system design, with moisture conditioning
- Negative pressure conveyor system eliminates fugitive dust emissions



ECONOMIC BENEFITS SUMMARY



- Estimated investment of **\$80 million**
- Estimated **\$35 million in local procurement** opportunities
- Economic spin-offs including **local jobs** and **First Nations opportunities**
- **Diverts waste** from landfills and extends the life of landfills
- Approximately **60 employees** required during construction, plus **21 full-time positions** at full operation
- As many as **40 indirect employees** will be needed to collect construction waste and treated poles
- Incremental **property taxes** estimated at \$250,000/year
- **Reliable, clean renewable energy**



COMMUNITY & STAKEHOLDER ENGAGEMENT

- Critical to the success of the Project
- All feedback will be given full consideration
- Fully transparent project development process



NEXT STEPS

- Ongoing public consultation
- Integration of feedback into Project plans
- Complete and submit permits, approvals, certificates and/or registrations required for plant construction and operation

Thank you for your input. We look forward to being part of your community

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