

**Biomass Gasification  
to  
Produce Green Hydrogen  
+ other Biofuels  
February 2023 AGM  
Presentation**

Energy Transition to a  
Net Zero CO<sub>2</sub> Economy by 2050

# Scalable Green Hydrogen Production from Biomass

Minnova Renewable Energy invests in new technologies that mitigate climate change by converting waste biomass to energy.

Invest and  
develop



3<sup>rd</sup> Generation biomass gasification technology can produce a higher hydrogen content syngas  
Produce carbon neutral pure hydrogen or other valuable biofuels

ESG Focus



Sustainable  
Waste to green hydrogen is socially accepted  
Meets Environmental, Social and Governance (ESG) goals

Bioenergy  
Opportunity



Government and industry are seeking increased sustainable renewable energy supply. Green H<sub>2</sub> from sustainable biomass gasification are an obvious solution

# Minnova Renewable Energy

## Our Vision

Become a leading global Cleantech company that develops and acquires innovative technologies to create a more a sustainable future:

- Transform waste to energy
- Green hydrogen production to decarbonize industries
- Green Job creation
- Support a clean energy transition
- Reduce forest, agricultural and municipal waste and maximize energy recovery
- Produce a diversity of zero carbon biofuels
- Re-use existing and legacy fossil fuel infrastructure (e.g., natural gas pipelines)
- Contribute to reduced fossil fuel use and greenhouse gas emission
- Export Canadian expertise and technology around the world

# Minnova Renewable Energy Cleantech Energy Focused Strategy

**Gasification of waste forest biomass waste produces a high-quality syngas that can directly power generators**

- Biomass syngas power generations is;
  - Sustainable,
  - Zero CO<sub>2</sub> emissions
  - Highly efficient
  - Distributed and scalable
  - Simple to operate
  - Low maintenance
  - Low / no emissions
- With sustainable biomass supply gasification to produce electrical power offers energy security

**Green hydrogen is the FUTURE FUEL and widely considered to be a key new energy source to reduce CO<sub>2</sub> emissions:**

The International Energy Agency<sup>1</sup> notes that in order to reach net zero emissions by 2050, global CO<sub>2</sub> emissions need to decline by 41% from their 2019 level .... the remaining 59% can decline at a much shallower, but still ambitious, curve over two decades, to reach net zero by 2050.

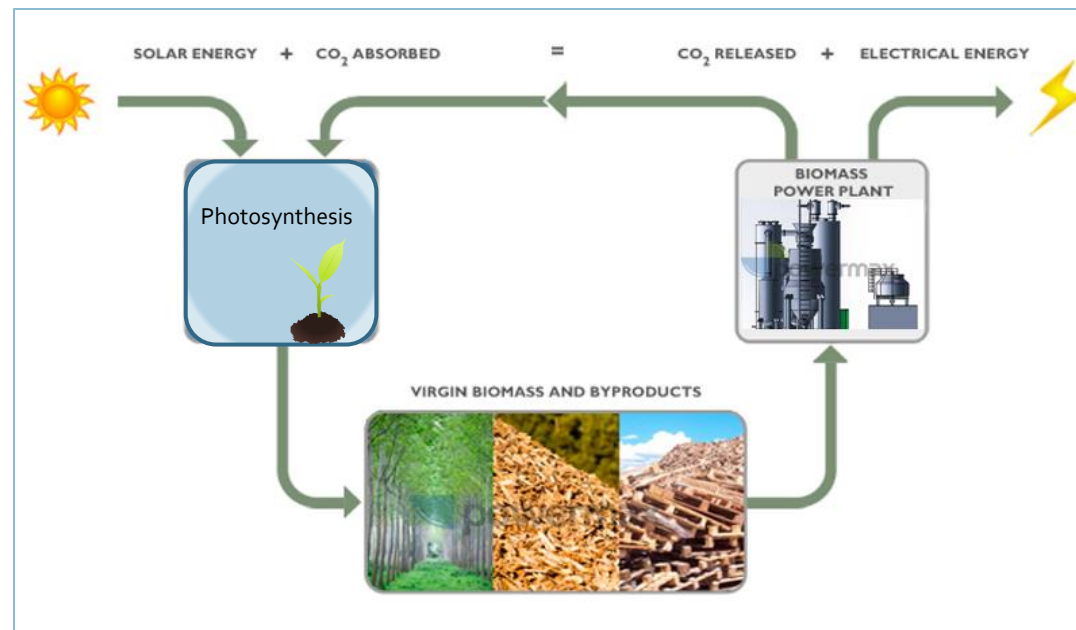
- Hydrogen is versatile, clean, and safe
- Green hydrogen that is produced from renewable energy produces zero CO<sub>2</sub> emissions
- Green hydrogen can be converted to green ammonia (fertilizer) to support growth in agricultural sector

**Our VISION is to produce low-cost electrical power and green H<sub>2</sub> via biomass gasification in support of the global ENERGY TRANSITION**

# Biomass – Living Stored Energy

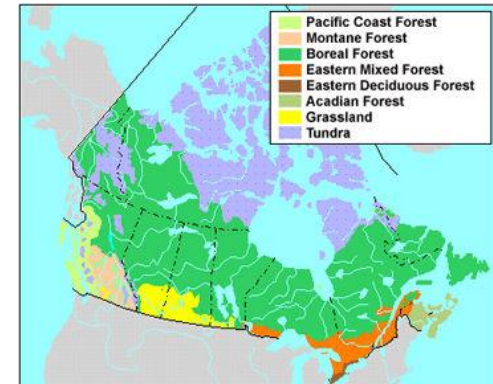
- Biological feedstocks rather than coal, oil or natural gas are attracting increased interest and support from policy makers, investors and consumers
- Biomass power addresses priorities such as energy security, climate change, decentralized production and rural economic development
- Long term economic development and job opportunity in rural communities

Energy contained in biomass is stored solar energy which is converted into electrical power for Net Zero CO<sub>2</sub> balance



# Boreal Forest Resource: Large, Sustainable and Underutilized

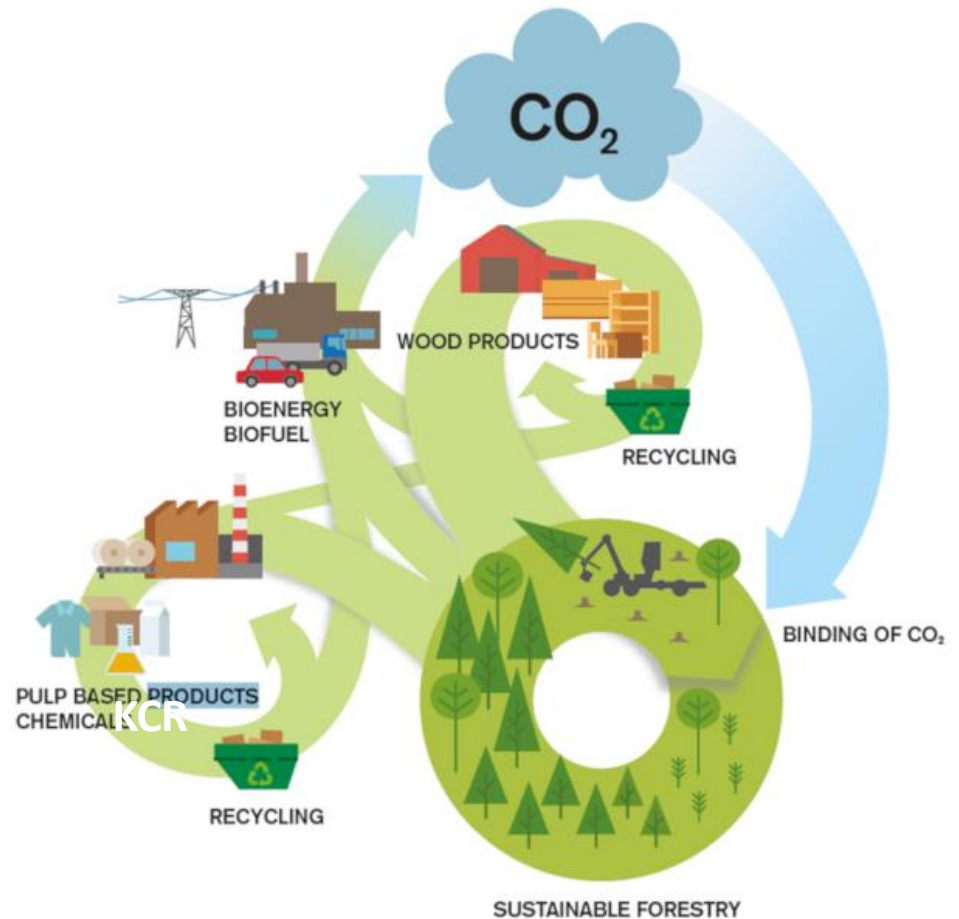
- Canada has nearly one-quarter (24%) of the world's boreal forests, and it is underutilized
- Reasons the use of biomass for energy from forests is still relatively low
  - Abundant hydro power
  - Major fossil fuel producer
  - Limited access and infrastructure
  - Mixed species, in part limited value
- Substantial bioenergy potential exists by efficient and expanded uses of available forest waste biomass
- Maximizing efficient agricultural and municipal waste represents similar bioenergy opportunity
- Green hydrogen and power generation from biomass represents a worldwide opportunity to create decentralized Zero Emission Green Energy Hubs



A regional renewable energy hub would include a transportation and infrastructure development anchored by a biomass gasification plant, like this 205MW Plant in Atikokan northwestern Ontario, above.

# A Worldwide Biomass to Energy Opportunity

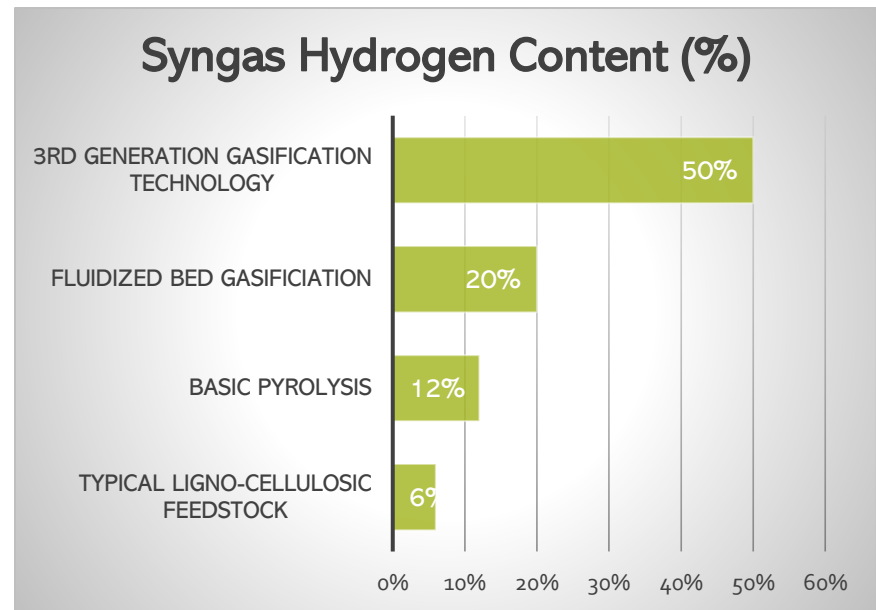
- Sustainable feedstock supply
- Low lifecycle CO<sub>2</sub> footprint compared to other renewable energy solutions
- Community support for circular economy solutions
- Decentralized and local green energy production
- Multiple energy products
  - green hydrogen
  - Green ammonia
  - Biofuels including SAF
- Potential to develop export markets



# Minnova Renewable Energy

## Innovative New Technology

- 3<sup>rd</sup> Generation biomass gasification technology is a step change in efficiency
- High Hydrogen content (~50%) syngas can be processed to pure hydrogen and other valuable bio-fuels or used to produce electrical power
- No external energy requirement post start up
- Modular - 10MW<sub>th</sub> unit requires 15,000 to 20,000 tonnes biomass per annum
- ~10,500 Nm<sup>3</sup>/hr of high-quality syngas to generate 10MW<sub>electrical</sub> power plus 30MW<sub>thermal</sub> power
- Pure H<sub>2</sub> output – 1.4 million Kgs per annum
- Minimal environmental impact with small footprint plant



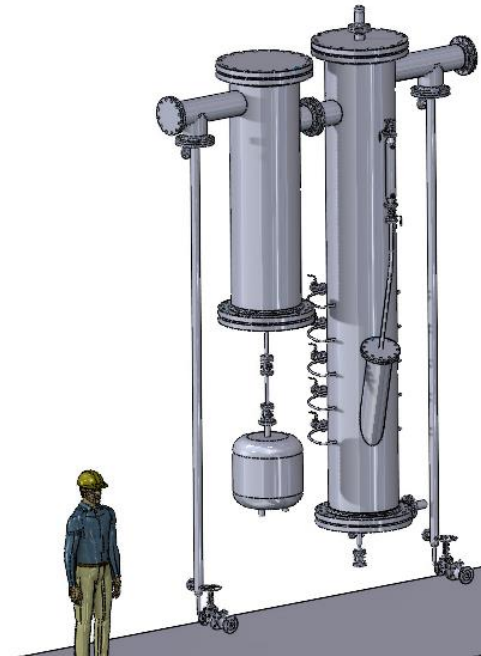


# Minnova Renewable Energy

## 3rd Generation Gasification Process

- Feedstock is dried to < 30% moisture content
- Fed into the reactor by device synchronized to gate mechanism to inject with a predetermined sequence
- Feedstock Pyrolysis is achieved in absence of air/oxygen by indirect heating up to 1000°C
- Proprietary technology and design generates a high content syngas (>50% H<sub>2</sub>)
- Resulting syngas is extracted from the reactor and passed through a gas cleaning system
- No Auxiliary Fuel required
- No tars in the Syngas
- No NO<sub>x</sub>, SO<sub>x</sub>, and other dangerous pollutants

10 MW<sub>th</sub> Module (scalable)



**Syngas can be used directly to produce renewable power, processed to pure green hydrogen or multiple other bio-fuels**

# Bioenergy Production Options:

## Green Hydrogen – Electrical/Thermal Power- Ammonia + Other Biofuels

Operational Inputs and Outputs	PHASE 1 – Start-up Initial 10MW <sub>electrical</sub>	PHASE 2 <sup>4</sup> Additional 20MW <sub>electrical</sub>	PHASE 3 <sup>4</sup> Additional 20MW <sub>electrical</sub>
	Year 2023-2024	Year 2025-2026	Year 2027-2028
Biomass feedstock (tpa)	45 – 60k	90 – 120k	90 – 120k
Biomass Input (MW <sub>thermal</sub> )	30	60	50
Syngas Production (wet, Nm <sup>3</sup> /hr)	~10,500	~21,000	~21,000
Bioenergy Output Options			
Generator type <sup>1</sup>	Combined Cycle	Combined Cycle	High efficiency CHP
Electrical Power (MW <sub>electrical</sub> )	~10	~20	~20
Thermal Power (MW <sub>thermal</sub> )	~30	~60	~50
Future Green H <sub>2</sub> (kg/yr) <sup>2</sup>	>4 million	>8 million	>8 million
Future Green NH <sub>3</sub> (kg/yr) <sup>3</sup>	>12 million	>24 million	>24 million

Notes: 1) Subject to feasibility study considering thermal loads (heating and cooling) , 2) Fischer-Tropsch reaction of syngas and upgrade to pure H<sub>2</sub> in support of industry and transport sectors , 2) H<sub>2</sub> conversion to ammonia NH<sub>3</sub> in support of agriculture sector, 4) subject to harvest volume allowances and market demand

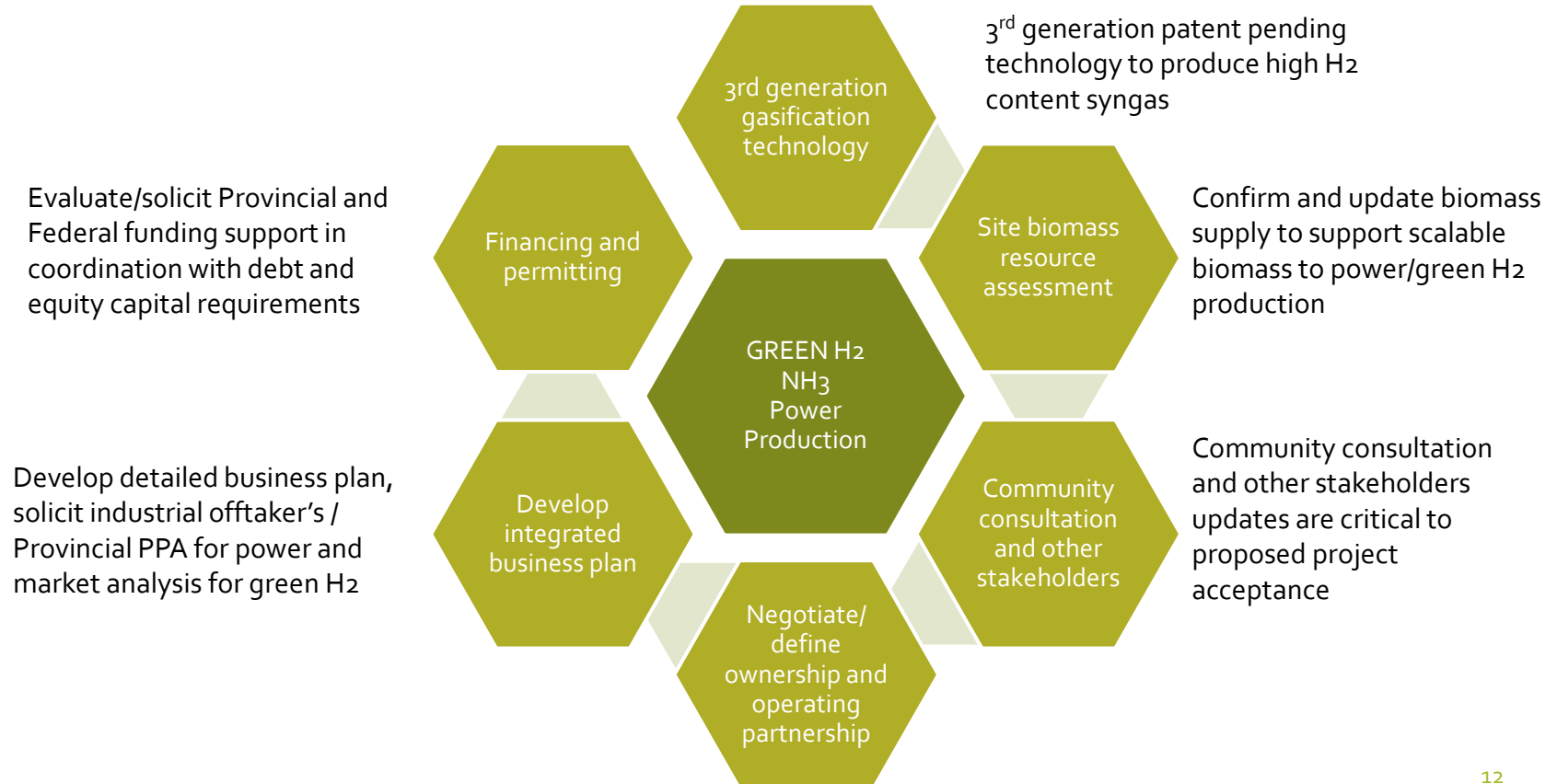
# Other Biofuels and Valuable Products

## Forest Biomass Product Opportunity

The versatility and range of applications for wood presents numerous opportunities for forest biomass. Beyond the more familiar uses of forest products like lumber, pulp and paper, or particleboard, there are a number emerging products and uses that can be derived from wood/forest biomass, such as:

Chemicals	Materials	Energy
<ul style="list-style-type: none"> <li>• Sugars and alcohols</li> <li>• Green solvents and chemicals</li> <li>• Resins, binders and adhesives</li> <li>• Medicines and pharmaceuticals</li> <li>• Paints and dyes</li> <li>• Plastics and polymers</li> <li>• Biocoal and bio-coke</li> </ul>	<ul style="list-style-type: none"> <li>• Composites</li> <li>• Textiles</li> <li>• Carbon fibre</li> <li>• 3D printing</li> <li>• Biochar and carbon</li> <li>• Cellulose nanocrystals and nanofibrils</li> <li>• Battery energy storage filaments</li> </ul>	<ul style="list-style-type: none"> <li>• Renewable natural gas</li> <li>• Modern wood heating</li> <li>• Biodiesel and liquid biofuels</li> <li>• Community / district energy systems</li> <li>• Green hydrogen</li> <li>• Sustainable aviation fuel</li> </ul>

# Site Selection to Produce Green Hydrogen, Electrical/Thermal Power and other Biofuels



# Environment – Minimize Impact

Committed to ensuring the project development and operation have minimal impact on the environment and people around them



## Noise

Minimize noise emissions for community and wildlife



## Air Quality

Minimize emissions and satisfy or exceed all permits standards



## Visual Impact

Minimize site footprint with modular design, earth modeling and tree planting



## Wildlife

Minimize habitat impact and maintain biodiversity

# Site Selection and Development

- Target jurisdiction with abundant waste/residual biomass
- Work cooperatively with biomass supply chain on various studies evaluating the proposed Joint Venture Proposal
  - Biomass supply assessment
  - Community Consultation
  - Preliminary infrastructure and logistics assessment
  - Environmental impact
  - Market studies for electricity, green hydrogen, ammonia and other biofuels
- With positive studies in hand Minnova can advance development with biomass supply agreements, under build-own-operate (BOO), BOO-transfer (BOOT), partnership or other structure
- Develop green H2 market with offtake agreements
- Depending on supply chains development timelines are 12-18 months

# Management and Directors



Aligned and Focused on Shareholder Returns

## MANAGEMENT AND BOARD

### Gorden Glenn - *Chairman, President & CEO*

Over 30 years industry experience in finance as Investment Banking/Mining Analyst and including 9 years as a geologist.

### James D. A. White - *Director*

Mr. White is the Managing Partner of Baynes & White, a Toronto-based pension and benefits actuarial consulting firm.

### Brian Robertson - *P.Eng., Director*

Over 30 years experience in corporate management, exploration programs, project management, mine permitting, construction, development and operation as well as the evaluations or corporate acquisitions.

### Chris Irwin - *LL.M., Interim CFO, Director*

Mr. Irwin is President of Irwin Professional Corporation, a corporation providing legal services mainly to the natural resource sector.

### Advisory Board

### Kent Newman - *Advisory Board*

Mr. Newman has over 30 years experience in utility scale power including over 20 years at MB Hydro. Mr. Newman is currently President of AMPS Powerline.

## EXPLORATION & DEVELOPMENT TEAM

### GEOLOGY - Chris Buchanan, *MSc., P. Geo.*

Senior structural geologist with 20 years of experience specialized in structural controls and alteration assemblages of gold systems.

### MINING & DEVELOPMENT – TBA



### Engineering and Technology

### Mario Mantaci, *P.Eng., MSc. Aerospace Engineering*

20 years experience in aircraft design, ship design and construction, hydrogen filtration, biomass gasification and simulation analysis.

### Marco Sonnessa, *BSc.*

15 years experience in project management, renewable energy systems design, steam reforming and hydrogen production from biomass.

Exploration, Development, Operations, Finance  
and Investment Experience

# Capital Structure

(Share data as of February 16, 2023)

Symbol	TSXV: MCI   AGRDF: OTC Pink
Shares Outstanding	69,888,176
Options average price \$0.21	5,810,000
DSU/RSU average price \$0.85	975,000
Warrants \$0.08	6,110,644
Fully Diluted	82,783,8218
Market Capitalization (recent price C\$0.08/sh)	~\$6 million
Cash and Equivalents	~\$300,000
Debt	~\$850,000
Management and Director Ownership	~15% basic ~20% fully diluted



## Gold Sector Valuation Significant Discount to Peers

Metric	MCI	Peers
EV/RSC OZ	<\$10	\$40
P/FS NPV @US\$1250 Au	<0.3x	>0.3x
P/FS NPV @US\$1875 Au	<<0.05x	~0.1-0.6x

## MRE - H2 Valuation Too Soon to Tell



# Thank You



Gorden Glenn,  
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