


# Greener Raw Materials From Waste

Changeover Technologies™

Visit Our Website
https://changeovertechnologies.com

*"Transitioning from Carbon Dependent to Bio-Carbon Net Zero"*

# CLICK TO VIEW VIDEO


**PLEASE VIEW OUR 60 SECOND QUICK OVERVIEW VIDEO *60 SECONDS WELL SPENT !***

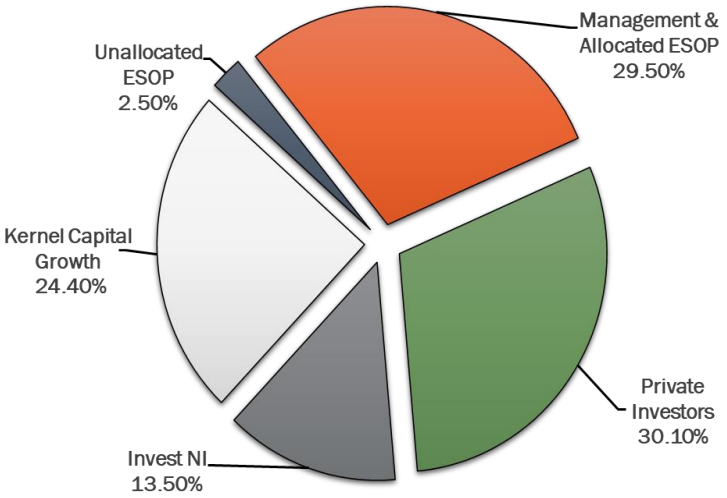
For the latest news and contact details, please see our website:
www.changeovertechnologies.com

**Follow us on LinkedIn:**
https://www.linkedin.com/company/70572282

## Who We Are

- Clean-Tech start up, based in Belfast, Northern Ireland, UK.
- 5 years in R&D and raised £5.6m to date from VC and Private Wealth. About 40% – 60% respectively
- EIS approved

## Capital Structure




£5.6m raised since 2017 through investment & Invest Northern Ireland (INI) support

European Union
European Regional Development Fund
Investment for Growth and Jobs

*INI Silver Innovation Award 2021*

SILVER LEVEL INNOVATOR
Innovation
Turning ideas into value

| INVESTMENT ROUNDS | | |
|---|---|---|
| DATE | VALUATION | INVESTMENT |
| Jan 2017 | £1.0m ($1.3m) | £0.50m |
| Jan 2019 | £5.2m ($6.8m) | £2.0m |
| Apr 2020 | £6.7m ($8.7m) | *£1.2m |
| Apr 2021 | £10.0m ($13.0m) | £0.87m |
| Jun 2022 | £10.8m $14.0m) | £1.03m |
| *50% Equity & 50% Convertible Loan | | |

KERNEL CAPITAL

Invest Northern Ireland

CLARENDON FUND MANAGERS

## What have we done?

- Developed a fine particle waste recycling technology, initially targeting carbon dependent industries
- Patented combination - binding formula and process
- Produces pellets uniquely suited to industrial logistics & advanced electric arc furnaces processes
- ***Not*** an Energy Fuel solution; ***Not*** a fuel pellet
- These are recycled waste pellets of high value carbon required today & in tomorrow's sustainable future
- Independent studies show our waste recycling technology reduces producers' scope 3 emissions by 8%-70% and overall life cycle CO2e by 1%-7%
- We've successfully completed independent testing including a 5t/hr pilot unit & have 3 patents pending
- Turns high-value carbon wastes into an environmental win and a profit stream
- At TRL 6, now ready to move via licensing to commercial operation over the next 18-24 months

# And here is a *"Big"* statement!

- We have achieved something that has not been done before
- We've developed a technology that lets re-cycled carbons be used in steel & silicon processes

## How do we know this? – Two independent market studies, but more importantly, "Traction"

- For the last 12 months we have been in testing & negotiations with 3* major global industrial companies, leaders in the steel & silicon sectors, who came to us to provide the solutions they seek
  - USA - leading industrial carbon producer to USA steel market
  - E.U. – USA owned, major producer of carbon reductants for the silicon process
  - Scandinavia - global silicon metal producer – end-user of the E.U. carbon reductants
  - Multi-million and billon $ turnover companies committed to reduce and recycle their carbon waste
  - Established relationships in place with NDA's & MoU's
    - **NDA restrictions, will discuss further detail with investors once under NDA*

## How do we benefit from this?

- From one of these relationships, we'll sign our first licensing agreement this year & have first unit commercial in 2024
- The second will follow closely behind
- We're on track to move to commercialisation in next 18-24 months

# About our Team, Board & ESG

- We’re a full-time group of 8 with 2 in part time support
- A mix of businesspeople, scientists, engineers, a level structure, all with hands on technical know-how
- We’ve great support from an experienced board and advisors - All investors
- Sound ESG principles – Strong corporate governance & ongoing industry certifications - 4 years audited accounts by Grant Thornton



**Team & Board Bio’s available in website https://changeovertechnologies.com/our-team & on-line LinkedIn*

# Business Strategy

## Route to Market

- License our technology - licensees will purchase our patented process plant & formula & pay royalty per ton
- We supply the licensee (producer) with the technology, and they manufacture the pellets to their specification
- ***Not*** a producer or manufacturer - we are a Clean-Tech solutions provider
- ***Not*** a labour-or-capital-intensive company. Capex growth funded by licensees
- Outsource our process plant & formula, under patent control
- Initial focus on "Niche" high purity carbons for steel & silicon sectors, then expand into others
- Ongoing industrial level co-operation on clean up and reduction of wastes in many sectors, e.g., biomass, bio-carbons, graphite
- Market Ready Technologies - ***SilForm® - MetForm® - BioForm®***

## R&D Pipeline

- *"Not a one hit wonder"* - *"Blue Sky Technology"* – ***AgriForm®*** - fossil ash & organic wastes

# Technology & Applications

- Our Technology is complex, it's a combination of formula & process, on which we have 3 patents pending;
  - Patent 1 - Formula
  - Patent 2 - Process
  - Patent 3 - Core Densification Unit - CT08

- These are supported with trade secrets and proprietary knowledge giving us that unique edge

- Many have tried to produce pellets from carbon wastes that the steel and silicon industries will allow to be utilized in their multi-million-dollar, Electric Arc Furnace process plants, none have succeeded

- The Electric Arc Furnace (EAF) is the low CO2, high temperature 2500-3000C process, that provides the "Green" energy in silicon metal production & recycling of steel, and future conversion to "Green" Hydrogen technology in iron production

- Steel is an alloy of iron and carbon. Carbon/silica reaction produces silicon metal

- Green steel & silicon still require carbon, it's elemental to their formation

- That is why leading industrial companies in the production of steel and silicon are testing our technology

- Over the next five slides we hope to give you some more understanding of our technology and its applications

- ***SilForm® - MetForm® - BioForm®- AgriForm®***

# Our Technology

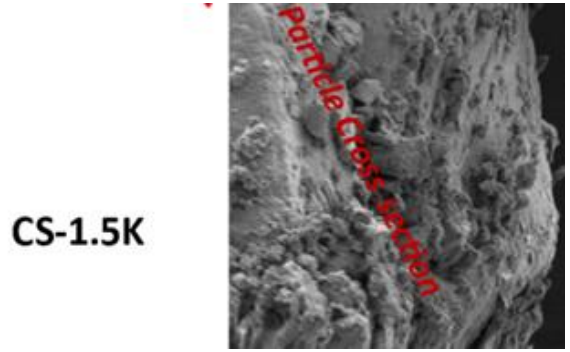
## What do We do?

- Solve the problem of the wastage in refining industrial high purity carbons
- Sized from a grain of rice to the diameter of a hair, our technology pelletises this waste
- The pellets are uniquely suited to industrial logistics & advanced electric arc furnaces processes
- We enable the recycling of these high value carbon wastes back into the circular economy
- Our technology is applicable to variety of wastes from mining, industry to agriculture
- Reprocess discarded wastes from high-purity industrial carbons to biomass to bio-carbons
- Enabling greener raw materials from wastes  - lower CO2 to net zero
- Turns waste cost streams into revenue streams

## What do We have?

- Platform technology – combination formula & process
- Unique industrial level logistical handling & ability to blend and size
- Unique densification ability
- Unique capability in high temperature electric arc furnaces
- Three patents & trade secrets
- Environmentally & commercially friendly technology

**Patented Molecular Level Formula**



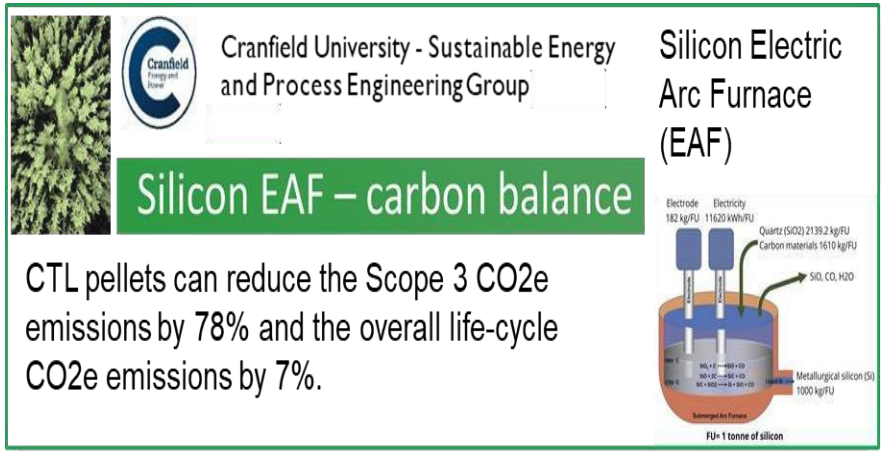

**Patented Process**

**Commercial Unit 100kt/Year Pellet Output**

# Technology Solutions – Market Ready Technology

## *SilForm®*

- Our technology can recycle the high value carbon wastes within the silicon metal supply chain so they can be used in the production of silicon
- Unique ability to be used within the high temperature electric arc furnace silicon process
- Unique ability to blend in other wastes
- Ongoing collaboration with global producer and end user in Netherlands & Scandinavia respectively
- MoU signed and working towards commercial licensing agreement by mid 2023
- ***SilForm®*** Reductant pellet produced from industrial high purity carbon wastes
- Requires 1.5T silicon reductants to produce 1ton silicon
- Reduces silicon producers' scope 1 & 3 CO2 emissions & turns wastes into profits




Independent Study by Cranfield University Sustainable Energy & Process Engineering Group

–

Impact of Changeover's technology in reducing CO2e Emissions in Silicon Metal Production.

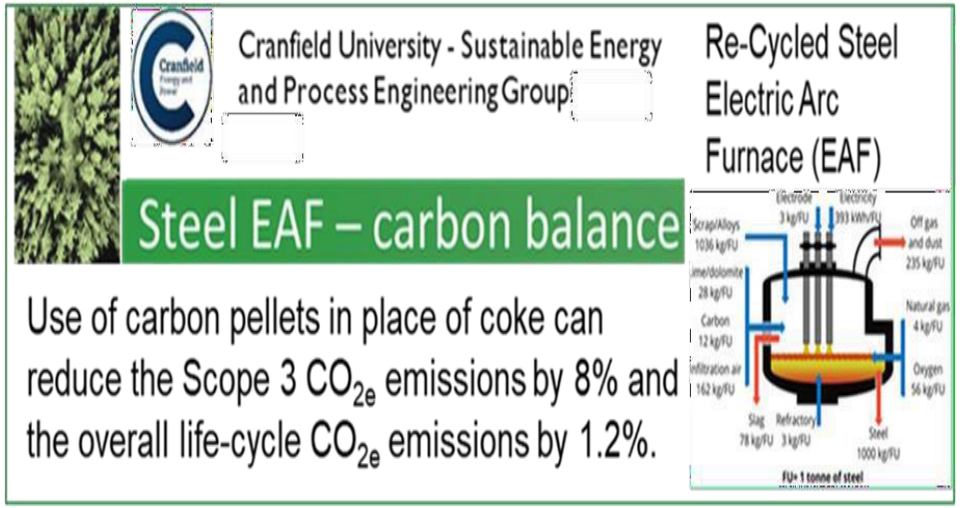
CRM Alliance Critical Raw Materials

Europe officially lists within the 30 critical raw materials for economic development - Silicon Metal

# Technology Solutions – Market Ready Technology

## *MetaForm®*

- Our technology can recycle the high value carbon wastes from the raw-iron supply chain, enabling them to be used in electric arc furnace steel re-cycling
- Unique ability to blend in other wastes from iron manufacture
- Ongoing collaboration with major USA producer of high purity industrial carbon
- ***MetaForm®*** High purity carbon pellet produced from industrial carbon wastes
- Requires 12kg of high purity carbon to produce a ton of recycled waste steel
- Reduces steel producers' scope 1 & 3 CO2 emissions & turns wastes into profits

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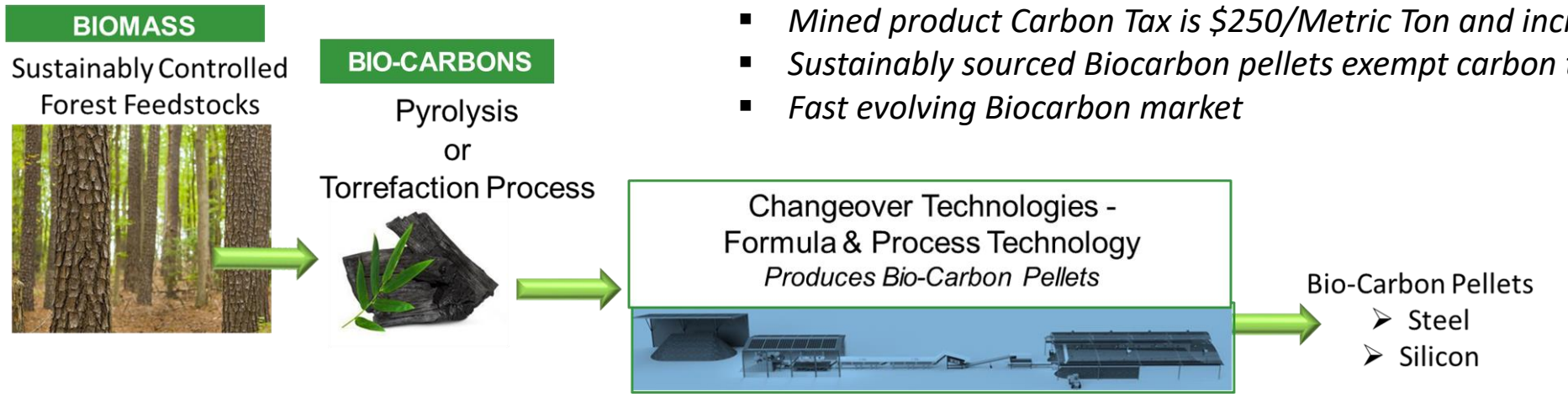
CRM Alliance Critical Raw Materials

Europe officially lists within the 30 critical raw materials for economic development - Coking Carbon

# Technology Solutions – Market Ready Technology

## *BioForm®*

- Our technology is a modular plug-on to the end of the bio-carbon production line
- Our technology enables the misshapen & low-density bio-carbons to be shaped & sized to specification pellets with four times density of raw bio-carbons & suited to high temperature electric arc furnaces in steel & silicon production
- This reduces by quarter the logistical handling and related CO2 transportation emissions
- An additional unique ability to blend in other wastes from steel & silicon processes
- Ongoing collaboration with global U.K. commodities group & USA biomass producer & specialist manufacturer
- A bio-sourced “Net Zero“ - 100% green bio-sourced alternative for silicon & steel reductants



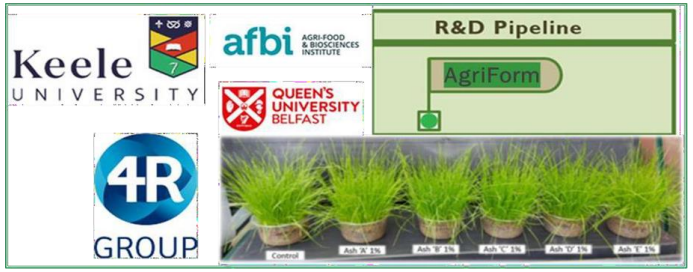

- *Mined product Carbon Tax is $250/Metric Ton and increasing*
- *Sustainably sourced Biocarbon pellets exempt carbon tax*
- *Fast evolving Biocarbon market*

# R&D Pipeline - *"Blue Sky"* Technology

## *AgriForm®*

Changeover Technologies are widening environmental frontiers in soil formation:

- *Value creation* from industrial legacy coal fly ash & organic wastes
- Distribution to *desert environments* for agro-forestry schemes (circular economy)
- R&D for 3 years now at TRL3/4




### KEY SOIL IMPROVING QUALITIES

- Increases **soil resilience** and **water holding** (↑ retention)
- Introduces **soil essentials** for fertility (↑ macro-nutrients)
- **Neutralises** acid soil (↑ pH)
- Improves texture of **sandy soils** (↑ soil binding)
- Granules mixed into surface soils with **slow-release action**

### TARGET MARKET & USE

- **Arabian Peninsula** (UAE and Saudi Arabia), dry arid landscapes
- Geo-engineering key to the 4th Industrial Revolution
- Large scale, **arid landscape terraforming** and desert control,
- Targeting **agro-forestry schemes** and **'green' soil-stabilisation**
- Promoting a **global, circular sustainable** economy

# Financial Snapshot

## Producers & Manufacturers - Licensees

- Our 100kt/year modular plug and play unit fits onto producer's existing $50m-$100m plant
- Our unit is a $4m buying decision
- Producers profit after costs and royalty $50 - $100/ton pellets
- $5m-$10m/year profit

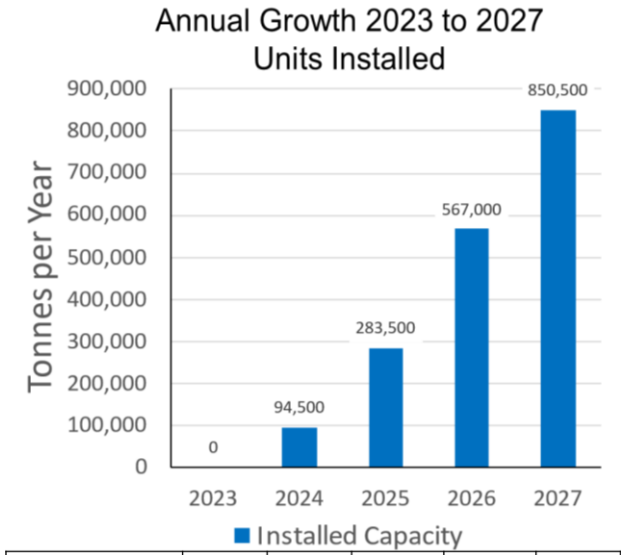
## Changeover Technologies – Licensor

- Our Gross Profit (Royalties) - $20/ton pellets
- Profit (Royalties) per unit - $2m/year
- Our *Niche* market (SOM) - 14m ton/year – Potential Profit (Royalties) - $280m/year

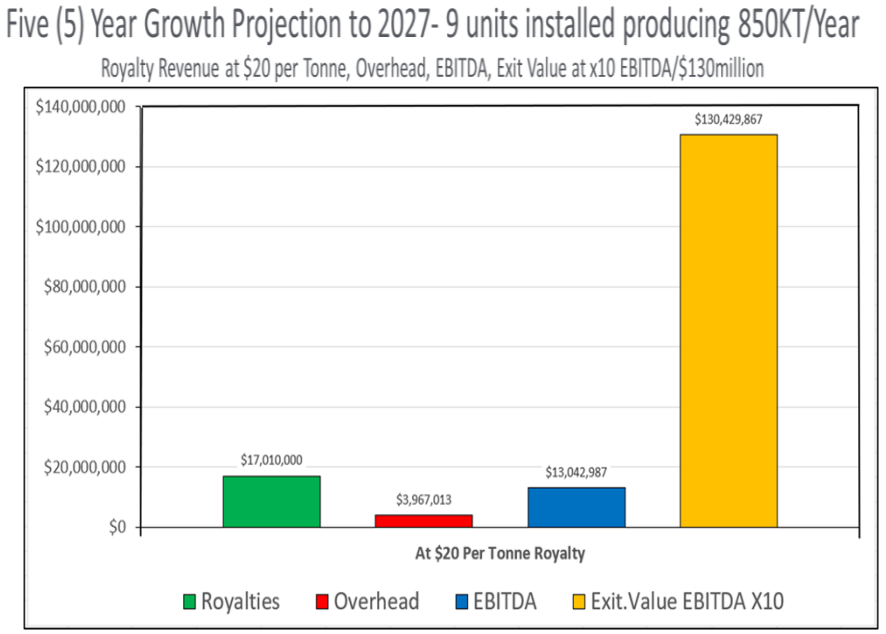
## Five Year Targets

- Global *Medium growth - 9 units or 850,000 tons/year
- Gross Profits (Royalties) - $17m/year
- Market Share 6%
- EBITDA - $10m range, Valuation $100m plus.
- Exit Strategy – Industry Buy out or IPO

**Does not include profits from Biocarbon or R&D Pipeline technologies*
*** Full financial models available*




| Units / Per Year | 0 | 1 | 2 | 3 | 3 |
|---|---|---|---|---|---|
| Accum. Units | 0 | 1 | 3 | 6 | 9 |



## The Ask, why we're pitching to you now?

- We've raised and spent in R&D, (inc. 2 covid years), £4.6m, and recently took in another £1.03m round from our existing shareholders to give us runway to end 2023

- The £1.03m we recently raised was part of a planned £2m fund round which we are now seeking to complete and raise remaining £970k

- This is now open to new investors as minimum £100k to maximum £970k to complete this £2m fund raise under same term sheet

## The Use of Funds

- To bring in "new" investment, to extend our runway over the next 18 - 24months.

- Supports us into production by 2024

## Summary Term Sheet

- Before Valuation - £10.8m

- Warrant incentive 1:1 share option to purchase at subscription price valid to 6th September 2024.

# Changeover Technologies™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