# Ocean GeoLoop AS

# **Company Presentation**

May 2022



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# The combined climate, environment and resource crisis is a major challenge and needs a holistic solution



Escalating emissions increase the global temperature, resulting in a major climate crisis



Man-made emissions causing ecosystem collapse and loss of biological diversity in the oceans



A growing world population requires an increasing amount of sustainable, local resources (energy, food, materials)

# Copying nature to bypass costly and polluting processes

the e-Loop

Point source carbon capture unit

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### GeoLoop Column unit

 A multi-functional, ocean-based dome-system enabling biomass production, ocean purification and oxygenation

• Captures CO<sub>2</sub> from a point source emitter and can turn it into a pure, liquid state.

 Can be delivered as a service, allowing the customers to pay per ton of captured CO<sub>2</sub>



produces no pollutants

### Biomass

Production and sale of biomass for feedstock

## Cleaning the oceans

Enabling ocean purification and oxygenation for public and private clients

Ocean GeoLoop Source: The Company

The proprietary point-source carbon capture technology can capture close to 100% CO<sub>2</sub> from flue gas, is 100% free from toxins and harmful chemicals and the company has an ambition to make it 100% self-financed by 2024 via the e-Loop

The patented GeoLoop Column is a proprietary multi-functional ocean-based system which can be utilized for biomass production, to clean the ocean from micro algae and particles and to oxygenate the lower water layers

**Ocean GeoLoop** 



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The company has exclusive access to the e-Loop technology for point source carbon capture, storage and utilization. When the point source carbon capture technology is integrated with the e-Loop, the process is expected to be net energy positive

Carbon Capture by Nature Subsidiary Energi Teknikk AS enabling access to core elements for the e-Loop rollout and EPC competences for rapid industrial growth

Attractive partnerships in place to develop the technological toolbox and launch enabling industrial pilots and rapid commercialization, including Norske Skog, Franzefoss Minerals, OKEA and several others

Strong leadership with diverse and complementary industry backgrounds

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# Ocean GeoLoop is established to commercialize green, disruptive technologies with a global reach



Our solutions are aimed at solving the greatest challenge of our time; a combined climate, environment and resource crisis



Based on more than 15 years of research & development together with international partners



cean GeoLoop

Copying nature to bypass costly and polluting processes

Highly scalable solutions with significant, global potential



# Actively maturing the product portfolio

ΤοοΙ	Main services delivered to clients	Technology maturity	Current status	Envisioned status end-22
	Point-source carbon capture	<ul> <li>Process tested, calculated and verified by SINTEF</li> <li>Industrial pilot engineered and constructed</li> </ul>	<ul> <li>On time installation of main carbon capture modules April 2022</li> <li>Pilot plant commissioning Q2 2022</li> </ul>	Verification procedures accomplished. Ready for full-size implementation
	Marine biomass and ocean purification	Industrial scale pilot launched outside Fiborgtangen, Trondheim Fjord in June 2021	Continuing process and product optimization	Engineering and project planning for first commercial unit

Working systematically to mature and industrialize the technologies



# Subsidiary and selected partners



Source: The Company

# Energi Teknikk AS - subsidiary of Ocean GeoLoop

### Maturing of game-changing e-Loop...

- e-Loop is a novel technology enabling clean electricity production by using low quality heat differences in fluids and gases to power a hydropower turbine
- Ocean GeoLoop has exclusive access to the e-Loop technology for point source carbon capture, storage and utilization
- The e-Loop is the enabler for the 100% self-financed Carbon Capture Gen 3
- Utilization of the e-Loop is expected to provide significant positive cash-flow effects through sale of surplus energy to the emitters and/ or downstream users



### ...accelerated by investment in Energi Teknikk AS...

 A total supplier of equipment and services for development and operation of small-scale hydro power plants with 24 employees

• Offer proprietary turbines, switchboards and control systems



### ...providing multiple benefits for Ocean GeoLoop



The acquisition ensures access to core elements for the e-Loop rollout



A future platform for fully automated, robotized and standardized high capacity hydroturbine production line



Energi Teknikk has strong experience with hydro turbines, which is a key element in the e-Loop technology



Full EPC team and operational organization important for scaling



In sum, enabling potential future net energy-positive carbon capture

Source: The Company

Ocean GeoLoop

# Energi Teknikk as a business



- Energi Teknikk has 24 employees within sales, design, project, engineering, service, site erection, commissioning and management. The company has delivered electromechanical (EM) supply to over 200 small hydro power plants in Norway and Europe.
- Energi Teknikk was established in 1998 and have put in significant effort in R&D and appear today as a complete supplier within the electromechanical segment.
- The company is engaged in a lot of servicerelated work and have a 24-7 on-call service.
- The company had a revenue of NOK 149 million in 2021.

Technology



ET Brekke Pelton





• ET AutoTurbin



Revenue Q1 NOK 20.8 million

FinanceQ1



Sales & Market: 9 new contracts in Q1, 24 ongoing projects in total



Order backlog: NOK 110 million



EBITDA Q1 NOK 0.1 million



Collaboration with OGL adds new market areas and opportunities for growth to Energi Teknikk.

Source: The Company

# Management with diverse and complementary industry backgrounds to take the company through to full commercialization



### Chief Executive Officer – Odd Geir Lademo

- More than 25 years of experience in SINTEF and NTNU. Research Manager in Department of Materials and nanotech, SINTEF Industry. Adjunct Professor at NTNU. Member of core team of high-ranking research centers, SFI SIMLab and SFI CASA
- Extensive national and international industry networks
- M.Sc and Ph.D from Department of Structural Engineering, NTNU

### Chief Operating Officer - Viggo Iversen



- Extensive renew able energy experience from NVE, Enova SF and Proneo
- 10 years experience from Proneo w here he was responsible for the advisory business providing business development and innovation services to +40 companies annually
- Cand. Agric. from the Norw egian University of Life Sciences in Resource Economics

### Chief Construction Officer – Jan Arne Berg



- Over 30 years experience from oil & gas industries. Former General Manager / Vice president at Kvaerner in Verdal managing a product- and technology company
- Broad skillset in business development, sales & marketing, management and has an extensive netw ork
- B.Sc in Mechanical Engineering from Trondheim College of Engineering

### Chief Commercial Officer - Ove Lande

- 15 years experience in investment management and capital markets from Skeie Alpha Invest and Terra Securities
- · Significant business experience as former consultant at BearingPoint
- M.Sc in Financial Economics from The Norw egian School of Economics



- 18 years of experience from auditing, accounting and operational operation from Pw C, Selvaag Bolig, Western Bulk and Mestergruppen
- Strong and versatile leadership skills, highest ethics, and broad experience in different industries, domestic and international
- M.Sc in Economics, M.Sc in Audditing and Accounting from NHH



### Chief Project Officer – Lars Strøm

- More than 20 years experience from chemical and process industries from Borregaard, Norske Skog, NorFraKalk and Aibel
- Leadership experience from intl. process and product development
- Degree in Chemical and Process Engineering from University of Surrey and MBA from Griffith University, Australia

### Chief Technical Officer – Carlos Delgado



- More than 20 years of international experience in the Oil & Gas Industry within engineering, manufacturing, business development, and management.
- Experience with founding and managing a technology development start-up focused on reducing CO<sub>2</sub> emissions.
- · Electrical Engineering graduate.

# Management with diverse and complementary industry backgrounds

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# Active and experienced Board of Directors



### Chairman – Anders Onarheim

- CEO BW LPG Ltd
- Chairman North Energy ASA
- Vice chairman Reach Subsea ASA
- Extensive experience from Capital Markets as CEO of Carnegie and Executive Director Goldman Sachs in London



### Board Member – Hans Kristian Hustad

- 45 years of experience in running operations & board director/chairman positions in the Nordics, CEE, and UK
- Previously CEO and chairman of Booker cash and carry
- Lead from the Reitan side bringing Rema 1000 International AS to the stock exchange through a merger with Narvesen ASA
- Chairman OceanTunicell, OceanBergen, Ocean TuniFeed



### Board Member - Ole Jørstad

- CEO and ow ner of K4 Eiendomsutvikling AS
- Chairman of several companies in the SMB business in Middle Norw ay
- Member of Executive Committee in The Norw egian Olympic and Paralympic Committee and Confederation of Sports
- Member of Executive Committee in European Handball Federation



### Board Member - Lars Sperre

- Senior Vice President Corporate Strategy of Norske Skog ASA
- Former interim President and Chief Executive Officer of Norske Skog ASA for a period of approximately one and a half years
- Previously part of Norske Skog Group's Legal Council and Vice President Legal
- Former associate law yer at Norw egian law Firm Wikborg Rein



### Board Member – Ebbe Deraas

- Former Colonel and CO of HV-12
- Chief of Staff UN forces Sudan (UNMIS/UNMISS).
- SSO Defence Staff, Chief transformation in the Norw egian Army, Chief operations Regional Command South-Norw ay.
- Extensive experience in general management and network building, business and project development



### Board Member - Morten Platou

- Partner, law firm Schjødt
- MA, jurisprudence, University of Oslo, 2010
- LLM, Georgtow n University, DC, USA, 2012
- Specialist tax law and corporate law
- Extensive experience w ithin mergers & acquisition, restructuring, financial structures & incentives



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# **Point source carbon capture**

### 100% capture

Can capture close to 100% of  $CO_2$ from the flue-gas

### 100% clean

The capture and separation of CO<sub>2</sub> from flue-gas uses no harmful chemicals, no toxic materials and produces no pollutants

### 100% self-financed

Our ambition is to make this possible via the embedded electricity generating unit, the e-Loop



### Steps towards self-financed carbon capture



Ocean GeoLoop

# The technology has been de-risked and industrial pilot will be commissioned ultimo Q2 2022 at Norske Skog Skogn (NSS)

#### De-risked through several measures

- Theoretical studies, numerical simulations and experimental testing with the most experienced R&D resources on carbon capture
- Evaluated on process kinetics, energy consumption, scalability, environmental aspects and process robustness to variations in gas composition
- Experimental test campaigns and process calculations performed by SINTEF and system verified at laboratory scale at SINTEF's facilities in 2021
- Selected engineering and construction partners. First pilot plant currently being installed at Norske Skog Skogn with broad involvement of NSS and SINTEF personnel to ensure successful project execution



#### Industrial pilot at Norske Skog Skogn





A simple, low cost and modular design



Pre-wash, absorber and desorber units installed at NSS April 2022



### Selected storage and utilization options



### Captured CO<sub>2</sub>

### Storage alternatives (CCS)

- Separation of CO<sub>2</sub> from flue gas and compression of CO<sub>2</sub> into liquid state for storage in sub sea-floor/aquifers/oil-gas reservoirs
- Storage of CO<sub>2</sub> enriched (carbonated) water-phase flue-gas in underground reservoirs: oil-gas reservoirs and sub seafloor aquifers
- Storage as solid carbon (carbon black)
- Storage via mineralization (conversion to CaCO<sub>3</sub>)
- **Storage** of diluted flue gas **in the deep ocean** (> 2,000 m): inert, pH stabilizing, neutral-buoyancy nanocavities

### Planned usage (CCU)

- **Green Ethanol:** Produced with GeoLoop CO<sub>2</sub>, water and e-Loop electricity, supported by an electrocatalyst
- **Green methanol**: Produced from GeoLoop CO<sub>2</sub> and green hydrogen (electrolysis powered by e-Loop)
- Other green e-fuels
- Chemicals, fertilizers and plastics
- Building materials, e.g. as aggregates in concrete
- Catalyst (CO<sub>2</sub>) for electricity generation
- Greenhouses

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## Introducing the GeoLoop Column



### A multi-functional oceanbased system

- Biomass generation via filtering process, farming and harvesting
- Ocean filtration
- Buoyancy neutral, nanocavity oxygenation of the ocean columns preventing underwater oxygen depleted volumes (dead zones) – requires no biology
- pH stabilization acidification prevention
- Storage of point-source captured CO<sub>2</sub> in the deep sea (> 1,000 m)



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# The GeoLoop Column provides two potential revenue streams



### **Biomass**

- The GeoLoop Column is designed to capture and harvest marine biomass
- Ocean GeoLoop expects that the quantities of biomass produced by GeoLoop Columns shall become very substantial
- The biomass is assumed attractive for a number of products and applications, such as fish and animal feed production

### **Cleaning the ocean**

- GeoLoop Column can provide services such as ocean purification and oxygenation, and is expected to have fundamental and positive effects on water environments
- The positive environment effects are expected to be attractive for both public (municipalities and other local authorities) and private clients

## The enabler, a new marine biomass resource: Tunicates powering the carbon capture and e-Loop



#### Tunicates

- Unique, nanofibrillated cellulose from the only cellulose-producing animal in the ocean, the tunicate
- Developed by Ocean Tunicell in Bergen, and exclusively licensed to Ocean GeoLoop, for GeoLoop CCS/CCU and related e-Loop applications
- Enabling the generation of nanocavities powering the CO<sub>2</sub> gas separation, the of e-Loop electricity production and buoyancy neutral oxygenation of the ocean column

More than 20 years of research to develop and industrialize the nanofibrillated cellulose

Source: The Company

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### Ocean GeoLoop presents a clear 2025 vision...



Ocean GeoLoop Source: The Company

# Attractive and scalable business model with multiple revenue streams





# High level timeline for the entire business rollout



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## Expected LCOC for a large-scale carbon capture facility \*



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## Market potential Ocean GeoLoop





## Domestic focus markets for Ocean GeoLoop





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# Rapid growth and multiple milestones reached since inception

1998	2010	2016	20	020	H2 2020	H2 2021
Tunicate R&D initiated and funded by the University of Bergen, Norway	Tunichor AS established bythe University, via BTO Business: Ocean farming and processing of tunicates. Product focus: Biofuel – fish feed	OceanBergen AS established: 49/51 ownership TuniChor – Hans Gude Gudesen Focus: Ocean farming of tunicates, including CO <sub>2</sub> capture via tunicate fecal (micro-algae) matters	by Hans Gude continuation of t Partnering with the climate, e	p AS: Established e Gudesen, as a he Ocean project. nature to combat nvironment and rce crisis.	Lol with Norske Skog Skogn, Franzefoss Minerals, OKEA, Levanger, Verdal and Flatanger Patent transfer and license agreement with HGG Elected Board of Directors Completion of a NOK 100m private placement	EPC of mobile CC pilot facility for industrial testing at Norske Skog Skogn Lol with the Government of Iceland to reduce atmospheric CO <sub>2</sub> and to produce marine biomass Filter feeder potentials concluded
2006 Start of the Ocean project (Hans Gude Gudesen) 2014 Hans Gude Gud (HGG) joined tunicate proje		d the Same sharehold	ers as in en unicate generative ulose factory cellulose will tand unique GeoLoop	H1 2021         CEO and complete management employed         Lol with Bluegreen, Green Industry Cluster and Proventia. General cooperation agreement with Norske Skog ASA         Installation of GeoLoop Column prototype and structures in the open sea for mapping the biological filter feeder potentials         Third-party system testing and verification of CC-technology         Completion of a NOK 106m private placement		LOIs entered into with Norðurál and e Carbon Recycling International Construction and installation of

# Ocean GeoLoop

**MAY 2022** 

