



Everyday Everywhere



We think about the future of humanity and earth.

EcoPro, EcoPro BM, EcoPro HN, EcoPro Materials, EcoPro EM, EcoPro Innovation, EcoPro CnG, EcoPro AP, Ecopro Partners, Eco Logistics, EcoPro Global.

Our subsidiaries may have different roles in the business, but we have a common thought when it comes to people and environment, creating a new world together.

contents

ECOPRO OVERVIEW

- 04 Mission & Vision
- **06** EcoPro Group History

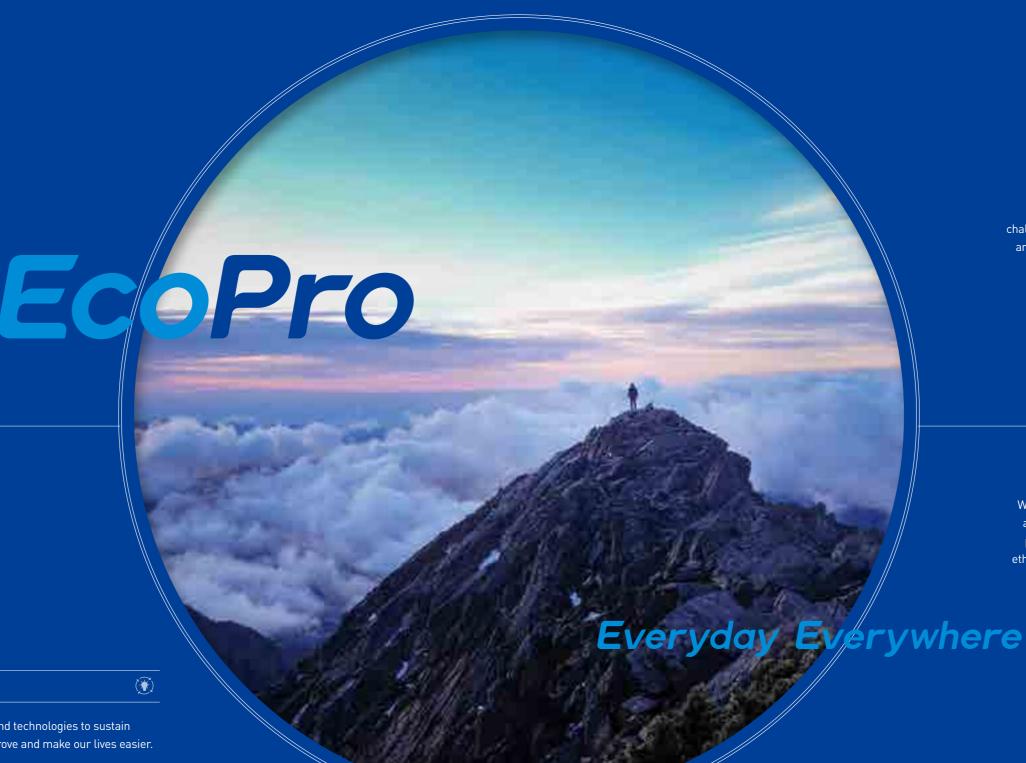
ECOPRO PROFILE

- 08 EcoPro, an Enterprise Leading Future
- 10 EcoPro BM, a World-Class Company Specializing in High-Nickel Cathode Materials
- 16 EcoPro HN, the Sole Company in Korea Offering Environment-Friendly Total olutions
- 22 EcoPro Materials, Korea's Largest Precursor Producer
- 26 EcoPro EM, Korea's Largest Cathode Material Producer
- 30 EcoPro Innovation, a Company Specializing in Lithium Material Production
- 36 EcoPro CnG, a Battery Recycling Company
- **40** EcoPro AP, a Company Specializing in High-Purity Oxygen, Nitrogen and Argon Production
- 42 Ecopro Partners, a Venture Capital Firm
- 43 Eco Logistics, a Company Offering Logistics Services
- 44 EcoPro Global, a Company Specializing in Overseas Business

ECOPRO DREAM

- 45 EcoPro, Venturing into the World
- 46 Eco Battery Pohang Campus
- 48 Social Contribution

Mission & Vision



CORE VALUE



We accept failure and are ceaselessly challenging ourselves based on independence and self-motivation to become No. 1 in the business field.



We respect the diversity of our employees and partners and are trustworthy as we perform tasks in consideration of work ethics to become No. 1 in the business field.

MISSION

Our mission is to develop new energy and technologies to sustain environment, which ultimately will improve and make our lives easier.

VISION



We make sure that EcoPro technologies are found 'Everyday, Everywhere.'

Everyday Everywhere EcoPro



We create new opportunities to enter markets through brilliant ideas and R&D, constantly pursuing changes and innovation to become No. 1 in the business field.

EcoPro Group History

EcoPro Group leads present and future.



1998~2015



1998. 10. Established EcoPro Co., Ltd.

2001. 06. Started research and development of catalysts for decomposition of perfluorinated compounds (PFCs)

2002. 07. Moved into Ochang Science Industrial Complex (located in Ochang-eup, Cheongju-si, Chungcheongbuk-do)

2002. 08. Participated in development of Nano Carbon Ball (NCB) authorized by the established corporate-affiliated research center

2004. 04. EcoPro, received the grand prize in the environmental technology part at the 4th Maeil Business Venture Awards (Maeil Business/Ministry of Commerce, Industry and Energy/Ministry of Science and ICT)

2004. 10. Entered business for cathode materials through joint-development of highvolume cathode active materials

2005. 07. Established EcoPro Innovation

2005. 08. Completed carbon monoxide (CO) removal catalyst facilities

2006. 09. EcoPro's PFC treatment system certified as New Excellent Technology (NET) by the Ministry of Trade, Industry and Energy (MOTIE)

2006. 09. EcoPro selected as Chungbuk Best Enterprise in the technological innovation part (KOSME)

2006. 11. EcoPro, awarded "Million-Dollar Export Tower" at the 43rd Trade Day [KITA]

2007. 07. Listed on KOSDAQ

2007. 12. Received an excellent patent award from the Ministry of SMEs and Startups with the developed PCF Scrubber

2008. 03. Completed the first cathode active material (CAM 1) factory

2009. 07. Completed the second cathode active material (CAM 2) factory

2010, 12. Received an official commendation from the Ministry of Environment for environment conservation 2010. 12. EcoPro, won the 2010 Korea Technology Awards for large-capacity catalytic

greenhouse gas reduction technology (Ministry of SMEs and Startups)

2011. 03. EcoPro, selected as an exemplary taxpayer at the 45th Taxpayer's Day (Ministry of Economy and Finance)

2011. 11. EcoPro, awarded "30Million-Dollar Export Tower" at the 48th Trade Day [KITA]

2012. 05. EcoPro Innovation, initiated the filter frame business

2012. 06. EcoPro, received the R&D Award (USA) with CSG for electric vehicles

2013. 03. EcoPro, selected as an exemplary business at the 40th Commerce and Industry Day (MOTIE)

2014. 09. EcoPro, received the grand prize at the Industrial Technology of the Month Awards (MOTIE)

2015. 10. Completed the third cathode active material (CAM 3) factory



2016~2018



2016. 05. Established EcoPro BM (physical division of EcoPro battery material business)

2016. 06. Established EcoPro BM-affiliated research center

2016. 07. ECOPOR Innovation, started the lithium material business

2016. 09. EcoPro, designated as an Excellent Environmental Firm (Ministry of Environment) 2016, 12. EcoPro, awarded "100Million-Dollar Export Tower" at the 53rd Trade Day, and received a commendation from the president (KITA)

2016. 12. EcoPro BM, listed in the World Class 300 (MOTIE)

2017. 04. Established EcoPro GEM

2017. 05. Won "IR52 Jang Young-shil Award" [Ministry of Science and ICT]

2017. 05. Completed the fourth cathode active material (CAM 4) factory

2017. 06. Established EcoPro Innovation-affiliated research center

2017. 06. Established EcoPro GEM-affiliated research center

2017. 07. EcoPro BM, won "IR52 Jang Young-shil Award" for NCA cathode materials (Ministry of Science and ICT)

2017. 12. EcoPro BM, awarded "100Million-Dollar Export Tower" at the 54th Trade Day (KITA)

2018. 03. EcoPro GEM, completed 1-1 precursor plant (CPM 1-1)

2018. 03. EcoPro BM, won "IR52 Jang Young-shil Award" and received the Prime Minister's Award for NCA034 Series(Ministry of Science and ICT)

2018. 07. World's first commercialization of MW VOC reduction system

2018. 09. EcoPro GEM, designated as an outstanding company for employing young people (Gyeongsangbuk-do)

2018. 09. EcoPro GEM, selected as a company leading recycling and received the Prime Minister's Award at the 10th Recycle Day (Ministry of Environment)

2018. 10. EcoPro BM, CTO Choi Moon-ho received the Prime Minister's Award at the

Energy Plus 2018 Opening and Awards Ceremony (MOTIE) EcoPro BM, received the Minister's Award from MOTIE for the World Class 300

Project at 2018 Leading Korea, Job Festival 2018. 12. EcoPro BM, awarded "300Million-Dollar Export Tower" at the 55th Trade Day (KITA)

2018. 12. EcoPro GEM, awarded "500Million-Dollar Export Tower" at the 55th Trade Day (KITA)







2019. 01. EcoPro GEM, completed 1-2 precursor plant (CPM 1-2)

2019. 02. EcoPro, founded Onnuri Sport Club

2019. 03. EcoPro BM, listed on KOSDAQ

2019. 03. EcoPro, opened Shanghai Branch

2019. 03. EcoPro GEM, received a Certificate of Excellent Company at 2019 Technology Evaluation (NICE Information Service)

2019. 05. EcoPro GEM, ISO140001/ISO145001/IATF16949-certified

2019. 06. EcoPro, CEO Lee Dong-chae received a special prize in the regional economy part at 2019 Citizen Day commemorating the 70th anniversary of Pohang being raised to the status of a city

2019. 07. EcoPro Innovation, selected as one of the best companies for job creation in 2019 (Ministry of Employment and Labor)

2019. 07. EcoPro GEM, concluded an MOU for battery innovation and industrial ecosystem development (13 organizations, including Pohang-si)

2019. 09. EcoPro GEM, received an excellence award at the Consortium for HRD Ability Magnified Program (Ministry of Employment and Labor/Human Resources Development Service of Korea)

2019. 10. EcoPro BM, Development Team 1 Head Yoo Hyeon-jong received the Minister's Award from MOTIE at 2019 Awards on Electrical Equipment, Smart Grid & Secondary Cells

2019. 10. Completed the fifth cathode active material [CAM 5] factory

2019. 11. EcoPro received the Minister's Award from the Ministry of Environment for creating jobs in environment

2019. 11. EcoPro, received the Minister's Award from the Ministry of Education at 2020. Korea Social Contribution Awards and won CSR grand prize forganized by 14 government departments, including the National Assembly, Ministry of Education and Ministry of Employment and Labor)

2019. 11. Established EcoPro ΔP

2019. 12. EcoPro BM, awarded "500Million-Dollar Export Tower" at the 56th Trade Day (KITA) 2019. 12. EcoPro GEM, received the Minister's Award from the Ministry of Employment and Labor for job creation

2019. 12. EcoPro GEM, certified as a family-friendly company

2020. 01. EcoPro GEM, concluded an agreement to collaborate with POSTECH

2020. 02. Established EcoPro EM (joint venture between EcoPro BM and Samsung SDI)

2020. 02. EcoPro, won "IR52 Jang Young-shil Award" for MW System (MSIT)

2020. 03. EcoPro, CEO Lee Dong-chae received the Gold Tower Order of Industrial Service Merit at the 47th Commerce & Industry Day (KCCI)

2020. 03. Established EcoPro CnG

2020. 04. EcoPro Innovation, started the lithium hydroxide waste treatment business 2020. 05. EcoPro GEM, certified as a company specializing in materials, parts and

equipment (Korea Evaluation Institute of Industrial Technology) 2020. 06. EcoPro Innovation, concluded a contract for long-term (6 years) supply of

industrial lithium carbonate

2020. 07. Established Ecopro Partners

2020. 07. EcoPro/EcoPro BM, selected as KOSDAQ Rising Star

2020. 07. EcoPro/EcoPro GEM, selected as the best companies for job creation in 2020 (Ministry of Employment and Labor)

2020. 08. EcoPro, certified as an international accredited testing agency by KOLAS (Korea Agency for Technology and Standards)

2020. 09. Completed EcoPro GEM-affiliated R&D center

2020. 11. Concluded CDM business contracts with 6 companies in China

2020. 12. EcoPro BM, won the Minister's Award from the Ministry of SMEs and Startups in the regional development part at the 15th Korea Social Contribution and CSR Awards

2020. 12. EcoPro BM, received an excellence award for transparent management at the 12th KOSDAQ Awards (Financial Supervisory Service)

2020. 12. EcoPro GEM, awarded "30Million-Dollar Export Tower" at the 57th Trade Day (KITA)

2021. 01. EcoPro BM, selected as one of the best companies in the field of materials, parts and equipment [MOTIF]

2021~

Take-Off Stage

2021, 03. EcoPro GEM, started building the second precursor plant (CPM 2) and completed the first sulfur oxide treatment plant

2021. 04. Established Eco Logistics

2021. 05. Established EcoPro HN (spin-off of the EcoPro environment business)

2021, 05. FcoPro HN, listed on KOSDAQ

2021. 06. EcoPro BM, selected as 2021 KOSDAQ Rising Star (KRX)

2021. 07. Relocated the head office of EcoPro Innovation (from Ochang-eup Cheongjusi Chungcheongbuk-do to Buk-gu Pohang-si, Gyeongsangbuk-do)

2021. 09. Established EcoPro Global

2021, 09. EcoPro Innovation, completed the first high-purity lithium hydroxide plant (LHM 1)

2021. 10. EcoPro AP, completed the first high-purity oxygen/nitrogen plant (ASU 1) 2021. 10. EcoPro EM, completed the sixth cathode active material factory (CAM 6) and

started building the seventh cathode active material factory (CAM 7) 2021. 10. Established EcoPro CnG-affiliated research center

2021. 11. EcoPro GEM, concluded a MOU for mutual cooperation regarding the secondary cell business, including nickel and cobalt supply and recycling

2021. 12. EcoPro, received the Minister's Award from the Ministry of Science and ICT for social contribution at Korea Social Contribution Awards

2021. 12. EcoPro GEM, awarded "200Million-Dollar Export Tower" at the 58th Trade Day 2021. 12. EcoPro, selected as the company recognized for social contribution at the CSR in the Community Day for 3 consecutive years (Ministry of Health and Welfare)

2021. 12. EcoPro BM, awarded "800Million-Dollar Export Tower" at the 58th Trade Day (KITA)

2022. 03. EcoPro GEM, changed the company name to EcoPro Materials 2022. 05. EcoPro Materials, concluded a MOU for mutual cooperation in relation to

solvent extraction for hydrometallurgy 2022. 06. EcoPro HN, concluded a MOU for secondary cell-related technical support for SNU Engineering Consulting Center

2022. 06. EcoPro HN, listed in the World Class 300 (MOTIE)

2022. 07. EcoPro HN, obtained a certificate of Environmental Product Declaration (EPD)

2022. 08. Launched a committee for community welfare fund

2022, 10. EcoPro EM, completed the seventh cathode active material factory (CAM 7) 2022. 12. EcoPro, selected as the company recognized for social contribution at the CSR

in the Community Day for 4 consecutive years (Ministry of Health and Welfare) 2022. 12. EcoPro BM, awarded "1000Million-Dollar Export Tower" at the 59th Trade Day (KITA)

2022 12 EcoPro FM awarded "500Million-Dollar Export Tower" at the 59th Trade Day (KITA

2022. 12. EcoPro Innovation, awarded "100Million-Dollar Export Tower" at the 59th Trade Day (KITA)

2023. 02. Ecopro Innovation, LHM2 plant groundbreaking ceremony

2023. 02. Ecopro published a responsible mineral report

2023. 03. Ecopro, SK Ecoplant-TES European Waste Battery Recycling MOU 2023. 03. Establishment of Saemangeum National Industrial Complex JV with Ecopro

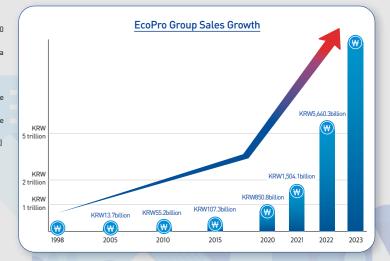
SK on and China GEM precursor production

2023. 04. I Square Ventures, Changed the company name to EcoPro Partners

2023. 04. Groundbreaking ceremony for Ecopro, Ecopro Global Hungary business site 2023. 05. Ecopro BM, Ecopro EM cathode material global carbon footprint certification (Carbon Trust)

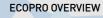
2023. 05. Designated as a business group (major company) subject to disclosure by Ecopro Group in 2023

2023. 06. Ecopro Materials, RMP2 plant completion ceremony











ECOPro 에코프로

Date of EstablishmentOctober 22, 1998Date of ListingJuly 20, 2007CE0Song Ho-jun

Employee Status 143 persons (3,087 employees

in the Group)

Business Area Holding company

(subsidiaries, investment management, etc.)



www.ecopro.co.k

587-40 Gwahaksaneop 2-ro (Songdae-ri 311-1), Ochang-eup, Cheongwon-gu, Cheongju-si, Chungcheongbuk-do, 28116, Republic of Korea



Financial Status 2022 Annual Consolidated Report







EcoPro 에코프로

succeeded in the phased localization of core materials for secondary cells that were highly import dependent. As such, EcoPro has grown by building its foundation in two main areas, environment and IT energy.

In May 2016, EcoPro BM was spun off by means of physical division for specialization in cathode materials. And, in May 2021, EcoPro HN was spun

Founded in 1998, EcoPro has focused on the development of eco-friendly core materials and parts related to air pollution control. In 2003, it

In May 2016, EcoPro BM was spun off by means of physical division for specialization in cathode materials. And, in May 2021, EcoPro HN was spun off for specialization in air environment business. As it switched to a holding company, it is planning to concentrate on 'discovering new growth engines,' 'establishing ESG management system,' and 'stable financing.'





Date of Establishment

May 2, 2016

Date of Listing

March 5, 2019 Joo Jae-hwan and Choi Moon-ho

Employee Status Business Area

1,344 persons

R&D and production of

materials ranging from precursors to cathode active

materials



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EcoPro BM

nickel cathode materials for the first time in Korea. Based on the infinite future growth potential of lithium-ion secondary cells, such as electric vehicles (EV), electric energy storage systems (ESS), uninterruptible power supply (UPS), smart grids, and ones for aerospace, medical and military purposes, EcoPro BM will grow into a core material

company that makes Korea the leader of next-generation battery market.

and abroad based on its success in developing and mass-producing high-

EcoPro BM, which was spun off from its parent company EcoPro in May 2016 by means of physical division for specialization in cathode materials, is a company which leads the high-volume cathode material market at home



Cathode Active Material

From power tools to electric vehicles (EV)

High-volume, high-energy and long-lived cathode active materials

Thanks to the steady growth of power tool markets and drastic EV market expansion, we are witnessing a rapid increase in demand for high-energy and high-density cathode materials. Accordingly, the interest in and demand for high-nickel cathode materials are rapidly soaring. EcoPro has been creating an ecosystem ranging for precursor production to battery recycling to build a business model of virtuous cycle. EcoPro BM, which is responsible for the battery material business, has already secured international competitiveness with its development of original fundamental technologies and mass production technology accumulated for over 16 years when it comes to high-nickel cathode materials.

Also, EcoPro BM is getting ready to advance into the global EV market. With this aim, it has improved cathode material technology applied to high-end cathode materials with ceaseless R&D and developed next-generation materials such as a highly stable single crystal in response to market changes. EcoPro BM promises to do its best to stand tall as a leading company in the field of core materials for secondary cells while satisfying customers and market needs.



Applied Products



Power Tool (P/T)



Electric Vehicle (EV)



E-Bike



Vacuum



Drone



Energy Storage System (ESS)

EcoPro BM's Identity



Korea's only company capable of simultaneously producing high-nickel cathode materials, NCA and NCM

04



Secured costcompetitiveness with upstream value chain



Continued quality improvement and active product development



Improved domestic/overseas production capability with continuous growth of the global EV market

Main Products

NCA Series

- Secured absolute advantage when it comes to high-nickel products
- Continuous Non-IT growth + expanded EV application
- Established a joint venture with Samsung SDI (EcoPro BM)

NCM Series

Leading the global high-

volume cathode material

market

- Frist in the world to commercialize NCM 811
- Realized high-volume and safety with concentration gradient technology
- Achieved the highest volume of Ni 90% NCM cathode materials in the industry

NCMX

- Combined the advantages of NCA (high-energy) + NCM (long life span)
- High-performance, highly stable nickel applied with single crystal
- Diversified the product line
- Realized various features with differentiated doping and coating

*NCA (Nickel, Cobalt and Aluminum), NCM (Nickel, Cobalt and Manganese),

Enhancing the competitiveness of core technology with ceaseless R&D

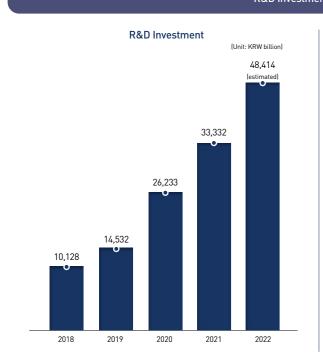
Cathode materials, the heart of secondary cells, are the core materials that determine a battery's voltage, volume and lifespan, etc., and it is important to secure a range of products in proper combination of metals to satisfy the performance needed according to the particular usage of the secondary cell. Also, the size, surface shape, etc. of the precursor, which is applied to cathode materials, affect the characteristics of cathode materials. Thus, it is important to adjust the characteristics of precursor powder during process control.

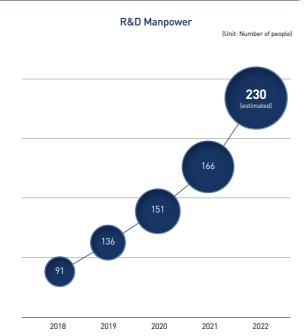
EcoPro BM retains a whole process synthesis technology from precursors to cathode materials and secures competitiveness in quality and cost as it receives precursors from the Group. It focuses on the development of technology for high-nickel ultrahigh volume cathode materials and promotes the development of single crystal products with outstanding life span and safety as well as cost-effective products with active R&D.

Also, it is developing element technology that can be applied to various areas while minimizing quality errors with the development of mass production process technology for highquality products.



R&D Investment & Manpower





Technology Development

Development of highly safe High-Ni technologies

Securing unrivaled technologies with verified technologies of highvolume NCA/NCM materials and enhanced safety

Development of low-cost, high-voltage technologies

Responding to the low-cost cathode material market with the developed cost-effective, safe materials (NMX & OLO)



Development technologies for Post LiB

Encouraging development of technologies to commercialize the nextgeneration secondary cells, including an all-solid-state battery and non-Li ion cells

Verticalization of the value chain

Securing the secondary cell market competitiveness and accelerating innovative technology development

*NMX (Nickel, Manganese + Additive), OLO (Over-Lithiated layered Oxide)







Date of Establishment May 3, 2021 Date of Listing May 28, 2021

Kim Jong-seop Employee Status 309 persons

Business Area Environmental business

integrated with solutions for environment diagnosis,

material design and maintenance



587-40 Gwahaksaneop 2-ro (Songdae-ri 311-1), Ochang-eup, Cheongwon-gu, Cheongju-si, Chungcheongbuk-do, 28116, Republic of Korea



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EcoPro HN MREEMOIND

in semiconductor processing; and 'Water Treatment System Solution' and 'Eco-Friendly Material Solution' to treat waste and pure water. EcoPro HN is expanding its business conforming to the ESG management principles to preserve healthy earth environment for the next-generation and sustainable growth.

EcoPro HN which was spun off from its parent company EcoPro in May 2021 is an environmental company offering eco-friendly total solutions for clients. It provided the following solutions: 'Chemical Filter Solution' to

remove harmful gas; 'Air-Pollutant Reduction Solution' to eliminate volatile

organic compounds (VOCs) in air that may cause fine dust; 'Greenhouse Gas

Mitigation Solution' to treat perfluorinated compounds (PFCs) generated

Clean Room Chemical Filter I

Market Trend

- Installation area doubled owing to process precision and enhancement
- Constant demand for new filters
- New items that require quick replacements (for equipment, VOC control, etc.)

Business Trend

- Samsung Electronics: Increased new lines in Pyeongtaek and Hwaseong, Republic of Korea and Xian, China
- SK hynix: New installations in Icheon and Cheongju, Republic of Korea and Wuxi, China, and planning to invest in Yongin Semiconductor Cluster (KRW 120 trillion)

Global Semiconductor Sales Forecast

• Downturn in cumulative sales (USD 203 billion) for 4 years owing to the COVID-19 pandemic

Source : Semiconductor Forecast Database, Worldwide, 2Q20 Update

Clean Room Chemical Filter II

Semiconductor Market Trend

Memory Semiconductor

- Mass-produced in a small variety that needs advanced production technologies and equipment investment
- →In most cases, larges companies are fully in charge from product design to production.
- Samsung Electronics and SK hynix are major companies in Korea that keeps the crown in the global memory semiconductor market, but the market is somewhat unstable because of fluctuations seen in the business condition.

System Semiconductor

- Mass-produced in a large variety, which is the key to the Fourth Industrial Revolution (AI, IoT, etc.) and industrial convergence
- → Its market size is more than twice of the memory semiconductor
- Mainly designed by SMEs (fabless semiconductor companies)
- Large company (foundry) production is segmented, creating a stable market focused on customized production
- As a relatively newcomer, we lack competitiveness in the system semiconductor area.

Prospects for the Memory Semiconductor Industry USD 299.7 billion USD 203.3 billion USD 203.3 billion USD 203.3 billion 2020 2021 2025 2030

Prospects for the System Semiconductor Industry USD 317.8 billion USD 287.1 billion USD 287.1 billion USD 2020 2021 2025 2030

Clean Room Chemical Filter III

- A range of chemical pollutants such as harmful substances (VOCs, HN3 and acid) in the clean room may cause a drop in yield and they are harmful to the human body.
- Depending on the type, it is installed on each clean room part to remove various harmful substances, and it may be designed to eliminate new harmful substances
- Its application may be expanded, for instance to a filter preventing errors generated upon analyses of harmful gas.

Technology-based Total Solution Business Model

- Offers a customized total solution ranging from material development to fabrication, assembly and installation (*the only one in Korea)
- Highly efficient in eliminating harmful substances and demonstrates a longer life span when compared to those of other companies; holds over 60 different patents



EFU: Equipment Filter / FFU: Fan Filter / OAC: Out Air Handling Filter / SENSOR: Noise Filter / ANALYZER: For analyzer non-drive end



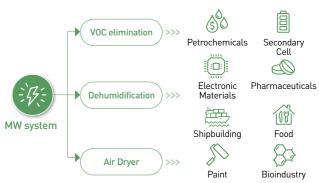
Fine Dust Reduction Solution I

Energy Saving System

Energy-saving with the Microwave (MW) technology and offering an optimized solution suitable for environment-friendly management



The MW technology is applied to directly heat a given target. Unlike the method of heating air and delivering heat, it increases the temperature quickly, saving time and reducing energy consumption. (Energy efficiency of over 30% compared to the existing technology.)



Started with the system to eliminate VOCs, the technology expanded into microwave application. Its business area now includes the entire industry, including petrochemicals, secondary cells, electronics materials and pharmaceuticals.

Fine Dust Reduction Solution II

Energy Saving System

MW-V0Cs



 It treats and handles VOCs generated in shipyards, automobiles, semiconductor and paint manufacturing facilities.

MW-Dehumidification System



 It removes humid air existing in the atmosphere so that dry air flows within the industrial facilities.

MW-Air Drver



 It eliminates moist in the pneumatic devices and systems to prevent equipment corrosion or malfunctioning while playing auxiliary roles such as improving productivity and extending the lifespan of production equipment and facilities.





Greenhouse Gas Mitigation Solution I

A new paradigm called 'Paris Agreement'

The Paris Climate Change Accord states that temperature rise owing to global warming should be controlled so that the temperature rises no more than 2°C when compared to that before the industrialization and does not exceed 1.5°C . The countries that agree to the accord are reinforcing regulations to reduce greenhouse gas emission.



Greenhouse Gas Emission by Industry & Quantified Emission Limitation and Reduction Objectives (QELROs) Greenhouse Gas Emission by Industry Industrial - Mining 3.5 F-gas consumption 2.4 Process 6.796 hundred

Source: Press Release from the Ministry of Environment (2022, 6, 28.)

Adjusted QELROs (Unit : ton CO₂ - equivalent) -26.3% -40.0% 2030(Existing) 2030(Confirmed) 2018 Reduced Emission Source: 2030 Nationally Determined Contribution (NDC)-Adjusted Plan

Greenhouse Gas Mitigation Solution II

Offering the world-class technologies for greenhouse gas emission

Since 2009, we have commercialized the world's best large-volume equipment applied for greenhouse gas mitigation, and are expanding the business areas as we enter overseas and CER markets based on our business performance in the related field.

RCS (Regenerative Catalytic System) for PFC Treatment				
	Energy saving	Saves energy with catalytic reaction when compared with equipment for pyrolysis		
	Energy conservation	Heat recovery efficiency 95% or above		
1	Excellent corrosion resistance	The material quality suitable for corrosive gas such as HF		

	Business & Production Information		
	Business Area	Greenhouse gas mitigation SDM(Sustainable Development Mechanism)	
Applicable Area C		Semiconductor and display manufacturing (PFC removal) Chemical industries such as nitrogen plants (N ₂ O removal)	
	Main Products	RCS POU Scrubber (Plasma & Catalysis) Catalyst (PFC, N ₂ 0, SF ₆ , NF ₃ , etc.)	

Environmental Catalysis

Selective removal of various harmful gases which are the causes of environmental pollution

1. Absorbent

Various absorbents applied to a wide range of areas ranging from industrial facilities to households, vehicles, clean filters and gas masks are used for physical/chemical absorption, which selectively removes harmful gases.

Product Information

ECOSORB IAC-130



It absorbs harmful gases from atmosphere, industrial site exhausts, laboratory hoods, etc.

ECOSORB IAC-900



It adsorbs various organic gases (VOCs) from the process of handling paint, the process of using glue, the semiconductor using organic solvents, the display process, and the laboratory experimenting with them.

ECOSORB IAC-100



It removes all kinds of odor-causing gases from public operating facilities and industrial sites such as food waste, water purification, sewage, and wastewater treatment plants.

ECOSORB IAC-139



It removes 22 types of offensive odor substances, including acidic, basic and aldehyde-containing gases, sulfur compound gas and volatile organic compound gas.

ECOSORB IAC-1390



It absorbs and removes various acidic and toxic gases from semiconductor process and waste gases.

2. Catalyst

We have catalysts for greenhouse gas mitigation and improvement of atmospheric environment, offering optimized solutions to meet our customers' requirements.

Product Information

PFC Decomposition Catalyst



Our catalyst is a specialized product that shows 99% removal efficiency at temperatures below 750℃ with PFC catalyst that derives low-temperature oxidation.

VOCs Oxidation Catalyst



VOCs generated in various industries such as paint, adhesion, and coating processes are oxidized from low to high temperature to efficiently eliminate them.

CO Catalyst



It removes carbon monoxide (CO) generated at industrial sites, during semiconductor process and in daily lives at room temperature through catalytic oxidation reactions.

Composite Odor Catalyst



It decomposes complex odor gases such as high concentrations of sulfur compounds, aldehydes, lowgrade fatty acids, and ammonia at low and medium temperatures (80-400℃) in public treatment facilities and bio-gasification facilities, mitigating odor through catalytic oxidation.



It removes nitrogen oxides which are air pollutants at a broad temperature range (from low to high temperature) with high removal efficiency.

ECOPRO 21 ECOPRO OVERVIEW



precursors for EcoPro BM. It is the first company in Korea to mass produce precursors for high-volume, high-nickel cathode materials, retaining the highest production capabilities in the nation when it comes to precursors. Since 2021, EcoPro Materials has been refining and manufacturing nickel and cobalt metals

which are ingredients for precursors, consolidating the identity of EcoPro that it is

We are still relying on China to procure secondary cell materials and components,

but it is important to build a domestic supply chain as we are now facing desinicisation. In this situation, EcoPro Materials plays a critical role in strengthening

competitiveness of the domestic secondary cell ecosystem. Currently, EcoPro

the company specializing in secondary cell materials.



Date of Establishment April 26, 2017
CEO Kim Byong-hun

Employee Status 481 persons

Business Area R&D and production of

precursors for cathode

materials



www.econromaterials.com

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Republic of Kore



Financial Status 2022 Annual Report





KRW 314.3 billion



Ecopro Materials

Materials is capable of producing 50,000 tons of precursors a year at Pohang Campus and is planning to expand its production capacity to 200,000 tons a year by 2026 with ceaseless investment.







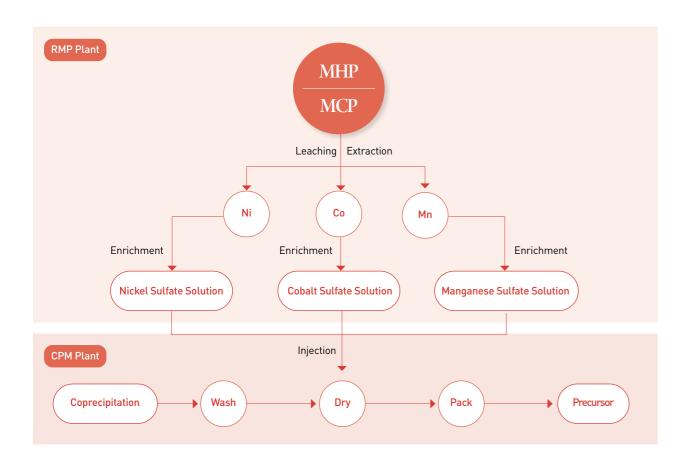
Materials Process

RMP (Raw Material nickel and cobalt as mixed hydroxide Precipitate) Plant

- MHP (Mixed Hydroxide Precipitate of nickel and cobalt), MCP (Metal Composite Precipitate)
- Secures the precursor price competitiveness by producing sulfuric acid solution for metal and using it as the ingredient of CPM.

CPM (Cathode Precursor Material) Plant

- Produces cost-competitive precursors by diversifying ingredients at RMP Plant
- Retains a technology to synthesize CSG (Core-Shell Gradient) precursors



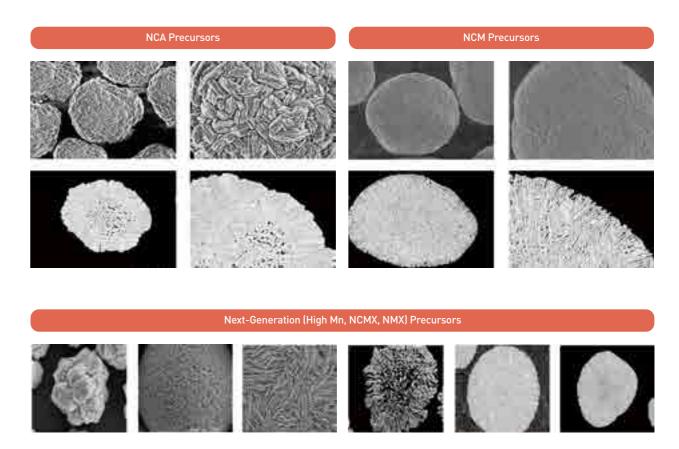
Precursor

Precursor

Precursor is a core material for cathode active material production which determines high-volume and long lifespan features.

We are developing precursors of the next-generation along with high-nickel NCA and NCM precursors.









Date of Establishment Feb

February 17, 2020 Park Jong-hwan

Employee Status

CE0

396 persons

Business Area

Mass production of high-nickel

cathode materials



ww.ecopro.co.kr/sub01030206

110, Yeongilmansandan-ro, Heunghae-eup, Buk-gu, Pohang-si, Gyeongsangbuk-do, Republic of Korea



ECOPRO EM

Ecopro EM

SDI. It has built a mass production system for NCA series, which are highnickel cathode materials. As the leader of Korea's battery business for the
next-generation, EcoPro EM produces core materials with fundamental
and new growth technologies based on potential growth of lithium ion
secondary cells applicable to electric vehicles (EV) and power tools (P/T).
In October, 2021, CAM 6 (the sixth factory for cathode active materials) that
is capable of producing 36,000 tons a year was built and high-nickel NCA
products are mass-produced at CAM 6 as of 2023. Completed in 2022, CAM
7 (the seventh factory for cathode active materials) is capable of producing
54,000 tons a year, which is the largest cathode material producing
company in Korea, and is striving to secure price competitiveness.

EcoPro EM is a joint venture established between EcoPro BM and Samsung

Financial Status 2022 Annual Report



KRW 11,58.4 billion KRW











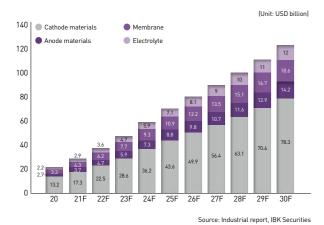
Cathode Materials

Cathode Materials

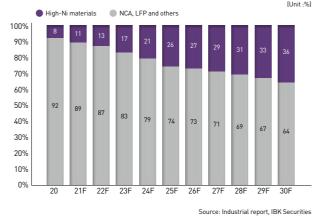
Thanks to the steady growth of power tool markets and drastic EV market expansion, we are witnessing a rapid increase in demand for high-energy and high-density cathode materials. Accordingly, the interest in and demand for high-nickel cathode materials are rapidly soaring.



Global Material Market (increase in the importance of cathode materials)



Prospect by Cathode Material Type (Increase in the share of high-nickel cathode materials)



NCA

NCA

As the only Ni-rich, high-end material in Korea, NCA retains the highest reversible capacity among the existing LiB cathode materials. We are capable of mass-producing NCAs through NCA modeling according to the customer's requirements. In addition to this, we have invested in single crystal production at CAM 7 to minimize particle cracks that may be generated when forming electrodes, which is apparently the limitation of the existing polycrystal cathode materials. We are preparing to manufacture quality products with improved charging/discharging efficiency and extended battery life.

Single Crystal

• As a material with maximized energy density, it does not break or damage during cell processing with no reaction to external stimuli.

Advantages	Disadvantages	
Long life span	Rise in firing temperature resulting in increased processing	
Less gas and increased thermal stability	expenses	
ullet Increase in density of mixture $ullet$ increase in volume	 Increase in the degree of hardening 	
	 More difficult to carry out the disintegration process 	

Polycrystal vs. Single Crystal Cathode Materials

Туре	Polycrystal	Single Crystal	
Volume	Low	High (About 30% higher when compared to Polycrystal)	
Stability	Low (much gas emission)	High (little gas emission)	
Life Span	Short	Short Long	
Shape			





Date of Establishment July 21, 2005 CE0 Kim Yoon-tae

224 persons **Employee Status**

Business Area Lithium hydroxide conversion, lithium recycling and lithium

crushing

www.ecopro.co.kr/sub01030204

74, Yeongilmansandan-ro, Heunghae-eup, Buk-gu, Pohang-si, Gyeongsangbuk-do, Republic of Korea 587-40 Gwahaksaneop 2-ro (Songdae-ri 311-1), Ochang-eup, Cheongwon-gu, Cheongju-si, Chungcheongbuk-do, 28116, Republic of Korea



Owing to the drastic growth of electric vehicle market, the market of lithium which is the core material for lithium batteries is expanding. However, we are

still relying entirely on foreign imports.

EcoPro Innovation has developed technologies for producing and processing lithium compounds, the core materials for lithium batteries, and secured a value chain for the batteries.

EcoPro Innovation is responsible for crushing and drying of ultra-pure carbonate and lithium hydroxide that is currently used in EcoPro BM and other subsidiaries as well as manufacturing and supplying lithium nickel oxide, an electrode additive. It has completed the process technology to produce materials ranging from lowpurity lithium to battery-grade lithium hydroxide. Also, EcoPro Innovation has secured lithium resources, a key ingredient of the Fourth Industrial Revolution, and is working on to develop a technology to recycle waste lithium.

Financial Status 2022 Annual Report







30 ECOPRO OVERVIEW ECOPRO 31

Ecopro Innovation







Business Area

iOH, Lithium Hydroxide

Battery-Grade Lithium Hydroxide Production

- Producing lithium hydroxide from salt, minerals and recycled materials
- Mass production: Mid-October, 2021
- Production capacity: 13,000TPA

SLC, Specialized Li Chemicals

• Specialized lithium chemicals applied with EcoPro Innovation's original technologies

Lithium Hydroxide

Lithium Carbonate Lithium Nickel Oxide

Specialized Carbonate Lithium (Li₂CO₃)

Specialized Carbonate Lithium Li₂CO₃



Particle-stabilized additive

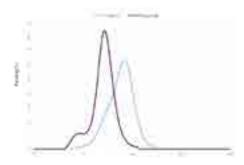
- Complete control of particle size
- Thorough moisture management to improve battery life
- (Magnetic) impurity control for safety

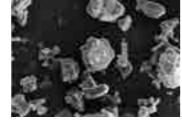
Application

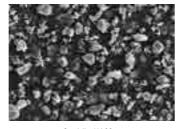
- ☑ Additive for lithium-ion battery
- $\ensuremath{\underline{\vee}}$ Cathode material electrode coating material

Specification

Product	Moisture	Particle Size D50	Particle Size D90	
General Li₂CO₃	< 5,000 ppm	5.83	11.24	
Specialized Li₂CO₃	< 750 ppm	2.55	4.49	







Specialized Li₂CO

Specialized Lithium Hydroxide (LiOH H₂O)

Lithium Hydroxide LiOH-H₂O



Optimized lithium hydroxide for cathode active materials

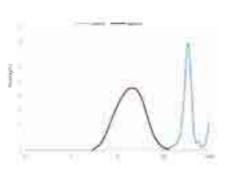
- Complete control of particle size
- Maximized solid state reaction
- Ideal (magnetic) impurity and moisture control for stability of cathode active materials

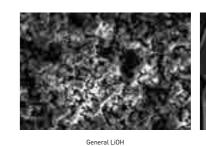
Application

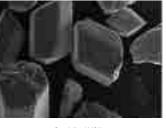
✓ Ingredients for cathode active materials

Specification

Product	Moisture	Particle Size D50	Particle Size D90	
General LiOH	>99.5 %	350	270	
Specialized LiOH	>99.8 %	18.2	43.8	







Specialized LiOH

LNO (Lithium Nickel Oxide)

LNO (Lithium Nickel Oxide



LNO production technology

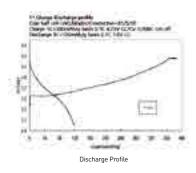
- Built an optimized system for Li/Ni mixture
- Stable production with thorough management of ingredients

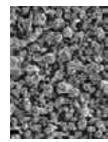
Application

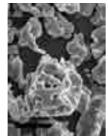
Additive for lithium-ion battery (cathode material coating agent)

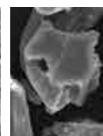
Specification

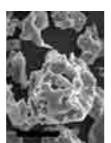
Product	Charging Capacity	Discharging Capacity	Efficiency	Particle Size D50
Li ₂ NiO ₂ (LNO)	375~395mAh/g	115~125	30 %	13.5 <i>µ</i> m











SEM Images

Lithium Hydroxide Production Facility (Pilot)

LHM Pilot Factory



- Completed in 2019
- Production capacity: 200ton LH/year
- High-purity lithium hydroxide: 99.8%
- High recovery ratio: 99%
- EcoPro BM completes cell testing of pilot products

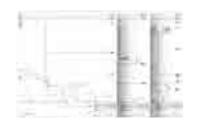
In-process test

- Secures data for LHM mass-production plant design
- High recovery ratio: ≥ 95%

Basic design

• Process equipment design and CAPEX/OPEX estimation







Lithium Hydroxide Production Facility (Commercial)

LHM Mass Production Plan



- Production capacity: 13,000tons LH/year
- Investment cost: KRW 77.7 billion
- Located in Yeongilmansandan, Pohang
- Mass production: Mid-October, 2021

Eco-friendly solution in response to the EV battery market growth

- Produces high-purity lithium hydroxide
 Purity 99%, battery-grade lithium hydroxide
- Applies ESG process Recycling water used in the process, using environment-friendly materials, and low environmental impact
- Verifies the process through pilot operation Possibility of expansion with the secured cost competitiveness

EcoPro Innovation Technology

Spodumene-ECO-Li Extraction

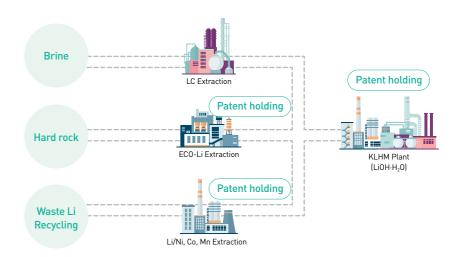
- Acid use unnecessary (acid free)
- Less waste water generation
- Reduced energy cost

Competitive LiOH production process

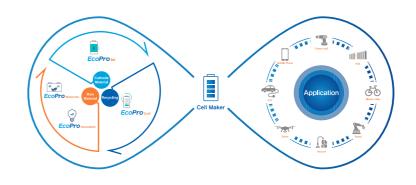
• Various ingredients applicable

• High-purity LiOH·H2O 99.5%

- No waste generated
- Salt, ore (Spodumene), waste battery, etc.
- ery, etc. Recycling process applicable



Closed-Loop Recycling System



- Built an ecosystem of cathode active materials for secondary cells
- Secured the most efficient closed-loop system around the world





Date of Establishment March 10, 2020 CE0 Park Seok-hoe 142 persons **Employee Status Business Area** Waste battery recycling



3, Yeongilmansandan-ro, Heunghae-eup, Buk-gu, Pohang-si, Gyeongsangbuk-do, Republic of Korea



Financial Status 2022 Annual Report



KRW 175.3 billion



(S) Sales

KRW 109.0 billion

EcoPro CnG is a global battery recycling company that leads environmental conservation and natural resource circulation as it retrieves not only waste batteries, but also battery scrap and valuable metal. We extract and recover valuable metal such as lithium, nickel and cobalt which are core ingredients of cathode active materials for lithium-ion batteries from waste batteries and scrap to produce lithium compounds and composites of nickel/cobalt/ manganese oxide that are the ingredient of precursors.

Valuable metal we collected from recycling is supplied to EcoPro subsidiaries and partners through the Closed-Loop System built in Yeongilman Industrial Complex, Pohang for final cathode material production, which contributes to securing cost competitiveness of secondary battery cathode materials.

36 ECOPRO OVERVIEW

EcoPro CnG

ECOPRO 37



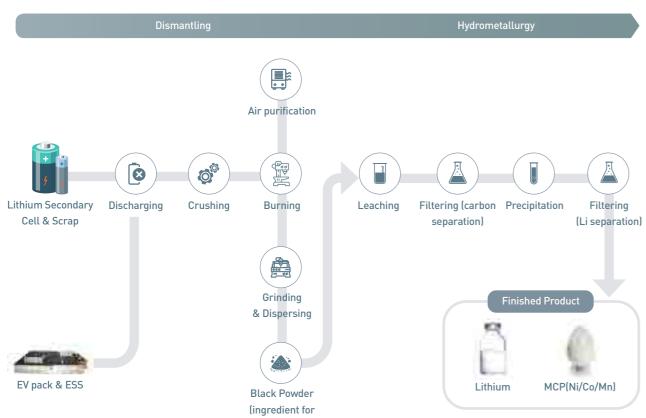


BRP Manufacturing Process

BRP process (Battery Recycling Plant)

- Dry process: Producing black powder with scrap or waster batteries generated in the secondary battery manufacturing process
- Wet process: Producing MCP (Metal Composite Precipitate) and LS (Lithium Sulfate) with black powder produced in the dry process

Manufacturing Process



secondary batteries)

High Value-Added Recycling Technology

- Building a closed-loop recycling ecosystem
- Possible to recover metal from waste batteries
- High recovery ratio of more than 95% (Li, Ni, Co and Mn)
- Possible to produce 16g/L of highly concentrated lithium solution

Production Capacity

Production Capacity	Dry(Scrap → BP) 20,000t/year (based on battery scrap)	
Froduction Capacity	WE(BP → MCP, LSS) 12,000t/year (based on cathode active materials)	

Finished Product









Date of Establishment CE0

November 12, 2019 Huh Tae-kyung

Employee Status

26 persons

Business Area

Industrial gas production

Product High-purity oxygen, nitrogen

and argon



www.ecopro.co.kr/sub01030205 39, Yeongilmansandan-ro 37bec eup, Buk-gu, Pohang-si, Gye 39, Yeongilmansandan-ro 37beon-gil, Heunghaeeup, Buk-gu, Pohang-si, Gyeongsangbuk-do,

Republic of Korea



Financial Status 2022 Annual Report



KRW 58.7 billion





KRW 21.4 billion

EcoPro AP

EcoPro AP, established to supply high-purity oxygen and nitrogen needed for production of high-nickel cathode active materials and precursors started its mass production in November, 2021. ASU (Air Separation Unit) Plant is the first in Korea that was built only with domestic capital and technologies that is in operation for mass production.

As of 2023, EcoPro AP has been supplying oxygen and nitrogen, and producing high-purity argon for our subsidiaries including EcoPro BM and EcoPro EM located in Eco Battery Pohang Campus.

ECOPRO 41



Financial Status 2022 Annual Report / Former Isquare Ventures

Corporate Asset KRW 3.7 billion

Capital Stock



KRW 3.1 billion

KRW 0.7 billion

Business Area Promising venture company investment, value

EcoPro Partners

July 20, 2020

Lee Jae-hun

7 persons

enhancement and networking within the environment, energy and other material industries

(Head Office) Chungbuk SW Convergence Cluster No. 405, 97, Gagni 1-gil, Ochang-eup, Cheongwon-gu, Cheongju-si, Chungcheongbuk-do, Republic of Korea

(Branch) 25th floor, Dongwon F&B Building, 60 Mabang-ro, Seocho-gu, Seoul



Date of Establishment

Employee Status

CE0

www.ecopro-partners.com

Founded in July 2020, Ecopro Partners is a venture capital firm playing a key part in creating a venture ecosystem of virtuous cycle. It invests in promising venture companies in the business field of environment, energy and other materials.

Ecopro Partners aims to vitalize the environment for startup businesses in Korea, improve the value chain of EcoPro Group and encourage new business.

Financial Status 2022 Annual Report

Corporate Asset **KRW 2.2 billion**

Capital Stock KRW 0.5 billion



ECOLogistics Date of Establishment April 1, 2021 Kang Sung-in **Employee Status** 3 persons

Logistics services

Eco Logistics offers container transport services for EcoPro subsidiaries in relation to import/export of ingredients/materials and finished goods required for production, supports them with a range of vehicles for logistics, encourages optimization of logistics services (an immediate action taken in response to emergent situations), and provides transport vehicles for partners in Korea (including vehicles for harmful chemicals).

We will continuously provide our subsidiaries with improved logistics services in response to gradually improving corporate capabilities, changes we face in this era and industrial development. We will do our best so that we play an important role in development of the Group by offering logistics services for efficient operation.

2nd Floor, 14, 2sandan 1-ro, Ochang-eup, Cheongwon-gu, Cheongju-si, Chungcheongbuk-do, Republic of Korea

ECOPRO OVERVIEW **ECOPRO**

CEO

Business Area



EcoPro Global

Date of Establishment CEO

Employee Status Business Area September 8, 2021 Kim Jang-woo 11 persons

Support overseas businesses of the EcoPro Group subsidiaries

Financial Status 2022 Annual Report



Capital Stock

KRW 193.5 billion

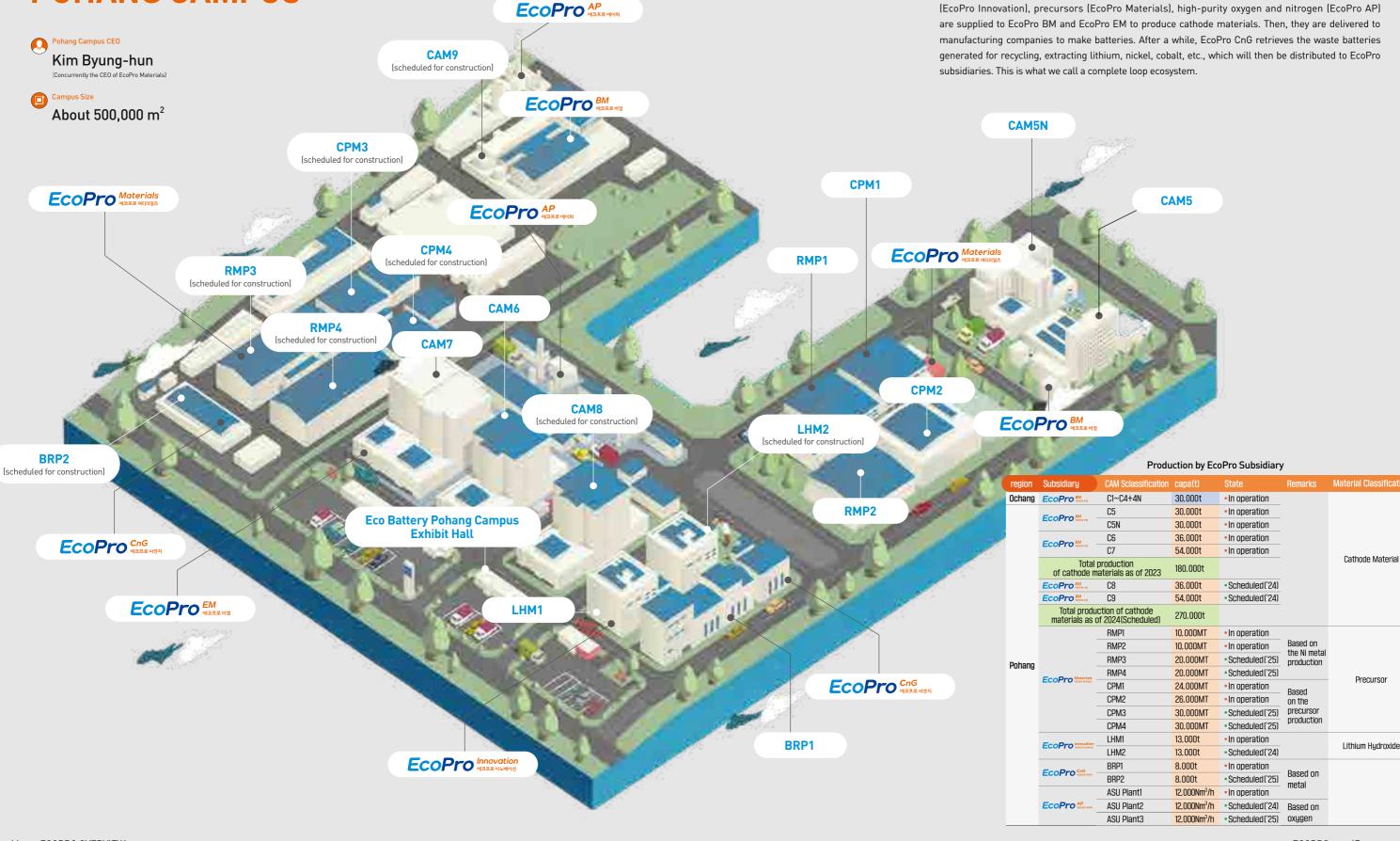


Founded in September 2021 as the subsidiary of EcoPro BM, EcoPro Global is playing an important role as a control tower of the Group to support EcoPro BM and the subsidiaries to enter global markets. EcoPro Global aims to expand the domestic ecosystem of cathode active materials to Europe and North America with local NCA, NCM and recycling bases, to strengthen partnership with local clients and to achieve a quick and stable growth of the global battery material business.

EcoPro, Venturing into the World







EcoPro Started EcoPro Materials in 2018 at the industrial complex in Yeongil Bay, Pohang and added EcoPro Innovation and EcoPro AP in October, 2022, finally creating a complete ecosystem for battery cathode materials and named it 'Eco Battery Pohang Campus.' It is the only value chain in Korea for

cathode materials that EcoPro has built which is called 'Closed Loop Eco-System.' Lithium hydroxide

Social Contribution

The Company Co-Existing with the Community

EcoPro has been conducting various social contribution activities for rehabilitation centers, childcare centers and families who are being left out based on the corporate philosophy, 'Co-Existing with the Community through Sharing' since its establishment.

We are doing our utmost to fulfill not only corporate responsibilities, but also contribute to the regional economy development, including creating jobs and building a sports environment for the physically-challenged, that is to organize a sports team in 2019, the largest team for the physically-



		Direction for social contribution activities	Status of social contribution activities
٥	Children/ Teenagers	Fostering future talent	Organizing work experience programs, installing fine dust status display boards, donating books, supporting community childcare centers and holding drawing contests for children
<u></u>	Young adults	Support for dream realization	Implementing scholarship programs, supporting university clubs for building electric vehicles and organizing EcoPro Volunteers
	Environment improvement	Actions against climate changes	Eco-walking, environmental cleanup and environmental education
_ Å	Physically/ Mentally- disabled	Raising public awareness and creating jobs	Operating a sports team for the physically-challenged
	Community	Shared growth through active exchanges	Supporting the underprivileged with medical expenses, conducting activities to improve the residential environment, delivering side dishes and offering meals, making kimchi, providing and delivering coal briquettes, supporting nursing homes/welfare centers, conducting Mother Box campaigns, etc.

CHEMICAL PROPERTY.

Campaign for Donations in Kind

Result of the Social Contribution Activities

800 items





60persons



Result of the Social Contribution Activities

Participating Sulnerable families with children -

700_{persons} KRW 5 million



Supporting the university clubs for

Result of the Social Contribution Activities





KRW 40

10 universitie







Donated 5 million Donated 30 million

donated 370 books donated 1,500 books



Donating 1% of the year-end monthly

Result of the Social Contribution Activities

1,600 persons





Result of the Social Contribution Activities







Organized Onnuri Sports Team, the first sports team for the physically-challenged in Korea

Result of the Social Contribution Activities

9 sporting events 10 sporting events



'Mother Box' support service to cope

Result of the Social Contribution Activities

241households



'Eco From Earth,' outreach activities

Result of the Social Contribution Activities





'Eco Bridge,' EcoPro Volunteers of

Result of the Social Contribution Activities





2021 (2nd Eco Bridge)

2023 (3rd Eco Bridge)



community childcare centers

326children



Number of participants Over **2,000** persons

Over 4,000 persons



restoration and delivery of flood disaster donations

Result of the Social Contribution Activities

KRW 3

Gyeongsangbuk-do KRW 3 hundred

Drawing contest for children at the local festival

EcoPro, Sharing Growth with the Community in 2022



Donation to restore damages caused by the typhoon EcoPro donated KRW 10 billion to Pohang-si to aid recovery from the typhoon



Received a plaque of appreciation from the Korea Paralympic Committee CEO Lee Dong-chae received a plaque of appreciation recognized for organizing Onnuri Sports Team and developing sports for the physically-challenged.



Selected as the company recognized for community contribution according to the Community Contribution Recognition System
EcoPro was chosen as the company recognized for community contribution for 4



EcoPro, received an award for its social contribution activities
EcoPro received Pohang Mayor's Award at the Pohang City Volunteer Competition.



consecutive years, the first in Chungcheongbuk-do.

Donated food boxes for the vulnerable social group in Cheongju-si



Delivered meals/lunch boxes for the vulnerable social group in Cheongju-si $\,$



Sponsored Cheongju-si Cleaning Application, 'Time to Throw Away' $\,$



Provided daily necessities for elderly people enduring



Donated 2,400 traffic safety articles for elementary school students in Pohang-si



Volunteering activities to paint murals in rural areas



Held Eco-Friendly Idea Contest for university students



Volunteer activities of making masks to prevent COVID-19 infections



Volunteer activities of house repairs for local residents



Delivered cool mats for 100 low-income elderly households in Cheongju-si



Volunteer activities of delivering coal briquette



EcoPro, participated in the community environmental cleanup activities



Supported park creation by donating a pergola and 300 pine trees



Volunteer activities for the river project with love for earth and water



Held an agreement ceremony to promote cooperation in creating a park of sharing and growth

Sharing & Growth



Celebrated the 3rd anniversary of EcoPro Onnuri Sports Team



Donations and tree planting volunteer activities at the park



Supported installation of fine dust display boards as part of the safe environment promotion project for children



Delivered Children's Day gifts



Delivered learning packages for creativity to support the community childcare centers

