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**CLEAN ENERGY, NEW BATTERY TECHNOLOGIES AND
SUSTAINABLE ECONOMIC GROWTH**

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The Center for International Business Advancement (CIBA) is excited to share with you the opening issue of its **INSIGHTS@CIBA**, a quarterly publication focused on the deep interconnectivity between regional and global economies.

Drawing on innovative policy-oriented research and publications on the most recent trends in the global economy, **INSIGHTS@CIBA** will:

- Allow regional stakeholders to better understand global and industry trends and regularly benchmark their own performance against peers and competitors;
- Provide actionable insights to Southern Tier businesses and economic development organizations to help them identify growth opportunities and develop effective strategies to optimize their competitive positions in the regional, national and global marketplace.

CIBA is an applied research and education center, and a policy forum with a mission to boost economic growth and job creation in New York's Southern Tier by fostering international strategic partnerships and emphasizing the importance of worldwide connectivity. CIBA is committed to helping companies from the Southern Tier expand to international markets and acquire global competitiveness; and to promoting foreign business investment and assisting foreign companies in their efforts to establish operations in the region.

We selected ***Clean Energy, New Battery Technologies and Sustainable Economic Growth*** as the focus of **INSIGHTS@CIBA**'s first issue. Environmentally-friendly sources of energy are going to be at the forefront of the global economy in upcoming years, and CIBA's goal is to support the Southern Tier's involvement in innovating and manufacturing new energy technologies.

In this newsletter you will learn more about the critical importance of new battery technologies for the worldwide transition to a clean energy future. We also present key global trends in the field. From around the Southern Tier we have included information about CIBA's Seventh Annual Global Trade and Investment Forum, held on April 7th, which engaged more than a hundred participants in discussions about the opportunities and challenges for the Southern Tier to grow as a national leader in battery innovation and community decarbonization.

AROUND THE WORLD

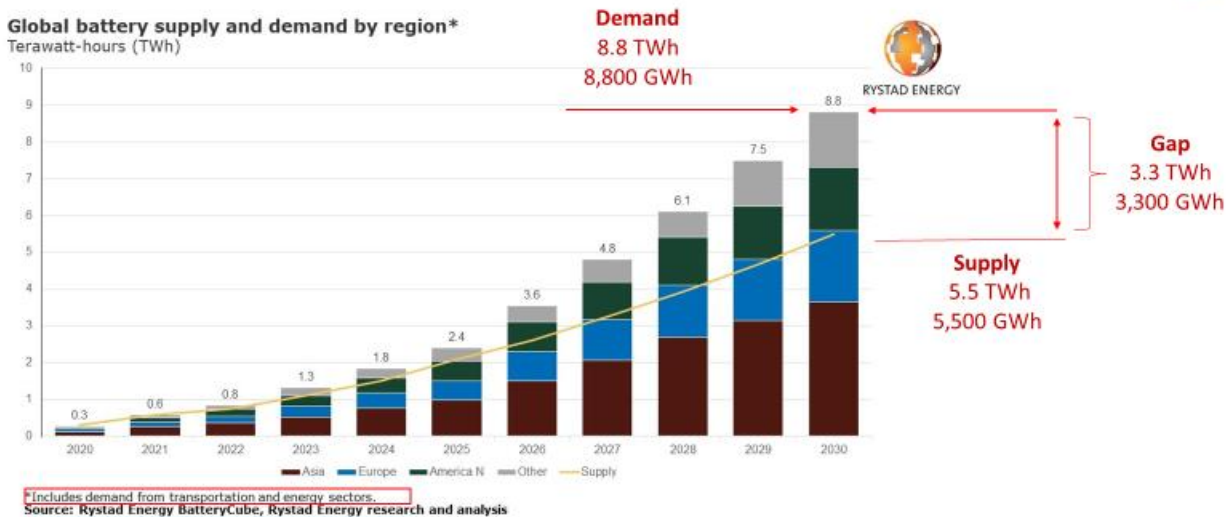
“Energy transition” has become the shorthand for discussions about the future of energy ever since 196 countries pledged in the 2015 Paris Climate Agreement to keep the rise in global temperatures to well below 2 degrees Celsius above pre-industrial levels, and preferably limit the increase to 1.5 degrees Celsius. The target for getting there is “net zero carbon” by 2050 or shortly thereafter. Batteries are a core technology to realize the energy transition and broaden energy access around the world. According to a 2019 World Economic Forum Report, global battery demand is expected to grow by 25% annually to reach 2,600 GWh in 2030.

Batteries play an increasingly important role in three areas:

- 1) Decarbonizing road transport through electrification;
- 2) Enabling the shift from fossil fuel to renewable power generation as a dispatchable source of electricity; and
- 3) Providing electricity access to off-grid communities.

Furthermore, the advent of lithium-ion battery technology has a tremendous potential in creating equitable clean-energy manufacturing jobs, adding significant economic value in the clean energy sector, and driving a responsible and just value chain.

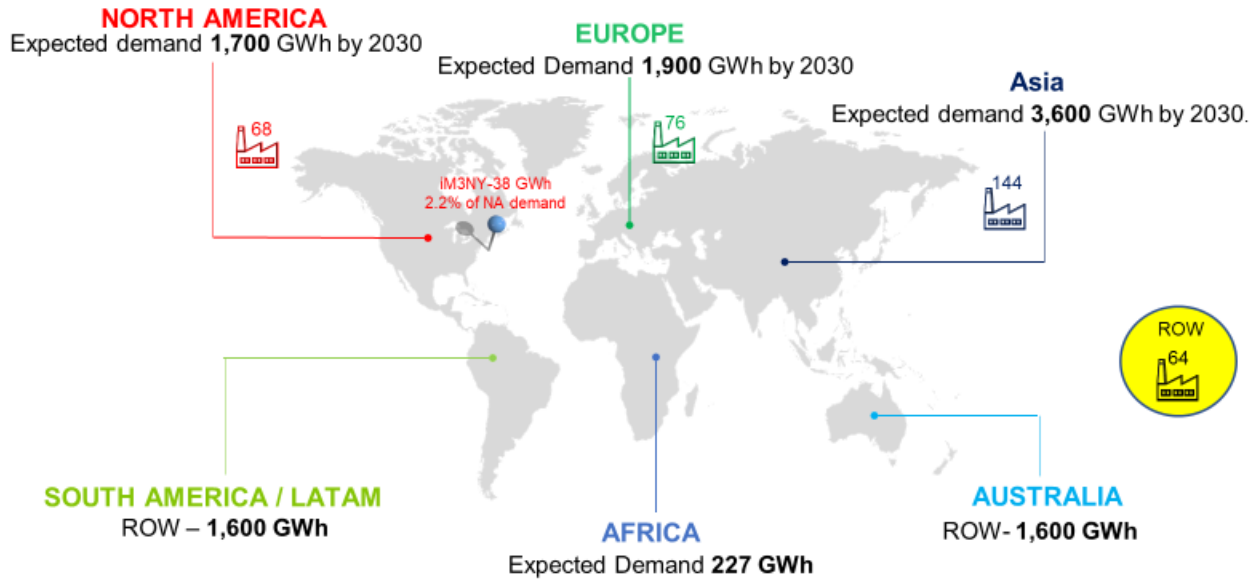
Demand / Supply - Worldwide by 2030



Demand for LIBs will outpace Supply by 3.3 TWh or 3,300 GWh by 2030
We will need an additional 132+ Gigafactories at 25 GWh each to meet demand

Source: Cliff Olin. “The World Transition to Electrification.” Presentation at the CIBA Global Forum, April 7, 2022, Binghamton NY

Regional Demand by 2030



Source: Cliff Olin. "The World Transition to Electrification." Presentation at the CIBA Global Forum, April 7, 2022, Binghamton NY

A looming transition is underway that in the decades ahead will shift the world away from using oil, natural gas and coal. The transition will have an enormous global economic impact, but it will also bring about major changes in the map of global power.

The Transition to Clean Energy Will Mint New Commodity Superpowers

The transition from dirty fuels to cleaner energy sources translates into huge demand for the metals, such as aluminium, cobalt, copper, lithium, nickel, silver and zinc, that are vital to the technologies underpinning everything from electric cars to renewables. Much like fossil-fuel reserves, these commodities are distributed unevenly. In a recent article published in *The Economist* on March 26, 2022, Paris Kolwezi and San Pedro de Atakama argue about an impending full metal jackpot and outline the winners and losers.

The club of the "green-commodity superpowers" could pocket more than \$1.2trn in annual revenue from energy-related metals by 2040. These electrostates include democracies such as Australia, which has troves of every significant metal, and Chile, home to 42% of the world's lithium reserves and a quarter of its copper deposits. Others are autocracies, such as Congo, which has 46% of global cobalt reserves (and produces 70% of the world's output today). China is the home to aluminum, copper, and lithium; Indonesia sits on mountains of nickel; and Peru holds nearly a quarter of the world's silver.

Who are the losers? And what might prevent the new commodity superpowers emerging? [Read more here.](#)

How China is Charging Ahead in the EV Race

China's lithium-ion battery capacity will be twice as big as the rest of the world's by 2031, according to a March 8, 2022 report published by fDi Intelligence, a division of London-based Financial Times. Across China, 125 battery gigafactories are already active — more than ten times

the combined number in Europe and North America, according to data from Benchmark Mineral Intelligence (BMI), a specialist information provider for the EV supply chain. China is home to factories producing batteries for everything from EVs and electric scooters to consumer electronics and toys. The country's dominant position in batteries, as well as the minerals needed to build their underlying components, makes it very unlikely for any other country or region to overtake it as the leading global production hub.

What is the recipe to China's success? The fDI Intelligence report underlines three key factors. First is the mix of early and effective industrial policy, and generous financial backing for producers. Second, foreign influx is another contributor to the success story. Between 2017 and 2021, the country attracted more than \$31bn worth of announced foreign direct investment into EV-related activities, according to greenfield investment tracker fDi Markets. This is more than double the total (\$15.4bn) recorded in the United States. A third key factor is a deep supply chain and the fact that Chinese companies have invested heavily in mines around the world. Overall, as a production hub for EVs, batteries and their components, China is well set to be a driving force behind electrifying the world.

Read the full report [here](#).

How the United States is Progressing in the Race for World Electrification

The EV Revolution Provides Windfall for U.S. States

The U.S. is in a strong position in one realm that will be essential for the energy transition—scientific research for the development of new energy technologies. Second, the shift to battery-powered vehicles has opened up an investment super-cycle into the U.S. economy. Major automakers and battery manufacturers have outlined their largest-ever investment campaigns across the United States, as the race for EV supremacy intensifies. Third, foreign carmakers also have bold electrification plans to enter the North American EV market. The latest fDi Markets data show the U.S. attracted more inbound foreign EV-related investments than any other country in 2021, including China, the UK and Germany.

Read the full article [here](#).

Federal Policy Outlines U.S. Agenda for Lithium Batteries

Read [here](#) the National Blueprint for Lithium Batteries 2021-2030 of the Federal Consortium for Advanced Batteries.

AROUND THE SOUTHERN TIER

CIBA Holds Seventh Annual Global Trade and Investment Forum

By Lorin Miller

CIBA's Seventh Annual Global Trade and Investment Forum, held on April 7th, addressed the future possibilities of clean energy from new battery technologies. The goal of the discussions was to discover opportunities in worldwide connections with clean energy for the economy in New York's Southern Tier. Attendees and distinguished speakers considered business investments overseas, international partnerships, and global markets to gauge a sense of competition and explore room for expanding business. From an economic development perspective, the Forum outlined the importance of the extensive mineral resources in North America, the need for workforce development, and the potential in the Southern Tier for a deep ecosystem or industry cluster centered on batteries.

Learn about what industry experts said during panel discussions, how the Southern Tier is becoming a national leader in green energy, and more!

Read article [here](#)

CIBA's Forum is an annual venue for business executives, policy makers, technology and academic leaders to connect and explore opportunities for regional growth through global connections such as exports to international markets, attraction of foreign business investment, and the advancement of international strategic partnerships.

Click [here](#) for pictures from the CIBA Global Forum

Click [here](#) to watch videos from the panel discussions

HIGHLIGHTS FROM THE PANEL DISCUSSIONS

KEYNOTE ADDRESS

Distinguished Binghamton University Professor and Nobel Prize Laureate M. Stanley Whittingham tells the story of the evolution and implementation of battery technology from his start at Esso (now Exxon Mobil Corporation) in the 1970s to the present day. He emphasizes that with the world moving toward renewable energy, we must keep in mind where we will store all of it. Whittingham speaks about the need for a regional supply chain and how it will build a future for safe and secure green energy. In a short Q&A moderated by Andrew Karolyi, the Charles F. Knight Dean of the Cornell SC Johnson College of Business, Whittingham answers questions regarding sustainability, manufacturing, and community engagement.

Watch video [here](#)

ENERGY STORAGE AS THE BRIDGE TO A CLEAN ENERGY FUTURE

CIBA Senior Policy Fellow Ed Kowalewski moderates a discussion between William Acker (Executive Director of NY-BEST), Craig Connelly (Director of Research and Development at NYSERDA), and Chaitanya Sharma (CEO of iM3NY). Topics in this panel include finding an ideal technology profile for energy storage, an introduction to the Endicott Gigafactory and what it will produce, and how a regional supply chain and non-nickel non-cobalt chemistry will help set Southern Tier cell production apart from competitors.

Watch video [here](#)

TRANSITIONING FROM LAB SCALE TO MANUFACTURING SCALE

Carol Miller, Executive Director of the Alliance for Manufacturing and Technology, moderates a discussion between Jennifer De Souza (Vice President for Energy Solutions, Procurement and Leasing, The Raymond Corporation), Emmanuel Giannelis (Vice President for Research and Innovation, Cornell University), and Per Stromhaug (Associate Vice President for Innovation and Economic Development, Binghamton University). Panelists discuss the bridge between science and business, nurturing early technologies and methodologies in academia, and building up a commercialization ecosystem in the Southern Tier.

Watch video [here](#)

THE SOUTHERN TIER AS AN EMERGING NATIONAL LEADER IN BATTERY INNOVATION AND COMMUNITY DECARBONIZATION

In a discussion led by Jeffrey Smith, Co-Founder of Tier Energy Network, panelists Shailesh Upreti (CEO of C4V and Chairman of iM3NY), Clifford Olin (Chief Business Development Officer, C4V), and Luis Aguirre-Torres (Director of Sustainability, City of Ithaca), talk about the "smart-giga" lithium-ion technology at the Gigafactory lab, Ithaca's Green New Deal, and a blueprint for decarbonization.

Watch video [here](#)

THE SOUTHERN TIER SOFT LANDING PROGRAM: WELCOMING INTERNATIONAL BUSINESS INVESTMENT IN THE CLEAN TECH SECTOR

Elena Iankova, CIBA Director and Director of the Southern Tier Soft Landing Program, talks about this new program and its mission to attract international businesses to the Southern Tier. Michael Jagielski (Director of the Southern Tier Clean Energy Incubator Program at the Koffman Southern Tier Incubator) discusses the Soft Landing Program's relationship with the Incubator and how the two programs will bolster an ecosystem where international businesses can thrive locally. Michael Mahan (Director of Cleanwatts Americas) discusses the benefits for this Portuguese startup from its affiliation with the Koffman Incubator and the Soft Landing Program. Luis Aguirre-Torres (City of Ithaca) talks about investing in infrastructure and talent to support a clean energy future. David Ding (Director of Taiwan Investment and Trade Office in New York) discusses the benefits of bilateral trade cooperation between Taiwan and the United States.

Watch video [here](#)

TESTIMONIALS

The CIBA Forum was a “very effective seminar describing the challenges and opportunities facing us as the area embarks on sustainable recharges [of] economic growth with an emphasis on battery energy storage. Excellently coordinated by Binghamton and Cornell universities. This hopefully will let us all work together to rebuild the economy of the Southern Tier so it again leads the world just as it did with IBM and Link Flight Simulation.” – **M. Stanley Whittingham, Binghamton University Distinguished Professor and 2019 Nobel Prize Laureate in Chemistry**

“The CIBA Forum sent strong messages of Binghamton and Cornell Universities working together. This is wonderful. I have always hoped that Binghamton University and Cornell would collaborate. As two of New York's ARC region's most prestigious universities, the effect of the collaboration has to represent a situation where combination is stronger than the sum of the parts!” – **George Korchowsky, Program Manager of NYS Appalachian Regional Development Program at New York State Department of State**

“I would like to thank the Center for International Business Advancement (CIBA) for holding the 7th Global Trade and Investment Forum, as it was an honor to attend this meaningful event and discuss clean energy and the energy storage industry with the participants. I was especially inspired by Professor Whittingham's keynote address explaining that the present global supply chain is untenable. As I mentioned at the event, Taiwan Economic Minister Mei-Hua Wang and US Secretary of Commerce Gina Raimondo announced a new ‘Technology Trade and Investment Collaboration (TTIC) Framework’ to promote bilateral supply chain cooperation, such as clean energy, between Taiwan and the US. The Southern Tier area of New York provides a lot of business and market potential for Taiwan. We are looking forward to collaborating closely with Empire State Development, CIBA, and other stakeholders to further promote bilateral economic and business relations. I look forward to participating in this meaningful event again next time.” – **David Ding, Director of the Taiwan Investment and Trade Office in New York**

“It was great to hear all the speakers discuss the potential opportunities and challenges facing new battery technologies and the exciting future being built in the Southern Tier.” – **Michael Winn, Managing Director, Head of Scale Facilitation Operations**

“After my exciting remote internship in the Summer of 2021 with the Koffman Incubator and as a student member of the Tier Energy Network (TEN), I was looking for an opportunity to come to Binghamton and meet everyone because face-to-face interaction is essential to me. And there couldn't be a more significant opportunity than the CIBA Seventh Global Forum. Aside from enjoying this outstanding performance from Liz Callaway, the best part for me was the presentation about Li-ion Battery technology and the visit to the Gigafactory in Endicott, which is a

testimony that Lab to Market is a reality in the Southern Tier. This event brought me meaningful connections from Binghamton University, Cornell University, C4V and iM3NY. I am very grateful to Elena Iankova, Director of CIBA, for the invitation.” – **Marcellin Adjoumane, Master student in Polymer Chemistry at SUNY-ESF, Syracuse**

“I’m glad I was able to meet some of the participants, and get a sense of what the future could bring to our ‘Green Valley of Opportunity.’ And I hope, in some small way, our performance inspires the business innovators and academic attendees to include the arts in the planning and development of the Binghamton region.” **Ron Tierno, Musician**

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