



# Scaling Up 2019

Delivering a Bio-Circular  
Economy



## Zeton's Role in the Bio-Circular Economy

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November 5, 2019



# ABOUT US

# Zeton's Business Model





SCALING UP IN THE  
BIOCIRCULAR ECONOMY



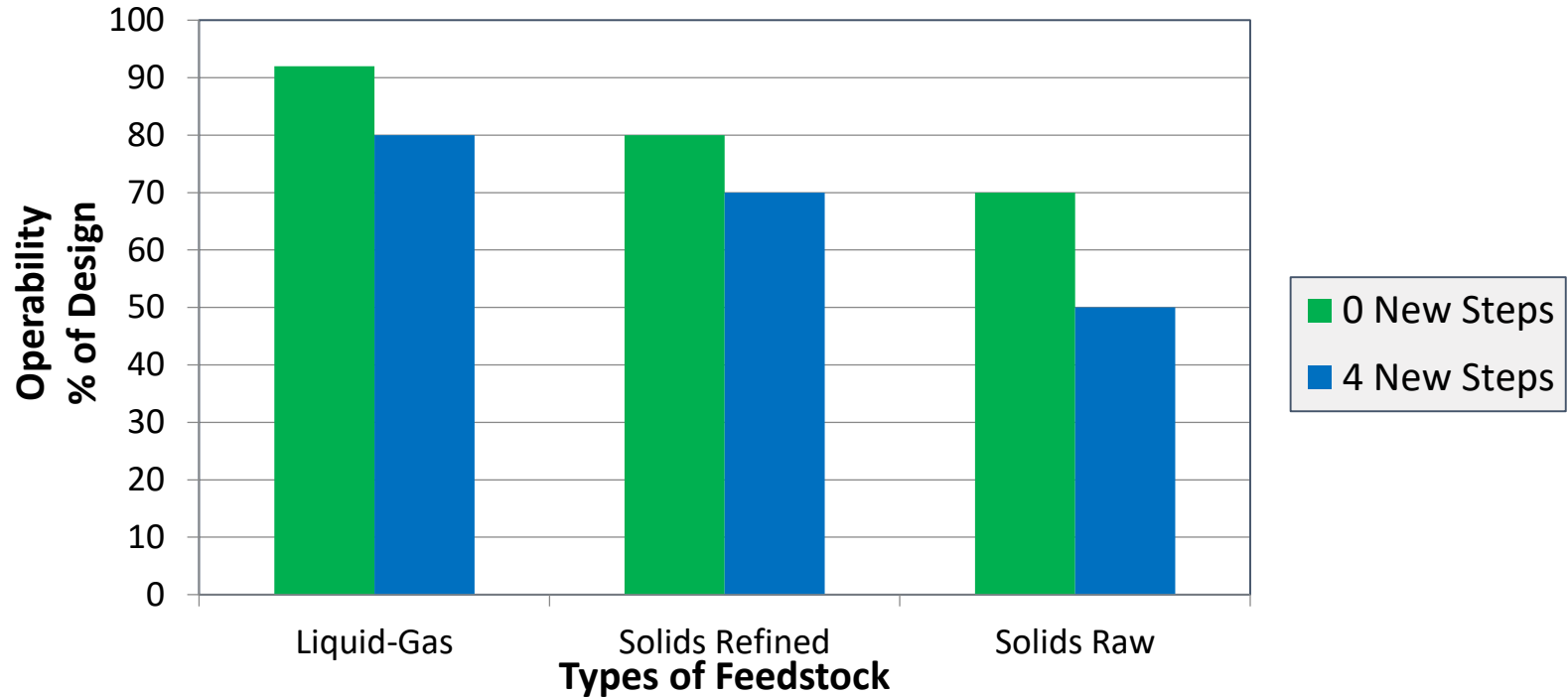
# From Lab to Demonstration Scale

Zeton assisted GTI and Shell/CRI in scaling up GTI's IH<sup>2</sup>® technology from lab scale to demonstration scale:

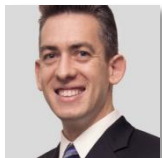
- Recirculating hydrogen used as fluidizing gas
- Main reactor followed immediately by second upgrading reactor
- KBR is commercial scale partner for FEED



# Operating Capacities after Start Up



# Forecasted Global Tonnage of Spent Li-ion Batteries

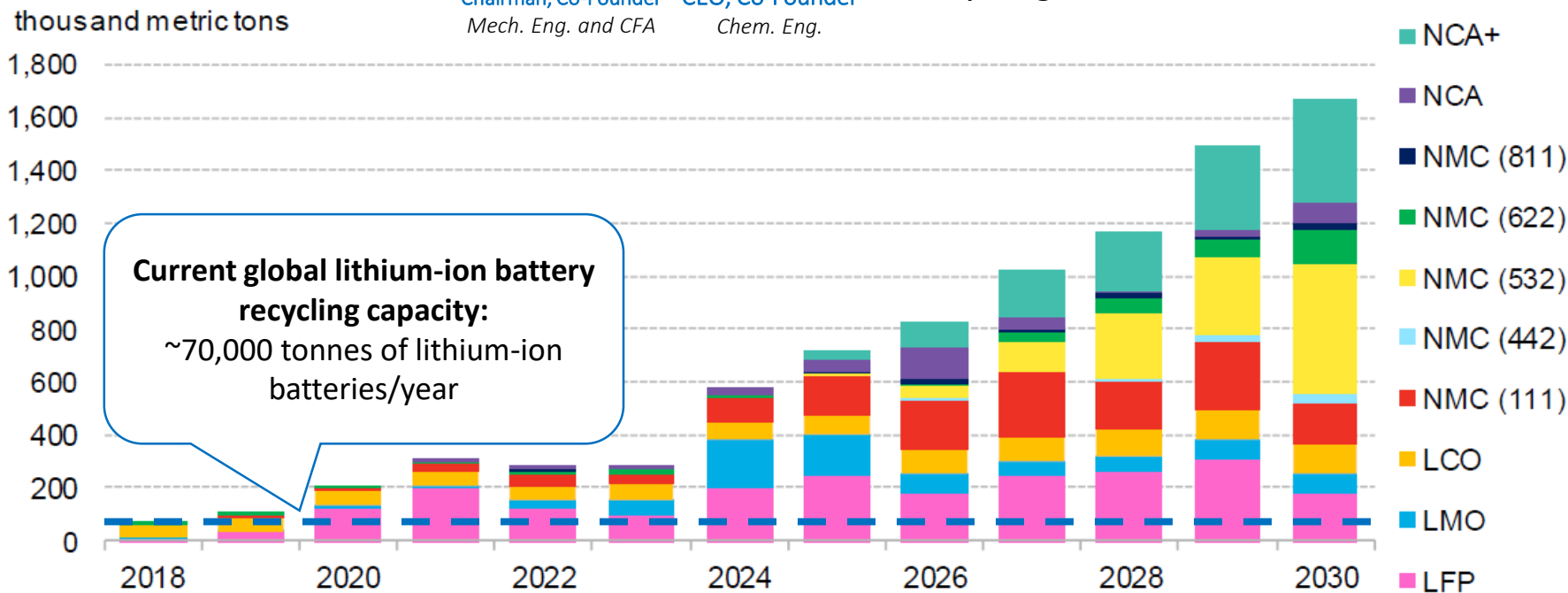


**Tim Johnston**  
Chairman, Co-Founder  
Mech. Eng. and CFA



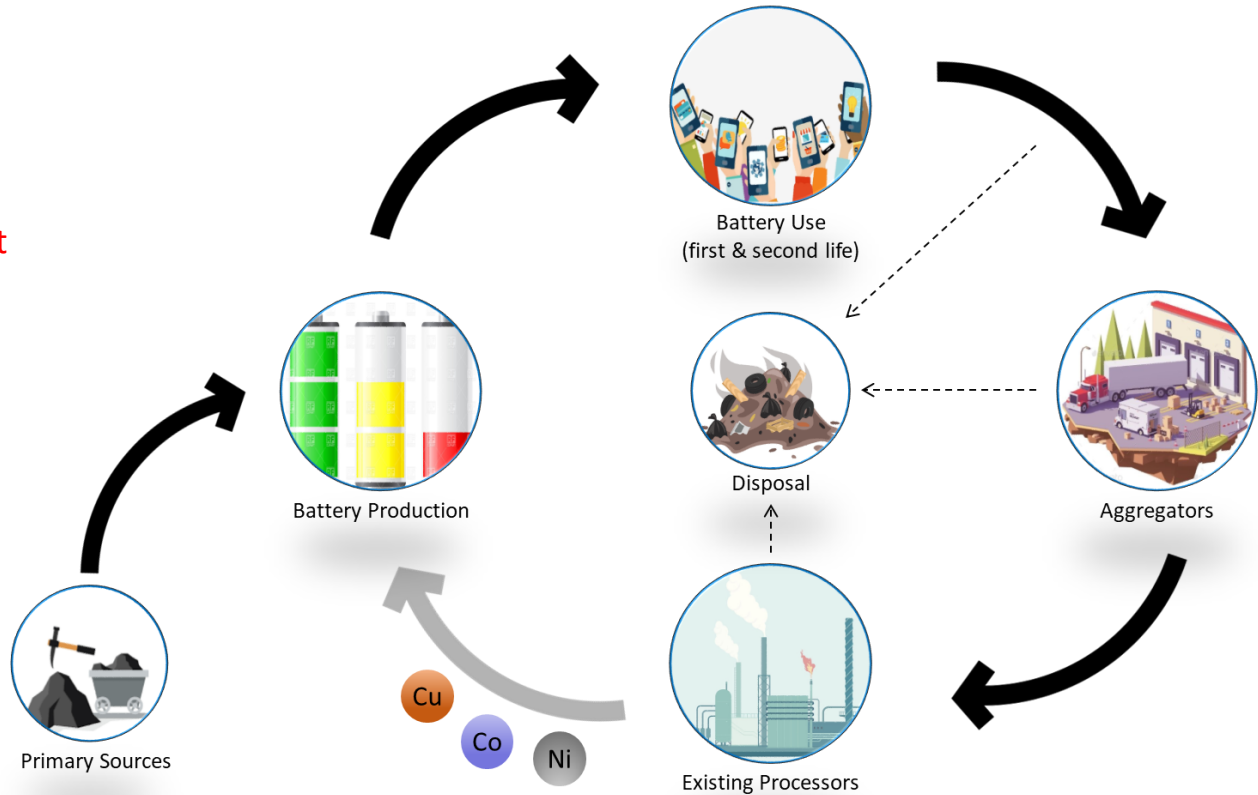
**Ajay Kochhar**  
CEO, Co-Founder  
Chem. Eng.

*Stark contrast between current global lithium-ion battery recycling capacity and lithium-ion batteries available for recycling*



# Incumbent Li-ion Battery Recycling

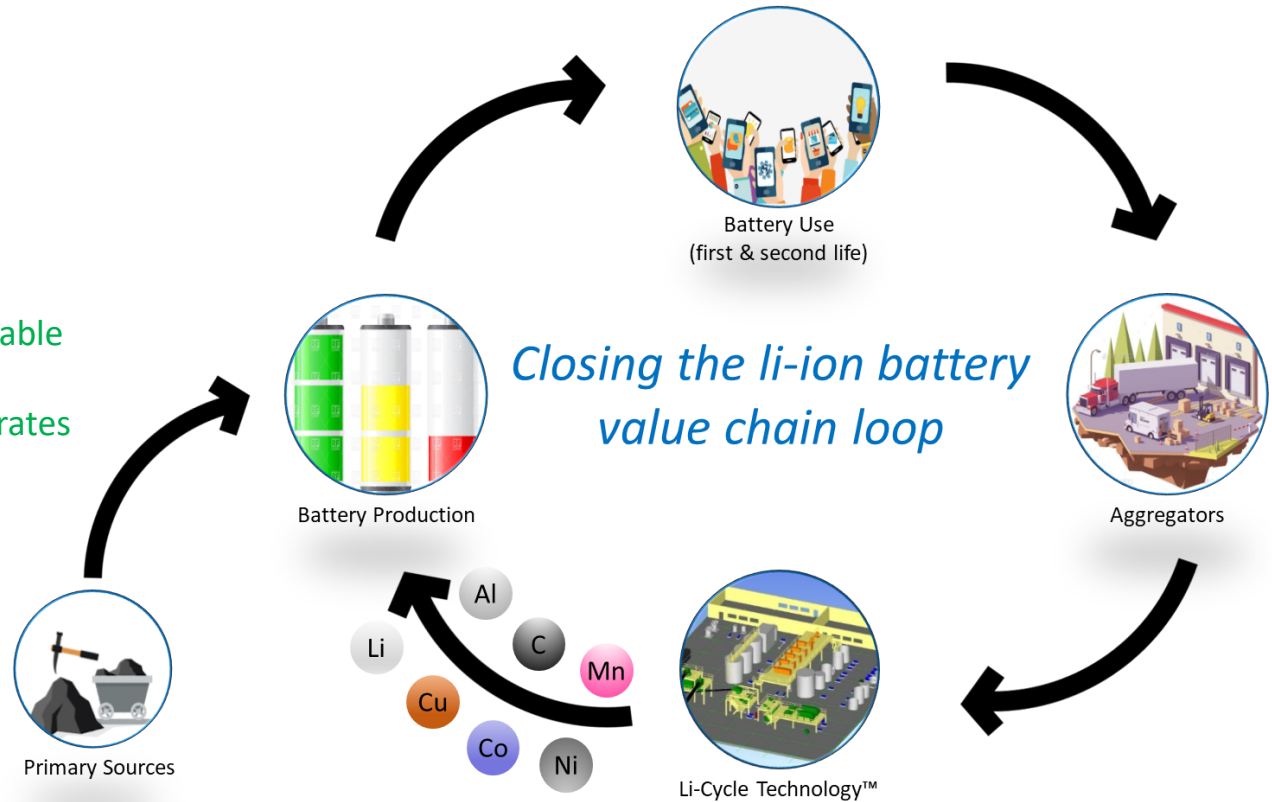
- ⚡ <40% Recovery
- ⚡ High cost to customer
- ⚡ Lithium and graphite lost
- ⚡ Hazardous
- ⚡ <5% collection rates
- ⚡ Chemistry dependent



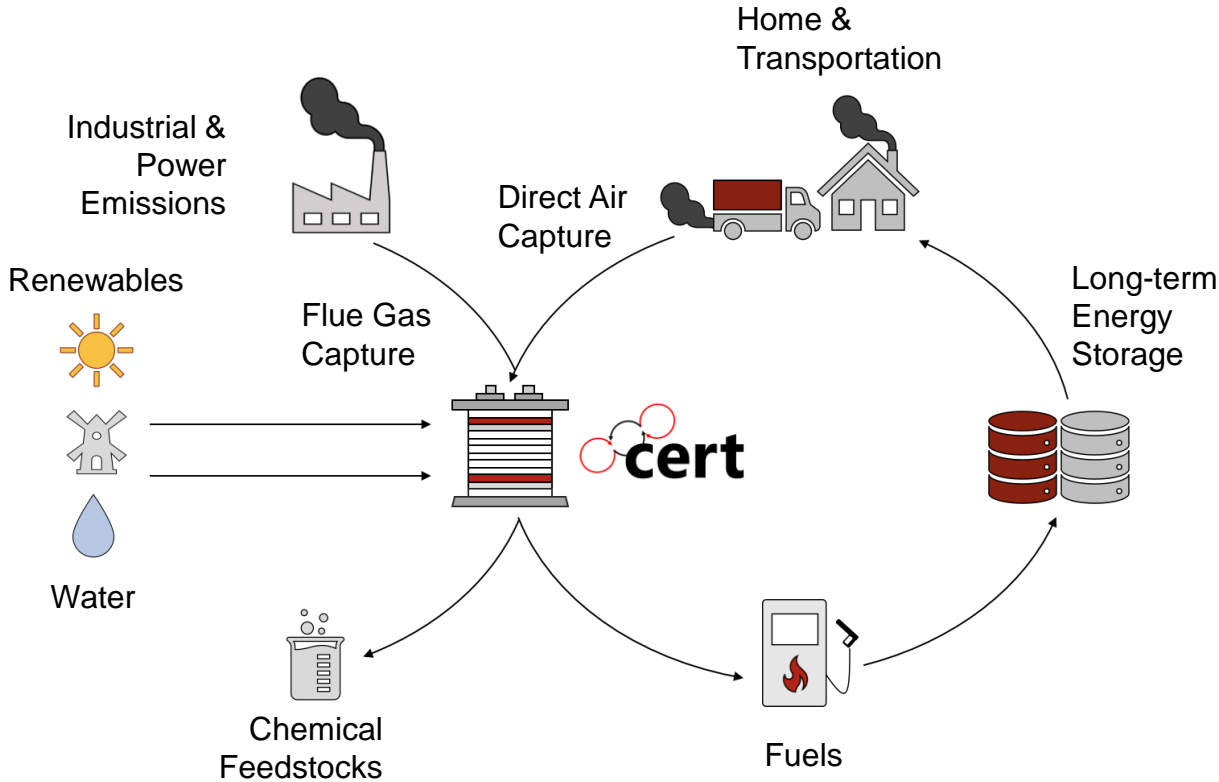
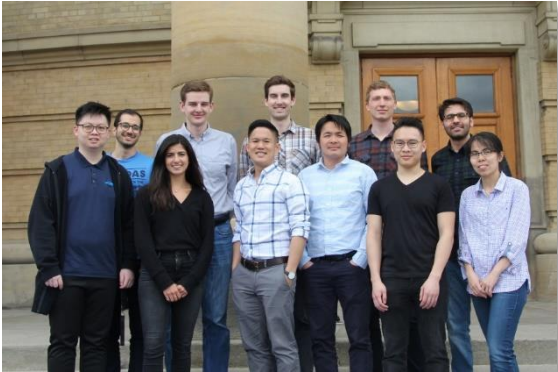


# Solution: Li-Cycle Technology™

- ⚡ 80-100% Recovery
- ⚡ Lower cost to customer
- ⚡ All materials recovered
- ⚡ Environmentally sustainable
- ⚡ Enable higher recycling rates
- ⚡ Chemistry agnostic



# Closing the Carbon Cycle



# Standard Lithium LiSTR Demonstration Plant

**Location:** Southern Arkansas

**Feed:** Waste brine from Lanxess' bromine production process

**Capacity:** 50 gpm of brine is treated, producing up to 150 TPA of Battery Quality Lithium Carbonate



Biocircular  
Economy  
Companies Zeton  
has worked with  
in scaling up their  
technology



MONOLITH



AIR  
C·O

**BATTELLE**



**bioX**

**PETROBRAS**



# Delivering On Time

