

Airgas[®]
an Air Liquide company

NAATBatt 2024

Airgas in the Battery Manufacturing Ecosystem



Airgas, an Air Liquide company

1M+
customers

90+
business
segments

18,000
associates



68 Large Primary
Production Plants

200+ On-site Units

410+ Cylinder Fill Plants

100+ Specialty Gas Labs



12.1M
cylinders



25,000+
bulk tanks



232K+
hardgoods
products
available



3,500
sales people

6
Distribution centers

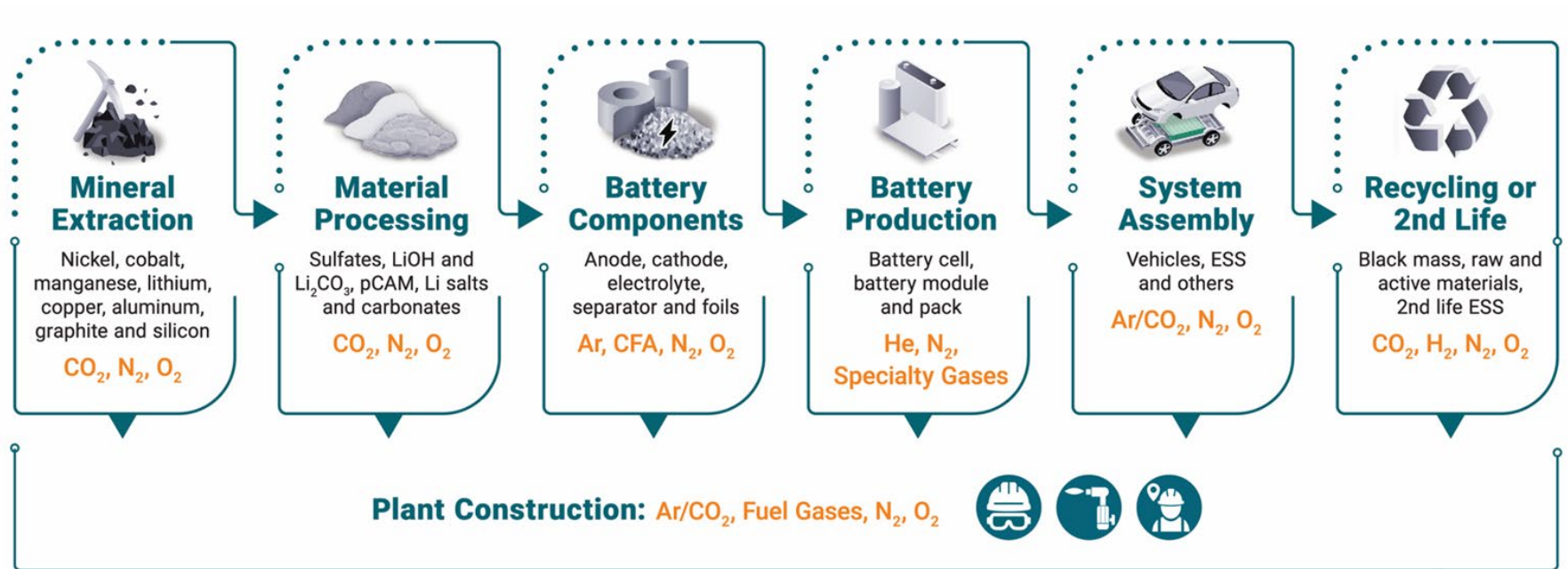
900+
branches

500
field-based
application
experts

- Founded in 1982; built with over 500 acquisitions
- Acquired in 2016 by Air Liquide; adding in global sourcing capabilities and R&D network

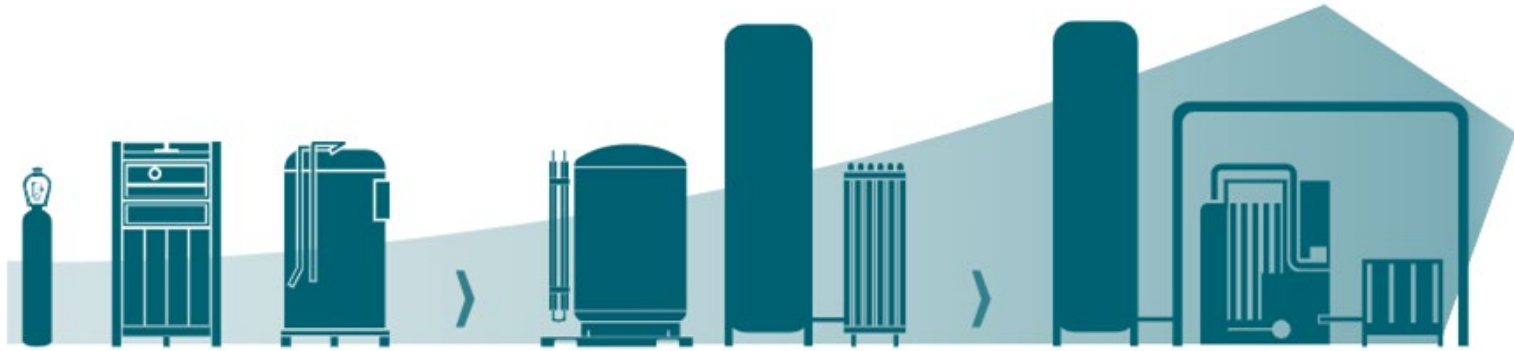
Our battery ecosystem | the role of gases and related services

for the safe, efficient and sustainable production of essential battery materials



Reliable and flexible gas supply modes from Airgas-Plan now!

Enable our customers to optimize their production processes and reduce total costs



Packaged Gas

- For small to medium volumes
- Cylinders for compressed gas
- Liquid cylinders
- Available in packs for larger consumption
- Innovative cylinder valve technologies available

MicroBulk and Bulk

- For large volumes
- Liquid form by tanker
- Proprietary on-site mixers
- Airgas Nitrogen Services for temporary on-site nitrogen needs

FLOXAL™ On-site Gas Generation

- For very large volumes from 10 to 1000s Nm³/H
- On-site at your facility even in remote locations
- Available for nitrogen, oxygen and hydrogen

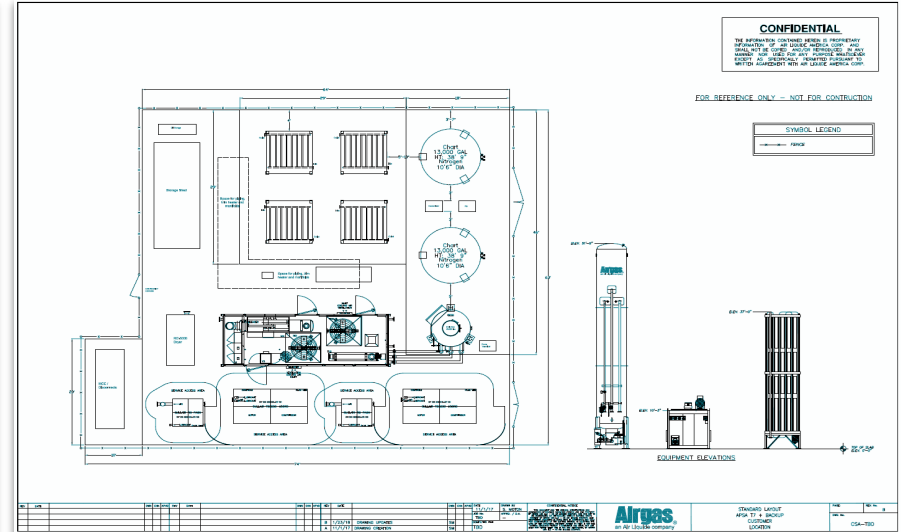
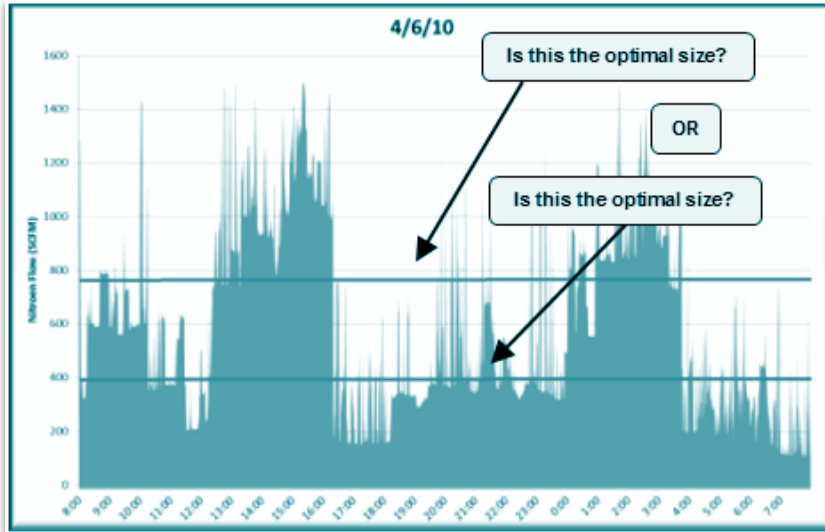
Critical Component to meet startup deadlines



- Construction Specialists—assets to match project timeline
- Engineering support—flow studies and validation
- Multiple modes of supply—single line to full production

30+

active project sites:
gas, welding
consumables &
safety equipment



FLOXAL™ on-site gas generation



Safe, efficient and sustainable production of essential battery materials

- N₂ and O₂ are critical to your process
- Gas purity and rate of consumption directly influences battery performance and safety
- Sustainable while reducing your Total Cost of Ownership

Why choose Airgas/Air Liquide in North America?

200+

total announced
projects in North
America

40+

North America
Airgas/AL contracts

1

New battery
pipeline network



Construction projects



Cell production sites



Laboratory builds



Recycling plants



Material processing facilities

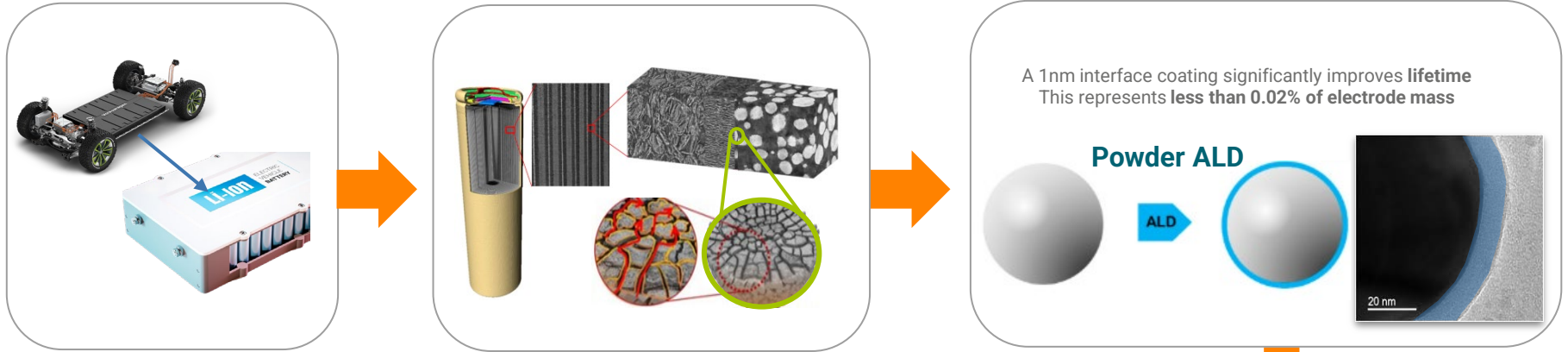


Electrolyte plants



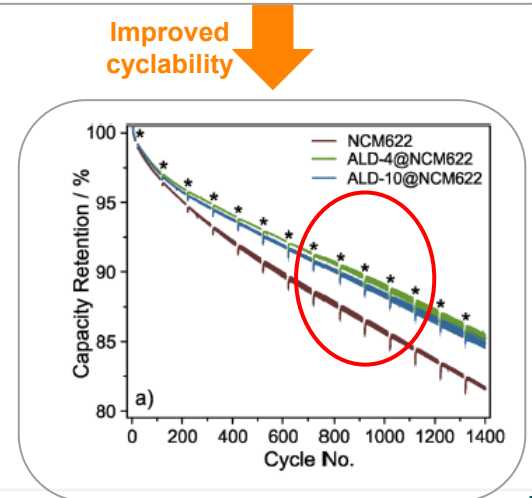
Carbon additives facilities

Moving battery technology and performance forward



Benefits of Atomic Layer Deposition for **Advanced Batteries**

- (1) **Energy density improvement** to surpass 400Wh/kg and 1000Wh/L by introduction of all solid state batteries and Si anodes.
- (2) **Cyclability improvement** by preventing cathode degradation (e.g. Mn dissolution) in low Cobalt CAMs → improved battery lifetime
- (3) **Fast-charge of all solid-state batteries** without degradation of the cathode materials by strict interface layer control.





Contact us

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