



# AD-MAT: ADAPTATIONS OF MATURE MANUFACTURING STRATEGIES FOR ACCELERATED REDOX FLOW BATTERY DEPLOYMENT

IDEA TYPE: Analysis

IDEA HISTORY: New

PRIMARY ESGC TRACK: Manufacturing, Supply-Chain & Workforce

2ND ESGC TRACK: Markets & Valuation

PROJECT SIZE: SMALL

SKILLS: Technical analysis, technoeconomic analysis, interdisciplinary industry survey

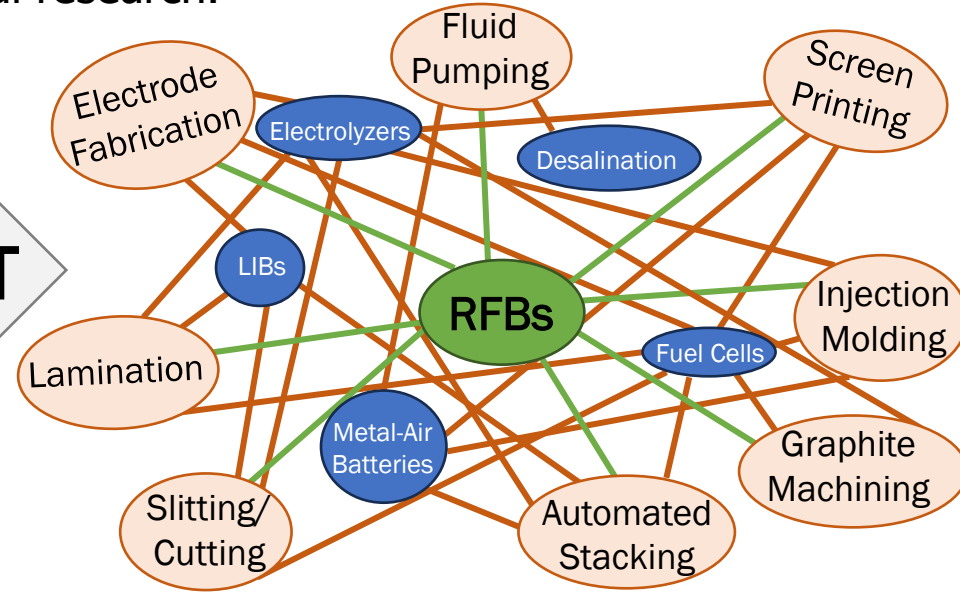
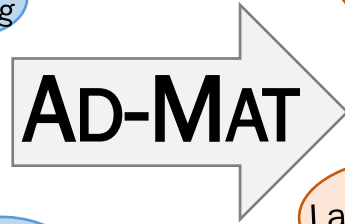
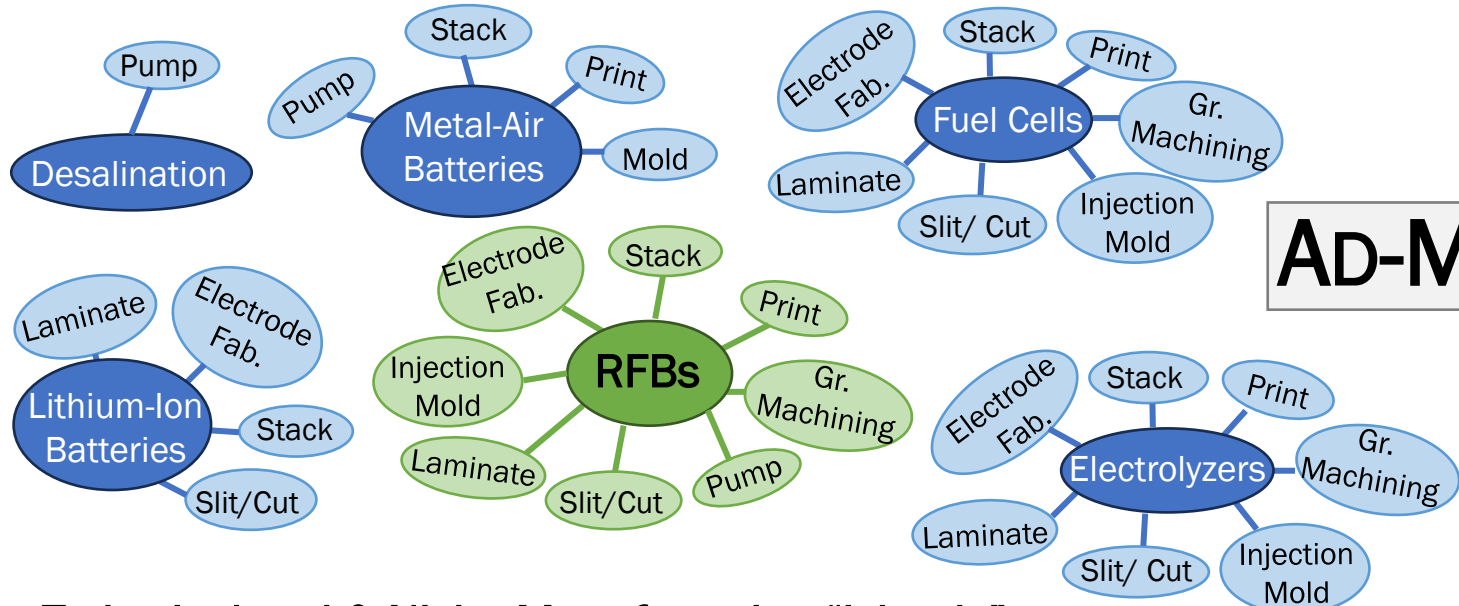
POTENTIAL IDEA SIZE	IDEA DEVELOPMENT FUNDING (6-12 months to complete)	POTENTIAL SCOPE TO COMPLETE (years to complete)	NUMBER OF NATIONAL LABS PARTICIPATING
S	\$50-100K	1-3	2+
M	\$100-200K	3-7	3+
L	<\$300K	7+	4+

K. Fink/NREL  
B. Tremolet de Villers/NREL  
K. Harrison/NREL  
L. Robertson/ANL  
V. Battaglia/LBNL

# LEVERAGE EXISTING “ADJACENT MARKETS” ACROSS TECHNOLOGIES TO REDUCE LEARNING CURVE & ACCELERATE RFB DEPLOYMENT AT SCALE



- **CHALLENGE:** Isolated small-scale manufacturing for RFBs precludes economies of scale needed to compete with LIBs.
- **TARGET AUDIENCE:** Cross-industry OEMs in translatable markets; existing RFB OEMs.
- **IMPACT:** *Break paradigm of isolated & niche manufacturing pathways* for emerging LDES solutions. Adapting from mature industries prevents unnecessary redevelopment, reduces costs, & accelerates deployment.
- **SIZE:** Small initial analysis defines landscape for larger follow-on technical research.



Today: Isolated & Niche Manufacturing “Islands”

Future: Interconnected Manufacturing Landscape

## FIRST-YEAR SEEDLING EFFORT:

(1) Identify holistic scope of opportunities to adapt mature technology to RFBs; (2) Quantify technoeconomic benefit



## ESGC BIG-DIG FAST PITCH

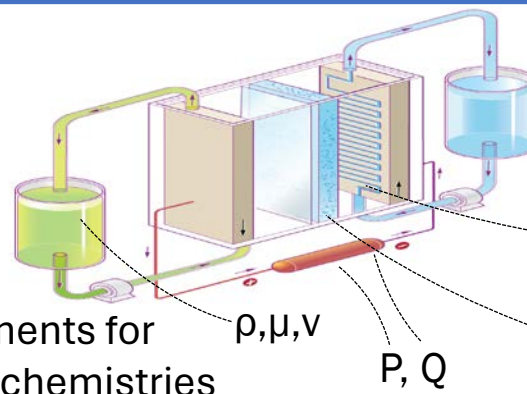
April 2024

### Industry Analysis

Industry survey of RFB OEMs & component suppliers + equipment manufacturers, toolers, etc. in distinct adjacent industries

### Technological Analysis

Technical manufacturing requirements for commercial & near-commercial RFB chemistries



System size  
Stacking  
Tolerance

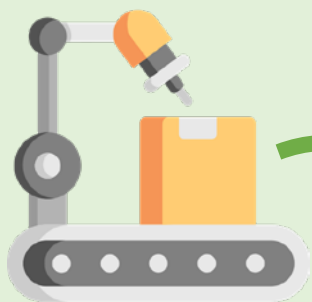
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 $K_{elec.}, K_{membr.}$

### Technoeconomic Analysis

Identify target areas for maximal cost savings by adapting learnings from mature industries

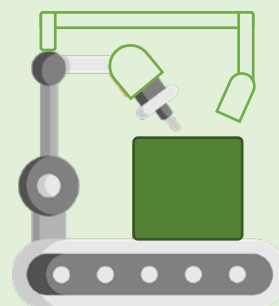
*Top candidates (tools/processes/equipment) for Ad-Mat for RFBs*

## AD-MAT "CHALLENGE" PROGRAM:

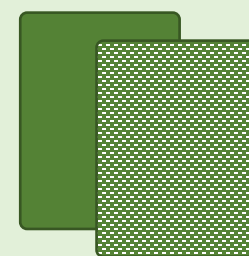


*Tool/process from mature adjacent industry*

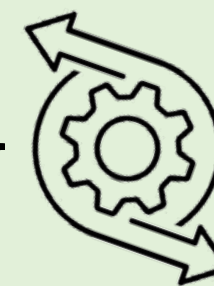
**Collaborative Partnerships:  
Industry +  
National Lab**



*Design/process engineering:  
adaptation to meet RFB specifications*



*Validation of  
performance:  
adapted vs  
purpose-built*



**OUTCOME & IMPACT:**  
**Flexible and mature  
manufacturing  
ecosystem to support  
accelerated RFB  
deployment at scale**

# AD-MAT PROGRAM PLAN:



ESGC BIG-DIG FAST PITCH

April 2024

- **KEY EXECUTION ISSUES:** IP barriers; diversity of RFB chemistries affects breadth of applicability for adapted solution.
- **KEY OUTCOMES:** Redefined flexible manufacturing approach enables cost-competitive deployment of RFBs. Ad-Mat leverages learning-curve maturity of LIB manufacturing to facilitate LDES opportunities for RFBs & beyond.
- **RESOURCES:** *OEM engagement:* Existing RFB players & mature adjacent adaptable industries. *National Lab collaboration:* technological & manufacturing process expertise; at-scale demonstration of adapted products.
- **SEEDLING BUDGET REQUEST:** \$100k/1yr (technological & state-of-the-industry analysis): ID top candidates for AdMat.
- **ESTIMATED PROGRAM BUDGET:** \$5M/3yrs: "Challenge" (NL/industry collaboration) to adapt existing manufacturing approaches to redox flow battery applications.

TIME IN YEARS

