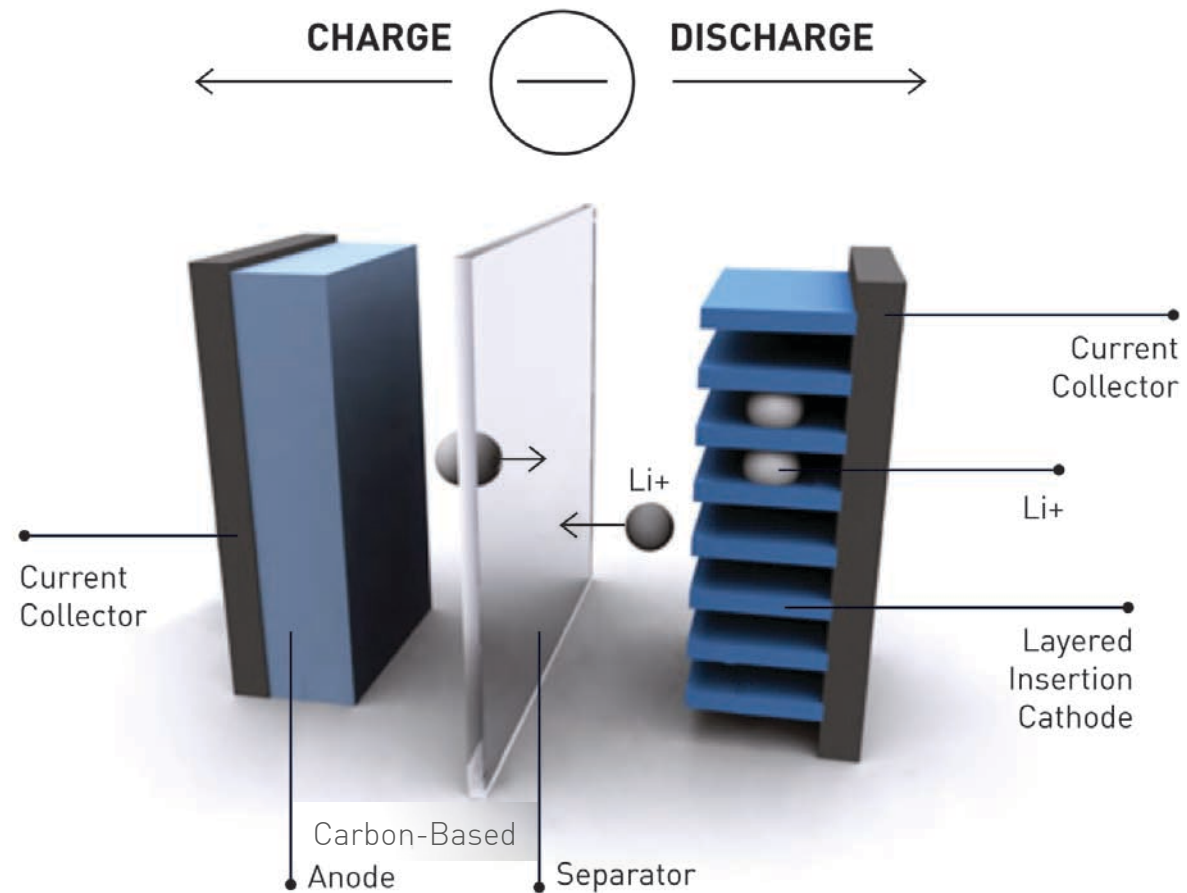


ENERDEL VOLVO TECHNICAL SEMINAR

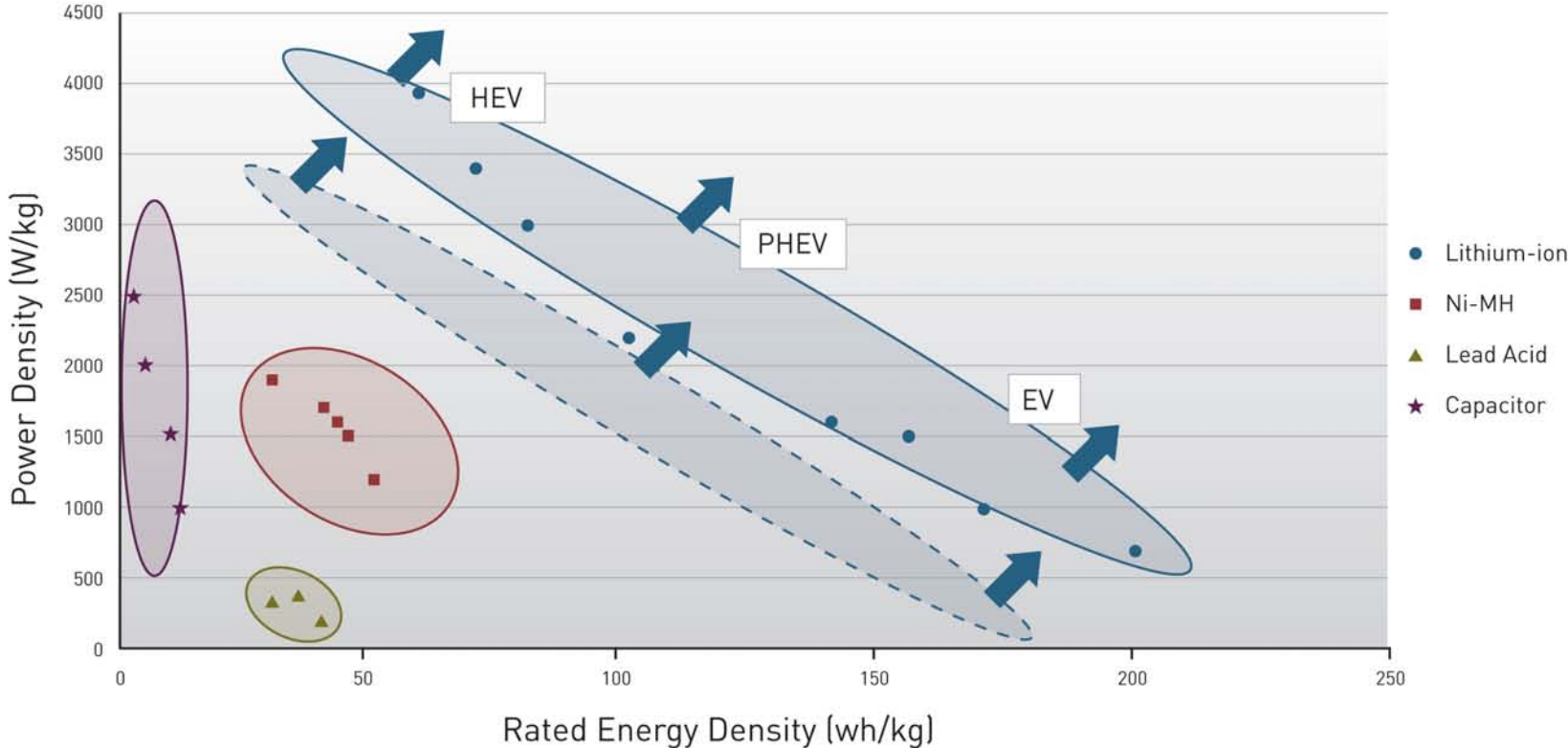
**How We Build a Battery:
Cell Chemistry & Pack Construction**
By Taison Tan & Derrick Buck

PARTS OF THE BATTERY



POWER AND ENERGY RATIO (CELL LEVEL)

Energy-vs-Power



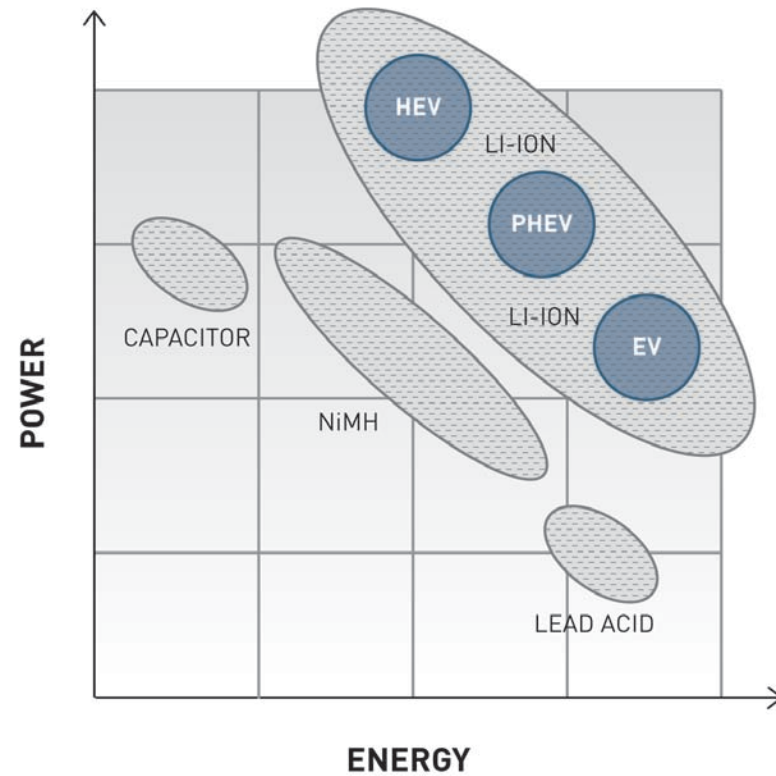
HEV: Rated Energy is not a requirement, but available Energy

ENERDEL TECHNOLOGY

3 UNIQUE CHEMISTRIES ensure balance between energy and power

- Support different applications based on energy power density requirements

- **EV/PHEV**
Hard Carbon + Mixed Oxide
- **HEV**
Hard Carbon +
Lithium Manganese Oxide
- **FUTURE**
Lithium Titanate Oxide +
Lithium Manganese Oxide



ENERDEL CHEMISTRY PORTFOLIO

- **HEV Chemistries** Designed for Power Performance
- **PHEV & EV Chemistries** Designed for Blended Power/Energy Performance

	HEV CHEMISTRIES		PHEV & EV CHEMISTRIES	
Cathode (+)	LiMn_2O_4 (LMO)	LiMn_2O_4 (LMO)	Mixed Oxide	High Voltage Spinel
Anode (-)	Hard Carbon	$\text{Li}_4\text{Ti}_5\text{O}_{12}$ (LTO)	Hard Carbon	$\text{Li}_4\text{Ti}_5\text{O}_{12}$ (LTO)
Development Status	Production Ready	Gen 2 Development	Production Ready	Gen 2 Development



ENERDEL TECHNOLOGY

Prismatic cell design with stacked electrode

- Provides custom power and energy balance
- Provides better packaging efficiency
- Keeps size/weight at a minimum
- Optimizes thermal performance

