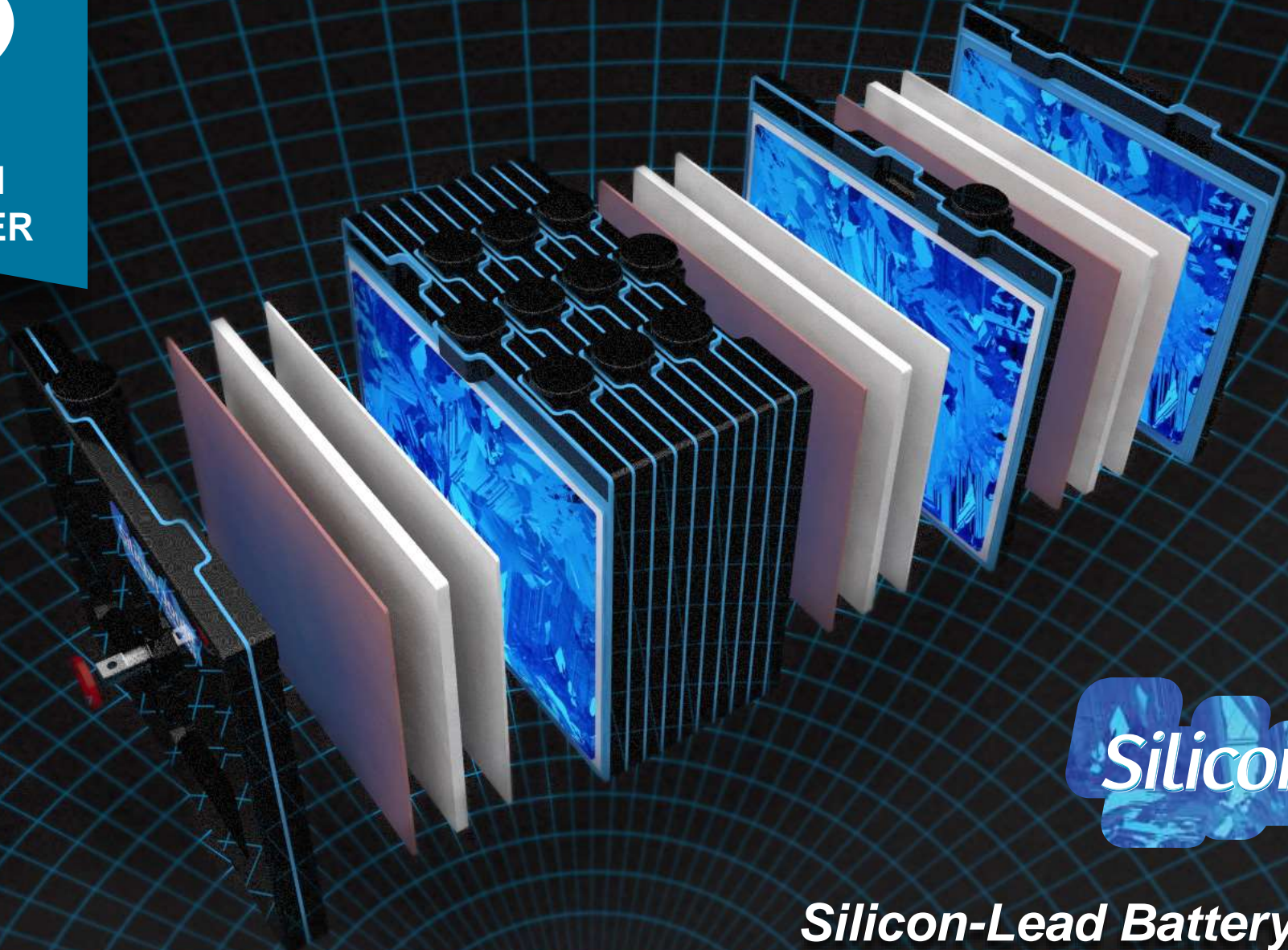




**2018
INNOVATION
AWARD WINNER**

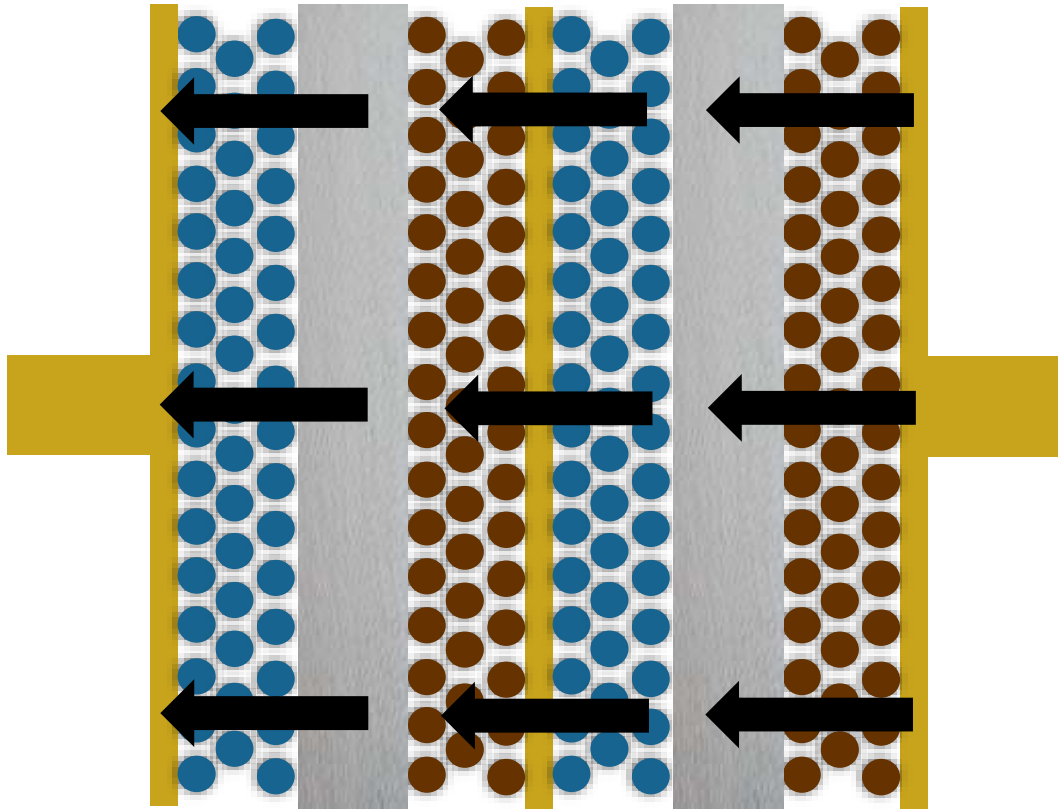


***Silicon-Lead Battery Power &
Performance***



BIPOLAR BREAKTHROUGH

A BETTER WAY TO BUILD A BIPOLAR BATTERY IS NOW POSSIBLE



Cross section of Silicon Joule[®] bipolar battery depicting uniform current flow

Silicon Joule[®] bipolar architecture offers design-driven, superior performance.

- The advantages of a bipolar approach is well accepted, but previously unviable due to cost and practical limitations of materials
- 30 years of cost reductions in solar manufacturing has created a new, low cost option
- 50 years of semiconductor processing makes the tools widely available in low cost countries
- Demand for greater battery performance in confluence with availability of low cost, high quality silicon bipoles is creating a great opportunity

ADVANTAGES OF SILICON

Silicon Joule[®] Current Collector



- Light and stiff, doped to low resistivity
- Impervious to sulfuric acid
- High thermal conductivity
- Silicides offer wide, stable electrochemistry window
- Low expansion and ductility create stable sealing surface
- Electroplated lead contact layer can be tailored to paste chemistry

SOLAR SILICON – AN INEXPENSIVE PRODUCTION MATERIAL

Solar Silicon



~\$8.90/kg

Solar Wafer



~\$0.27/wafer
(weight ~ 11g)

Solar Cell

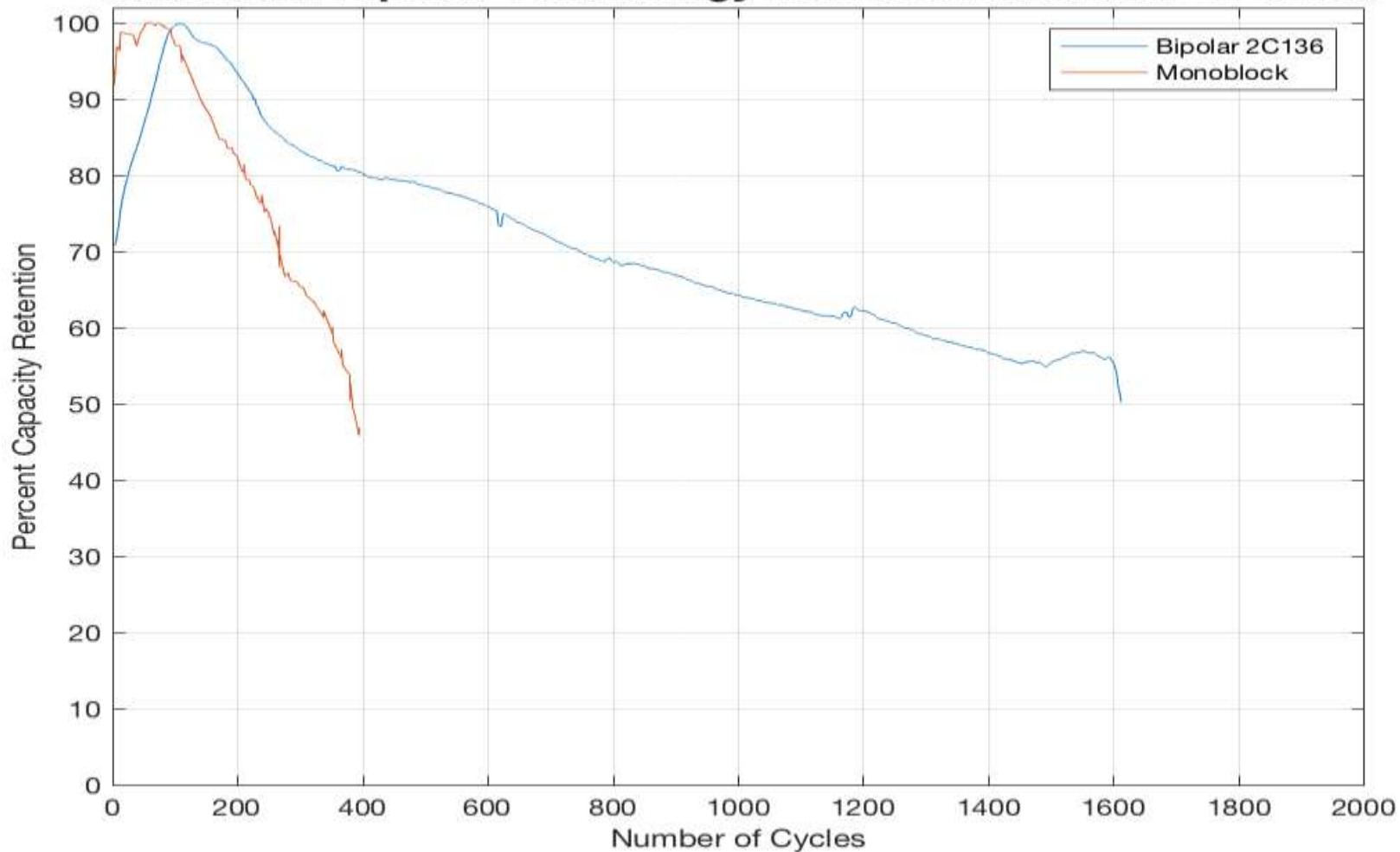


~\$0.48/cell
(4 steps)

- » 25 Billion solar wafers produced each year
- » High volume, high quality supply chain established in low cost regions
- » Batteries can use even lower grade silicon with material cost as low as \$2/kg and silicon weighs less than lead

SILICON JOULE® PERFORMANCE EXAMPLE – SUPERIOR CYCLE LIFE

Gridtential Bipolar Technology versus Standard Monoblock



*80% DOD

GRIDTENTIAL – HELPING TO TRANSFORM AN INDUSTRY

HIGH PERFORMANCE BIPOLAR BATTERIES AT CONVENTIONAL BATTERY COSTS



Silicon Joule® is the most significant technology advancement for lead batteries in 20 years.

- Step-change improvements in power & energy density, cycle life, weight & charge acceptance
- Retaining the proven low cost, safety and recycling attributes of lead
- Can convert the existing \$150m+ lead battery factories for <\$10m each
- Leveraging the huge global solar wafer industry for robust, low cost supply chain.

SILICON JOULE® RECAP

- Silicon Valley VC and battery industry backed company
- Developer of Silicon Joule® bipolar technology
- Deliver our technology through licensing to global network of battery companies
- Delivering advantages in power & energy density, cycle life, weight & charge acceptance
- Leveraging proven low cost materials taken from solar energy industry
- Now in commercialization with global industry leaders



THANK YOU!