



## Investor Update



ENERGY EVERYWHERE

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### MISSION

To be the provider of LEADING EDGE SOLID STATE ELECTRICAL ENERGY STORAGE and related capacitor technologies across a broad spectrum of industries and applications

# ENERGY EVERYWHERE



## EESTOR OVERVIEW

EEStor has spent 15 years refining a Composition Modified Barium Titanate (CMBT) ceramic powder that can be used as a primary material in capacitors, and to potentially allow for game-changing solid state electrical energy storage capabilities at disruptively low costs

- 35x improvement in energy density: <u>continuous improvement</u>
- Million+ cycles: permanent storage
- Proprietary stacking techniques: <u>highly</u> <u>innovative</u>
- EEStor is set to conclude the negotiation of a number of strategic commercial Joint Ventures for production and distribution of its technology: <u>ready to commercialize</u>



### EESTOR AT A GLANCE

#### ENERGY EVERYWHERE

Please email your questions to inquiries@EESt

Summary Financial Overview (\$CAD)	
Ticker: Market value at \$0.05 (6/13/2019):	ESU:TSXV \$6.8M
52 Week Range	\$0.04 to \$0.46
Capital Structure (6/13/2019):	137m Common Shares Outstanding; 90M Options & Warrants Outstanding with Proceeds of \$35M
Net Operating Losses (09/30/2018):	\$64.2M



## HIGHLY EXPERIENCED MANAGEMENT

### Management

### lan Clifford Director, Founder and CEO



- Over twenty five years of experience as a technology marketing strategist and multimedia producer.
- Successfully led the EEStor Corporation to global brand recognition through its unique energy storage solutions.
- From 2006 to present, Mr. Clifford has raised over \$50 million in equity financing for EEStor.
- Co-founded digIT Interactive, a full-service Internet marketing company serving Fortune 500 clients sold in March 2000.

Abhijit Paul, Ph.D. VP Research and Development



- Over 17 years of experience with polymer synthesis, analysis, testing and characterization of polymeric materials, including high-performance industrial coatings and rubber compounding.
- He earned his doctoral degree from Oklahoma State University and did his postdoctoral work at University of Texas at Austin and University of Massachusetts in Polymer and Materials Science
- Advanced research interests include: surface functionalization of nanoparticles, solid state and thermal battery technologies, phase change materials, polymer colloids, organic photovoltaic, polymer nanocomposites, polymer blends, alloys and zwitterions
- Has been employed by EEStor early in 2017 as its Principal Polymer Scientist in Austin

### Bryan K. Kelly VP Production



- 20 years at NASA. For 10 years as a Space Shuttle / International Space Station Flight Controller and 10 years as the Operational Manager of Guidance and Propulsion Systems branch for the International Space Station and Space Shuttle.
- Degree in Aerospace Engineering from the University of Texas at Austin.
- Has been involved with EEStor since 2008 and was employed by EEStor early in 2016 as its Production Manager in Austin.



### HIGHLY EXPERIENCED BOARD OF DIRECTORS

### **EEStor (ESU:TSXV)**

#### Eugenio Noel Cuesta Director

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- Mr. Cuesta, holds dual M.Sc. degrees in Mechanical Engineering and Nuclear Engineering.
- Since 2014 Mr. Cuesta has been responsible for new product testing and implementation for Hydro-Québec's Testing and Commissioning Group.
- He also worked as a physicist at Hydro-Québec's Reactor Physics Group at the Gentilly-2 Nuclear Power Plant from 2006 to 2014.
- Additionally, Mr. Cuesta is a Technical Advisor for Renewable Energy with Global PoleTrusion Group Corp. (GPGC).
- Prior to his employment at Hydro-Québec, Mr. Cuesta was a Professor of Mechanical Engineering at Simon Bolivar University in Caracas, Venezuela from 2003 to 2005.

#### Dr. Robert M. Tocchio Director

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- Dr. Tocchio is one of EEStor's longest supporters and is currently its largest single shareholder.
- Dr. Tocchio operated a successful orthodontic practice for over 25 years and brings extensive entrepreneurial experience in a wide array of private and public start-up investments to EEStor.
- Dr. Tocchio has sat on various boards, most notably as a Founder and Board Member of Medisystem Technologies, which he and his team took public and later successfully sold to Shoppers Drug Mart.



## STRATEGY



### THE EESTOR VALUE PROPOSITION





## UNIQUE PRODUCT PERFORMANCE

Key Benefits of EEStor's CMBT (Composition Modified Barium Titanate)



Increase in power density (electronic speed charge and discharge)



Increase in useful service life (millions of cycles)



Increase in energy density (energy stored per unit volume)



Decrease in amortized cost per watt hour (very low cost raw materials)



Increase in charging speed over electrolytic storage technologies



Non-toxic domestically and globally available raw materials



# COMPETITIVE ADVANTAGES



## EESTOR'S CAPACITOR COMPETITIVE ADVANTAGES



### **EEStor CMBT capacitors**



### Competing Energy Storage Technology

- EEStor's dielectric is a lead-free relaxor with high cyclic and thermal stability
- Long lifetime (1,000,000+ cycles) with no degradation
- Charge/Discharge at electronic speeds
- Low amortized costs that continue to decline with technology improvements
- Non toxic, non explosive, non-corrosive materials
- Globally and domestically available and inexpensive raw materials: low impact extraction
- More recoverable energy per charge
- High voltage per layer/ small footprint
- Capacitance increase through stacking without equivalent increase in leakage

Intertek

• Thermally stable capacitance

Ferroelectric and Electrochemical capacitors:

- Lifetime limited
- High amortized costs
- Toxic materials
- Small voltage per layer/ large footprint
- Leakage increases proportionally with capacitance
- Decreases in capacitance / lifetime with temperature extremes

#### Batteries:

- Lifetime limited
- High amortized costs
- Toxic and explosive material
- Lithium is rare and expensive





## MARKET DISRUPTER



## DIFFERENTIATE AND DISRUPT IN HUGE MARKETS

### \$4.6 billion

opportunity per year today: Aluminum Electrolytic and High Voltage Capacitors (600v+)

### \$8 billion

opportunity per year today: De-coupling, Filters, Defibrillators, Inverters, Control Systems

### \$250+ billion

opportunity per year grid storage by 2040



## DIFFERENTIATE AND DISRUPT IN HUGE MARKETS

### **High Voltage High Dielectric Constant Capacitive Applications**

(De-coupling, Filters, Defibrillators, Inverters)



- EEStor's performance advantages: high voltage per layer/small footprint, high power, flexible, temperature stable, long life of over 1 million cycles, low amortized cost, non toxic
- According to a study from Global Market Insights, Inc. the market was \$8 billion in 2016 and expected to grow to \$19.8 billion by 2025

### **Electrochemical Capacitor Market Replacement**

(Grid Storage, Automotive, UPS, Railway Wayside, Pulse Power)



- EEStor's performance advantages: high voltage per layer, high capacity per unit volume, small footprint, long life of over 1 million cycles, low amortized cost, flexible polymer dialectic and non-toxic
- Electrochemical Capacitor Market market to reach USD \$2.18 Billion by 2022, CAGR of 20.7% (per MarketsandMarkets Supercapacitor Market Global Forecast to 2022)

### **High Voltage Power Factor Correction Capacitors**

(Grid Support and Stabilization)

- EEStor's performance advantages: high voltage per layer, high capacity per unit volume, small footprint, low amortized cost, long life of over 1 million cycles, flexible polymer dialectic and non-toxic
- Market of \$1.9 billion with a estimated growth 5.0% per year, Dennis Zogbi (Paumanok)





## PROPRIETARY TECHNOLOGY

## EESTOR TECHNOLOGY

### PATENTED TECHNOLOGY



EEStor has developed and patented a lead free relaxor-paraelectric dielectric with very little remnant polarization



US7033406 2006-04-25 Electrical energy storage unit (EESU) utilizing ceramic and integrated circuit technologies for replacement of electrochemical batteries. Broad range of international patents also in place and in process



EEStor dielectric material was patented in 2006 and remains a leading dielectric when compared to academic and commercial materials available today

# ENVIRONMENTALLY BENIGN



## LOW ENVIRONMENTAL IMPACT

All materials used in manufacturing are non toxic



The primary resource is barium from barite

- There are massive known barite reserves in 25 US States and British Columbia, Ontario and Nova Scotia (with abundant reserves globally). Unlike other electrochemical energy storage, supply for raw material is NOT an issue
- Barite is so abundant and inexpensive it is primarily used commercially as oilfield drilling mud.



Barite and all other EEStor feedstocks are non toxic in production, use and disposal

- No safety or toxicity issues during production or use
- No corrosive or explosive materials or hazards
- Both batteries and capacitors suffer from corrosive and toxic fluids and materials
- Some such as lithium ion are prone to fire safety issues
- No disposal issues since no toxic materials utilized

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EEStor's long life of 1,000,000 cycles makes it durable. Ferroelectric and electrolytic capacitors (as well as batteries) have short lifetimes and need to be replaced several times to match the expected service life of EEStor capacitors



# DEVELOPMENT PROGRAMS

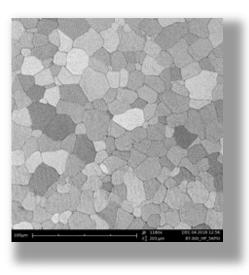


## 2019 ADVANCED GLASS AND POLYMER PROGRAMS



Commercial Grade Multi-layer Ceramic Capacitor (MLCC) Manufactured With EEStor CMBT

> Optimization Of Sintered Microstructure To Increase Electrostatic Properties





Development Of New Polymeric Binders That Increase Dielectric Constant And Reduce Leakage, Flexible Electrostatic Capacitor Solutions



## ADVANCED POLYMER PROGRAM



On January 12, 2017 EEStor announced the hiring of Advanced Polymer Chemist, Dr. Abhijit Paul to lead its advanced polymer program



Dr. Paul's team has leveraged EEStor's CMBT and many different methodologies to create lines of capacitors with various operational parameters showing the flexibility and customizability of the dielectric



The energy density of the polymer product has increased 35x since the advanced polymer program started, while lowering the material cost by over 10 times



EEStor's polymer formulations when optimized show up to 3x higher energy density for EEStor 's formulation than comparable published results for lead free paraelectric relaxor capacitors on the market



Future polymer work will focus on improving current formulations and exploring other identified materials and methods to further enhance performance



## ADVANCED GLASS PROGRAM



In May of 2017 EEStor began a glass program to develop very high K, high insulation resistance relaxor dielectrics for use in energy storage and high capacitance applications.



Results to date have been excellent, with EEStor glass components achieving very high K and validating the high K ceramic path. These lead-free-relaxor glass/ceramic capacitors have been fabricated with extremely high dielectric constants and low leakage and dissipation. In October of 2018 EEStor revealed the results of third party production and testing of multi-layer capacitors using commercial MLCC techniques. These capacitors open up existing markets in high-dielectric, low-loss A/C and D/C applications, such as de-coupling in consumer and industrial electronics and energy conversion in inverters and power supplies.



EEStor's advanced glass program has produced many successful capacitor layers with a variety of inorganic binders. These various formulations display different thermal and electrostatic performance, confirming EEStor's ability to design capacitors using its unique dielectrics to tailored specifications for differing markets.



Electrical characteristics of current glass program materials have been measured and verified by Radiant Technology, MRA laboratories and Intertek.



Planned future glass work includes optimization of dielectric to increase thermal performance, further refinement of CMBT sintering microstructure, using MLCC manufacturing techniques to increase electrostatic performance and improve flexibility and customizability of the dielectric. These efforts will broaden addressable markets considerably.

Early results of EEStor's advanced programs have been encouraging and continue to advance on a daily basis. Relevant results will be made available as they are realized and third party certified.



## WHAT'S NEXT

Ongoing improvement of thermal and electrostatic properties of EEStor's Glass CMBT system and continued development of currently identified polymer dielectrics with EEStor's CMBT are expected to lead to:



Measured improvements in dielectric constant and energy storage capacity of the Glass and Polymer samples



Refinements of sintering process and formulations that will enhance MLCC manufacturing as well as dielectric and thermal performance



Secure Joint Venture/Licensing Agreements for multiple sectors of deployment Targeting new polymers and glass formulations for development of new dielectrics, new markets driven by dielectric and thermal performance enhancements of existing formulations





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