

# TOSHIBA

Leading Innovation >>>

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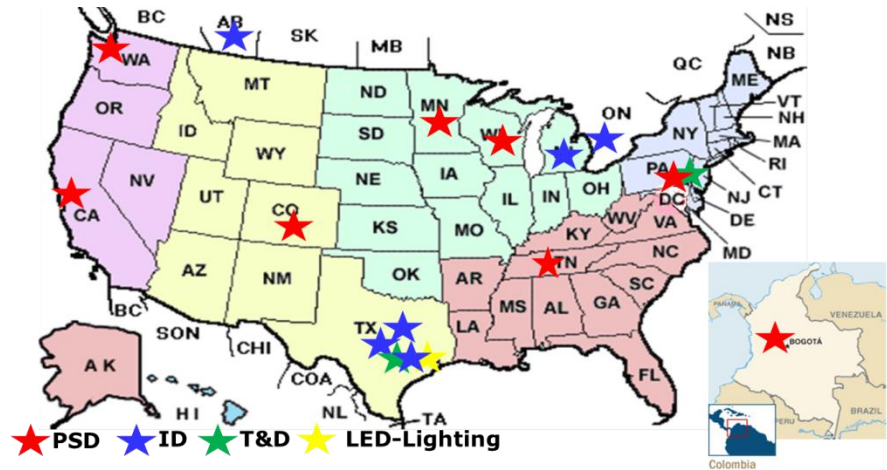
## HMW VSD Workshop



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# Toshiba International Corporation



**Recent Additions:**  
 West Allis – PSD Service Center (ex-Regenco)  
 Philadelphia – PV Business Operation  
 Austin – R&D Center for Power Electronics

Edmonton – Service Office for Motors & Drives  
 Dallas – R&D Center for Currency Sorter  
 Hamilton: TIPCA – Motor Operation



**Oil & Gas**  
 Drilling & Pumping  
 Production  
 Pipeline



**Mining**  
 Pumping  
 Transportation  
 Refining



**Utilities**  
 Power Transmission  
 Power Distribution  
 Energy Management



**Agribusiness**  
 Raw Materials  
 Extraction  
 Food Processing



**Water & Wastewater**  
 Processing  
 Treatment  
 Wastewater Re-Use



**Datacenters**  
 Data Storage  
 Colocation  
 Infrastructure



**Medical**  
 Power Solutions  
 Facilities  
 Control Systems



**Aggregate & Cement**  
 Extraction  
 Crushing  
 Handling



**Food & Beverage Pharmaceutical**  
 Packaging  
 Handling  
 Daily Pressure Washes



**Pulp & Paper**  
 Wood Processing  
 Pulping  
 Production

# TIC/H Manufacturing Products

## Motor & Drive

### Low Voltage Motor



### JK Starter



### Medium Voltage Motor



### Components



## Power Electronics

### Low Voltage Drive



### Medium Voltage Drive



### OEM Drive



## Specific Purpose Product

### HEV

#### Generator



#### Motor



### Propulsion Inverter



### ESS PV/ PCS



### UPS

#### 1600XP



#### G8000



#### 4300



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**"It is not the strongest of the species  
that survive, nor the most  
intelligent, but the one most  
responsive to change." - Charles  
Darwin**



# MADE IN HOUSTON TEXAS



# High MW VSD

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- **MVD Penetration**

- Going up in last 15 years, especially last five years
- Strong demand from oil & gas, mining

- **Challenging Specification**

- Higher input voltage
- Higher Power
- Highly customized design
  - Footprint, frame, cooling ...except for power module

# Impact of SiC on High Power VSD

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- **Impact is revolutionary**
  - Waiting for reliable power module with higher blocking voltage and higher power
  - Need redesign the whole power converter
    - Reconsider topology and snubber circuit
    - Redesign power module and module level control
  - Educate design engineers, quality control team, industrial engineers, manufacturing workforce....
  - The cycle is VERY long

**"Know what's weird? Day by day,  
nothing seems to change, but pretty  
soon...everything's different." -  
Calvin from Calvin and Hobbes**

**Thank You**