# Process Development

## *Low Cost OLED Manufacturing*

DOE SSL Manufacturing R&D Workshop

June 14th, 2012

plextronics®

# Background

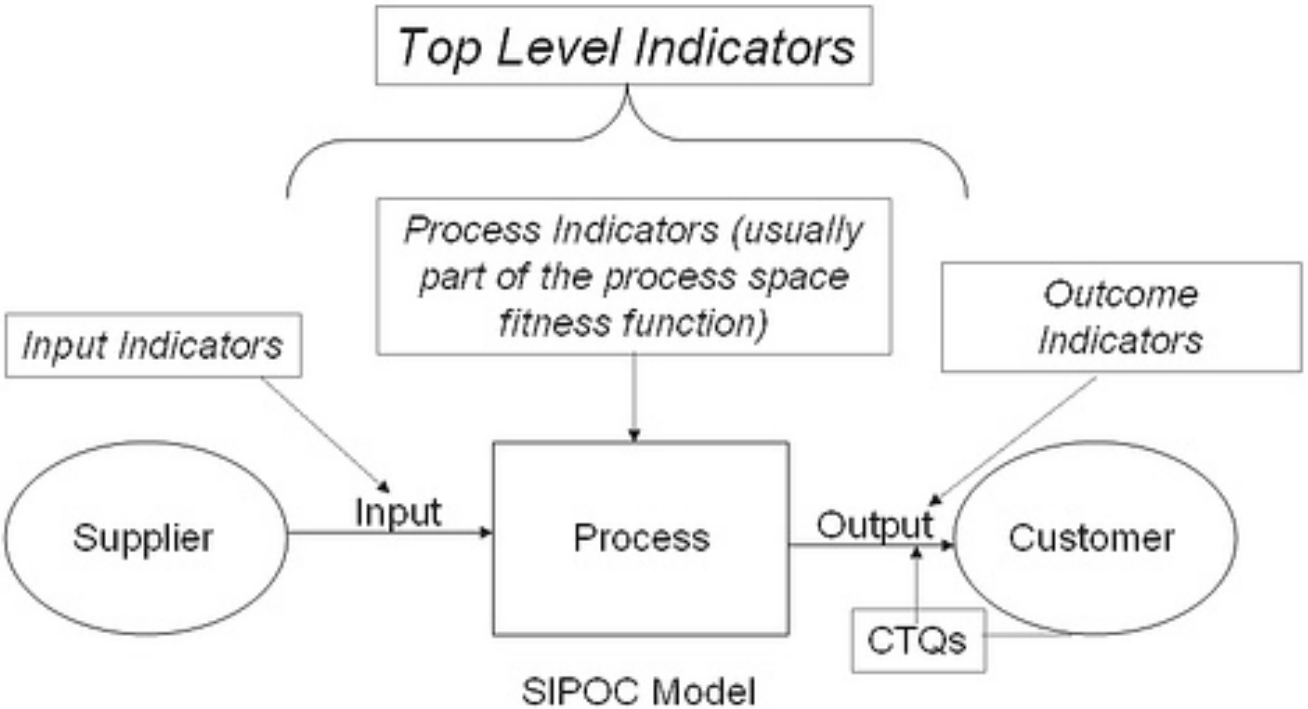
Driving down average variable costs.....

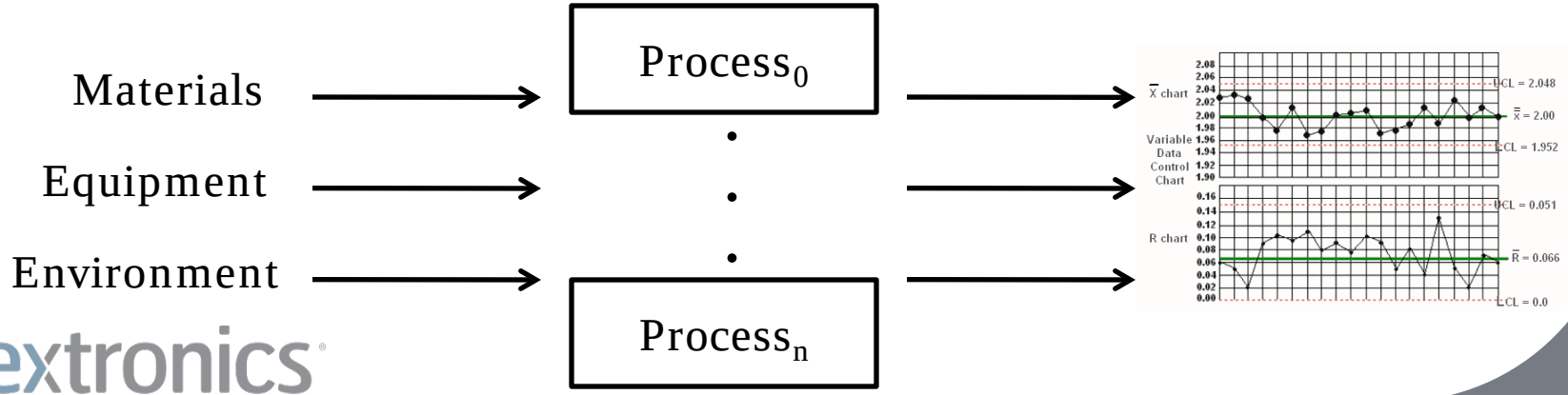
plextronics

# World Class Process Developers

plextronics

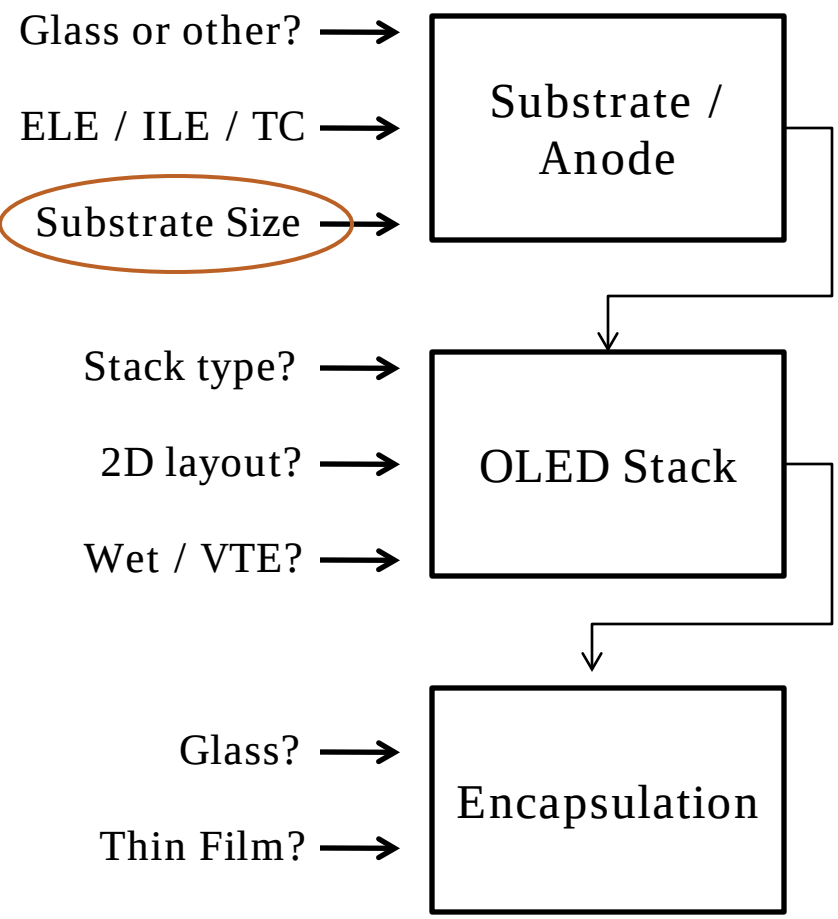
# Process Development Framework



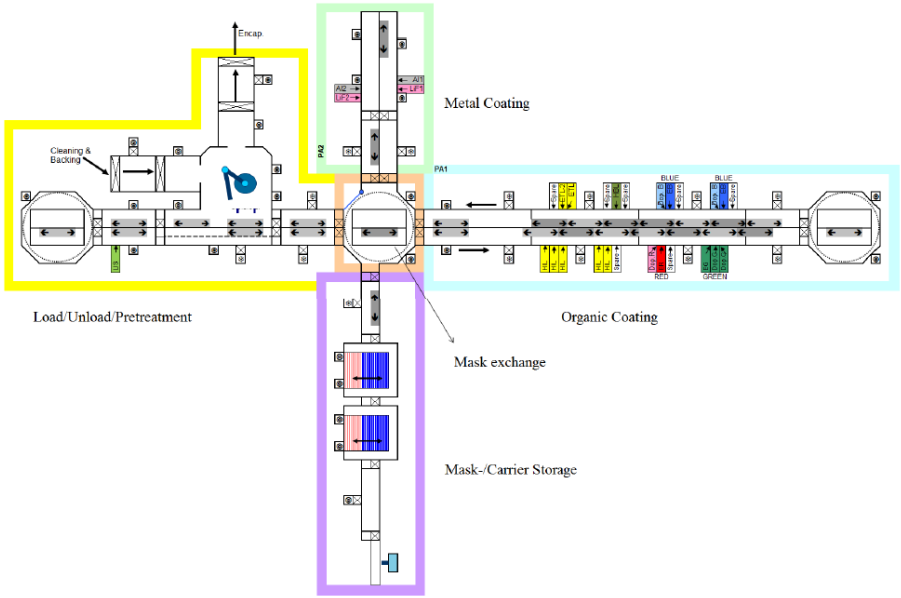

plextronics

# Critical Input Factors




There are two competing strategies for high througput VTE deposition:

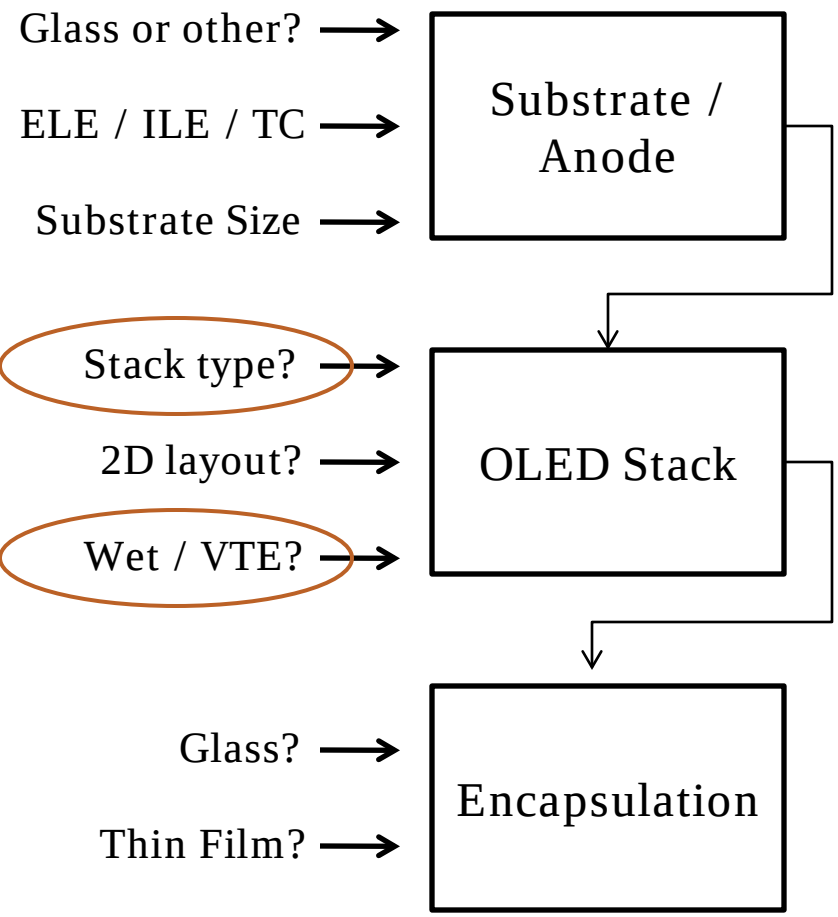
1) Large-area sheets (from displays)
2) Small-area sheets (from optical media)



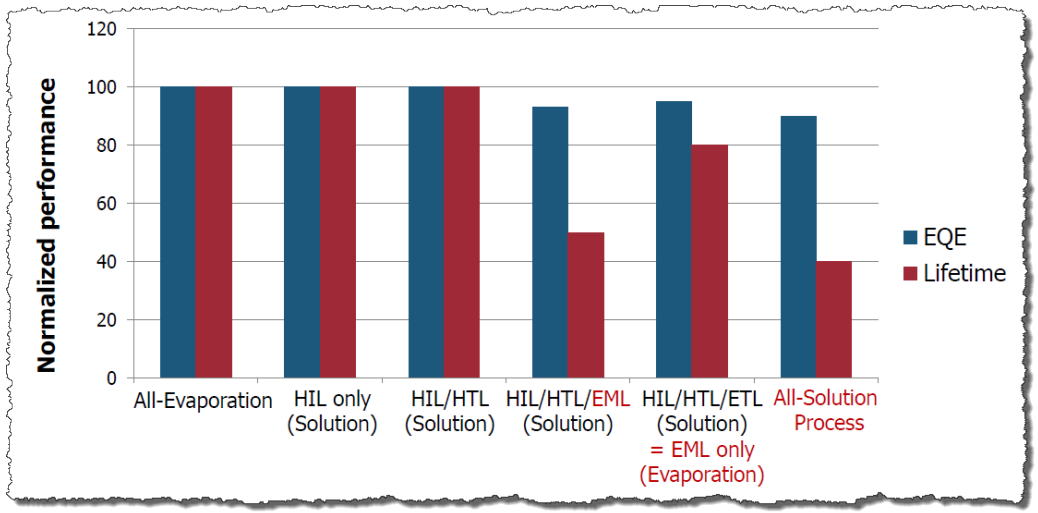

Source: Applied Materials, SID 2012.

plextronics

# Critical Input Factors




Multiple wet layers have been integrated with similar or equivalent performance to VTE....

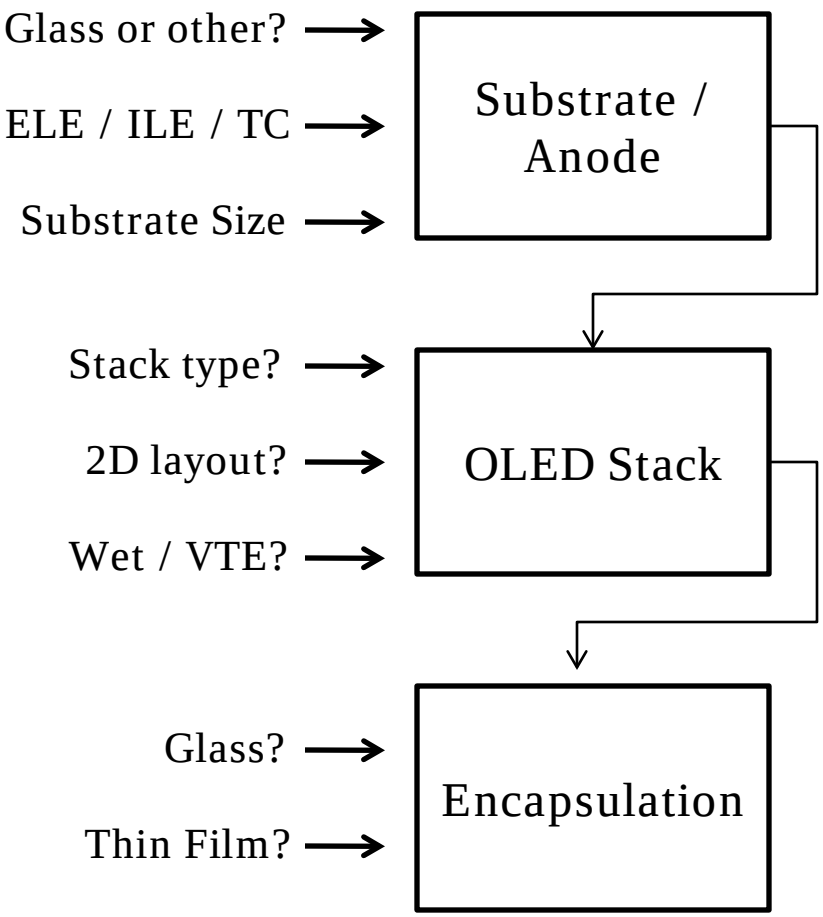


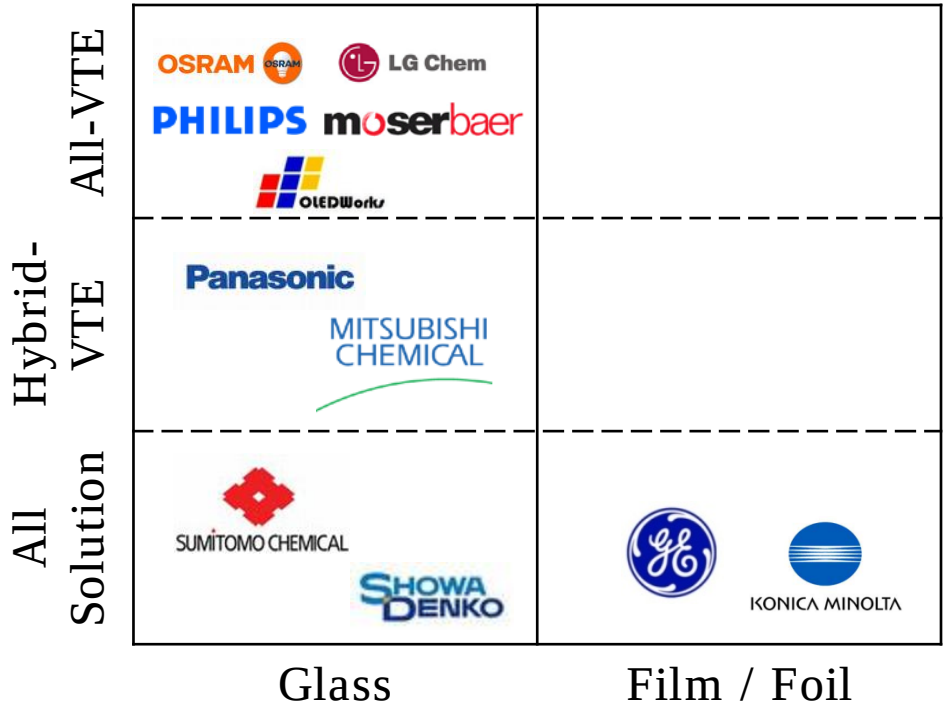

Source: Konica Minolta, Printed Electronics Europe, 2012

.... but, (how) can multiple wet layers be implemented with VTE on a production basis?

plextronics

# OLED Development Snapshot

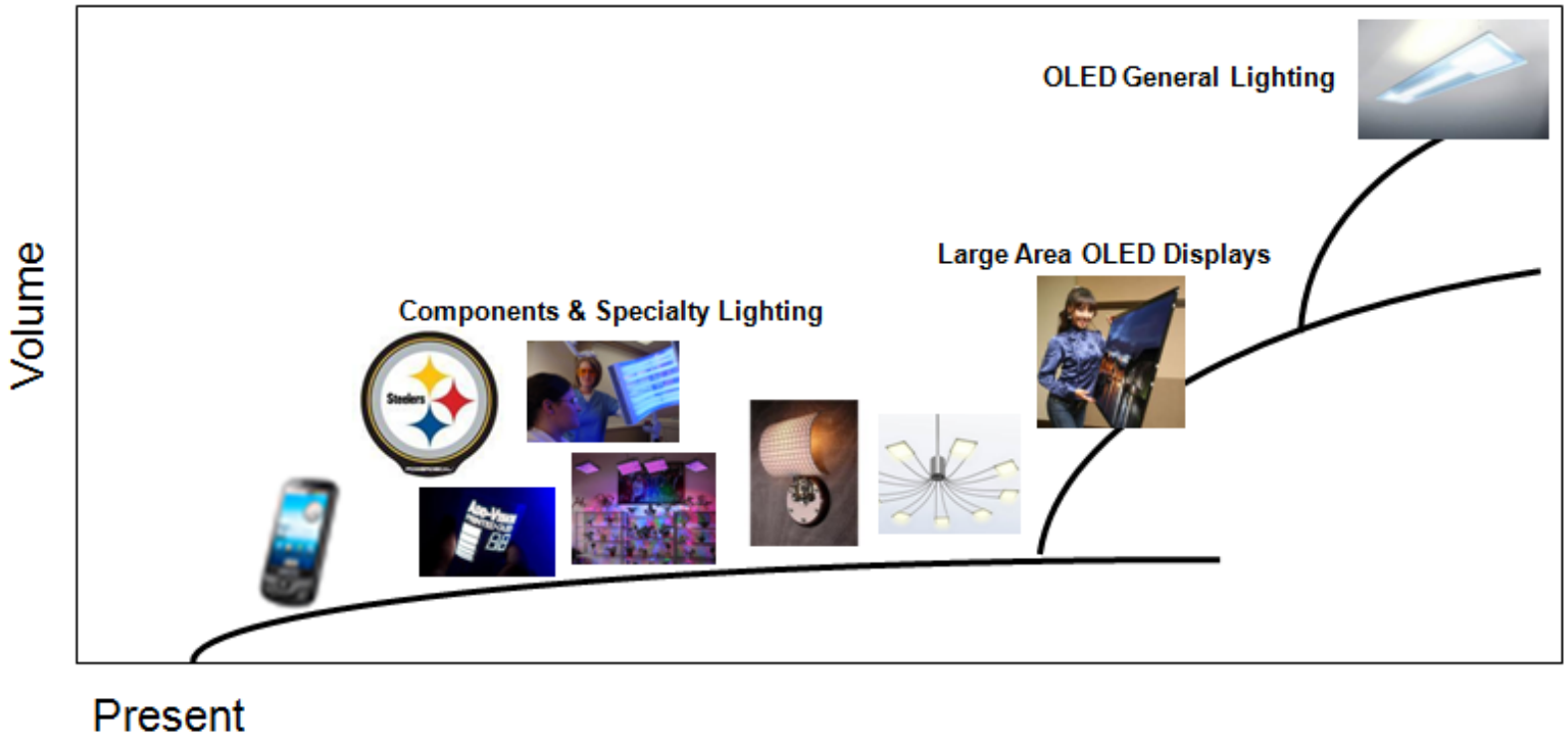



plextronics

# Process Development Paths Forward

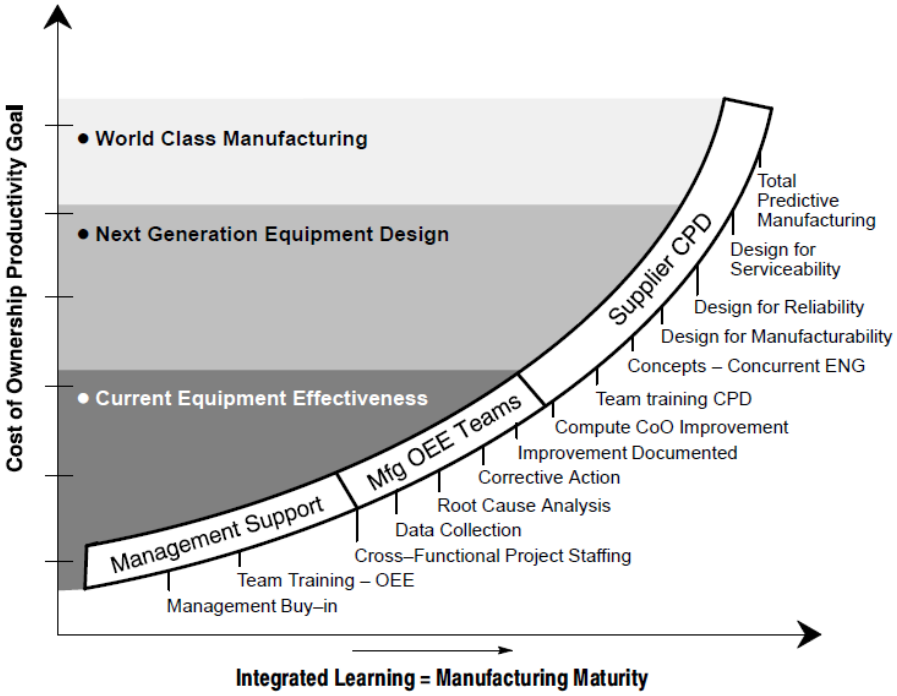
- Focus on customer outcomes (CTQs)
  - Near term – niche, but enable cycles of learning
  - Long term – mainstream applications




plextronics

# Process Development Paths Forward

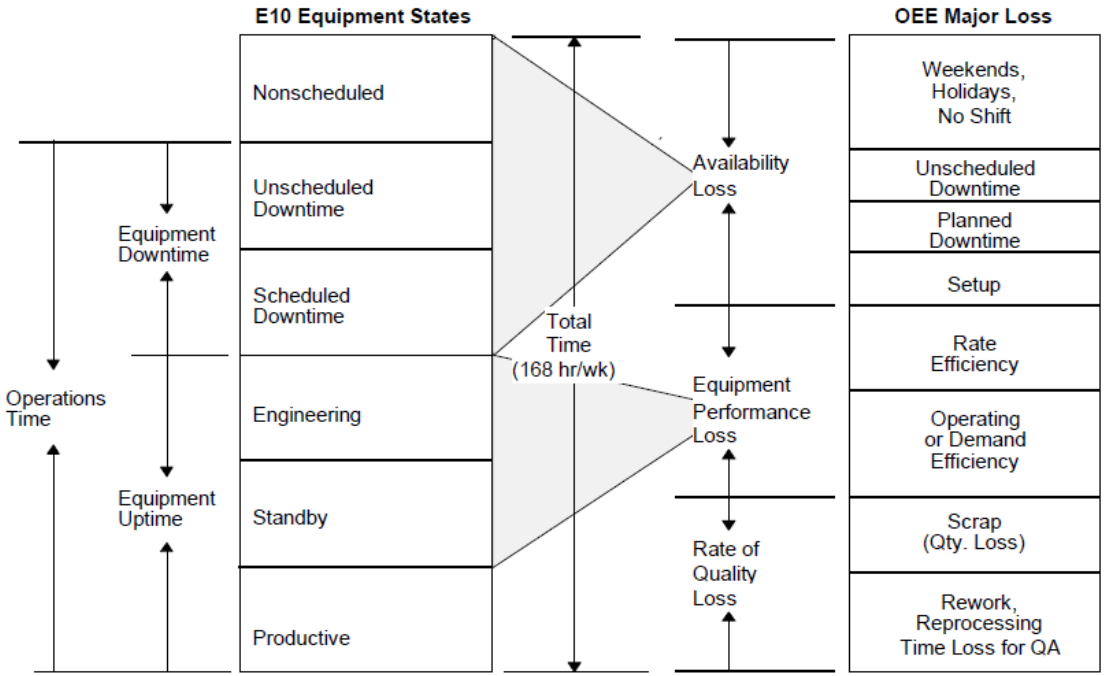
- Ecosystem development / risk pooling
  - Panel developers are keystone collaboration partners
    - Align materials & tool makers' activities
  - Can US compete for panel manufacturing?
    - Alignment with US Advanced Manufacturing Iniatives?




plextronics

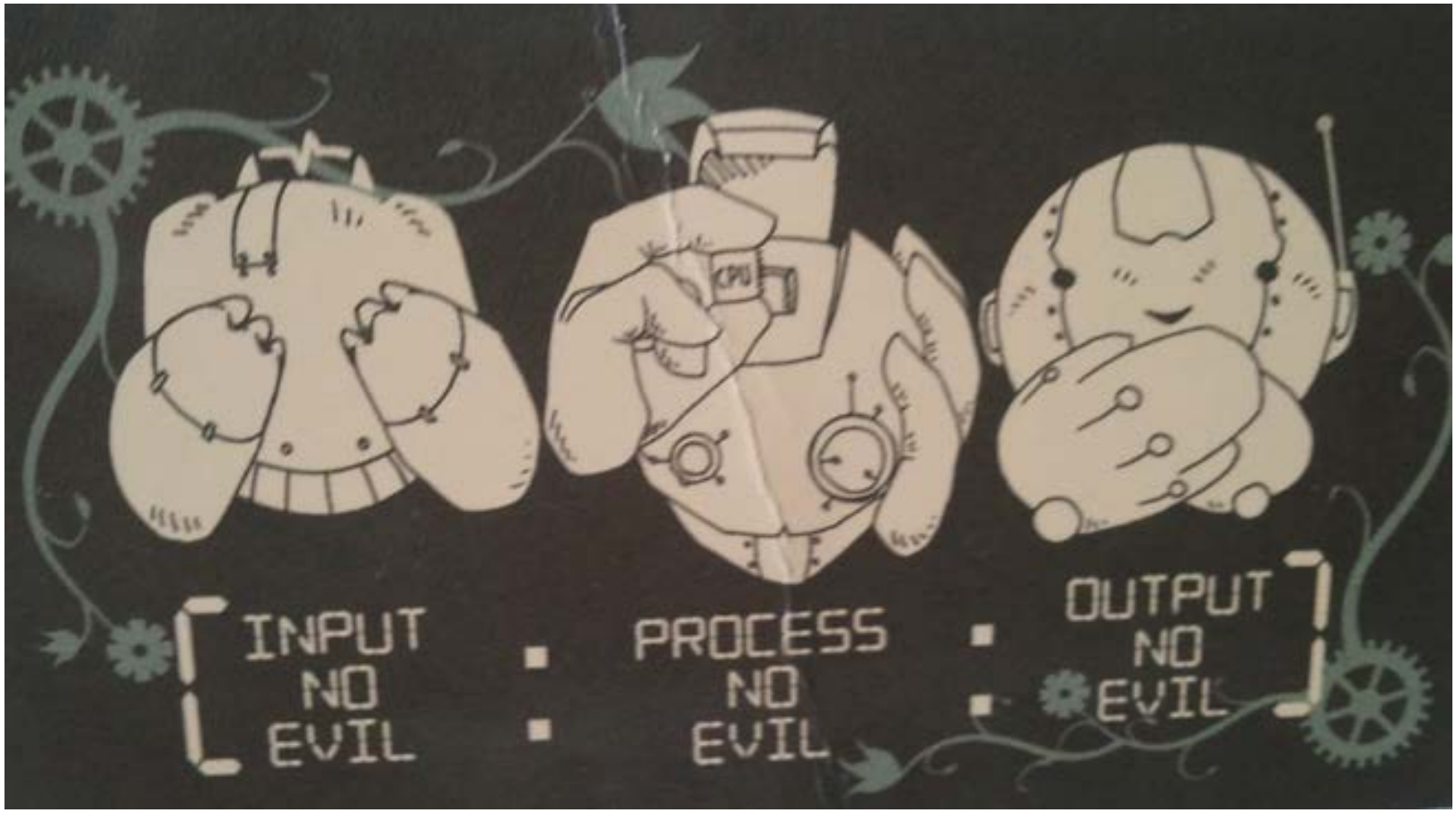
# Process Development Paths Forward

- Co-opt existing standards for COO / OEE
  - Tool specifications are not yet robust, especially for wet coating equipment
  - Validate process performance based on a common language




plextronics

# Summary




plextronics