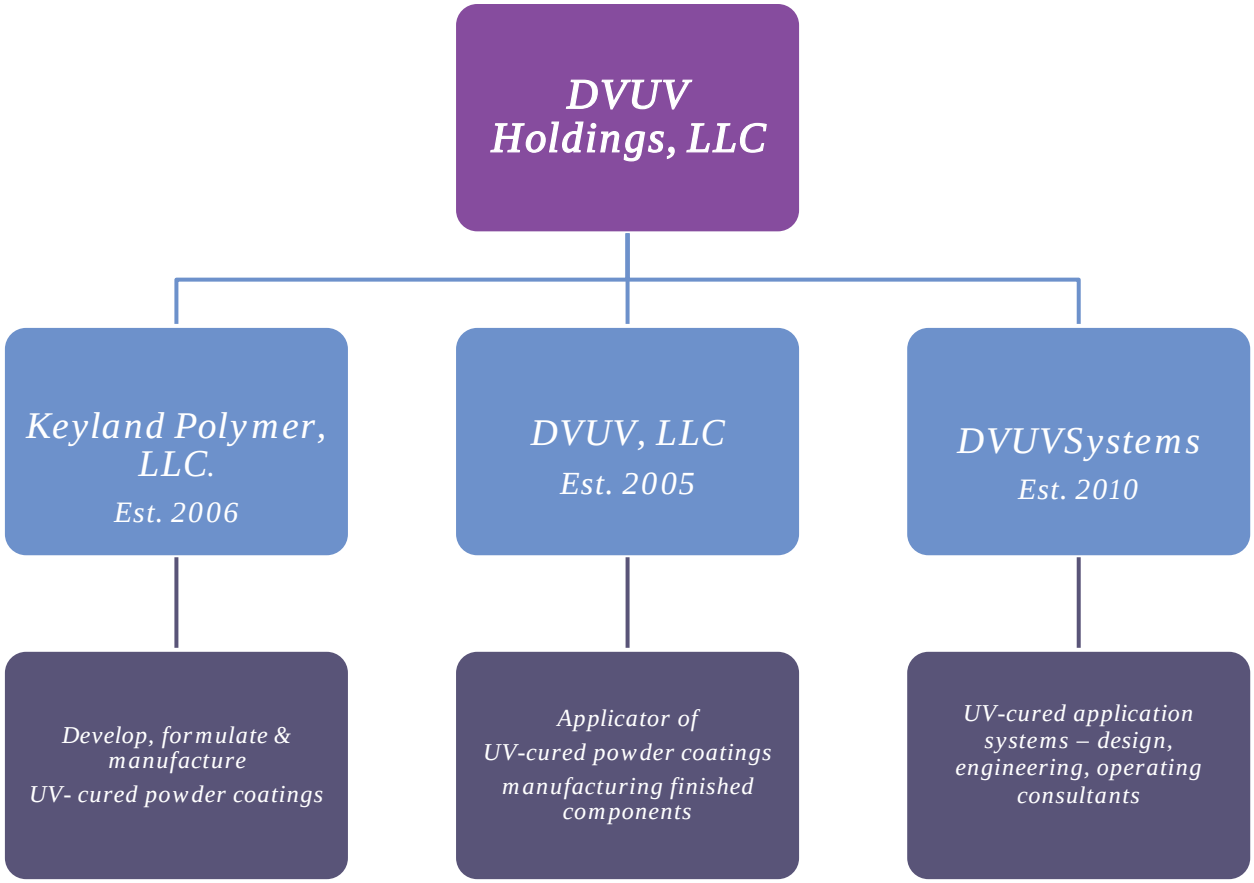
Radtech Webinar

UV-Cured Powder Coating
+
Resource Productivity
=
Higher Profits

Keyland Polymer, LLC

Manufacturer of UV-Curable Powder Coatings



Sole focus on UV-Cured Powder Coatings
Powder – Application - Systems

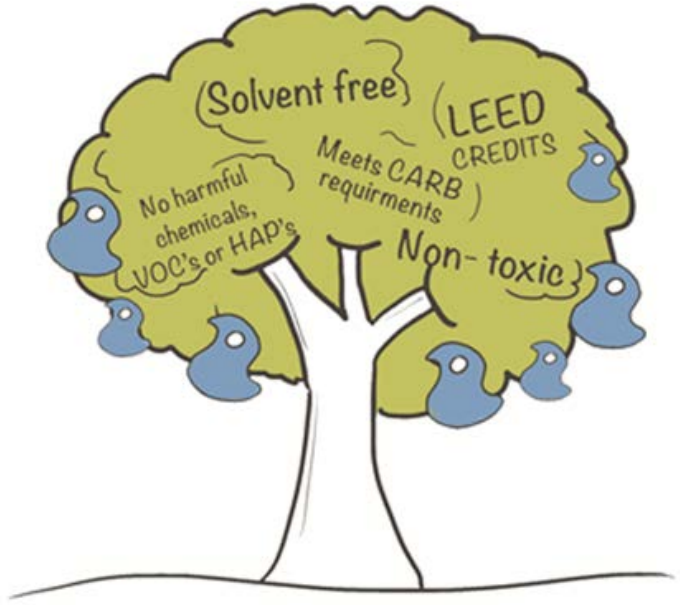
Goal of Presentation

- *Using the book Resource-Production Operations: Five Core Beliefs to Increase Profits Through Leaner and Greener Manufacturing Operations by Markus Hammer and Ken Somers of McKinsey & Co. as a guide this webinar will take the participant on a journey that will demonstrate that adoption of UV-Cured Powder Coating can be a "higher profit" material and process finishing solution.*

UV-Cured Powder Coating

Clean

Fast



Green

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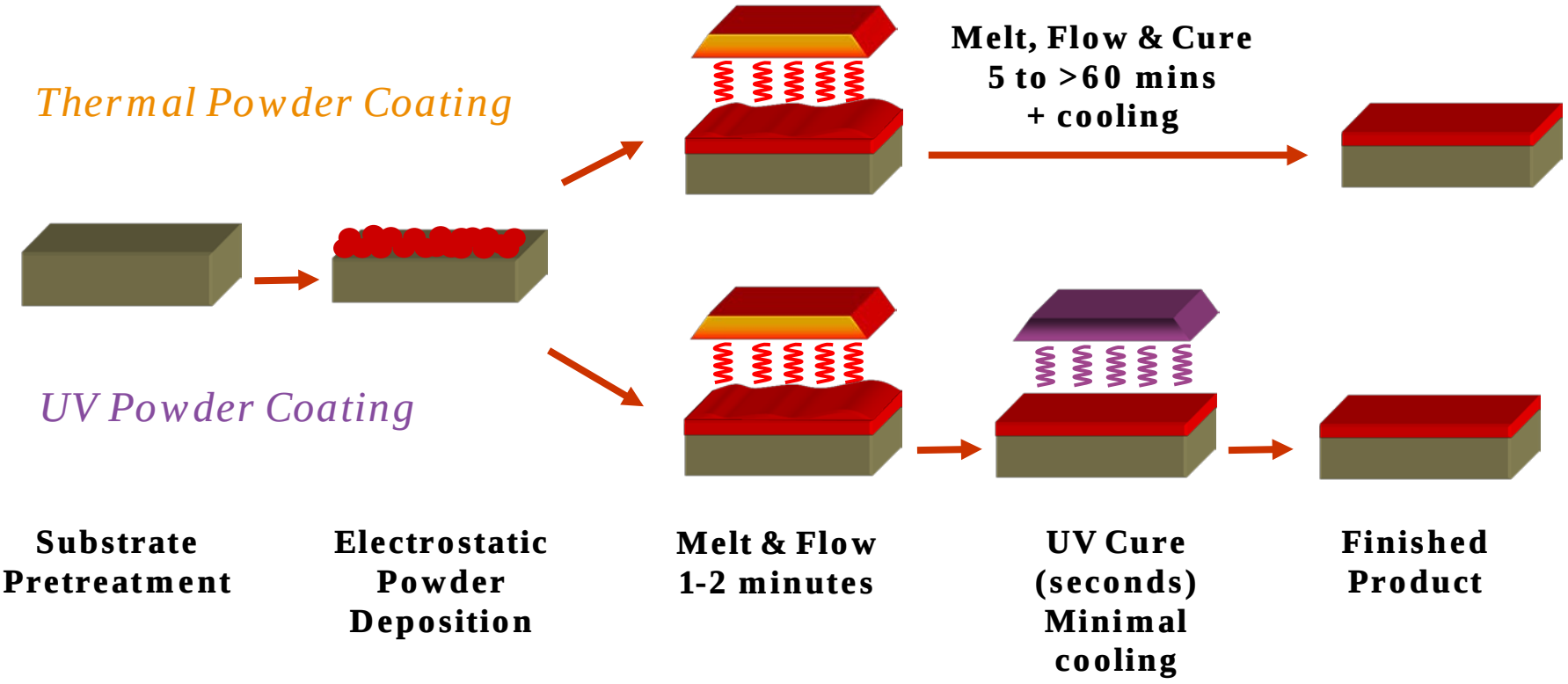
UV-Cured Powder Coating

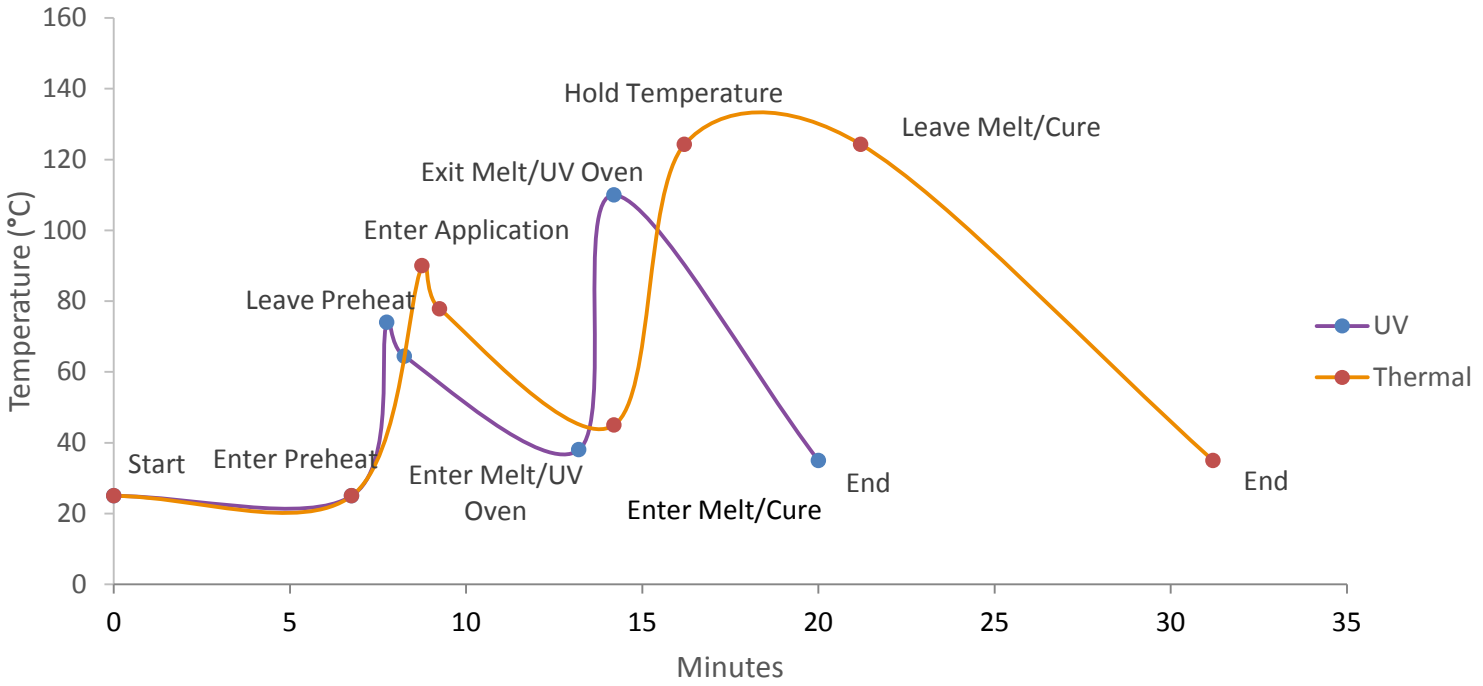
- *UV-cured powder coating has been around for more than a decade and has achieved modest market penetration, mostly as a coating for medium density fiberboard (MDF).*
- *Significant improvements in functionality, corrosion and other physical properties is broadening the reach of UV-cured powder. A more than suitable replacement for solvent based and solvent containing liquid coatings, in some cases replacing thermal powder coatings and other finishing materials and processes.*
- *This increasing market penetration corresponds to the development and implementation of the business strategy known as Resource Productivity.*

UV Powder Coating

- *The differentiating characteristic of UV-curable powder coating is the separation of melt & flow from cure*



Powder Coating Time & Temperature



System Description

1 part change = 2 line rotations

	Length Ft	*Speed Ft/Min*	*Preheat Time Min*	*Melt/Cure Time Min*	*Plant Size Sqft*	*Avg Parts/hr*	*kWh*
UV	*200*	*10*	*1*	*1*	*2500*	*550*	*158*
Thermal	*321*	*10*	*2*	*5*	*6440*	*520*	*461*

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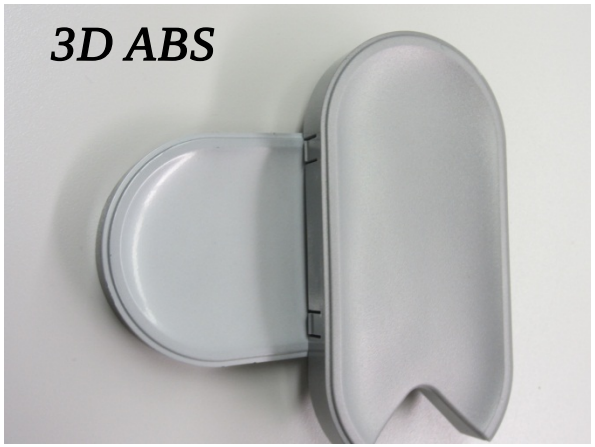
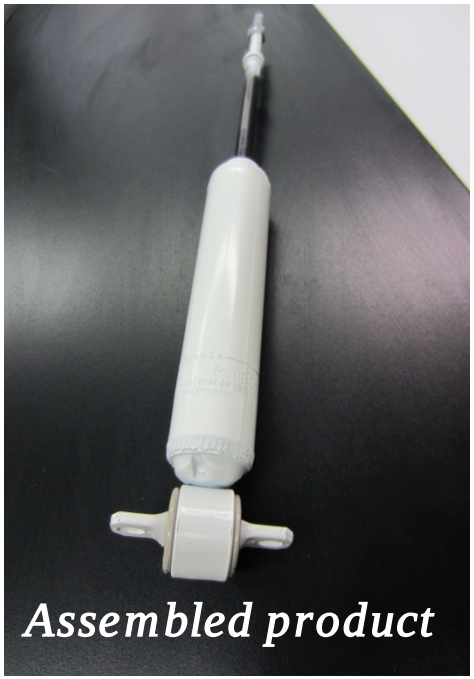
Application on Various Substrates



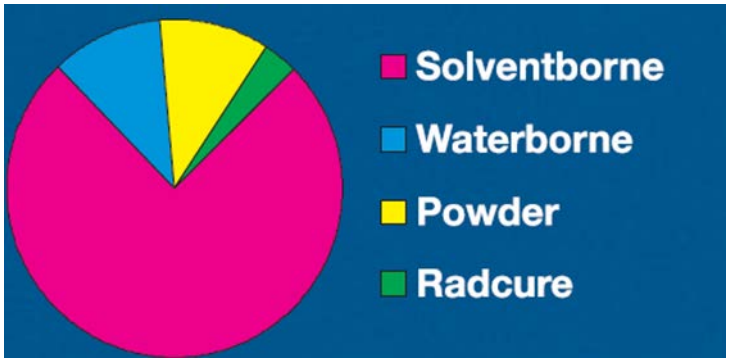


Carbon Fiber

Wood MDF panels

Coating Industry Today

- *Paints and coatings market**
  - *Global coatings market demand 80 billion pounds - US$120 billion 2013 and will grow to 102 billion pounds – US$150 billion in 2018*
  - *Solventborne & solvent containing liquid coatings 88% by value & 92.7% by volume 2013*
  - *Projected global growth rate of 5% through 2018*
- *UV-curable coating market as a segment of the global market**
  - *2.5% by value & 0.88% by volume - 2013*
  - *2.73% by value & 0.83% by volume - 2018*



* *APCJ , April 2014*

Coating Industry Tomorrow

UV-Curable coating technology is increasingly being seen as the future technology in the area of industrial coatings. The technology represents one of the rapidly growing segments in the coatings industry, and is arguably emerging as the answer to the rising environmental concerns and stringent regulations. Several application related advantages come to serve the technology that include absence of pot life issues, lower energy costs, fast cure speed, and reduced environmental impact.

As such, one-component UV-Curable coating ranks among the fastest coating chemistries available in the present context. Curing takes a few seconds to a few minutes, which makes it more ideal for use in applications that require faster turnaround time.

Global Industry Analysts, Inc. March 2012

Scope of Presentation

- *Convergence of UV-Cured Powder Coating and Resource Productivity*
  - *Adoption of UV-Cured Powder Coating is a CAPEX investment driven by demand to increase profits*
    - *Key component in a value adding manufacturing system*
    - *Replacement of an obsolete or constrained finishing system*
  - *UV-cured powder coating will increase resource productivity and increase profits*
    - *Increase profits per hour - production speed and process flexibility*
    - *Lower energy consumption per unit of product produced – less energy per part*
    - *Increase plant floor utilization – smaller plant footprint*
    - *Reduce environmental impact – less total energy & waste product repurpose*

Resource Productivity

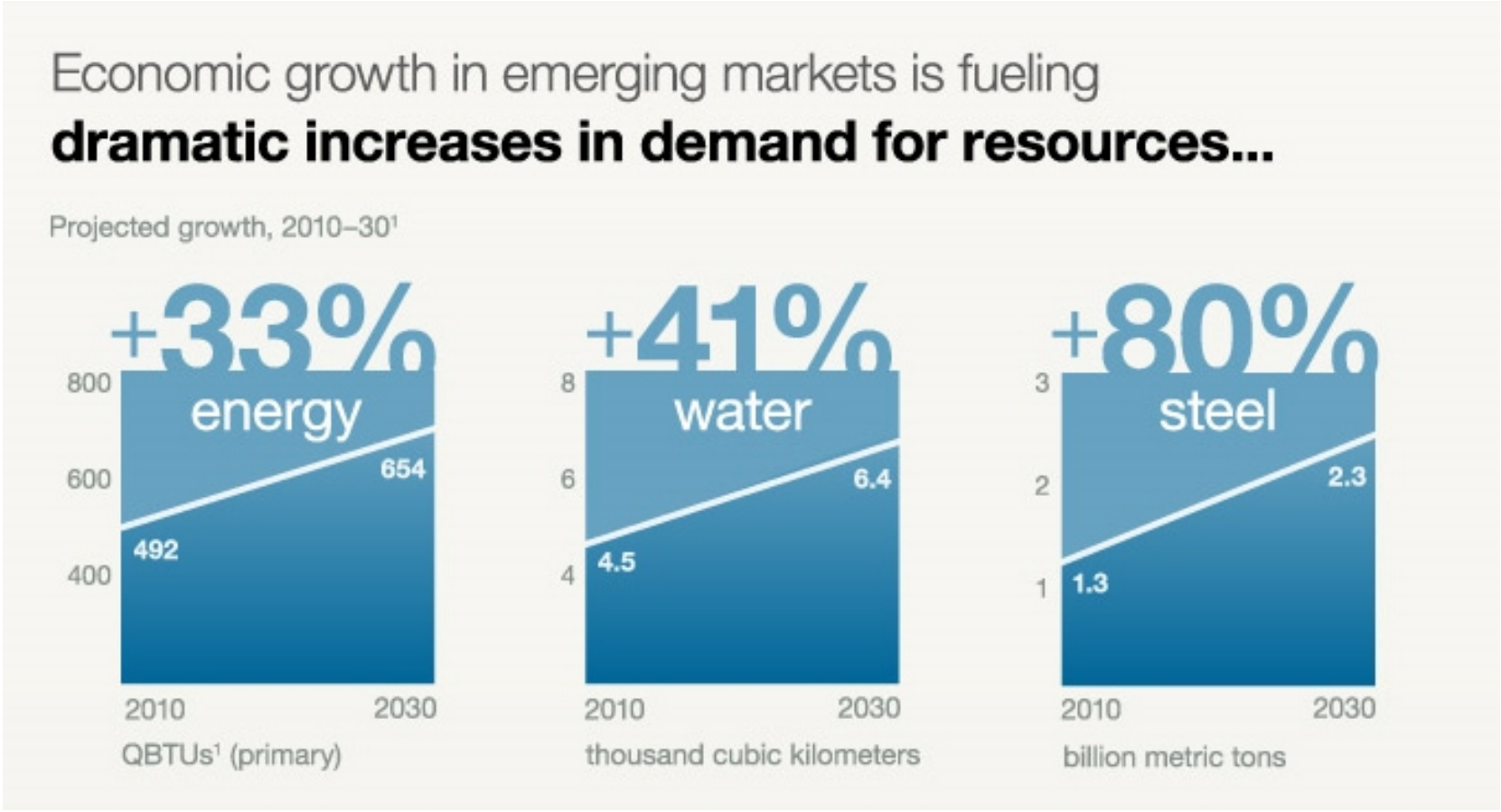
- *Resource productivity is the quantity of good or service (outcome) that is obtained through the expenditure of unit resource. This can be expressed in monetary terms as the monetary yield per unit resource.*
  - *Sales per labor hour*
  - *Sales per employee*
  - *Sales per machine hours*
  - *Sales per square foot of plant*
  - *Sales per kWh or BTU*
- *The use of fewer resources to make more money and increase return to shareholders.*[1]

[1] *Markus Hammer, Ken Somers Resource-Productive Operations, Five core beliefs to increase profits through leaner and greener manufacturing operations McKinsey & Company, Page 22*

The High Cost of Low Cost

- *"How much does it cost per pound?"*
  - *The most asked question and a good indication that the asker is not getting the "right cost" and limiting profit potential, by asking the wrong question.*
  - *Ignores the costs of misuse or misallocation of resources.*
- *The Right Question is*
  - *How do I make more profit with less resources in today's customer driven and product segmented market, by minimizing the influence of resource constraint & volatility?*

Resource Demand and Constraints



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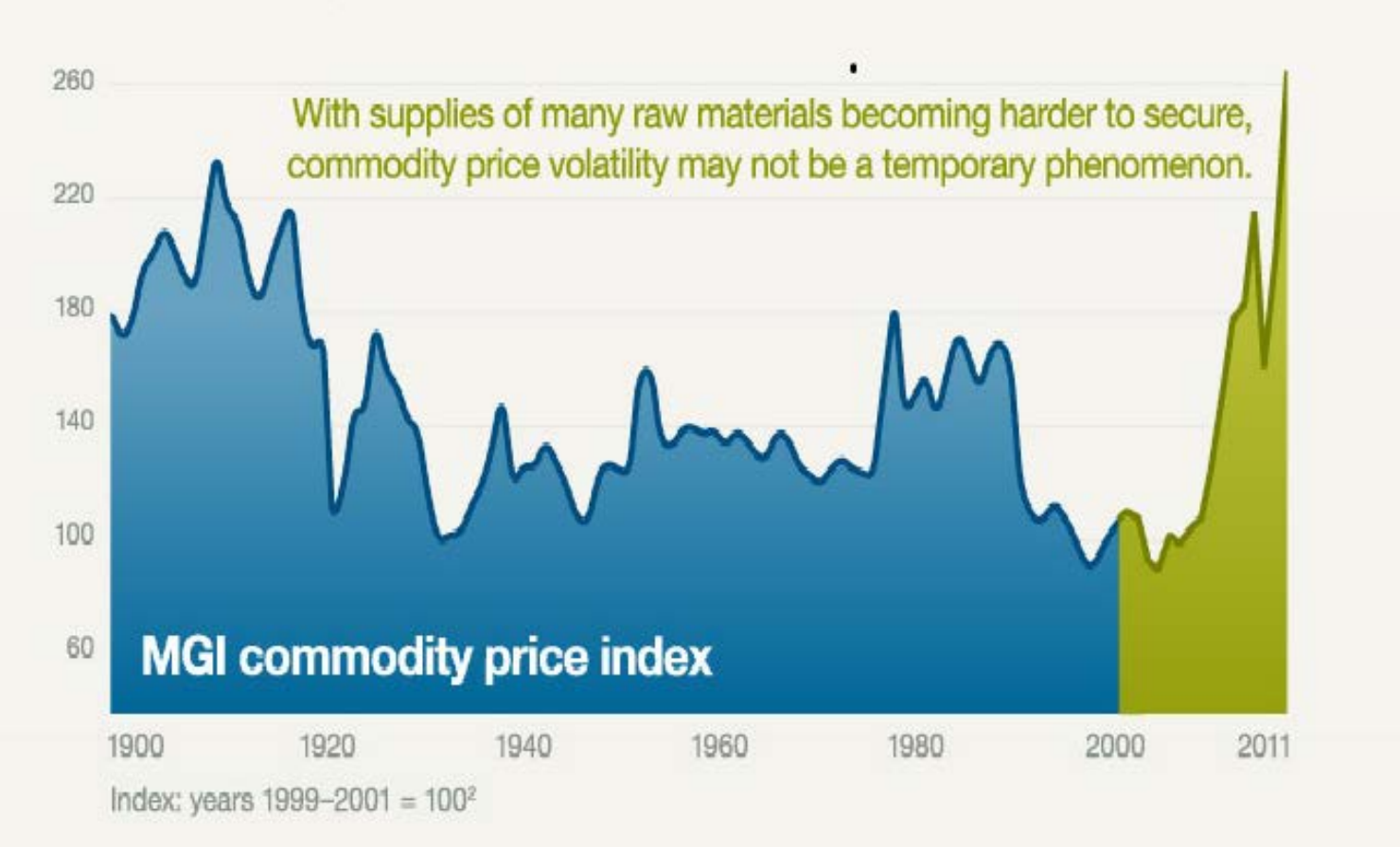
Accelerating Demand and Supply Constraints Leads to Price Volatility



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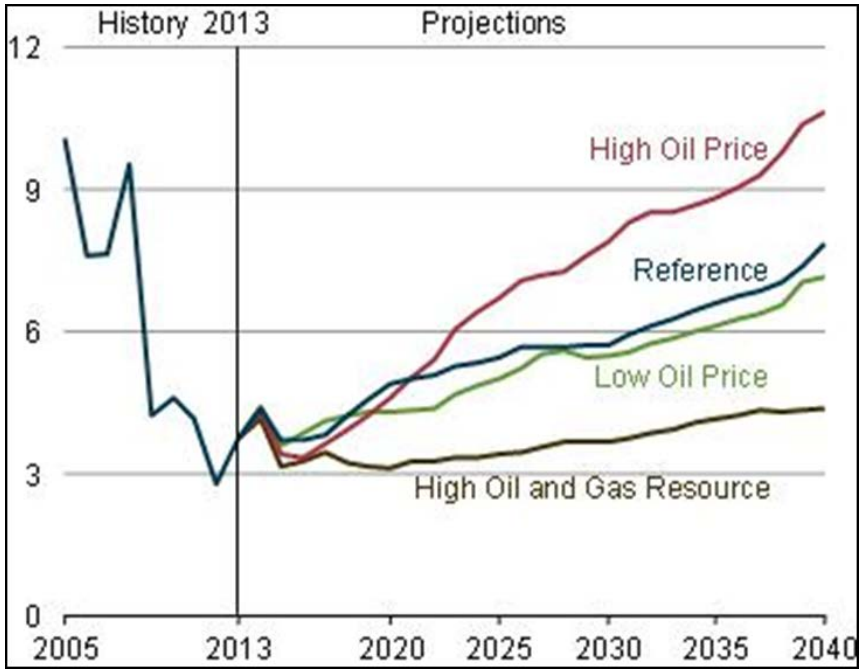
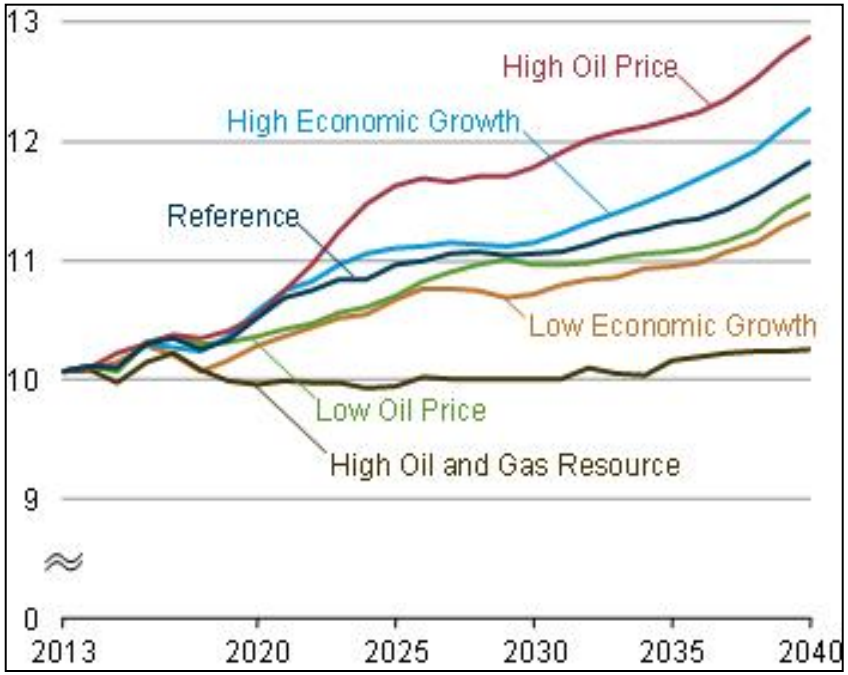
Energy Cost Projections

Natural gas cost projections 2013 – 2040 $/1mm BTU



Source: History: U.S. Energy Information Administration, Natural Gas Annual 2013, DOE/EIA-0131(2013) (Washington, DC, October 2014). Projections: AEO2015 National Energy Modeling System, runs REF2015.D021915A, LOWPRICE.D021915A,HIGHPRICE.D021915A,and GHRESOURCE.D021915B.

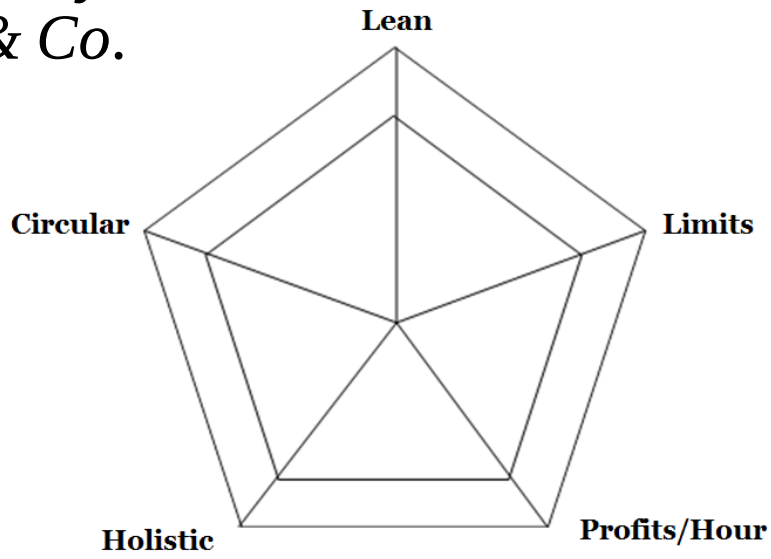
Electricity cost projections 2013 – 2040 $/kWh



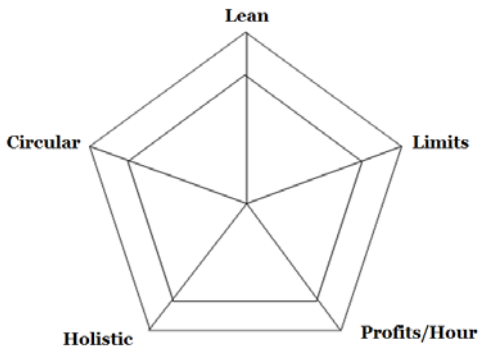
Source: AEO2015 National Energy Modeling System, runs REF2015. D021915A, LOWPRICE.D021915A, HIGHPRICE.D021915A, LOWMACRO.D021915A, HIGHMACRO.D021915A, and HIGHRESOURCE.D021915B.

Five Core Beliefs

- *Resource-Production Operations: Five Core Beliefs to Increase Profits Through Leaner and Greener Manufacturing Operations by Markus Hammer and Ken Somers of McKinsey & Co.*
  - *Five Core Beliefs*
    - *Think Lean*
    - *Think Limits*
    - *Think Profits per hour*
    - *Think Holistic*
    - *Think Circular*

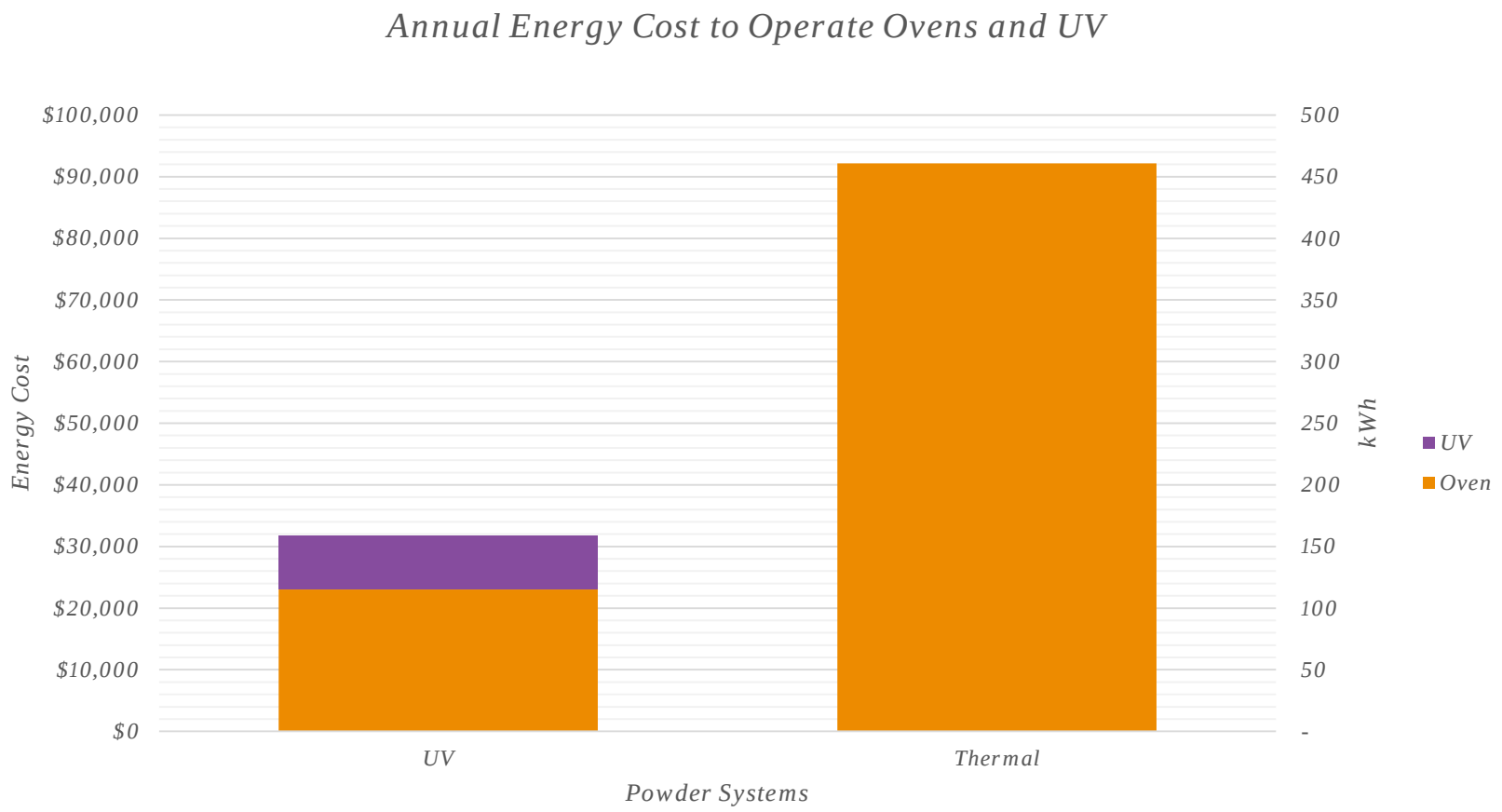


Lean

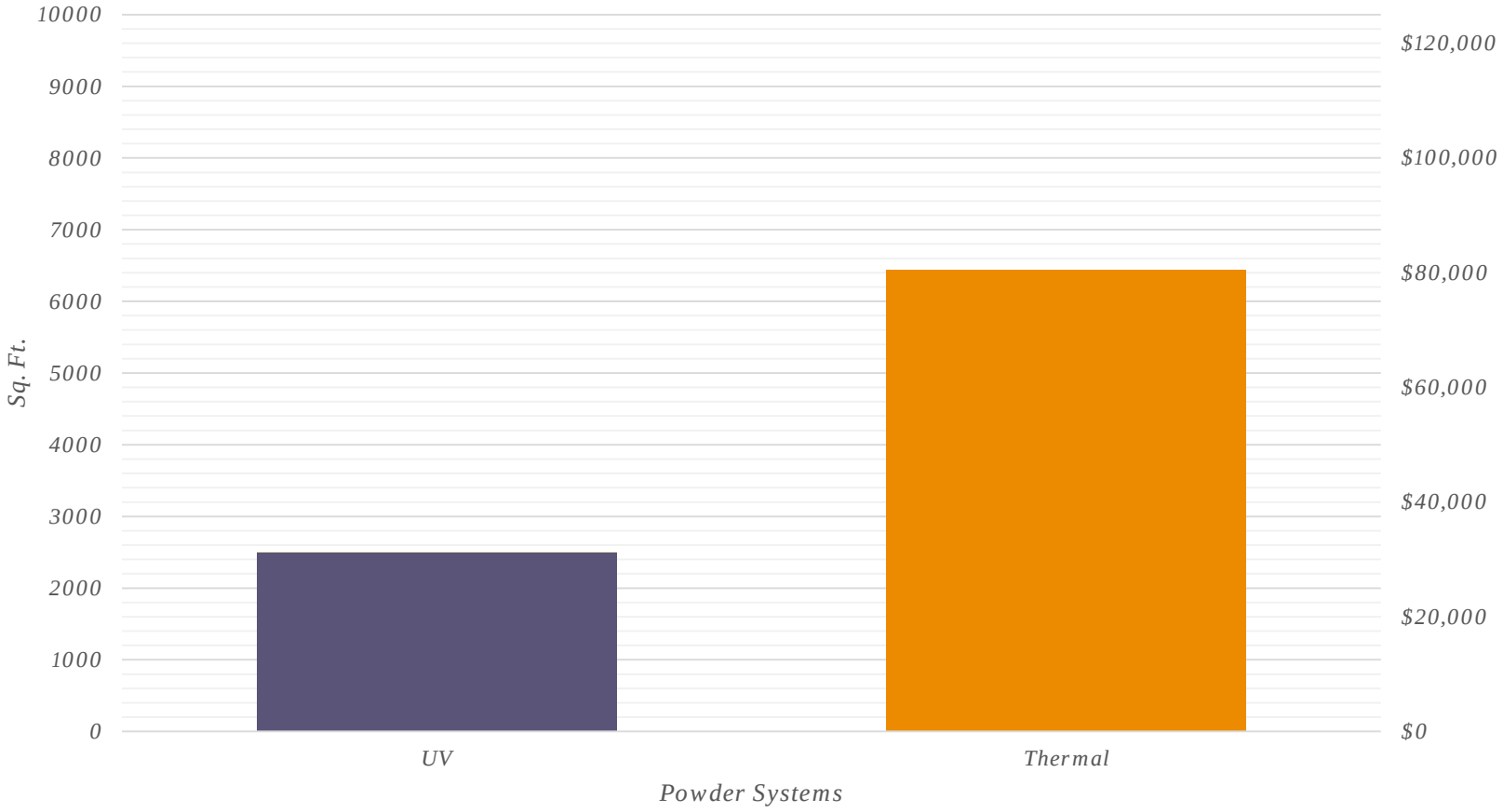


- *The identification, quantification and elimination of factors/costs/activities that do not add value or contribute to profit*
  - *Wasted/excessive energy*
  - *Excessive floor space*
  - *Job set up or part change*
  - *Disruption of material flow causing lost production time*
- *Results are based upon system description on slide #8 and are solely for illustration purposes.*
  - *The model allows for a 25% higher cost of UV-cured powder coating*
  - *Part change is the only introduced constraint variable*
  - *The purpose of the model is to demonstrate trend as constraint is introduced*

Annual Cost of Energy



Annual Cost of Plant Footprint



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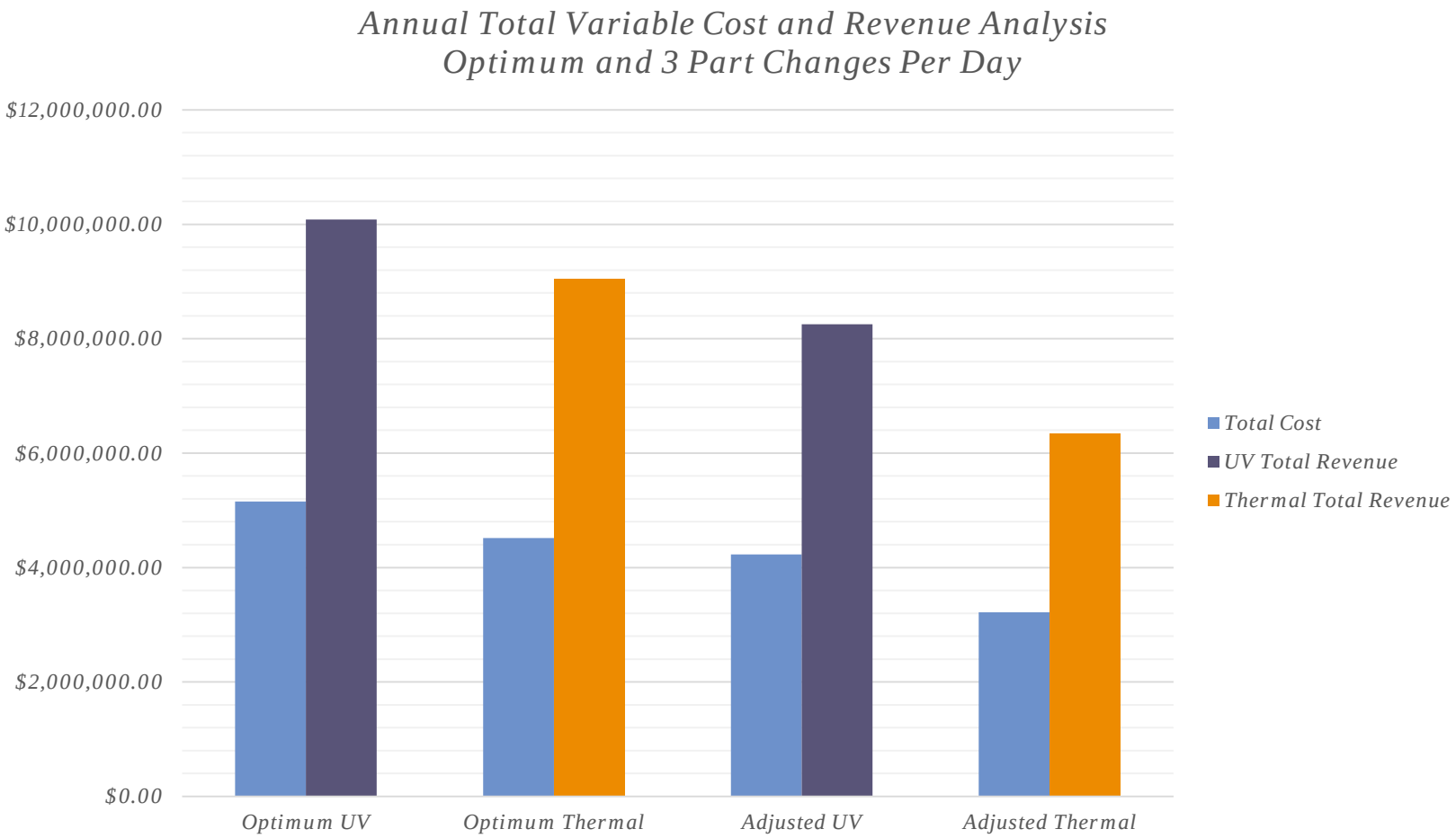
Operation Efficiency



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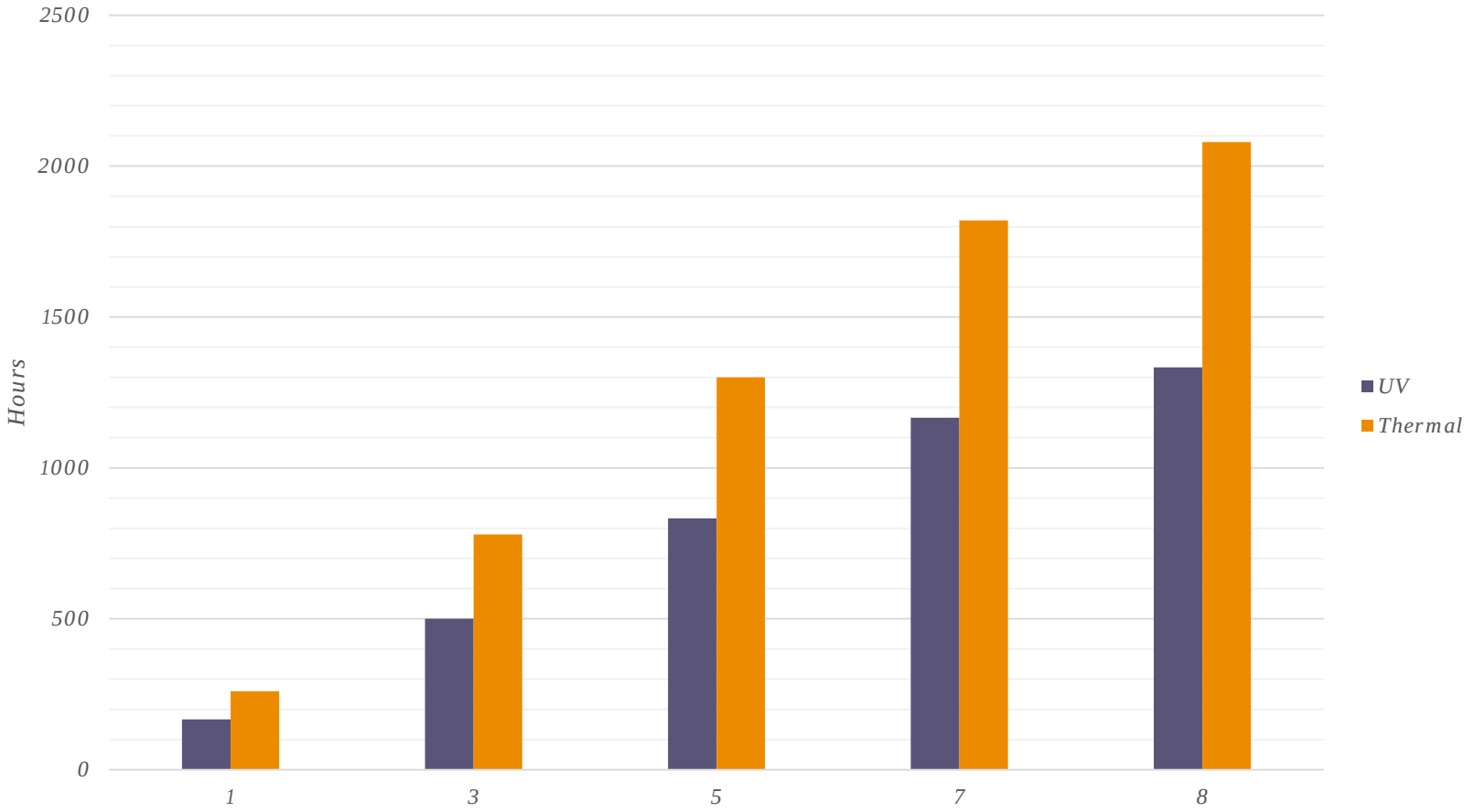
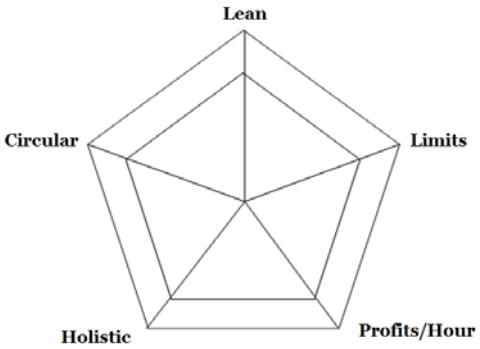
Annual Production Hours Lost

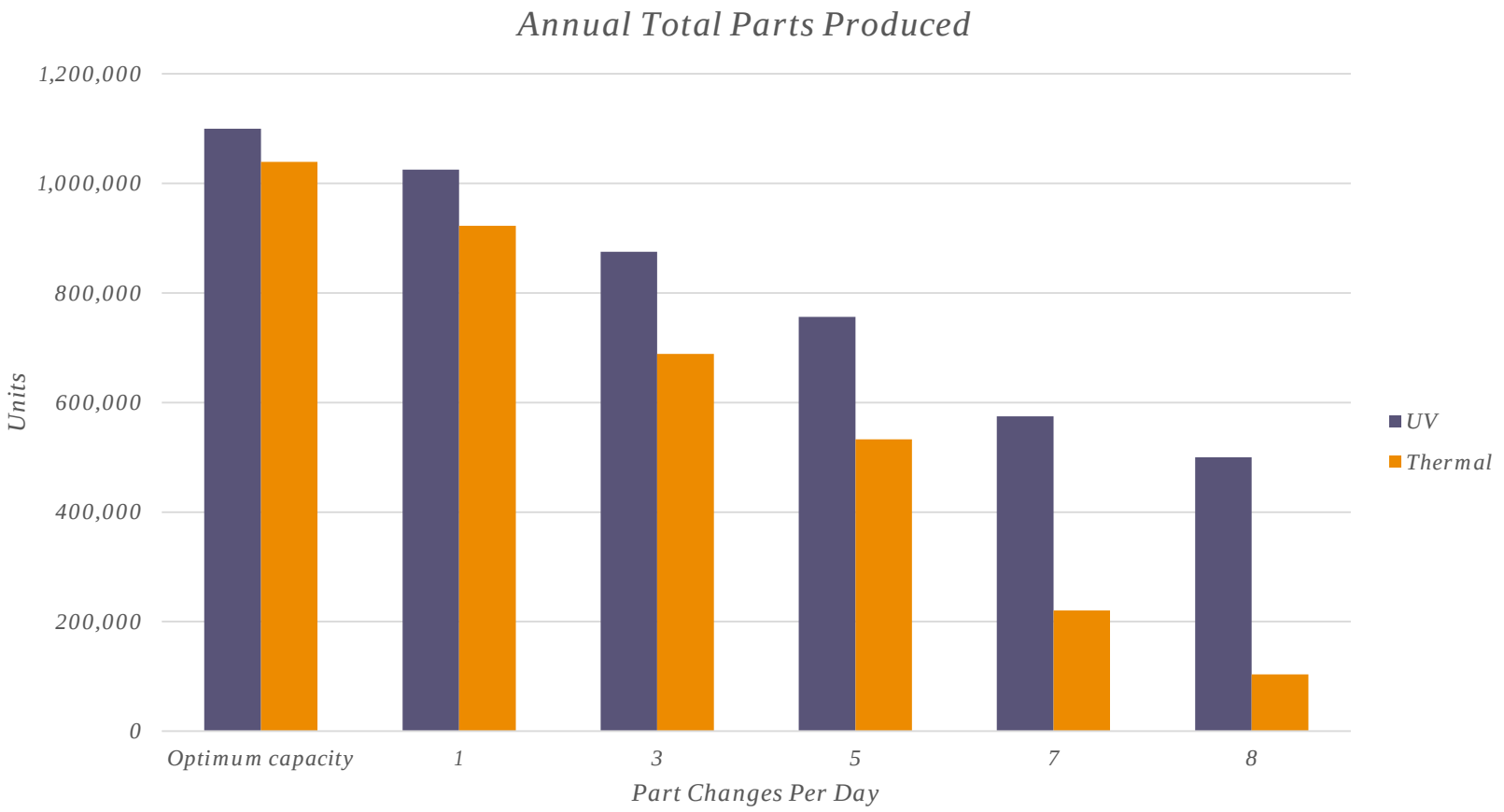


Limits

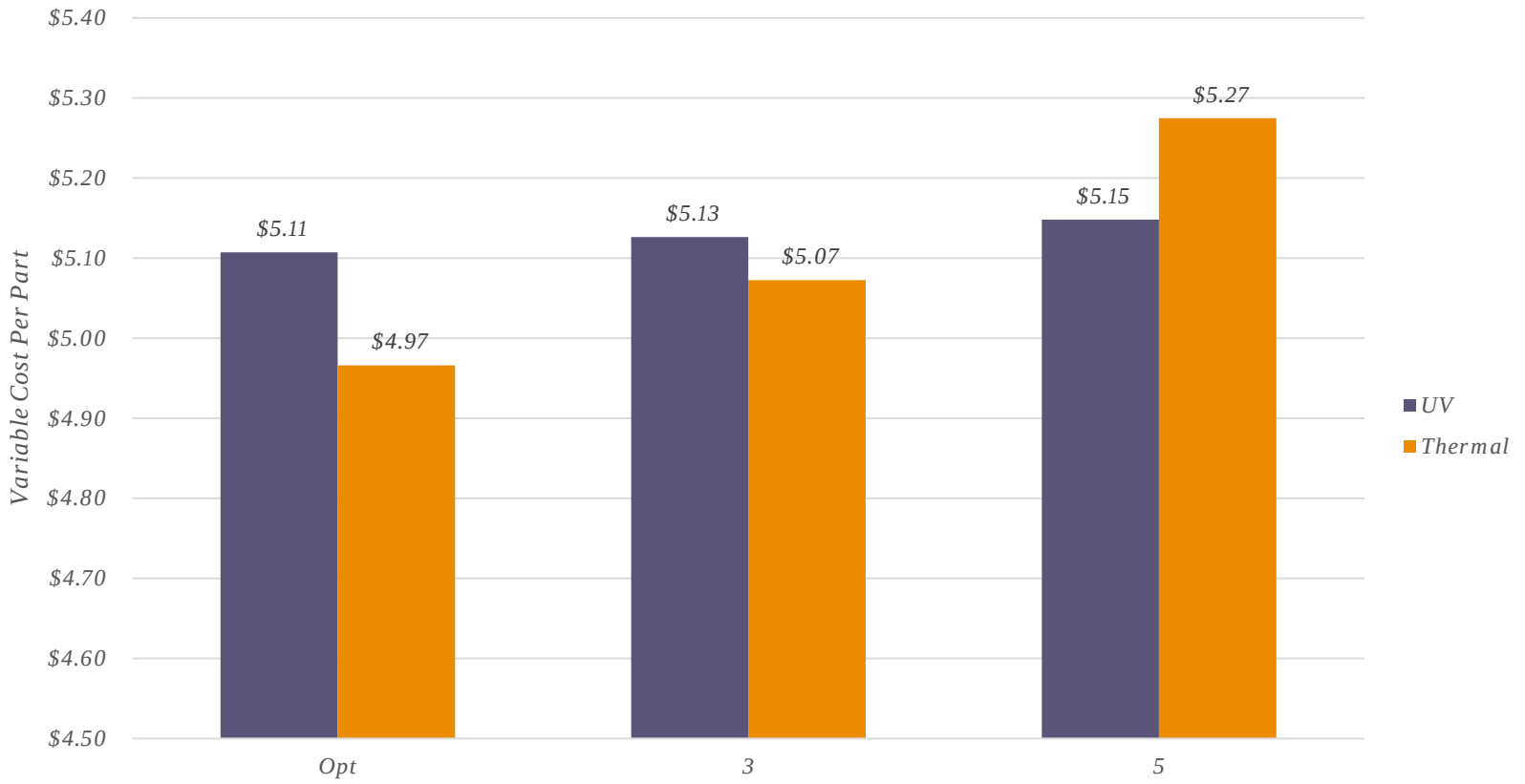


- *What is the optimum production output?*
  - *Volume of produced product per unit of time increment without any constraints*
- *What is the impact on optimum output with the introduction of a constraint?*
  - *For the purpose of illustration the model uses part changes per day as the constraint.*
    - *Change in variable cost*
    - *Change in parts produced*
    - *Change in revenue generated*
    - *Change in profit per hour*
    - *Change in lost production hours*

Capacity Model



Total Variable Cost



Total variable cost = material + labor + energy + plant floor + allocated energy & plant floor for lost production

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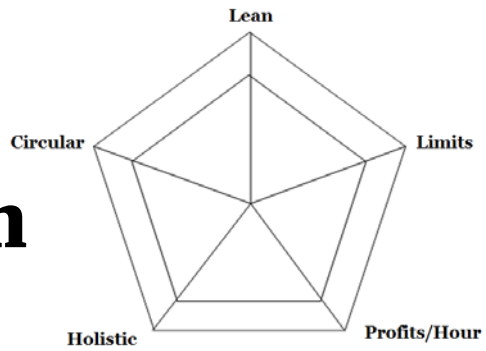
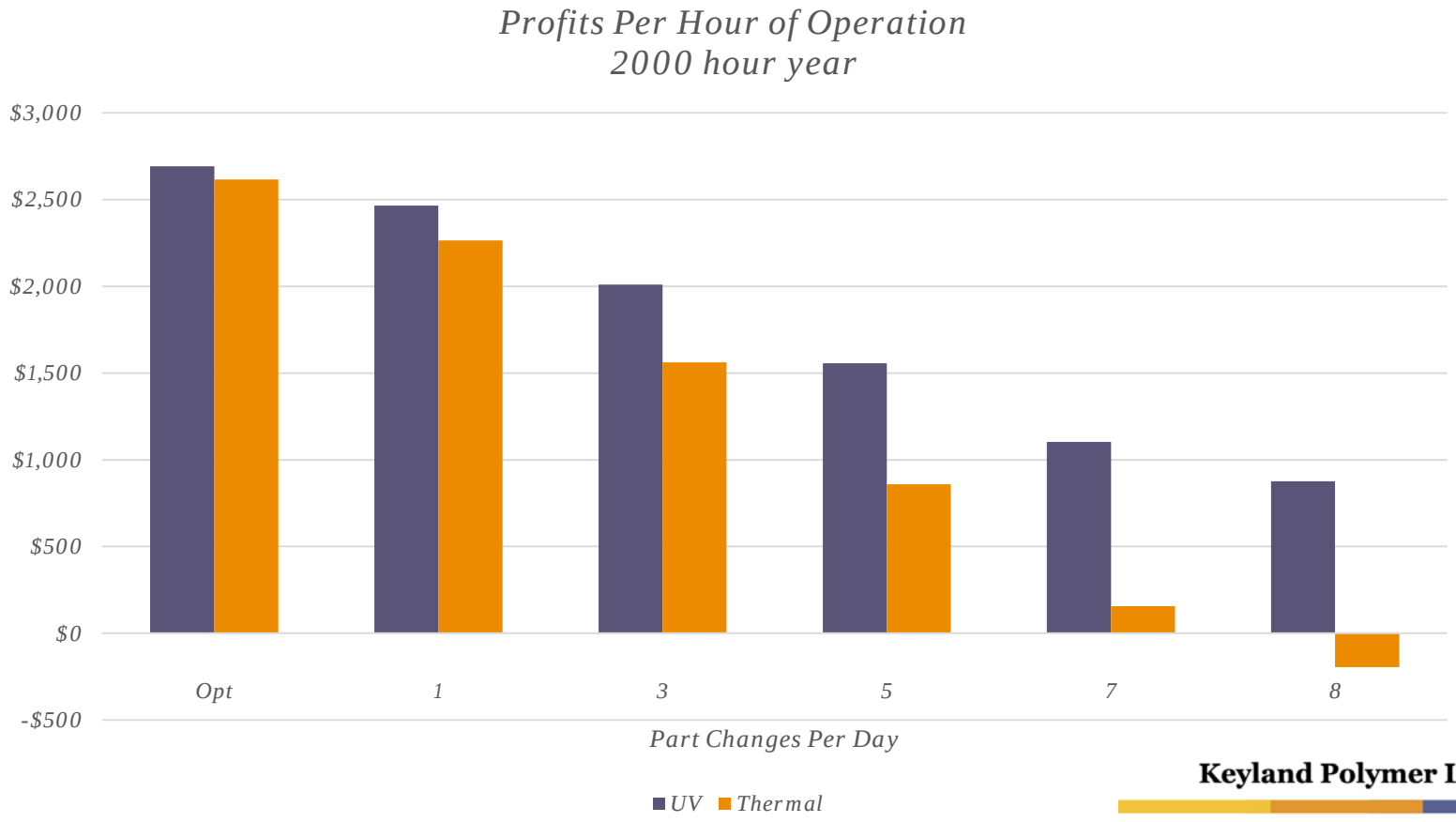
Profits per Hour of Operation



- *Total revenue – Total variable cost ÷ Total hours = Profit/hr*



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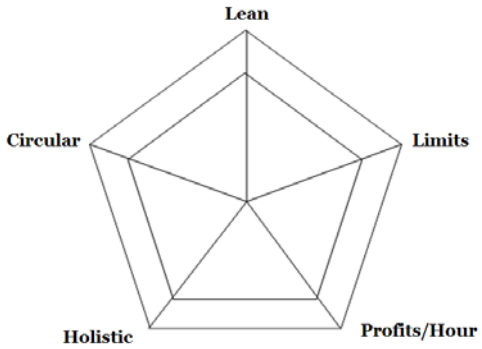
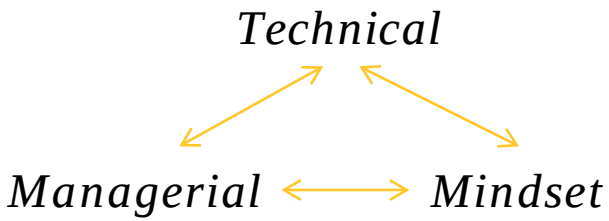
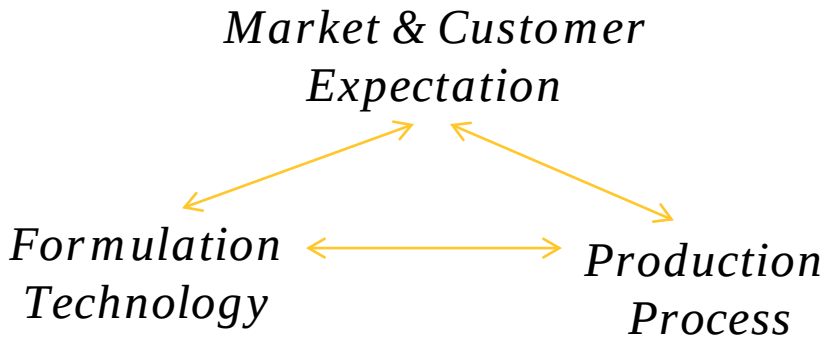
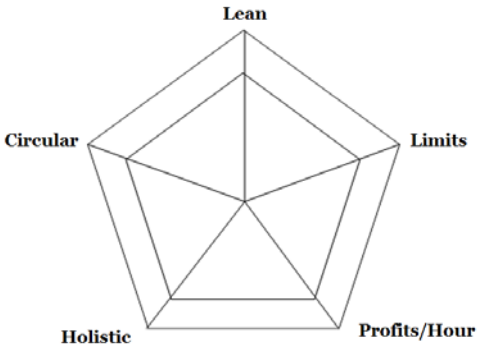
Holistic



- *Combination of managerial, technological process and material skill sets to produce a successful outcome.*
  - *Systems have to integrate and function in concert*
  - *Process managers and implementers have to be engaged*
  - *Collaboration with supply and support channels*



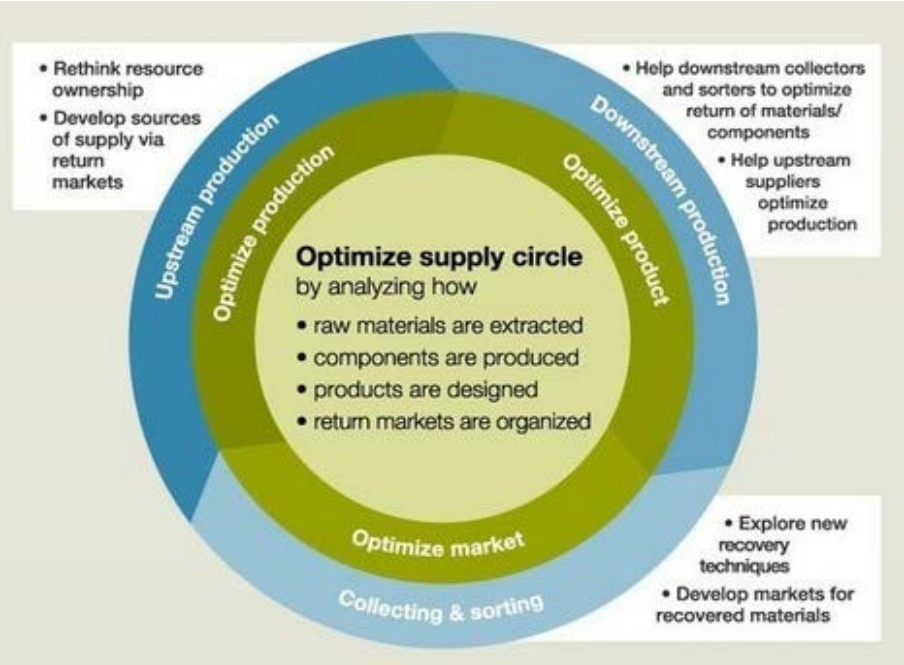




The Supply Circle

- *Focuses on value creation*
- *Restoration of resources back into the value chain – materials – energy – labor*

Recycle– Replenish – Reuse – Resell – Restore



McKinsey & Company

Call to Action

Worldwide demand and competition for resources will continue grow at accelerating rates. Resource constraints and cost volatility affect all firms. Production capacities need to be modified or created with mechanisms and processes to minimize and manage the negative influences of resource constraints and volatility.

Resource Productivity and the 5 core beliefs are quantitative and qualitative tools and methods that when employed can relieve or minimize constraints and volatility on energy, space, time and materials.

UV-cured powder coating is an exceptionally robust finishing system well suited for a wide variety of material and product applications fitting within the scope of a Resource Productivity business strategy. The adoption of UV-cured powder coating improves production flexibility, saves energy and plant space, is environmentally friendly and most importantly produces higher profits.

Questions

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