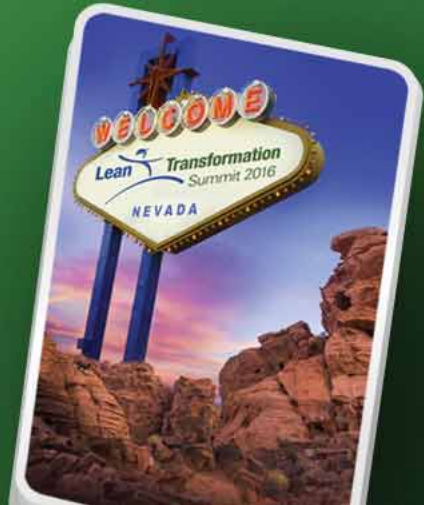


SunPower CLean in Mexicali

Ralph Robinett – Vice President, Operations
ralph.robinett@sunpower.com



Let's Deal With The Work

March 17-18, 2016 | Las Vegas

Bienvenidos a Mexicali

A photograph of the Sunpower building entrance in Mexicali. The building features a prominent white overhang supported by two blue columns. A large white sign with the 'SUNPOWER' logo is mounted on the wall. The foreground is a paved area with a circular pattern, and a flagpole with three flags stands to the right.

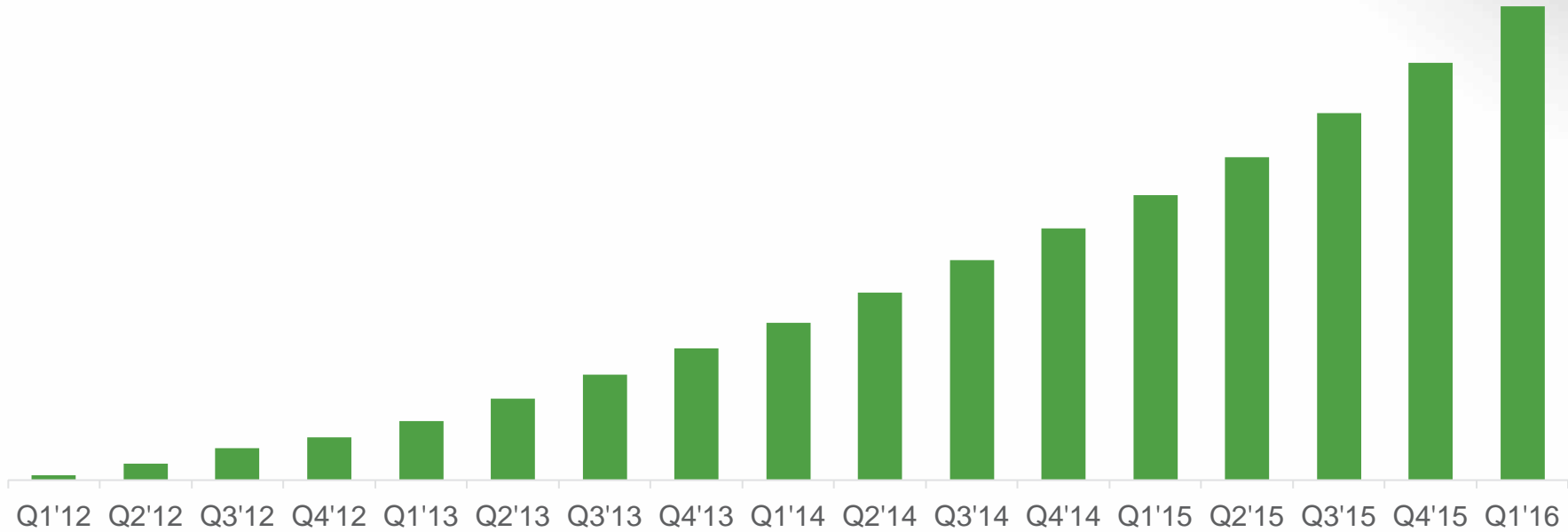
SUNPOWER

SunPower Mexicali, Baja California

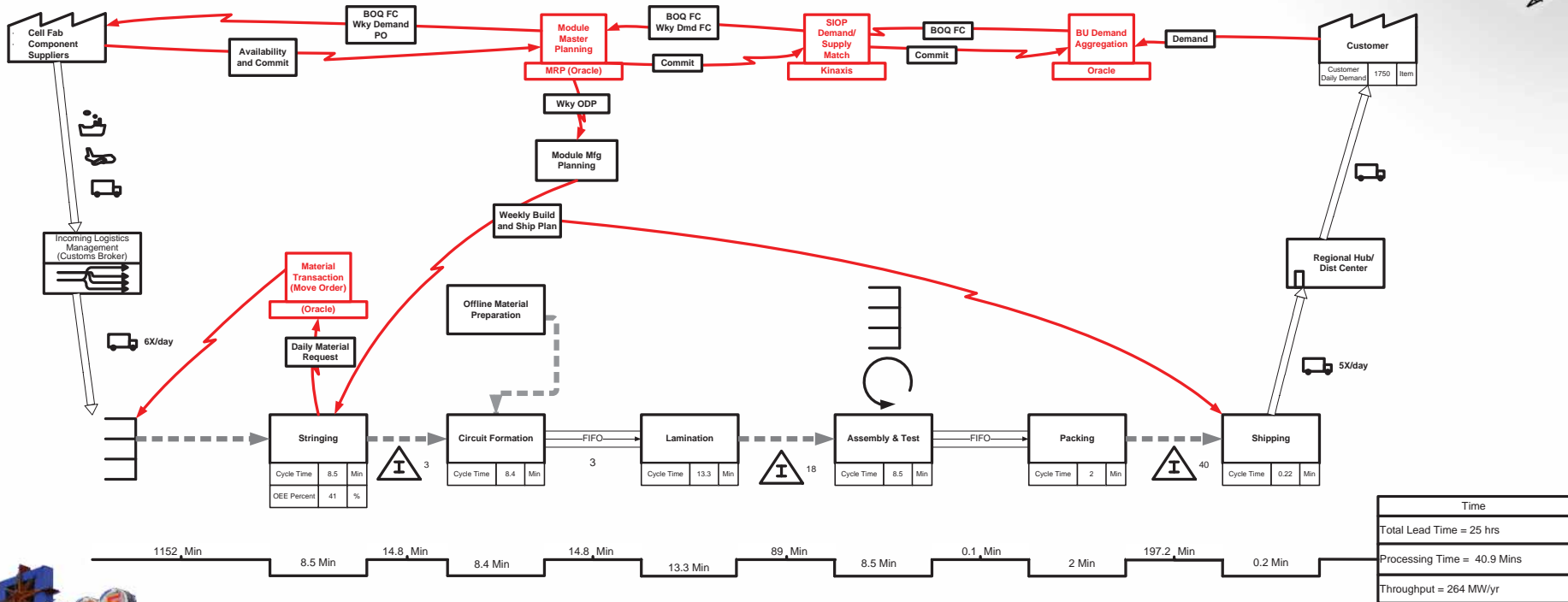




Mexicali Factory Continuously Ramping



Mexicali Factory VSM 2012



2012 Purpose, Process, People

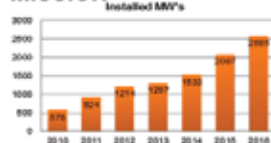


PURPOSE

VISION



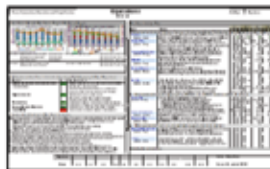
MISSION



VALUES



OBJECTIVES: 1 & 5 YEAR DEPLOYMENT: A3 & AOP



PROCESS

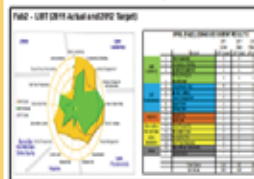
SunPower Production System



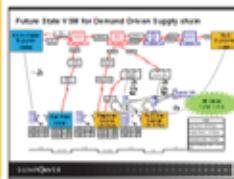
SPC Level Up Plan



Lean Maturity Tracker



Value Stream Map (VSM)



Core Processes

- PCR
- EPR
- TCR
- RPR
- eWAP
- OTP
- IIF
- Zbb/SG
- PSC
- FMEA
- 8D
- FCTP

PEOPLE

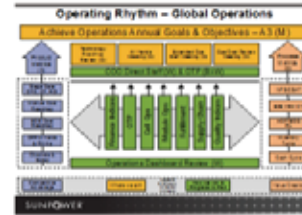
Innovation



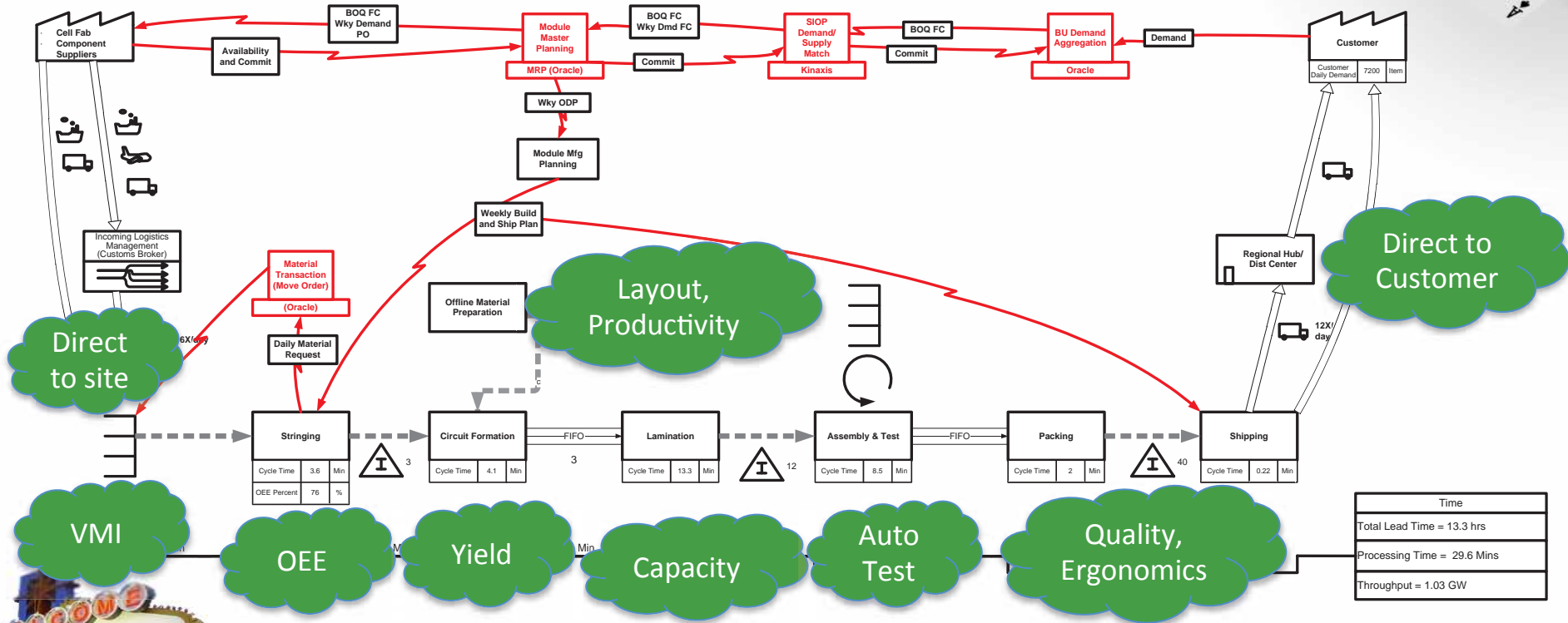
Development



Operating Rhythm



Factory VSM 2015



Key Operating Metrics



Key Metrics	2012 to 2015 Improvement
End to End VSM Lead Time (Days)	47%
Total Cost	54%
Building OEE	41%
Module Manufacturing Labor Productivity	23%
Yield Loss Reduction	77%
Customer Quality: Corrective Action Requests	75%



CLean Transformation Journey

Business
as Usual
(2012)

Circular
Economy
Inspiration

Defined
New 3P

Selected
Pilot
Factory

Got the
Knowledge

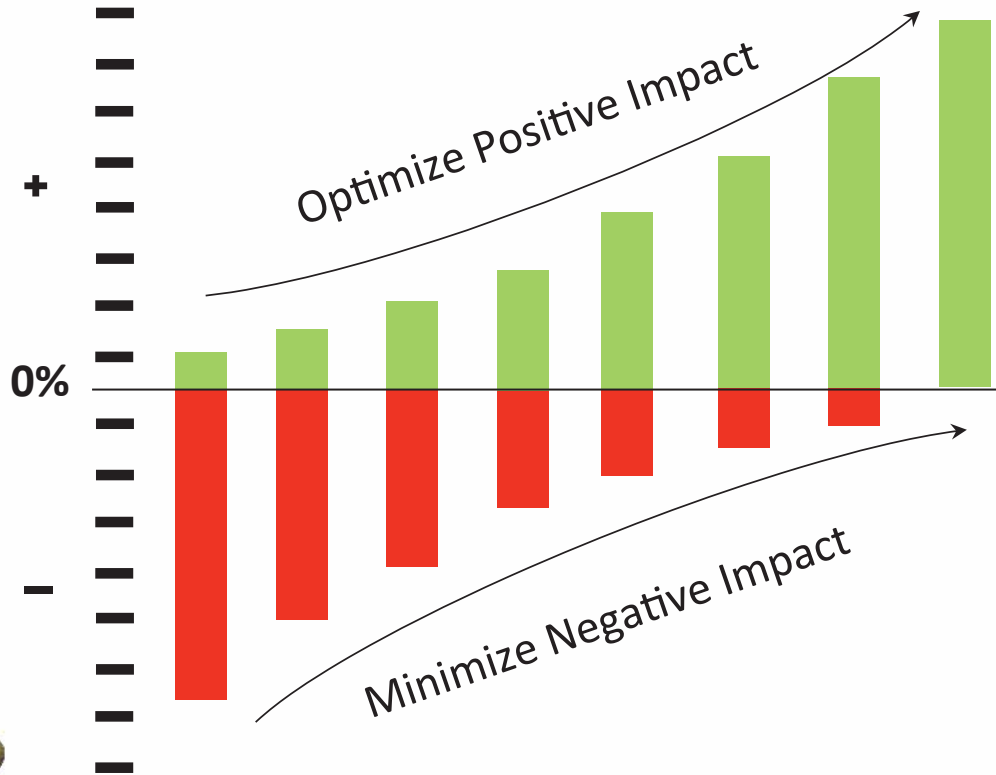
Kaizens
& People
Engagement

Yokoten

Embedded
in SPS
Process
(2015)



Upcycling - Pilot Program at Mexicali



Cradle to Cradle

Zero Waste To Landfill



CLean Transformation Journey

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Embedded
in SPS
Process
(2015)



How Do We Get Started?

- Let's go to Mexico!
- Launch a pilot program
 - Get Cradle to Cradle
 - Add Zero Waste to Landfill
 - Add LEED Certification
- Measure the results
- Standardize the work, Yokoten

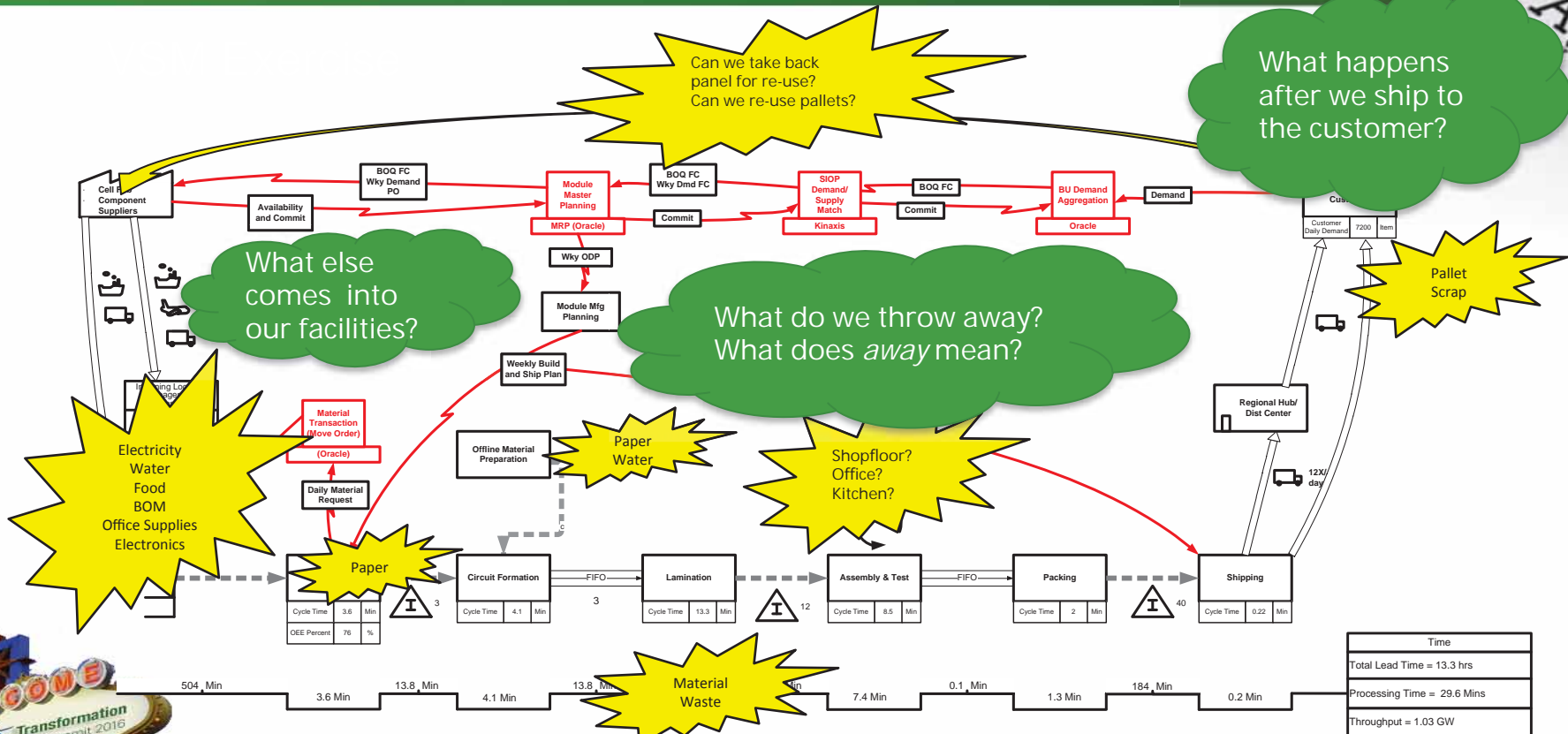




Exercise: Draw your current state VSM



Examining Our VSM in a Different Light



What is Cradle to Cradle (C2C)?



- C2C creates production techniques that are not just efficient but are waste free
- All material inputs and outputs are quantified as technical or biological
- Technical nutrients can be recycled or reused with no loss of quality
- Biological nutrients are composted or consumed

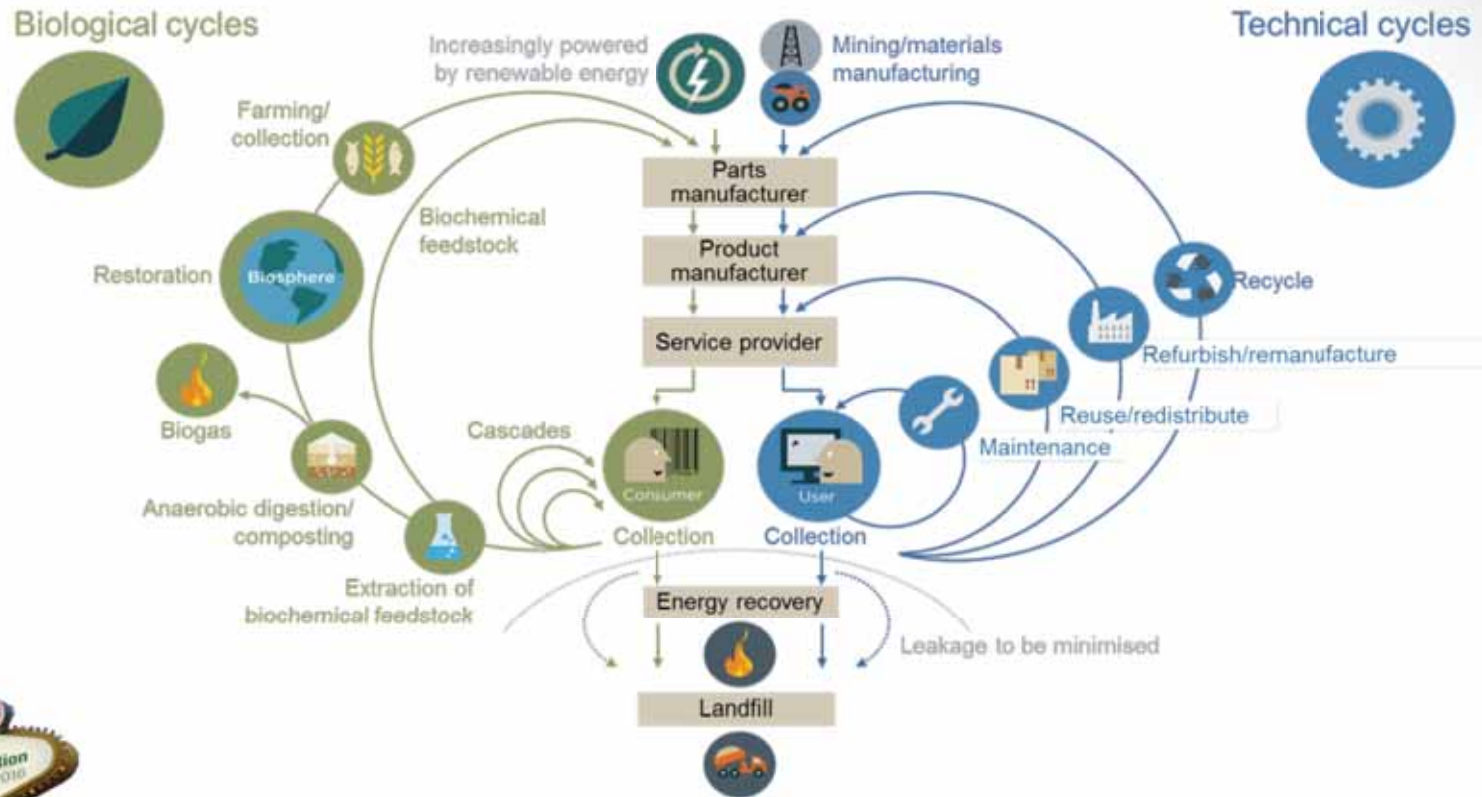


E-Series/X-Series Solar Panel
SunPower Corporation
Version 3.0
Recertification October, 2016

SILVER		BASIC	BRONZE	SILVER	GOLD	PLATINUM
	Material Health			✓		
	Material Reutilization			✓		
	Renewable Energy			✓		
	Water Stewardship				✓	
	Social Fairness			✓		



Circular Economy Butterfly Diagram





Exercise: C2C Self-Assessment



Clean Transformation Journey

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Embedded
in SPS
Process
(2015)



What is Zero Waste to Landfill (ZWTL)?



Definition:

- Zero Waste to Landfill: Facilities that achieved a landfill diversion rate of >99%

Standards available from third party:

- NSF 445 Landfill Free Verification
- UL ECVP 2799 Zero Waste to Landfill



ZWTL: Get the Knowledge



DEFINING SUSTAINABILITY AT SIA:

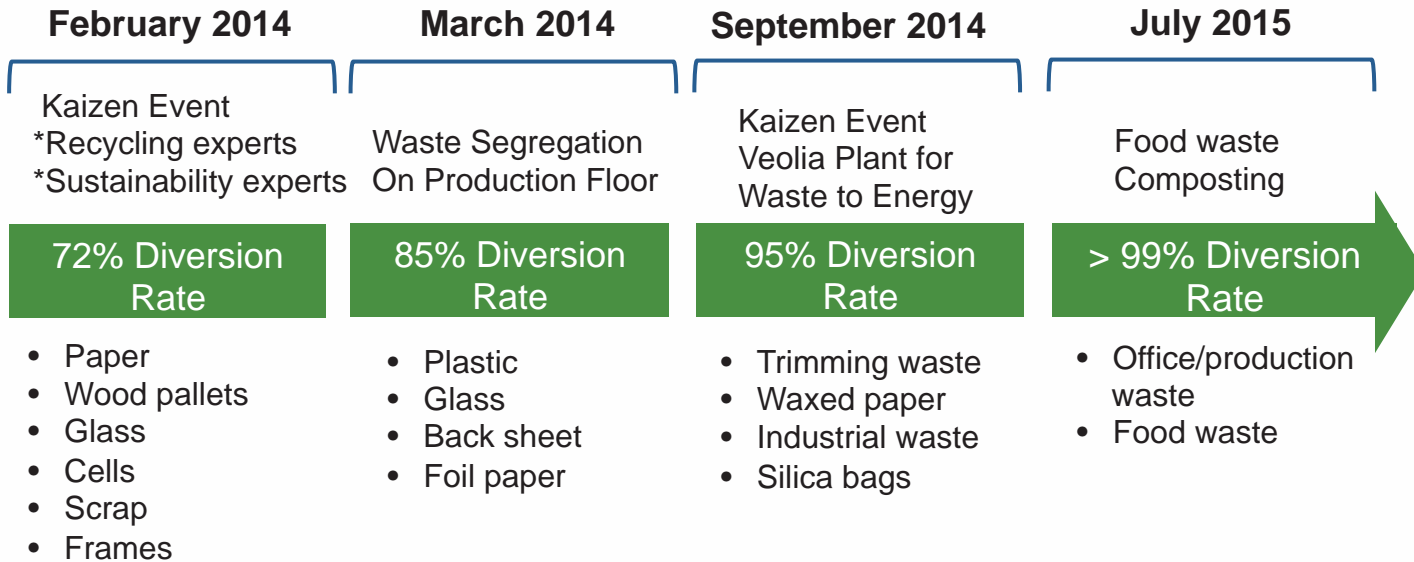
Operating in a way that meets our current needs without compromising the needs of the future.

- We went to the Gemba!
- Subaru Indiana



SPMX ZWTL Milestones

- Certified in August 2015



First manufacturing plant to achieve ZWTL certification in Mexico



CLean Transformation Journey

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(2015)



Do a Kaizen! – February 2014



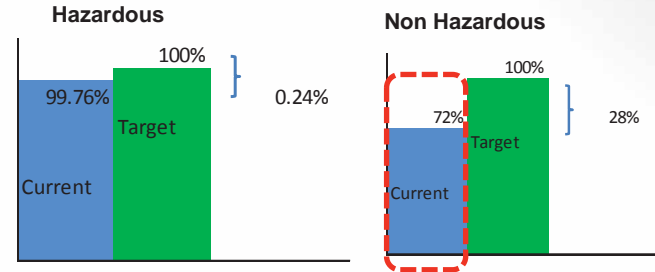
Problem: 28% of Waste Going to Landfill

Form the Team:

- Bring in an expert in ZWTL
- Corporate Sustainability Leaders
- Factory Lean Manufacturing Leaders
- Factory Manufacturing Associates
- Waste Handling Associates & Contractors

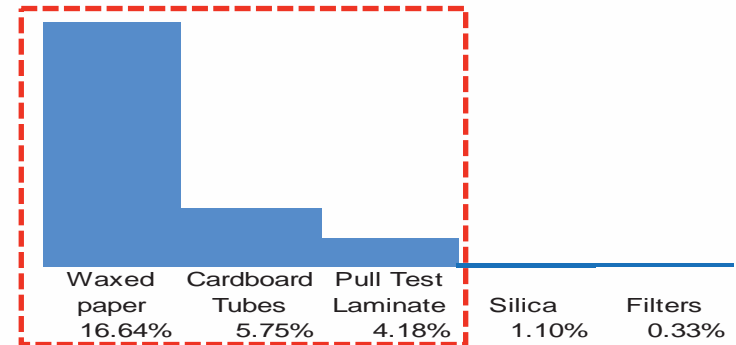


Baseline Analysis: What is the Gap?



Baseline: 72% Diversion Rate

Second level analysis: Major contributors



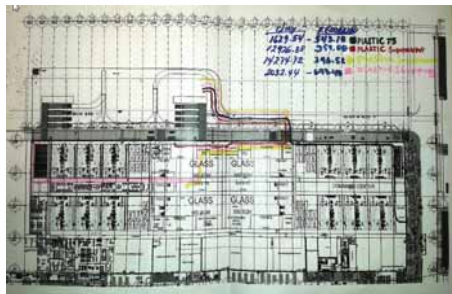
Go to the Gemba & Walk the Value Stream



Dumpster Diving - Literally Getting Our Hands Dirty!



Apply Lean Tools – March 2014



Process Step	Machine	Operator	Start	End	Time	Inventory
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Actions:

- Map waste in the value stream
- Segregate at the source
- Standardize work for waste collection



85%
Diversion
Rate

Paper, Plastic, Glass, Backsheet, Foil Paper



Drive the Culture Change

Cafeteria

- Eliminated non-reusable cups, plates, utensils in cafeteria



Coffee Stations

- Eliminated non-reusable coffee cups



Eliminated 2.8
Metric Ton of
cafeteria
Waste to Landfill

Engage all employees in all departments. Focus on Elimination



2nd Kaizen – September 2014



Biological cycles



Technical cycles



Energy Recovery:

- Go To Gemba!
- See Actual Process
- 6 Sites Evaluated



95 %
Diversion
Rate



3rd Kaizen – March 2015



Upcycling: Food Waste Composting

Phase 1: Reduce food waste. Moonshine manual composting process.



3rd Kaizen – July 2015

Automate Composting Process



Ready for Certification!

>99 %
Diversion
Rate



Achieved ZWTL & Kept Going



December 2015: Greenhouse and Farming



Solar Energy runs Composter in Greenhouse



Mixing Compost



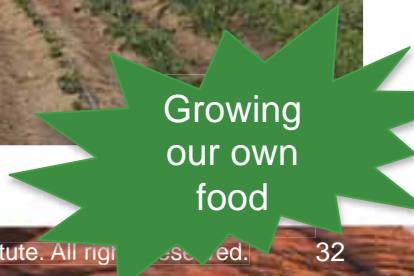
Soil Preparation



Seed Tray Preparation



Harvest





Exercise: ZWTL Self-Assessment



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in SPS
Process
(2015)



PURPOSE

We change the way our world is powered

Mission



Values

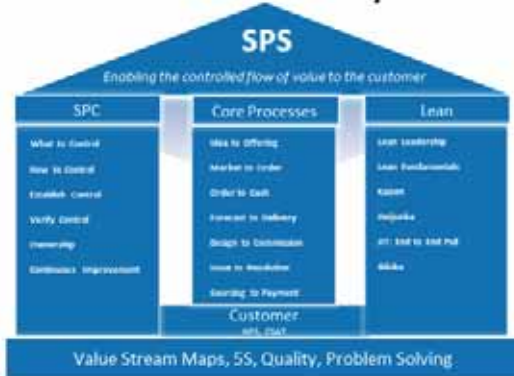


**Strategy Development & Deployment:
MYP, AOP, A3 & Key Initiatives**



PROCESS

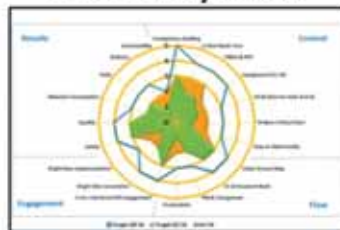
SunPower Production System



Value Stream Map (VSM) Last Updated: Q4'15

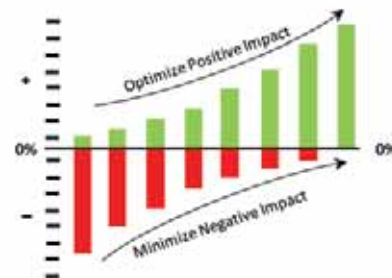


SPS Maturity Tracker



PEOPLE

Innovation



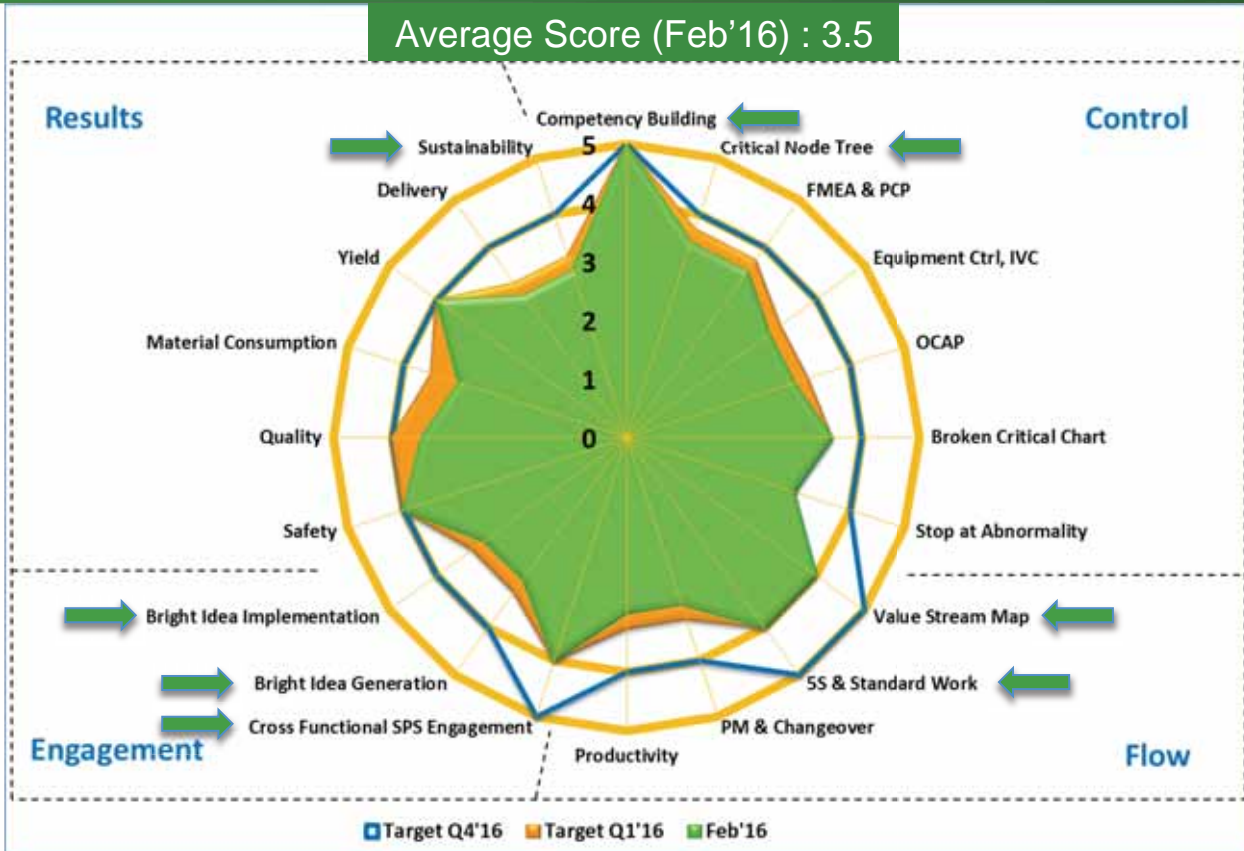
Development



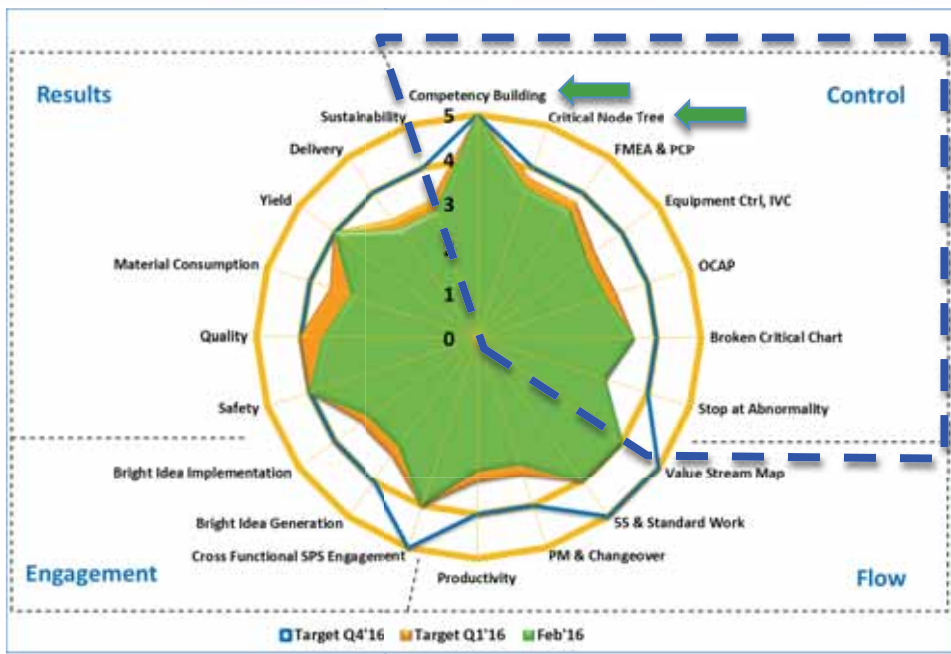
SPS Maturity Tracker - SPMX



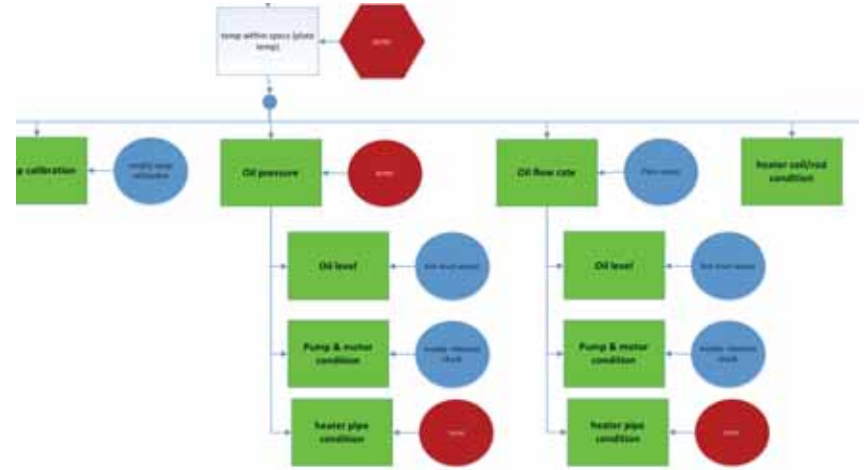
Average Score (Feb'16) : 3.5



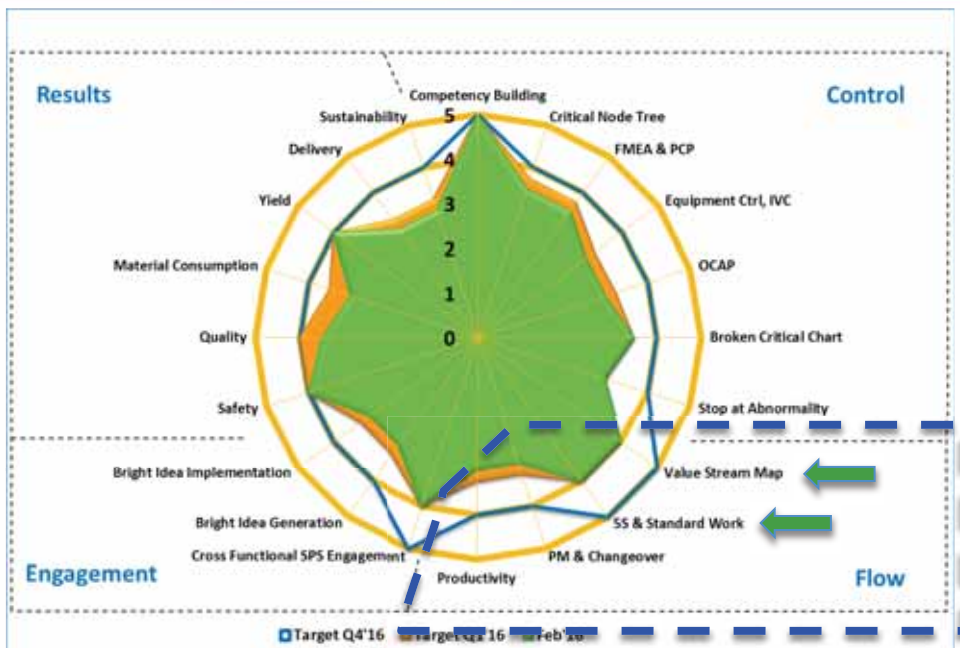
Control



- Competency Building
 - Provide Knowledge to employees
- Critical Node
 - Identify biological and technical waste in the processes



Flow



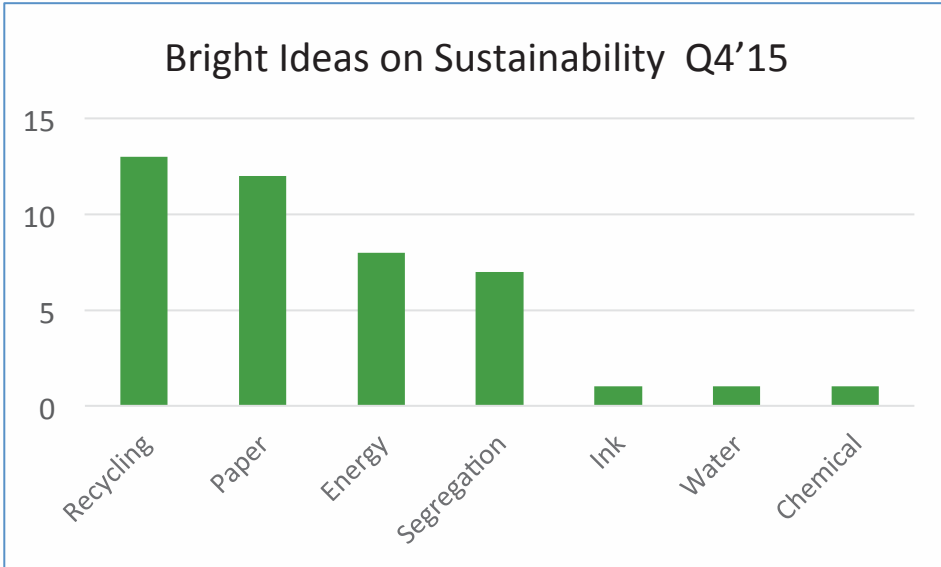
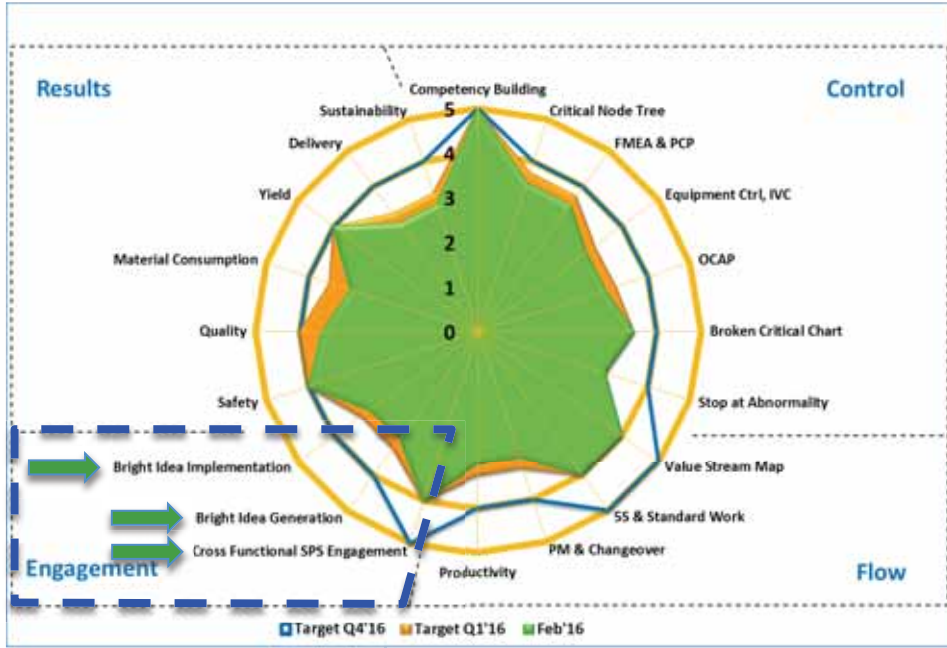
- Value Stream Map
 - Go See - Identify waste physically from the processes
- 5S & Standard Work
 - Integrated C2C requirements into New Product Development Process
 - Right by Design



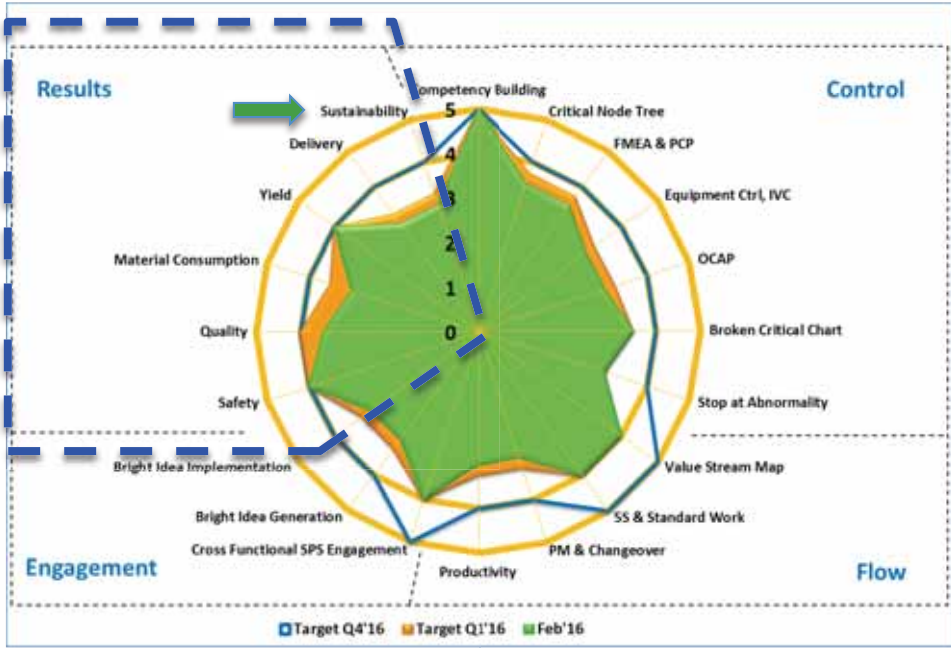
Engagement



- Cross Functional SPS Engagement
- Bright Idea Generation
- Bright Idea Implementation



Results



- Sustainability

- Evaluates site maturity on:

- C2C
 - ZWTL
 - LEED



Does it Work?

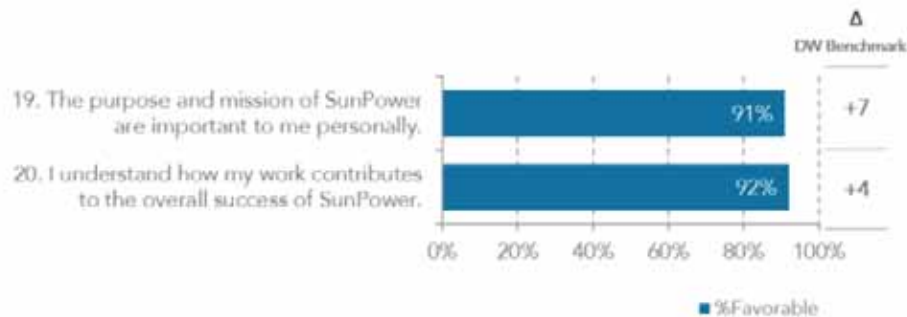


DecisionSite

Employee Engagement

Strength – Organizational Connection

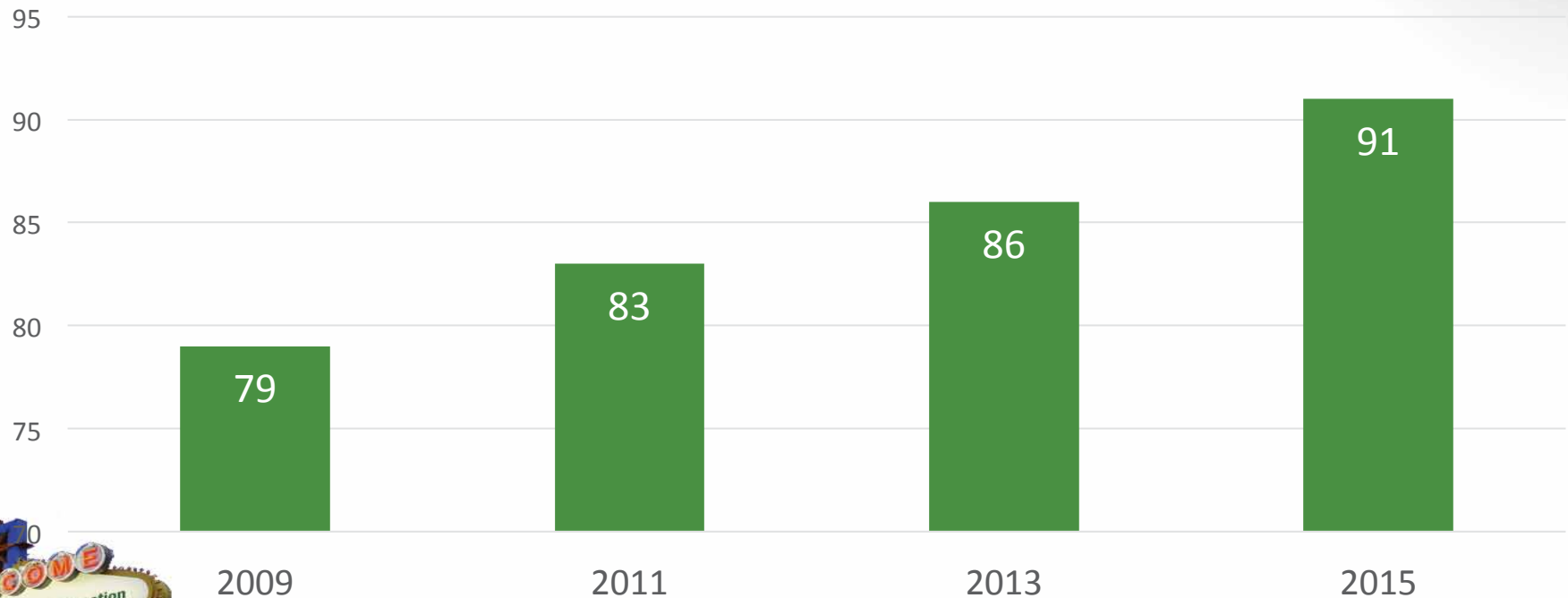
Employees feel connected to the mission and see how their work contributes to SunPower's overall success



Employee Connection to Purpose & Mission



Employee Engagement Survey Results



Where to Learn More



NSF International

<http://www.nsf.org/services/by-industry/sustainability-environment/landfill-free>



Cradle to Cradle Products Innovation Institute

<http://www.c2ccertified.org/>



Leadership in Energy & Environmental Design

<http://www.usgbc.org/leed>





Thank You

Let's Deal With The Work

March 17-18, 2016 | Las Vegas

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