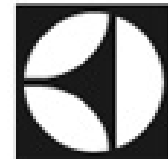


# Global Optimization: Footprint, Automation and Digitization

Frank Wagner



Global Operations Major Appliances



*Thinking of you*  
**Electrolux**

# Who Is Electrolux?



## Position

- Sales SEK 110 billion
- Op income SEK 5.2 billion
- Sales in more than 150 markets
- A world leader in appliances

150  
MARKETS

## People

- 61,000 in 60 countries

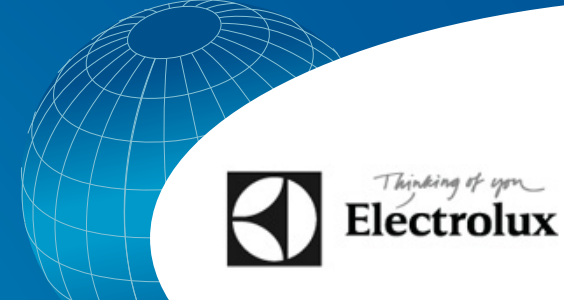
60  
COUNTRIES

## Products

- More than 40 million products per year
- To meet the real needs of consumers and professionals

40  
MILLION

# What Is Electrolux?



**Cookers, ovens & hobs**



**Refrigerators & freezers**



**Dishwashers**



**Laundry products**



**Vacuum cleaners & small appliances**

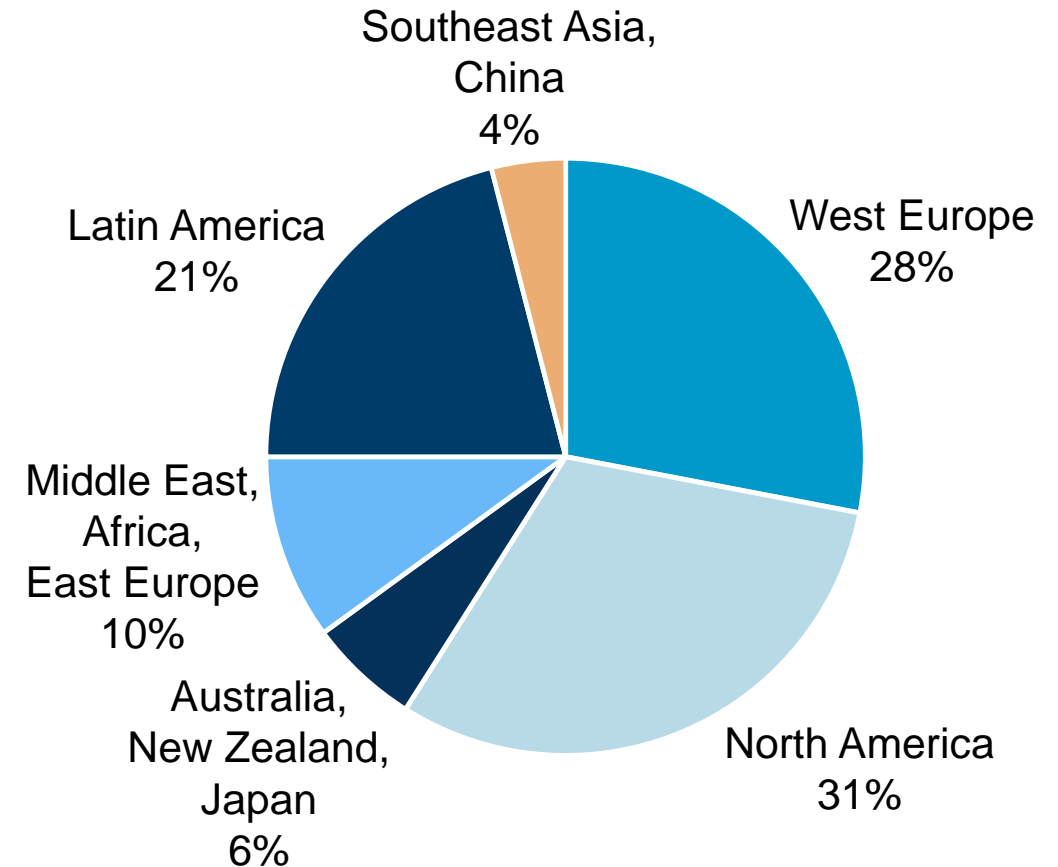


**Air conditioners & dehumidifiers**

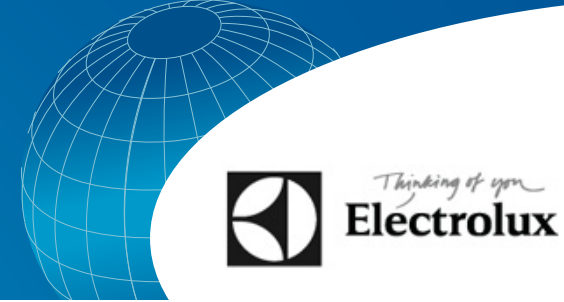


**Products for professional use**

## A true global company



# How Was Electrolux Created?



- Acquisition
- Construction



# Steps to Global Optimization



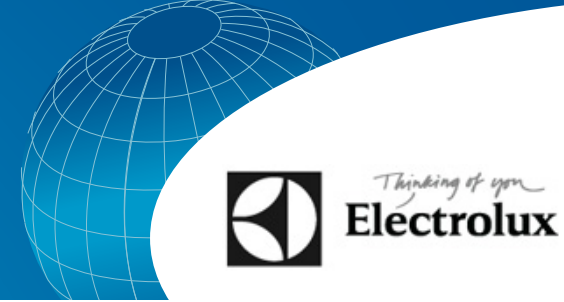
**FOOTPRINT**

**DIGITIZATION**

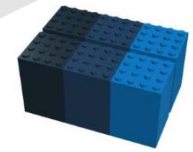
**AUTOMATION**

# Optimization and Integration

## Electrolux Global Network



Safety	EMS	Quality	Supply Chain	BPD Process	Optimum Process	Modularization 2.0	Integrated Optimized Network
<ul style="list-style-type: none"> <li>▪ PPE</li> <li>▪ STOP</li> <li>▪ Central Safety Committee</li> <li>▪ Integrated Safety</li> </ul>	<ul style="list-style-type: none"> <li>▪ Lean Tools</li> <li>▪ Training</li> <li>▪ Certification</li> <li>▪ Team Organization</li> <li>▪ Continuous Improvement</li> <li>▪ Cultural Change</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pareto based root cause resolution</li> <li>▪ Global Product Line</li> <li>▪ New Products</li> <li>▪ Electronics</li> <li>▪ FFF</li> <li>▪ OEM</li> </ul>	<ul style="list-style-type: none"> <li>▪ Global S&amp;OP</li> <li>▪ Materials Excellence Program</li> <li>▪ Master Production Scheduling</li> </ul>	<ul style="list-style-type: none"> <li>▪ Clear metrics &amp; initiative system</li> <li>▪ Rigid deployment &amp; responsibility approach</li> <li>▪ Regular follow up from global operations to plant floor</li> </ul>	<ul style="list-style-type: none"> <li>▪ Global manufacturing processes;                             <ul style="list-style-type: none"> <li>- Process</li> <li>- Equip Suppliers</li> <li>- Performance</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Global product architectures                             <ul style="list-style-type: none"> <li>- Complexity reduction</li> <li>- Efficiency improvement</li> <li>- Market agility</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Objectively define network optimization levers which are being utilized to drive aggressive footprint optimization</li> </ul>



Step function improvement in global operations program for continuous improvement and footprint optimization



# Key Guiding Manufacturing Strategic Levers



## Standardized Processes

1. Core vs. Non Core Products
2. Vertical Integration
3. Process Technology
4. Role of Automation

## Strategic Growth Processes

5. Multi Product Line Sites
6. Emerging & New Markets Entry
7. Integration and Role of Acquired Plants

## Network Policies

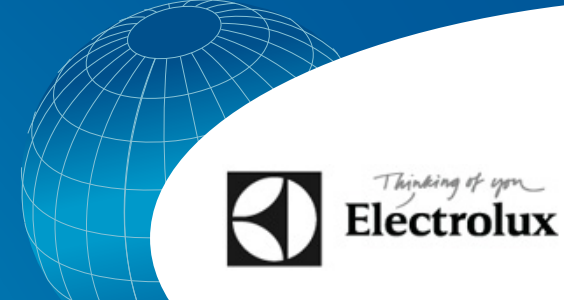
8. Plant Leadership Role / Co-location
9. Premium vs. Mass

## Network Levers

10. Tariffs
11. High Cost Country, Medium CC and Low CC
12. Ideal Plant Size & Capacity Utilization
13. Global vs. Regional Sourcing
14. High vs. Low Runners
15. Customer Flexibility and Responsiveness
16. Production Platform
17. Modularization



# 1. Core vs. Non Core Products



- Definition of core and non core finished product categories need to be supported by business requirements
- Significant changes on core and non core decisions will impact overall network design, capabilities, coordination principles and will affect plants design and its vertical integration

- ✓ We will utilize the ***Strategic Importance vs. Supplier Effectiveness*** for finished products regularly in order to identify the company Core and Non Core product guidance
- ✓ The company will insist on the core and non core guidance compliance



# Core vs. Non Core Analysis

## Tool Introduction



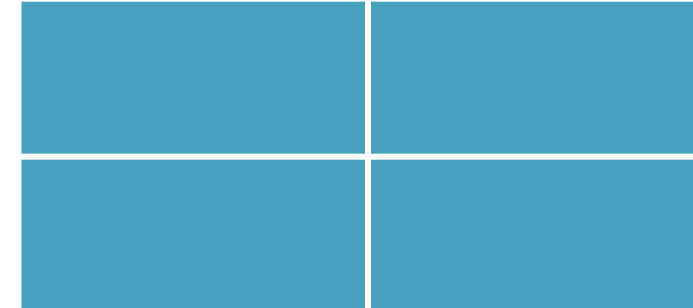
### Market Attractiveness

- Current sales volumes (25%)
- Profit margin ambition (25%)
- Future revenue growth ambition (25%)

### Electrolux Product Differentiation (25%)

- Value of differentiating features / technology

Strategic  
Importance



Supplier Effectiveness

### Quality

- Quality & functional reliability (30%)

### Cost

- Delivered cost (30%)

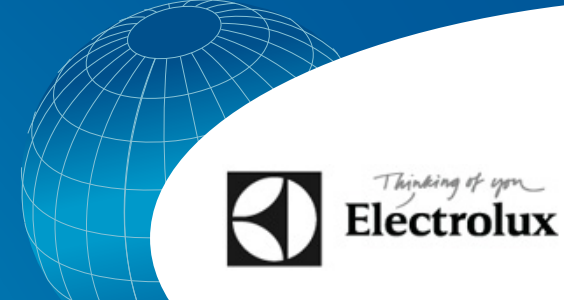
### Delivery

- Lead-time & delivery reliability (20%)

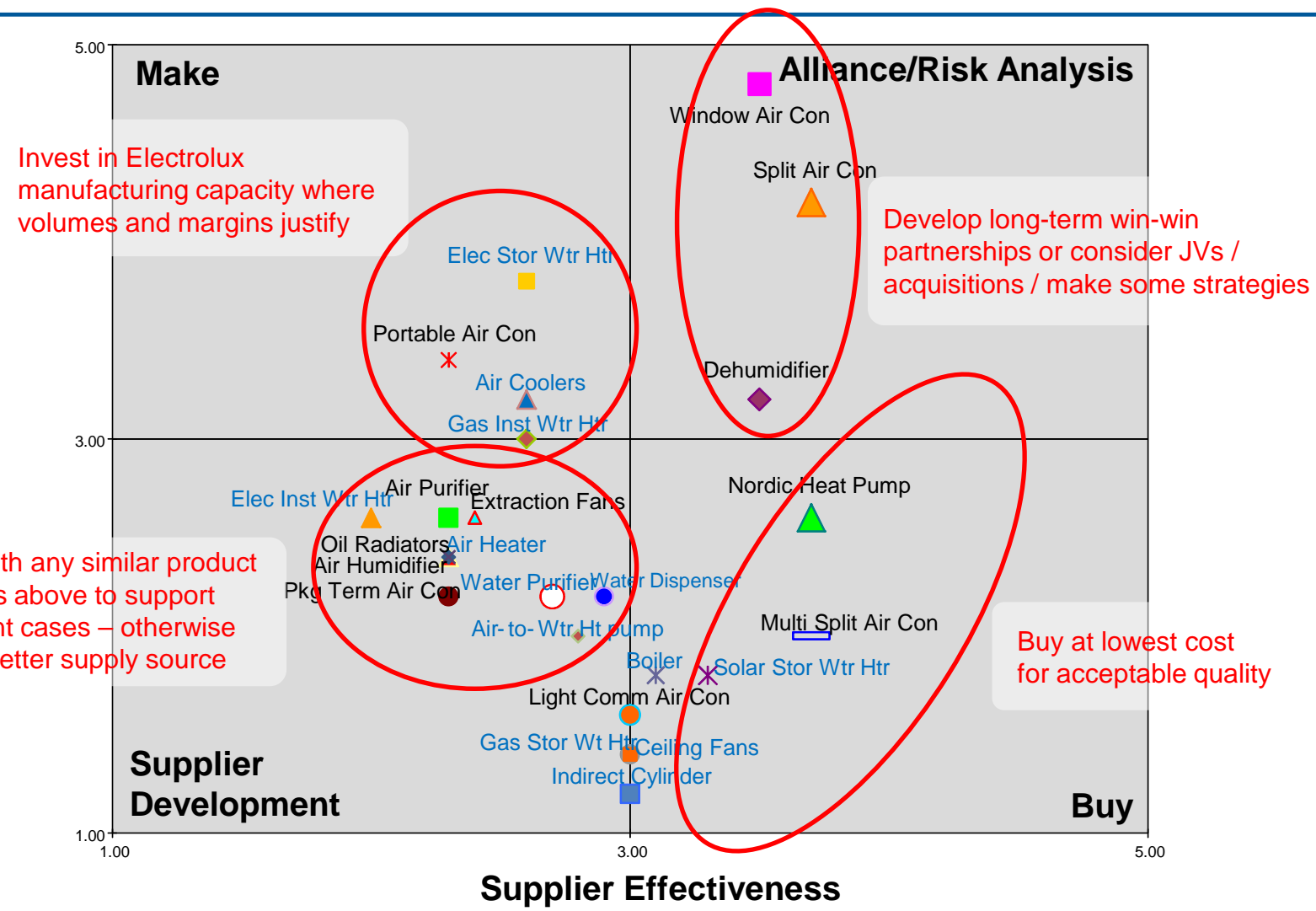
### Innovation

- Participation in innovation (20%)

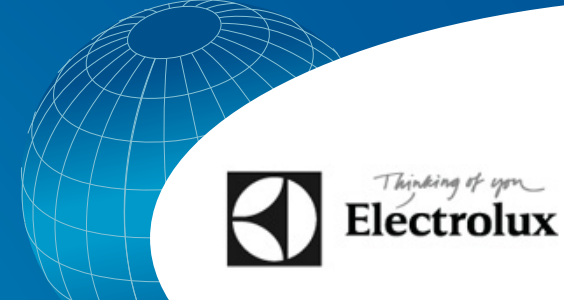
# Home Comfort Core vs. Non Core Product Categories



Strategic Importance



## 6. Emerging & New Markets Entry

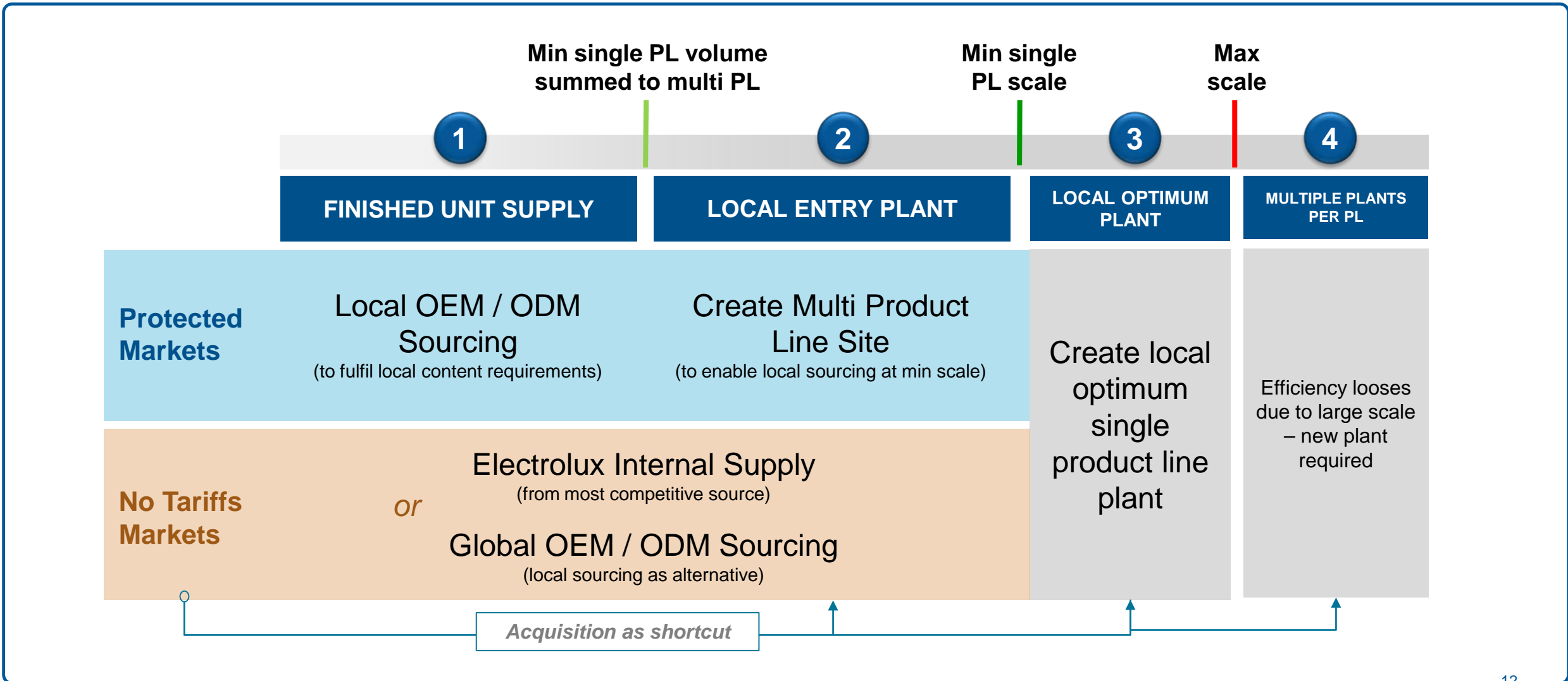
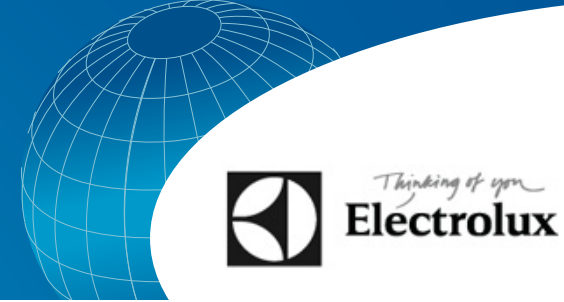


- Access to new and emerging markets is key for Electrolux strategic growth plans
- Some emerging countries have closed borders and tariffs on imported appliances impact significantly on product cost competitiveness
- Electrolux does not have manufacturing sites in many of the targets emerging markets

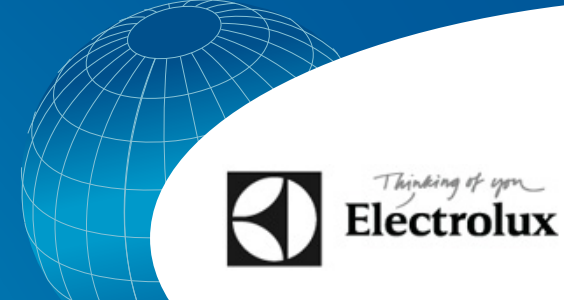
✓ We will apply a standard staged approach to enter new markets, developing volumes until we reach sufficient scale

# Market Entry Model

## Staged Approach



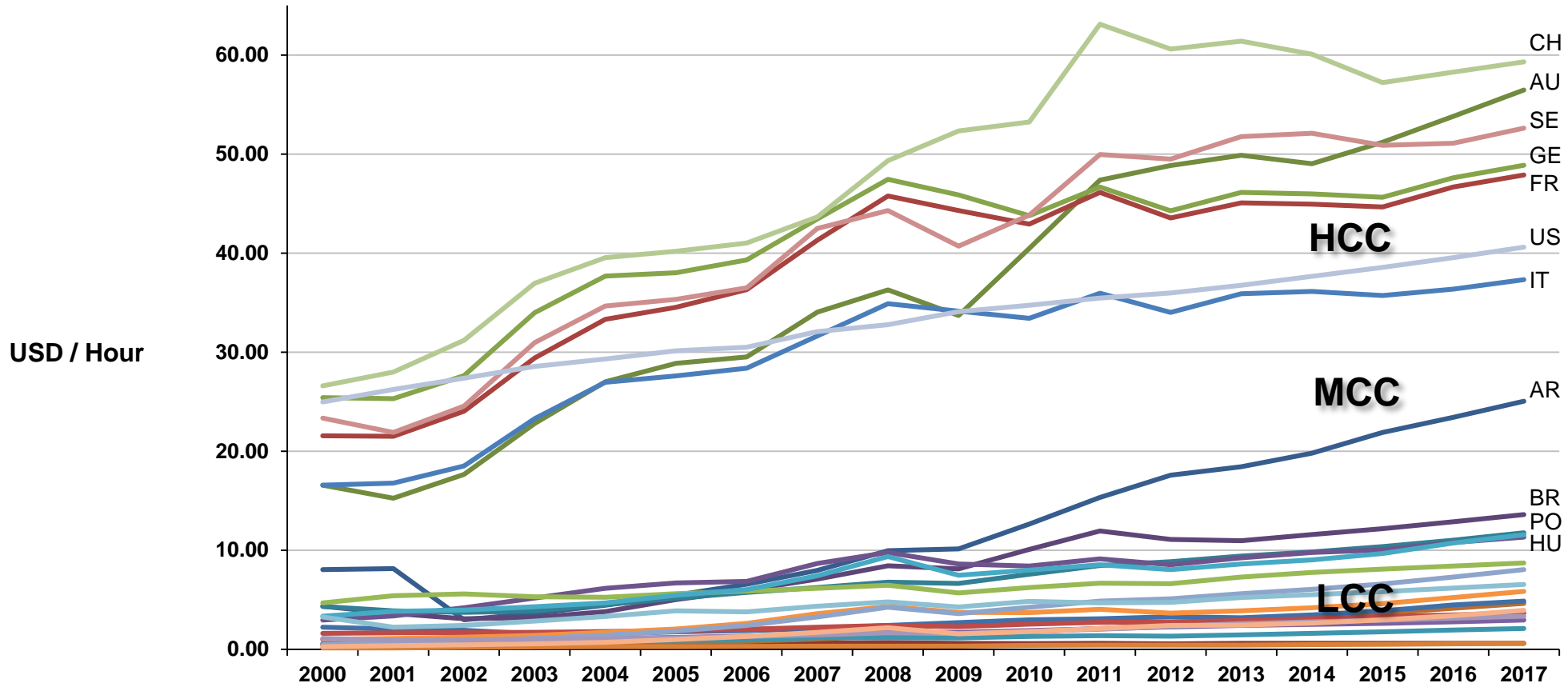
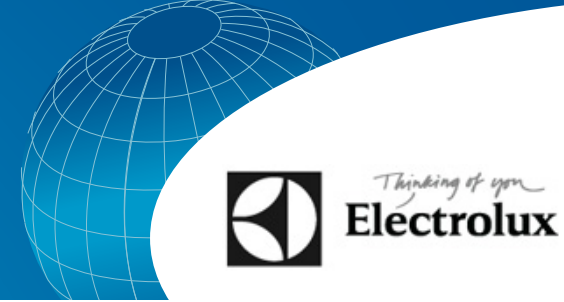
# 11. HCC, MCC and LCC Locations



- Labor cost in HCC tends to be generally stable
- Wages increase might convert some LCC into MCC
- Electrolux has manufacturing sites in current and future LCC

- ✓ We will continuously shift production between HCC and LCC/MCC, targeting a high utilization and volume move towards the lowest cost within region (where economics justifies)
- ✓ We will apply the levers of high vs. low runners and automation in high cost areas where closure or further shift to low cost area is not feasible

# Labor Cost Trends: HCC, MCC and LCC

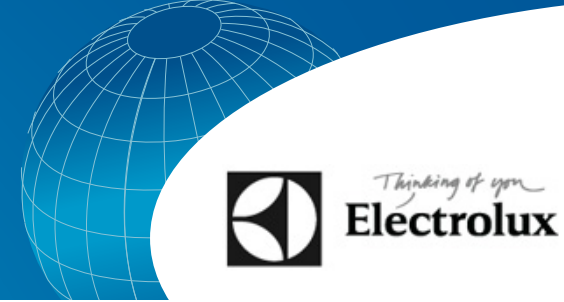


Average hourly compensation costs for all employees in manufacturing. Includes direct pay, bonuses, healthcare and other social benefits, and labour-related taxes and subsidies.. Conversion to USD based on average yearly exchanged rate. Projected future figures based on local market analysis, expected GDP and inflation rates.

Source: International Labour Organisation, US Bureau of Labour Statistics, United Nations Industrial Development Organisation and OECD through The Economist Intelligence Unit - Copyright © 2013



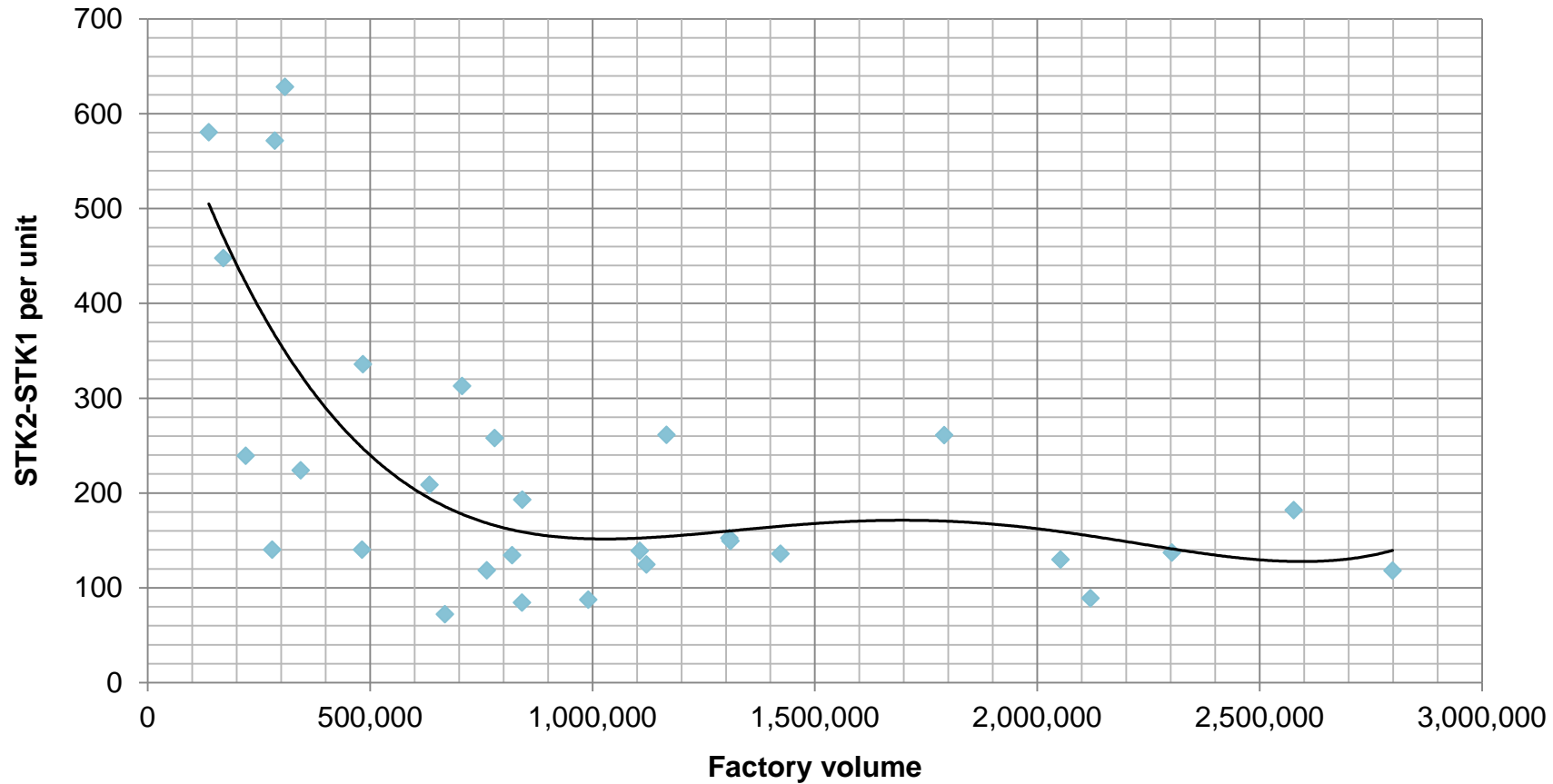
# 12. Ideal Plant Size & Capacity Utilization



- All plants have a minimum economic scale defined by a certain production volume that makes optimum usage of fixed cost within the plant
- All plants also have a maximum scale
- Product portfolio and process complexity has an influence on minimum and maximum scale

- ✓ We will target to have all plants above minimum economic scale and add volume towards maximum economic scale – this will be done through plants consolidation, organic growth and insourcing activities
- ✓ Where regional demand exceeds twice the minimum economic scale, we will consider splitting the volume between two focused plants
- ✓ We will aim to run all plants above 75% designed capacity

# Fix Cost per Unit Over Factory Size

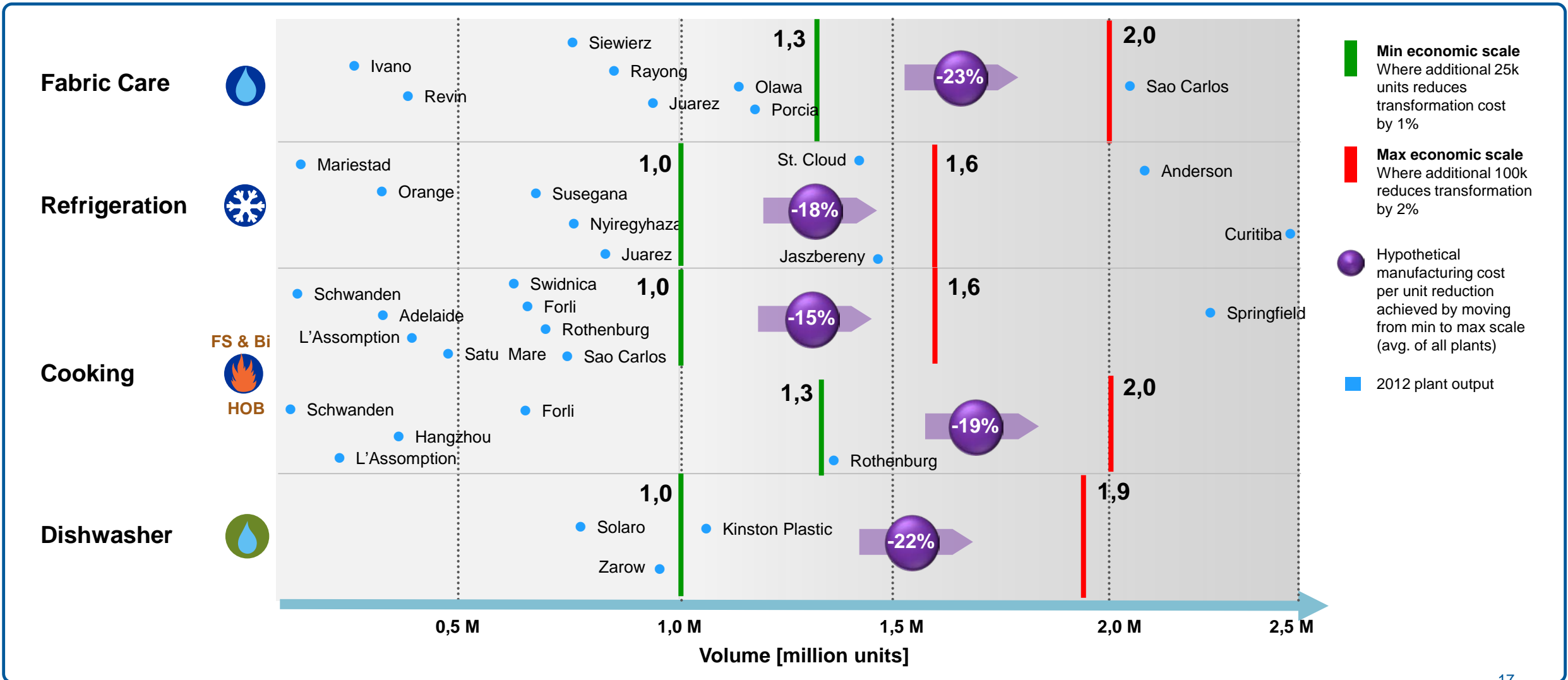
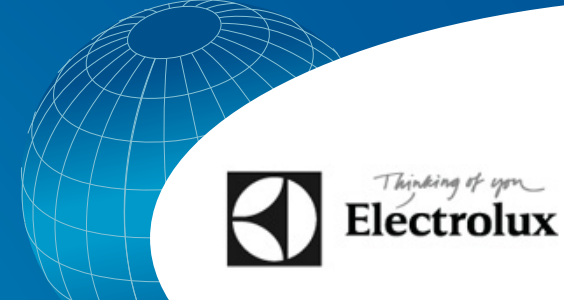


Above 1 M units there is limited leverage on fixed cost

\* Trend line is polynomial 4th grade

# Ideal Plant Size

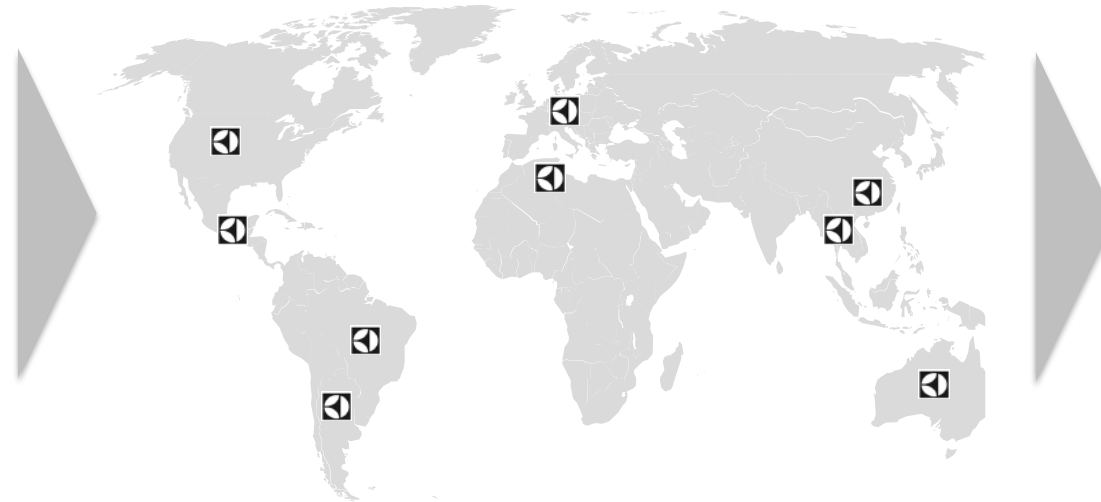
## Min and Max Scale Points



# Electrolux Strategic Manufacturing Levers



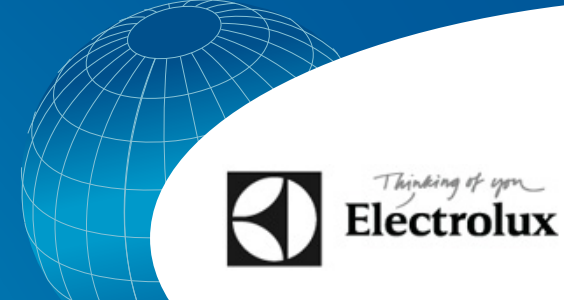
**Electrolux Strategic  
Manufacturing Levers**



**Responsiveness  
Landed Cost  
Access to Resources  
Attack Growth Areas  
Agility  
Innovation**

**How do we apply and combine network  
levers in order to maximize Electrolux  
network capabilities?**

# Global Integrated Manufacturing Strategy



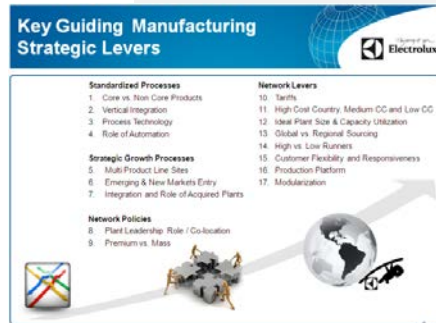
2011

2012

2013

2014

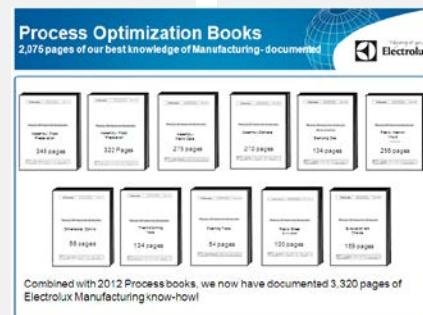
Global Manufacturing Strategy



Global Manufacturing Scenario by PL

Core Mfg Process Optimization Books x9

Core Mfg Process Optimization Books x20



Food Preparation Summary of Scenarios (2012 volumes)

to MSEK	Scenario 1	Scenario 2	Scenario 3
Labour cost saving	262	209	111
Transport cost penalty	-53	-54	-33
Fixed cost saving*	321	265	158
<b>Total</b>	<b>530</b>	<b>474</b>	<b>231</b>
Closure cost	2337	2076	1500
Capex for transfer**	700	600	700
<b>Pay-back time</b>	<b>5,7</b>	<b>5,6</b>	<b>9,6</b>

„Market to Plant Floor“ – Integrated Global Manufacturing Footprint Strategy by Product Line

# Footprint Evolution

2004 – 2015



## 2004

**Share of LCC Capacity**

22%

- ✓ 8.1 BSEK Restructuring
- ✓ 2.5 BSEK Annual Savings
- ✓ 10 closures
- ✓ 6 factories downsized

**Capacity Utilization**

76%

- ✓ 8 new factories
- ✓ 1 acquired factory

## 2010

45%

- ✓ 3.8 BSEK Restructuring
- ✓ 1.2 BSEK Annual Savings
- ✓ 7 closures
- ✓ 4 factories reengineered

60%

- ✓ 3 new factories
- ✓ 9 acquired factories

## 2015 +

64%

76%

**42% LCC Increase and 25% Variable Cost Reduction**



# Steps to Global Optimization



**FOOTPRINT**

**DIGITIZATION**

**AUTOMATION**

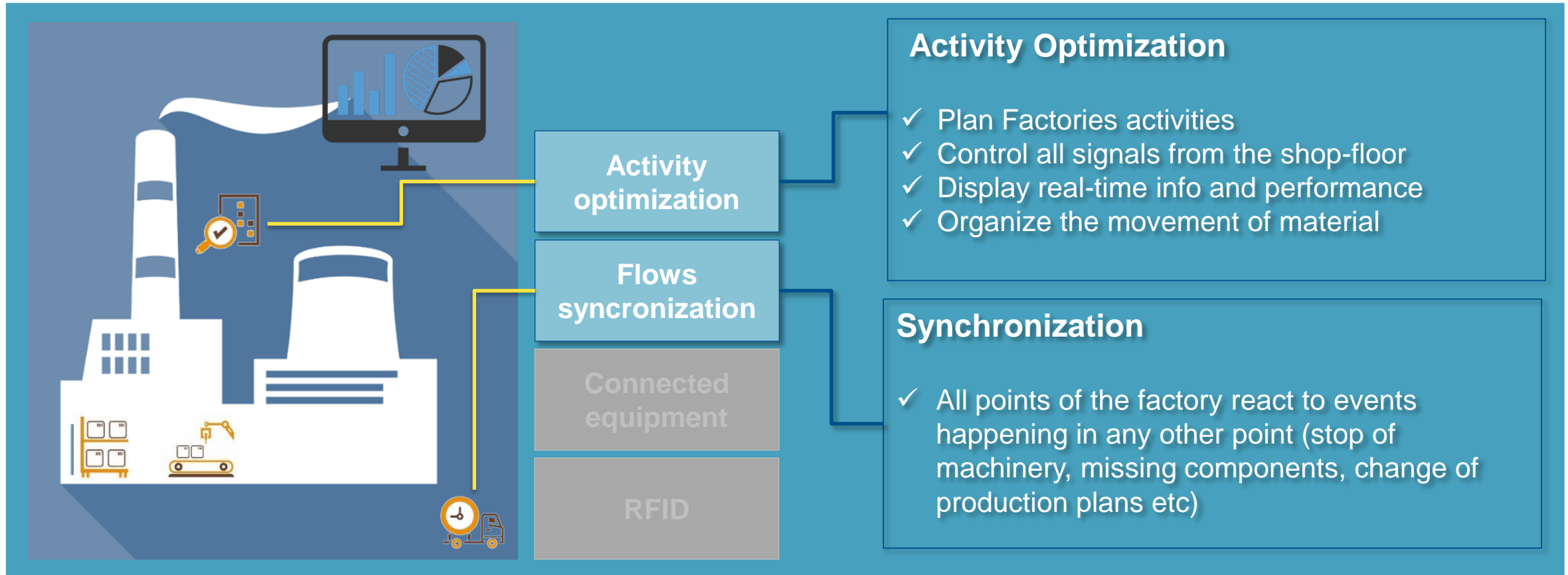
# Industrialization – Factory Model



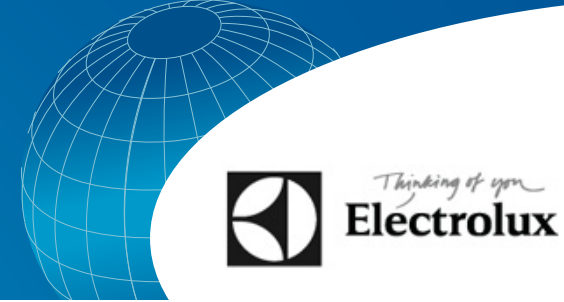
- Global specification
- Standard equipment
- Connected to MES
- Usage of RFID
- High automation degree
- Collaborative robots
- Digital Twin
- Standard sub modules
- Standard factory organization

# What are the DOME building blocks?

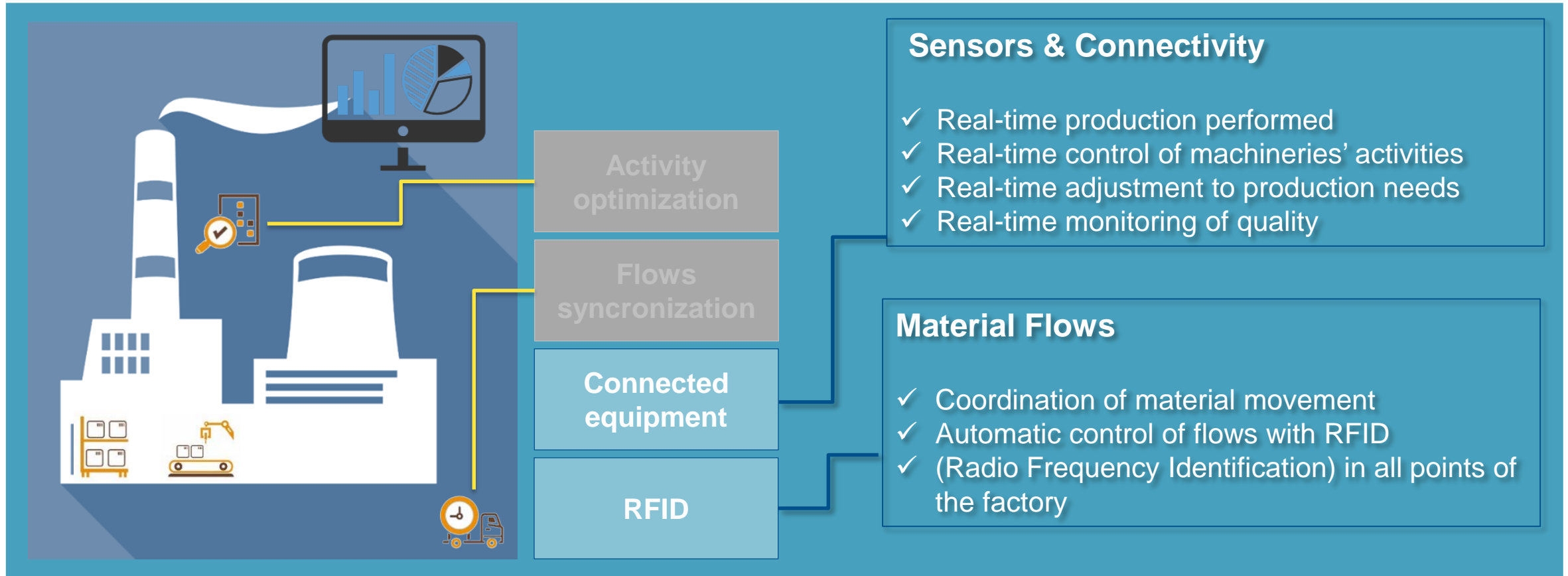
## Manufacturing Execution System



# What are the DOME building blocks?





## Manufacturing Execution System





# Range of Capabilities of the DOME Project




- 

1 Keep control and synchronize all operations and machineries within the Factory
- 

2 Provide real time status of all activities in production (what has been produced) and of machinery (performance, break-down, maintenance, etc.)
- 

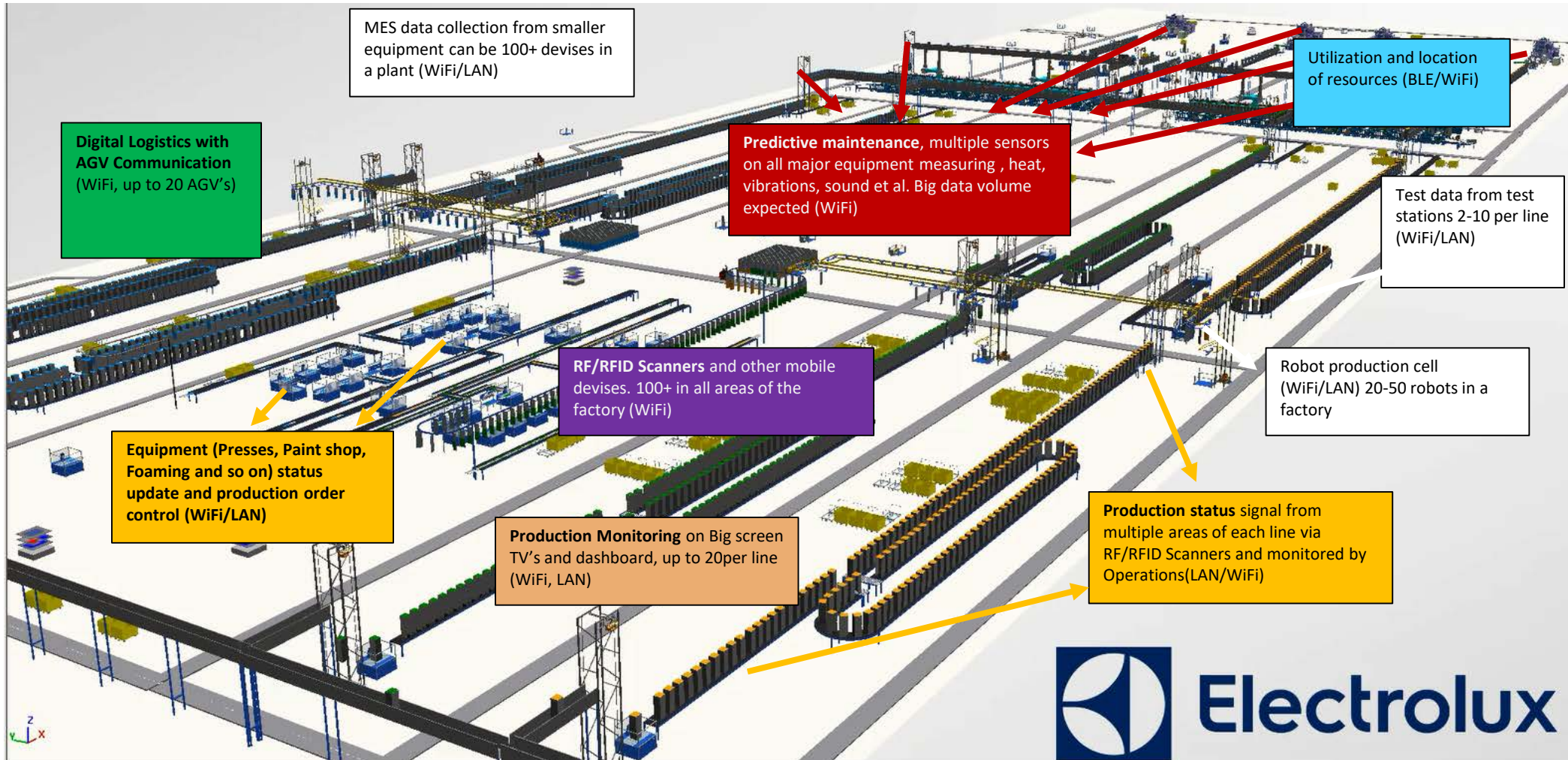
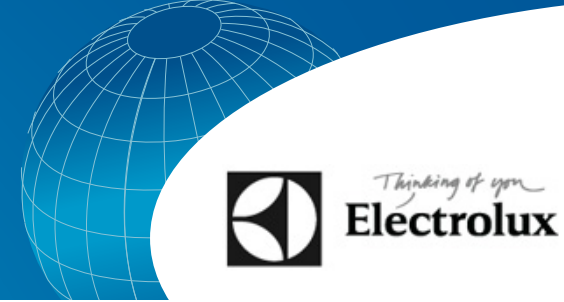
3 Manage and synchronize all material movement and stock within the factory (intra-logistics)
- 

4 Reduce manual activities to control material and products movements and stock (Bar-code scanners, RFID, etc.)
- 

5 Operational Console for real time KPIs and status monitoring (also on mobile devices)



# Anderson Factory Digitization





# Steps to Global Optimization

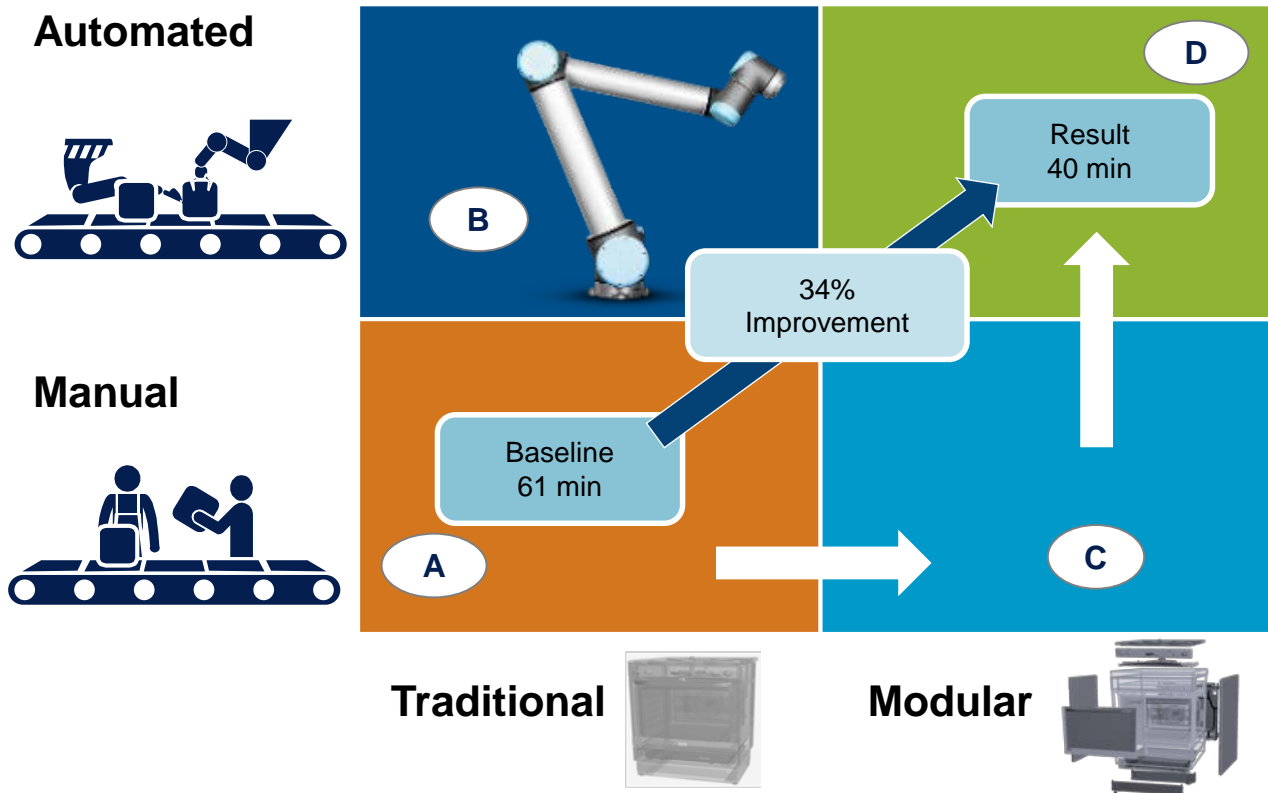
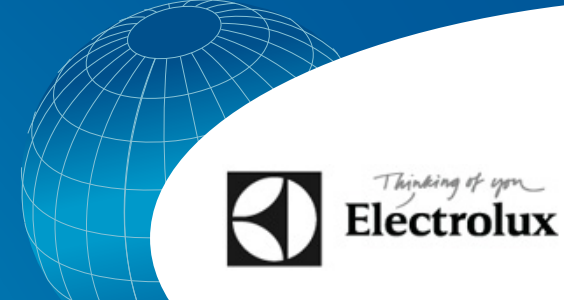


**FOOTPRINT**

**DIGITIZATION**

**AUTOMATION**

# Anderson Industrialization – Modularization and Automation



## MODULARIZATION OF PRODUCT

- Global Product Architecture
- DFAA For Each Module And Subsystem
- 20% Automation Degree Increase (14% to 34%)
- Labor Content Reduced By 30%
- Bronco is Designed For Automation

# Anderson Automation: 106 Robots Installed



Thinking of you  
**Electrolux**



# Global Optimization: Final Results



*Our Vision*

We will be the *'best'* appliance company in the world

Driven by...



**Profitable  
growth**

**-25%**

Cost/Unit



**Innovation**

**-26%**

SCR



**Operational  
excellence**

**-41%**

Energy/Unit



**People**

**-66%**

TCIR