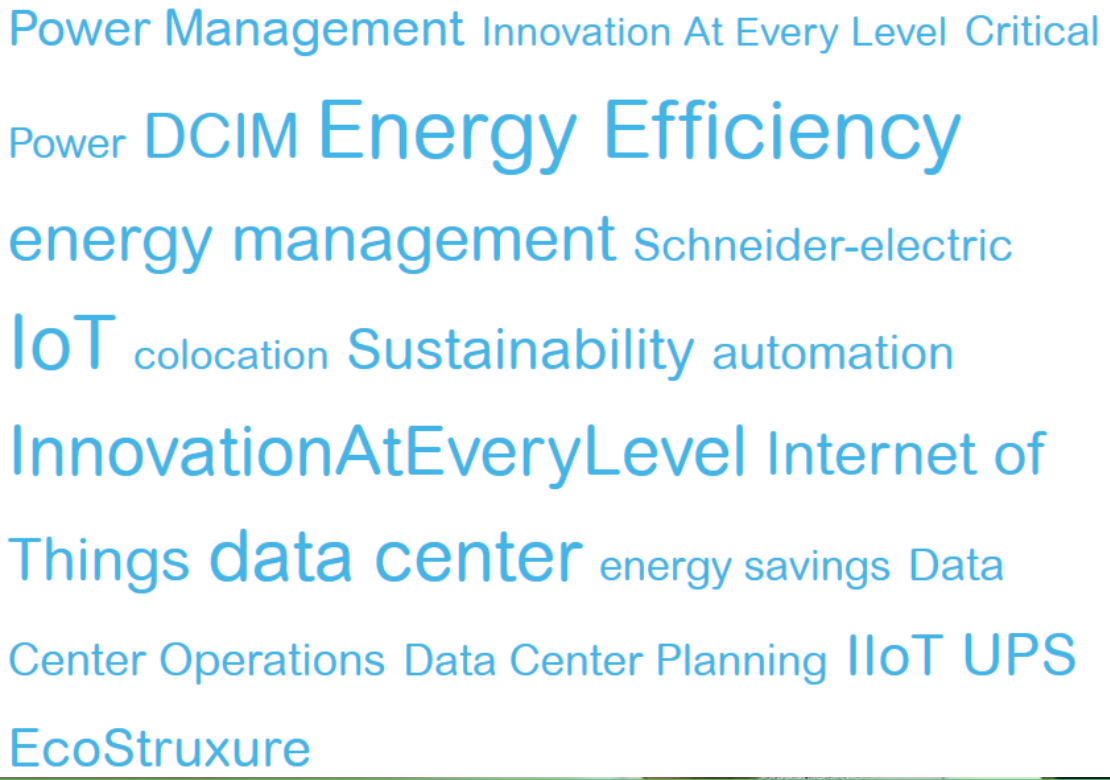


Schneider Electric

E79

Number of employees: 155,286 (2018)
Revenue: €25.72 billion (2018)
Headquarters: Rueil-Malmaison, France
Industry: Electrical equipment

Presented by: Rene Meuleman
October 2019

Industry 4.0

6TH glasspex GLASS PRODUCTION TECHNOLOGIES & PROCESSES INDIA
10-12 OCTOBER 2019

a pragmatic approach

Confidential Property of Schneider Electric

Life Is On Eurotherm by Schneider Electric

Data…..?

In God we trust. All others must bring data

It is a capital mistake to theorize before one has data

The goal is to turn data into information, and information into insight

Without big data analytics, companies are blind and deaf, wandering out onto the web like deer on a freeway

W. Edwards Deming

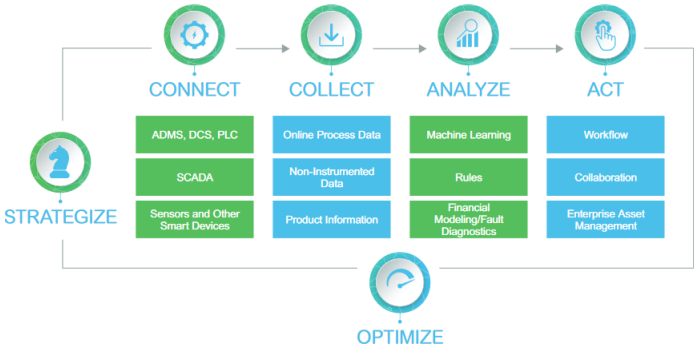
Sherlock Holmes

Carly Fiorina

Geoffrey Moore

Life Is On Eurotherm by Schneider Electric

Predictive Asset Analytics



EcoStruxure™ Facility Expert

IoT-cloud software to deliver operational and energy efficiency while ensuring business continuity . Based on latest technology mergi...

EcoStruxure Power Monitoring Expert

Purpose-built to keep your power reliable and efficient. Award-winning EcoStruxure Power Monitoring...

Eurotherm
by Schneider Electric

Industry 4.0: According to Wikipedia

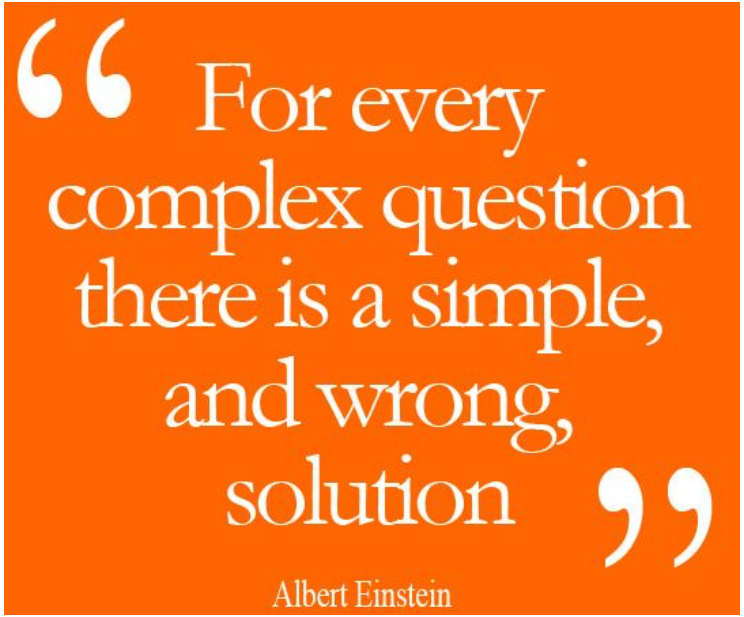
Industry 4.0 is a name for the current trend of automation and data exchange in manufacturing technologies. It includes **cyber-physical systems**, the **Internet of things**, **cloud computing** and **cognitive computing**.

Life Is On
Eurotherm
by Schneider Electric

Let’s do a bit of “simplifying”

The Glass industry:

- **Glass making is a tough job**
- Doesn’t like storing data in the cloud
- Runs furnaces 24/7 for +15 years
- Is partly a commodity industry
- Sometimes has low margins
- **Now needs to convert towards CO_2 free manufacturing**



Life Is On
Eurotherm
by Schneider Electric

Talking about recent innovations?

- Regenerative furnace: 1867
- Pilkington float process: 1957
- Narrow Neck Press and Blow: 1987
- Gorilla glass: 1960

All electric glass melting 2020

- **Hybrid furnaces**
- **Hydrogen firing**
- **Recycling**
- **Alternative raw materials**

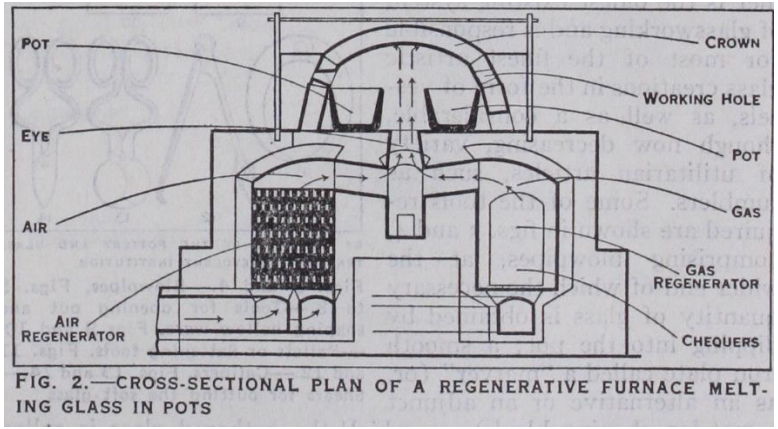


FIG. 2.—CROSS-SECTIONAL PLAN OF A REGENERATIVE FURNACE MELTING GLASS IN POTS

Life Is On
Eurotherm
by Schneider Electric

Step 1: Data Collection

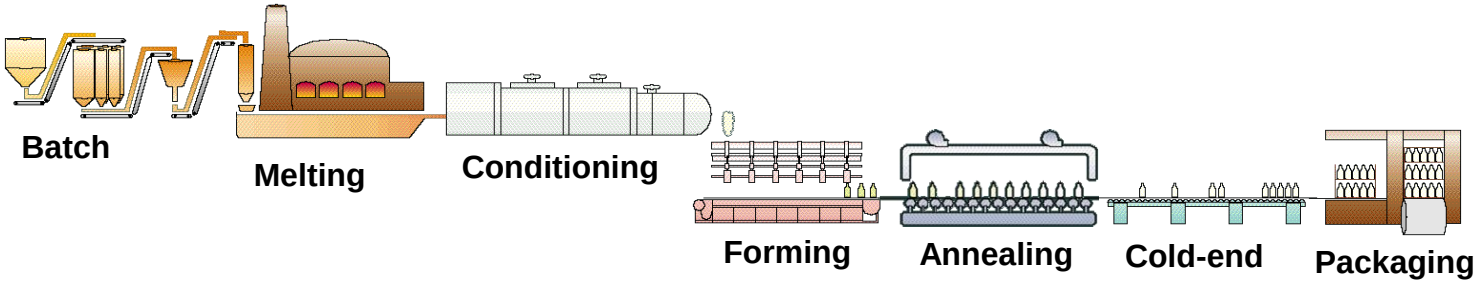
- Enterprise Wide
- From Raw Materials to Warehouse
- All Data Formats
- Real Time
- Sufficient Resolution
- From All Kind of Data Sources
- Automatic and Manual Inputs
- One Virtual Data Space
- Unlimited Storage Capacity

Wonderware
Historian

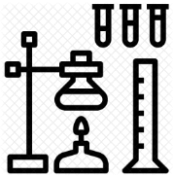
The Owner should set the database standards - not the equipment suppliers

Life Is On
Eurotherm
by Schneider Electric

Data Collection



TIME SYNCHRONISATION



Laboratory

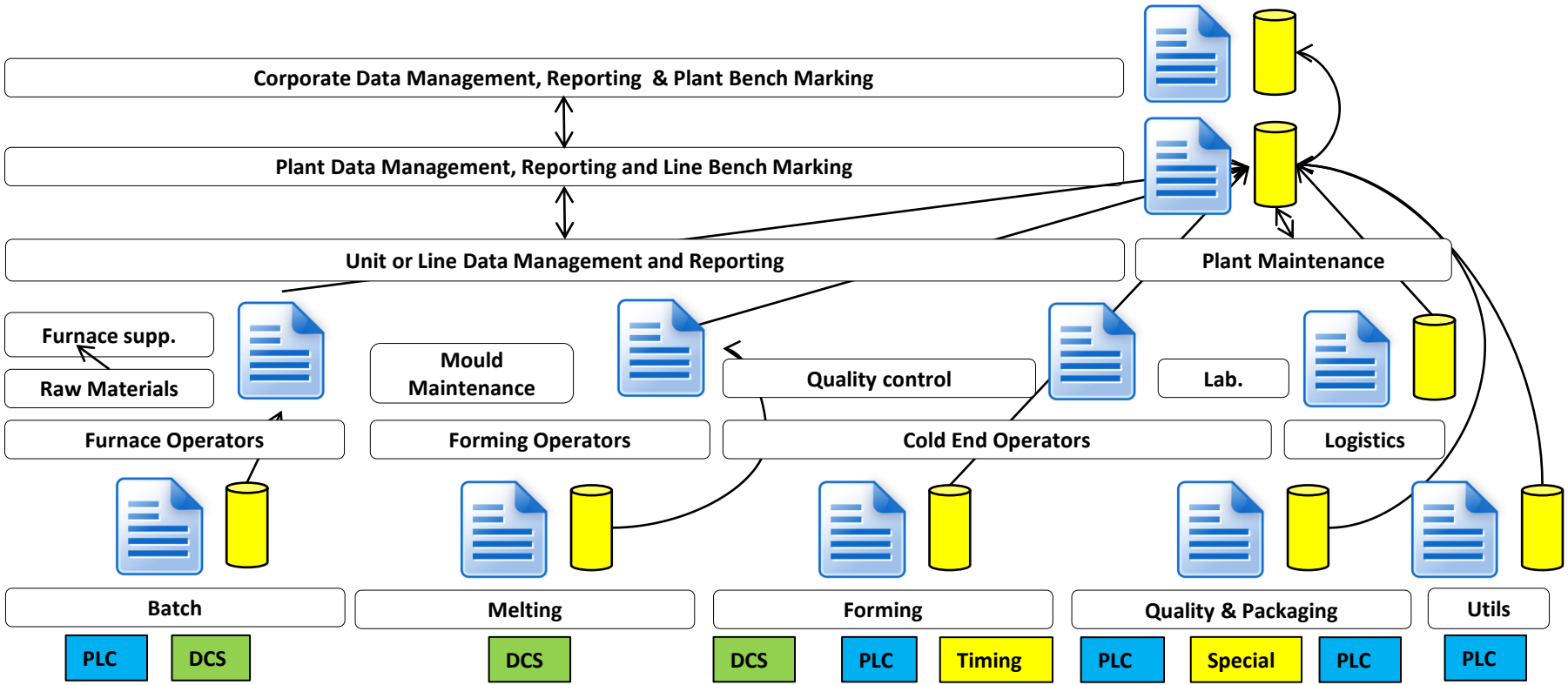
Customer

Environment

Different Users

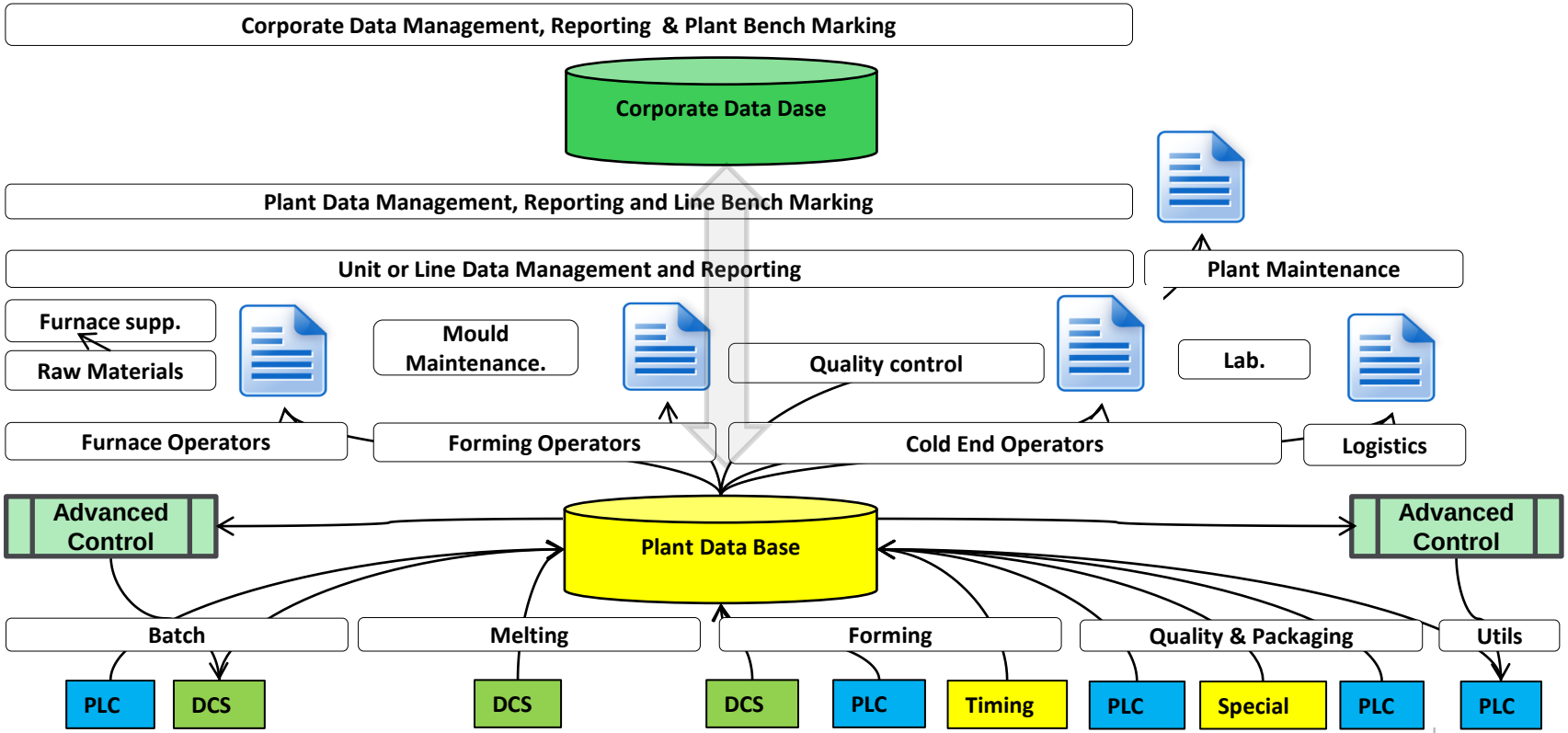
Life Is On
Eurotherm
by Schneider Electric

How Plant Data is Managed Today



Life Is On
Eurotherm
by Schneider Electric

How Data Should be Managed



Life Is On
Eurotherm
by Schneider Electric

Step 2: What's in a Name?

Enterprise Wide Naming Conventions

- Time Synchronized
- Covering All Data Types
  - Batch Data
  - Continuous Process Data
  - Digital Data
  - Images
  - External Data – Smart Grid
  - Environmental Data
- Easy to Recognize
- Easy to Learn
- Easy to Manage
- ONE SIZE FITS ALL

Life Is On Eurotherm by Schneider Electric

Examples

FOV1TONX	P.VAL/SUM/7401/AA/1	Pull Rate Furnace 1 PV	tons/day
FOV1GAW	P.VAL/R/0021/AA/1	Flow Gas Furnace 1 SP	Nm3
FOV1GAX	P.VAL/R/0021/EA/12	Flow Gas Furnace 1 PV	Nm3
FOV1LUW	P.VAL/R/0011/AA/1	Flow Air Furnace 1 SP	Nm3
FOV1LUX	P.VAL/R/0011/EA/12	Flow Air Furnace 1 PV	Nm3
ZOV1W	P.VAL/OVN/1/AA/5	Gas/Air Ratio Furnace 1 SP	
QOV1O2X	P.VAL/M/3004/EA/2	Percentage O2 Furnace 1 PV	%
QOV1O2LX	P.VAL/OXY/2/AA/2	Percentage O2 Furnace 1 L PV	%
TOV1O2LX	P.VAL/OXY/2/EA/11	Temp. O2 Sensor Furnace 1 L PV	grdc
QOV1O2RX	P.VAL/OXY/1/AA/2	Percentage O2 Furnace 1 R PV	%

MST_FRN01CRW_TPPV	Furnace 1, crown temperature, measure
GRC_FRH51ALC_HTN_MU_TPSPHI	Forehearth 51, alcove heating, Temperature Set Point High Limit for Middle Upper thermocouple
GRC_FRH51ALC_CLN_MM_TPPV	Forehearth 51, alcove heating, Temperature Measure for Middle Middle thermocouple
MST_FRN01GAS_FLSP	Furnace 1, Gas flow setpoint
MST_FRN02NOX_WGCX	Furnace 2, NOx weight emission (calculated)
MST_LIN11PTM_EFCX	Line 11, Pack to melt, calculated performance indicator
MST_FRN03NOX_KNT_PMMI	Kentall value for furnace 3 (parameter for Nox calculation, Manual input)
MST_MCH23MCW_PSPV	Machine 23, Pressure of machine cooling wind,
RDF_MCH24ATM_TPPV	Atmospheric temperature relative to machine 24
MST_CMP10_IN01_PSPV	Compressor 10, Pressure measure for indicator 1

Life Is On
Eurotherm
by Schneider Electric

Getting the Speed, Resolution, Capacity and Data-Set Right

- Different types of data need to be managed
- Different resolutions
- Different sample rates
- Different events
- Manual data input
- Third party data (raw materials, energy, grid, weather info)
- Different time scales

- **Data needs to be open for all users**

Life Is On

Eurotherm
by Schneider Electric

Different Users, Different Demands

Production

Management

Quality

Maintenance

Suppliers

Customers

Life Is On Eurotherm by Schneider Electric

Why Analytics are Important

The Glass Melting Process will Change Dramatically

- Fossil fuel compositions are changing (Hydrogen content)
- Fossil fuel compositions are becoming less stable

Transition from Fossil Fuels Towards All-Electric with Intermediary Steps

- Experienced workforce not available
- Youngsters will use data-driven approaches

Utilities Would Like to be in Control of Power

- More renewable energy on the grid will cause grid instabilities that need to be predicted
- Centralized power generation will become de-centralized power generation

Smart Grid Compatibility

Glass Quality

- Predicting freedom of control without glass impacting glass quality will generate revenues

Melting Efficiency

Life Is On Eurotherm by Schneider Electric

Separate Right from Wrong

What we have:

- Huge amounts of data
- Different formats
- Time shifts
- Smart analytic tools
- Little or no understanding

What we need:

- Desired result
- Process Knowledge
- Open Mind

What we get:

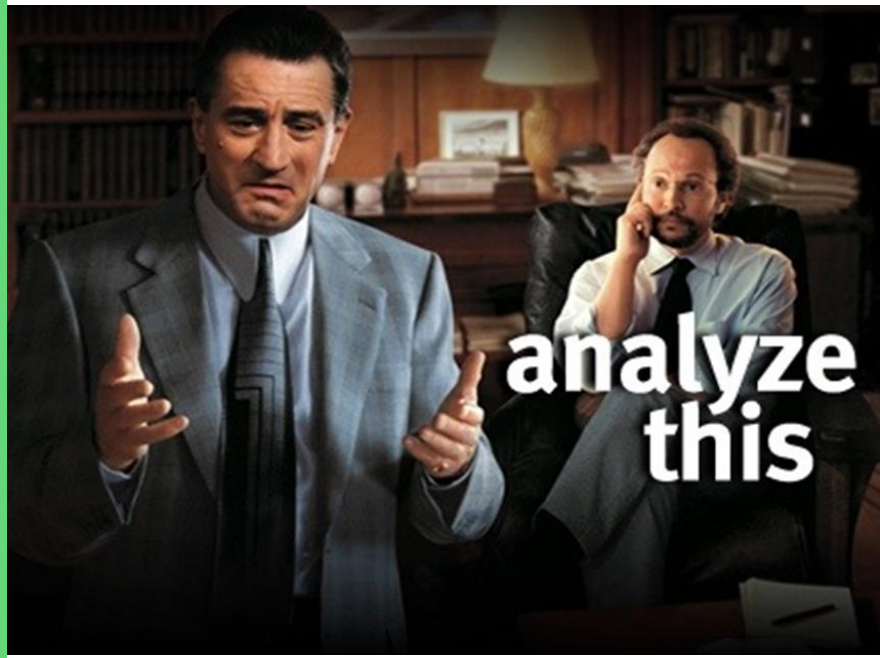
- Correlations
- Models
- New insights
- Improved process

Life Is On

Eurotherm by Schneider Electric

Example: Furnace Energy Household will become more Complex

- Conversion from fossil fuel towards all-electric
- Hydrogen?
- Bio-fuels?
- Increased boosting capacity
- Smart grid management
- Natural gas composition fluctuation
- Fossil / electrical energy ratio control



Life Is On
Eurotherm
by Schneider Electric

First get the Fundamentals Right

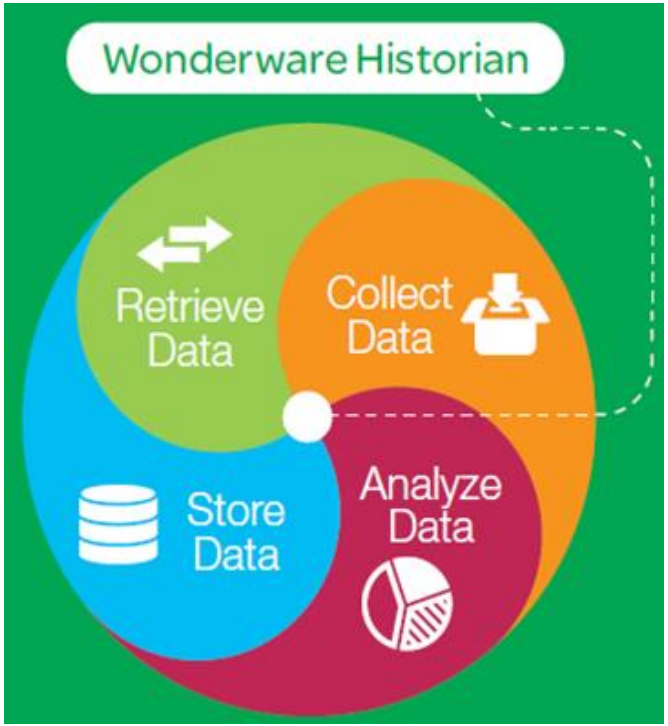
- It eases current challenges for glass makers
- It leads to an innovation economy
- It puts the consumer in the center of all activities
- It even puts humans into the center of production
- It will enable sustainable prosperity

Life Is On
Eurotherm
by Schneider Electric

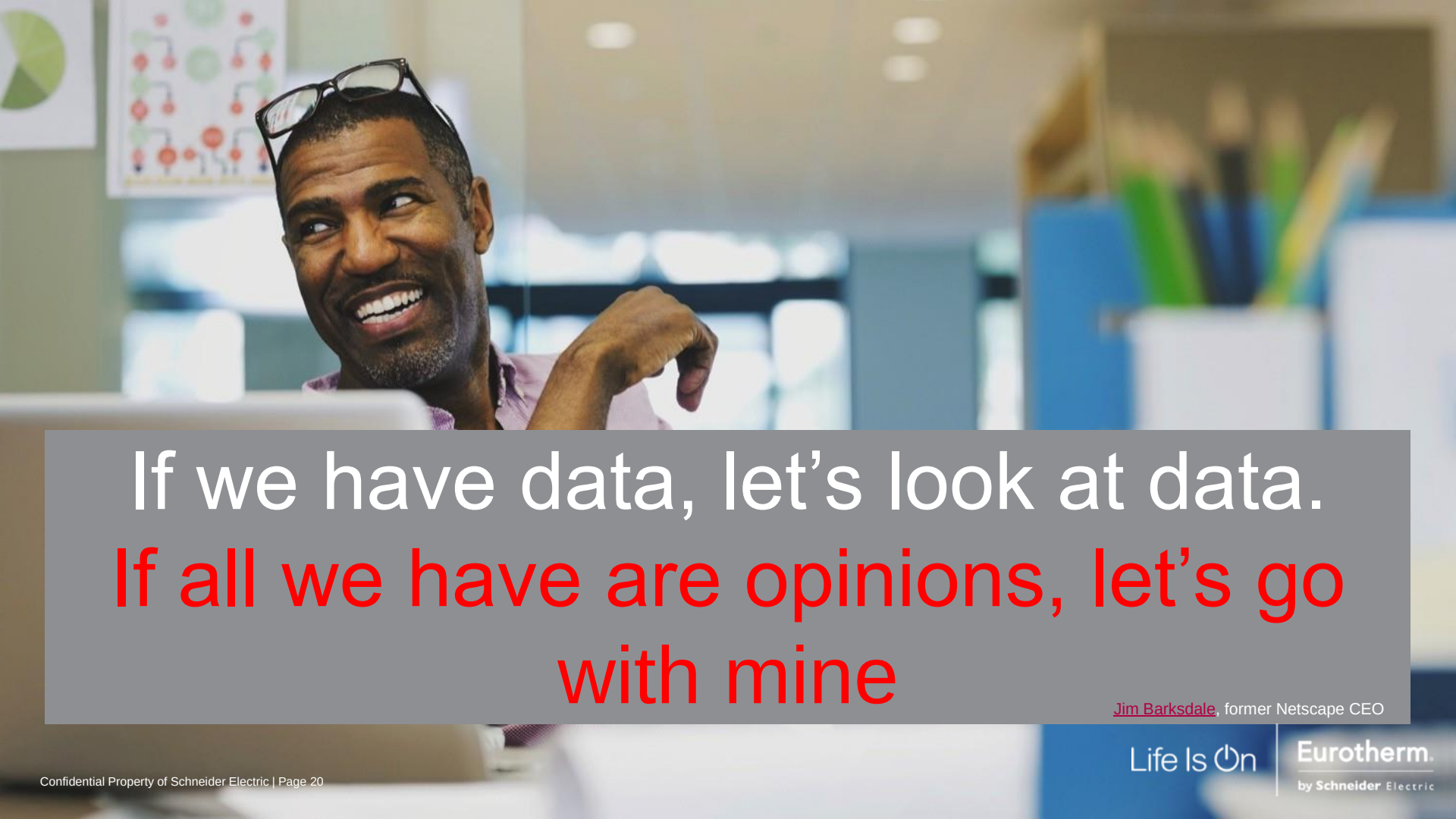
Conclusions

- You are the owner of data not your supplier
- Get the data right
- Store it in one virtual space
- Choose an understandable naming convention
- Open it up to all
- Take it from there

- Better understanding of our processes
- Improved quality and throughput
- Helps adapt our process to the outside world
- Increases flexibility
- Increases attractiveness to new employees
- More energy effective and reduces carbon footprint



Life Is On
Eurotherm
by Schneider Electric



If we have data, let’s look at data.

If all we have are opinions, let’s go with mine

Jim Barksdale, former Netscape CEO

Life Is On Eurotherm by Schneider Electric

Life Is On | Eurotherm by Schneider Electric