

#### **Smarter than Smart**

#### The DATA CONNECTION in Smart Grids





Jeroen Scheer 5 October 2012

#### **Setting the Scene**

#### Energy Transition: Multi-level revolution

#### Customer Centric Interactive Grid Management

#### **Hurdles to Overcome**

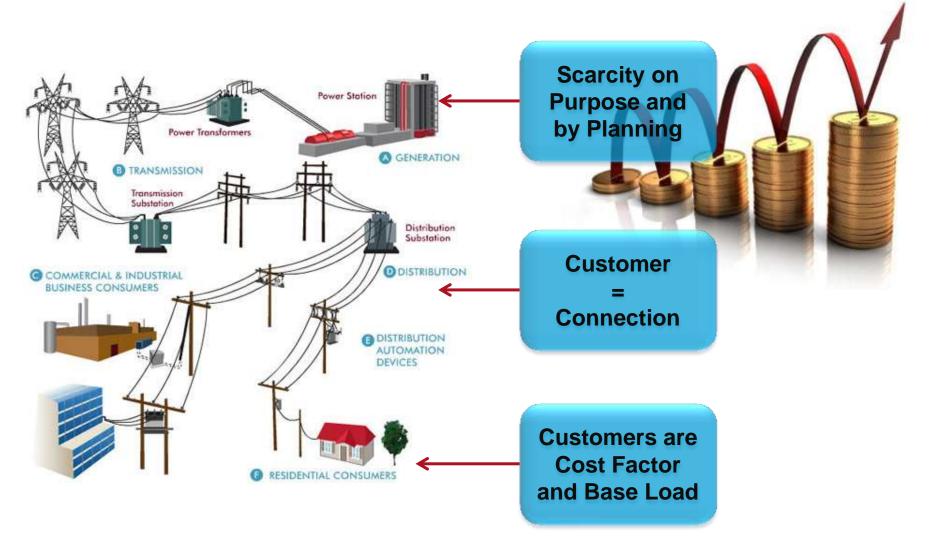
#### **The Data Connection**



Conclusions

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#### Our Current Energy Business Model is based on <u>Planned Scarcity</u>



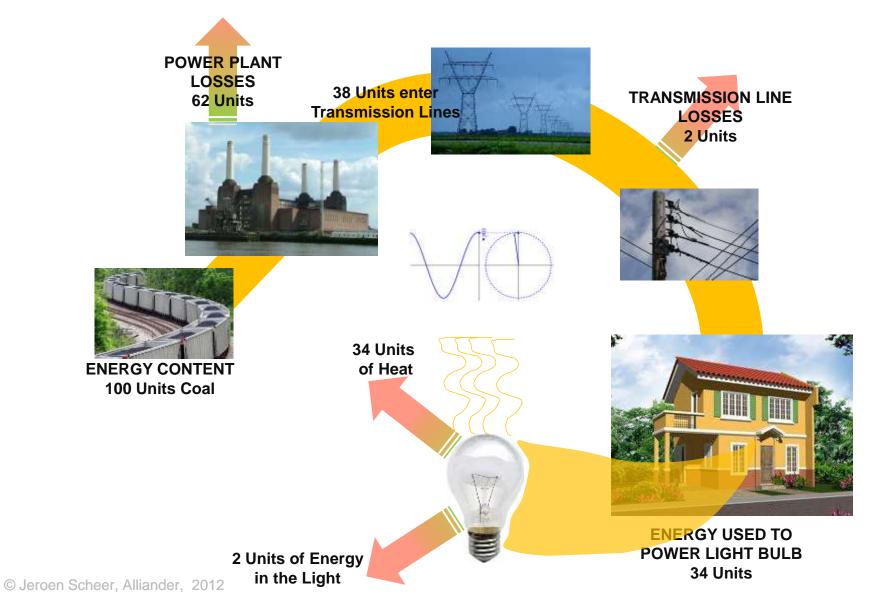






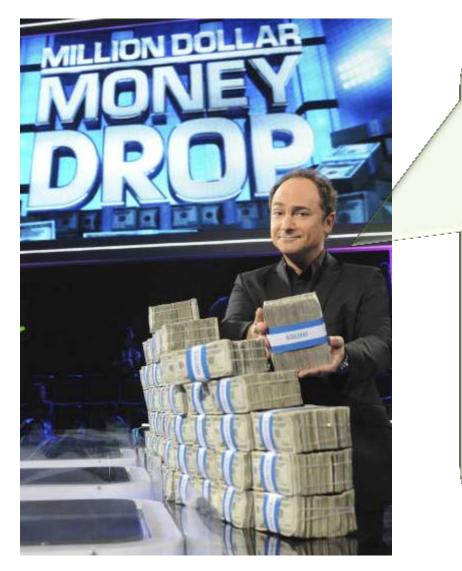
#### Bleeding at the Speed of Light Energy losses in Powering a Light Bulb











It is not a question IF the Energy Transition will take place

Nor is it a question WHEN the Energy Transition will take place

The question is HOW we can make it happen,

and how WE can THRIVE (on) it





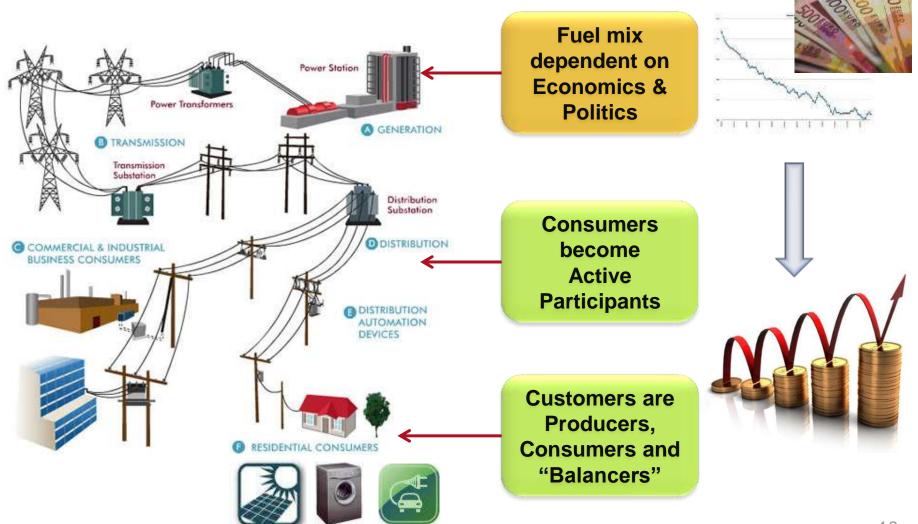


#### ... towards TIDES in Energy



## The NEW energy business model is based on <u>Sustainable Balance</u>





#### **Setting the Scene**

#### Customer Centric Interactive Grid Management

#### Hurdles to Overcome

#### **The Data Connection**



Conclusions

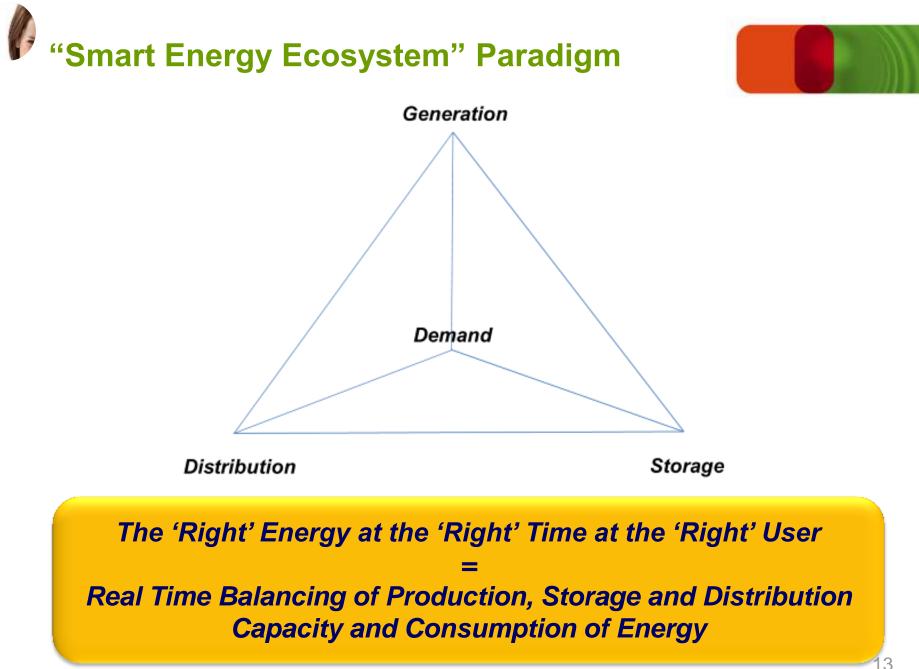
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#### We have a dream...







#### WHEN IT COMES TO SMART GRID WE NEED TO SEE THE FOREST, NOT JUST THE TREES

## Vision to connect Customers (*Prosumers*) to Energy via Information-intensive Network

#### The DSO's new grid world

1. Electricity

Gas

2

New sensors / distributed computing on **Smart Meters and** Data **Transmission and Distribution Lines** HAN help users to alarm operators, resolve problems, deploy energy integrate large scale renewable more wisely, generation mitigate peak demand and integrate local generation Transmission Generation Distribution **Users / Customers** 15

#### **Setting the Scene**

#### Hurdles to Overcome

#### **The Data Connection**



Conclusions

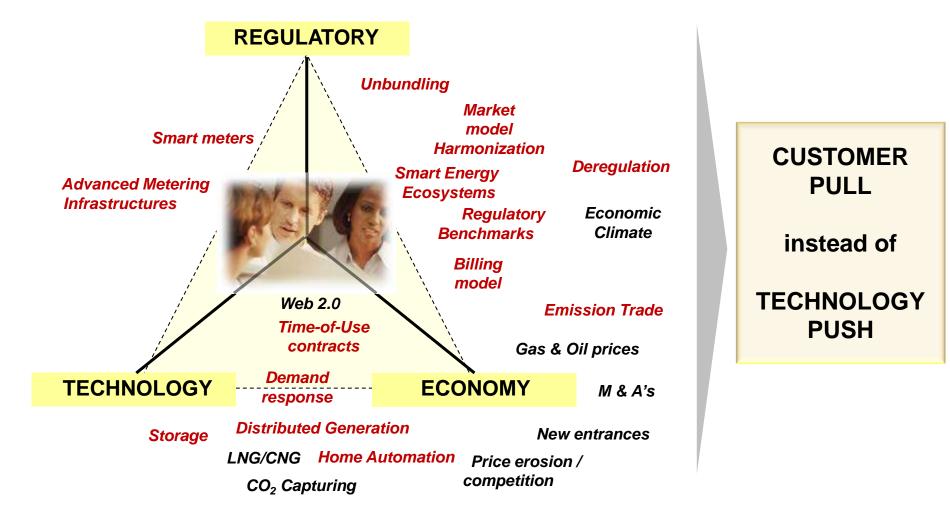
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#### **Turmoil: our Environment** Towards a Smart(er) Future





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Business Model Power Matching Customer Centricity



Technology Advancement Technology Adoption Standardization

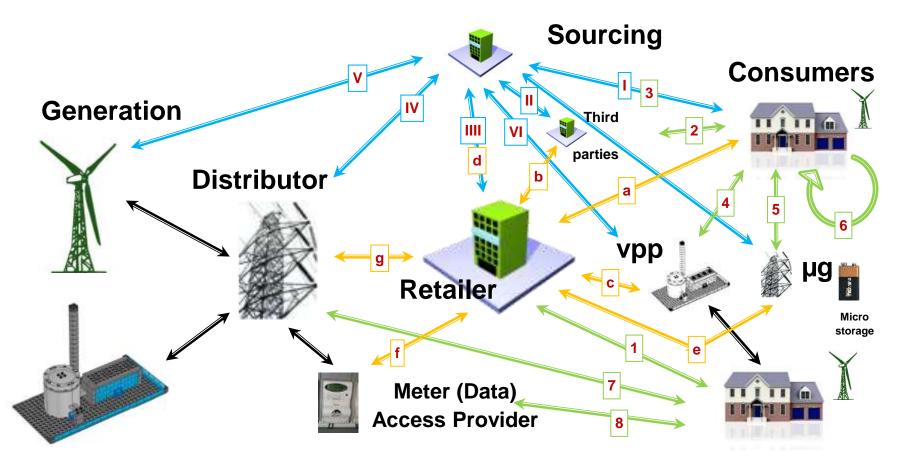


Market Model Stress Tax Stress Mind shift Need



#### Forest and Trees Smart Energy Ecosystem Stakeholders







#### **Challenges for grid company**

Need to consume less energy

Monitor and steer complex energy flows

Need for energy storage

Enhanced security of supply





From large scale centralized to micro generation

Intermittent and unpredictable production: back up needed

Local balancing demand and supply of energy

Billing two way value stream

#### **Setting the Scene**

#### **The Data Connection**

Hurdles to Overcom



Conclusions

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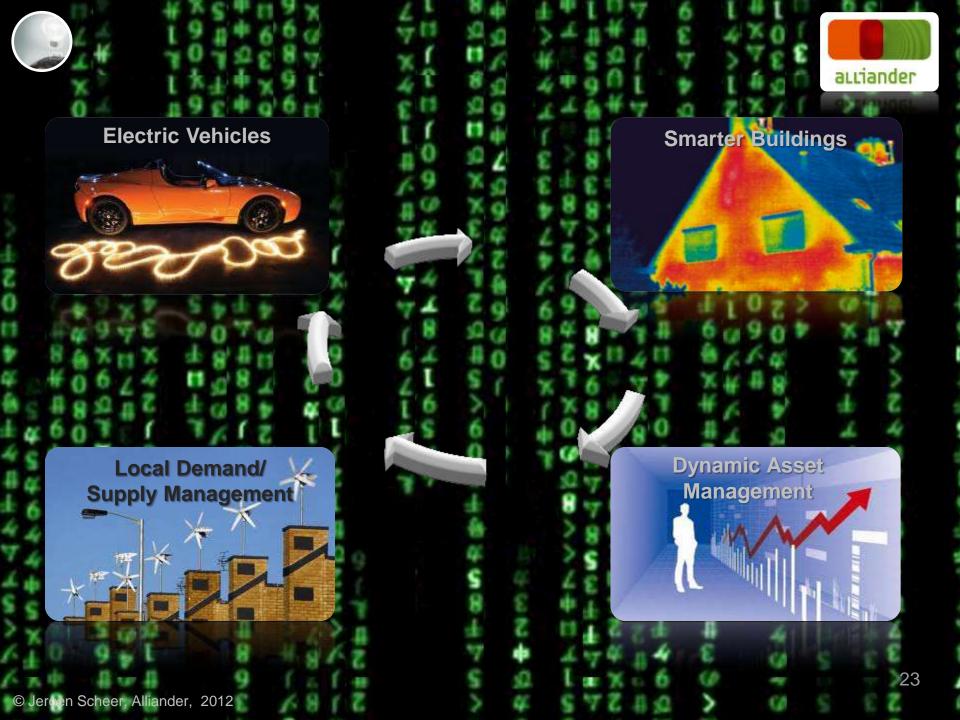
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#### Why are Pilots being paid so much salary?



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## **Energy = Information**

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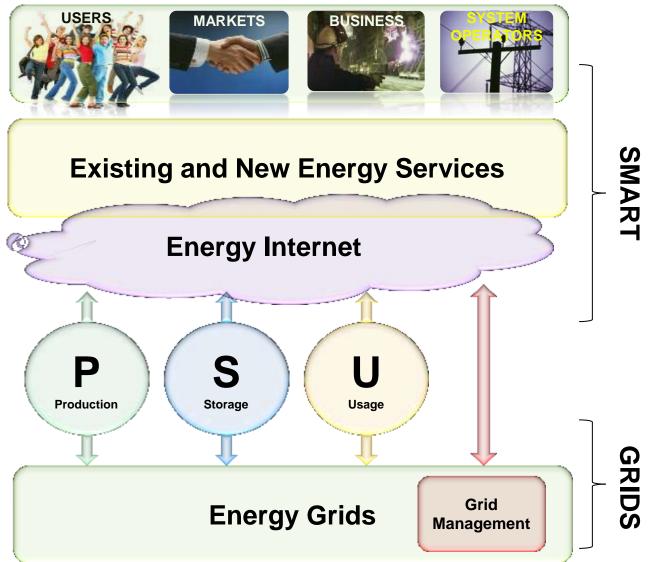
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#### This leads to Smart Energy Ecosystem





#### IOT Strategy Combining several Worlds into One

TRANS-ACTIONAL WORLD (Customers, Workforce)

ANALYTICAL & BUSINESS DECISION SUPPORT WORLD

REAL TIME WORLD (Energy, Grid Status) STATIC WORLD (Geo, Assets)



# REALITY CHECK AHEAD

# So, let's get to the Real World

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## Many questions on the deployment and potential advantages of a smart grid



0,4kV

### het digitale net

Het digitale E-net bestaat uit d

- Gedigitaliseerde bedrijfsvo houdt het net 24 uur per dag in de ge elektronische systemen en schermen Project Liander DMS
- Intelligent onderstation Intelligent gemaakt door computeren sensortechnologie (SASensor). Project SA Llander
- Intelligente middenspanning Intelligent gemaakt do computer- en sens orte Project i-Net
- Flexibele ring netstructuren waarop tweerichtin mogelijk is. Project i-Net
  - Slimme meter in de woningen geeft inzient in het energieverbruik. Project uitroi slimme meter

How should maintenance of the smart grid be organized ?

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Which instrumentation is required in the medium voltage stations ?

Which data can be provided and what is the reliability of this data ?

be at of What is the value of data for fraud detection, power quality, failure

location detection, etc. ?

380 / 150k / 20 What are the a distribution control center ? ( Which security and privacy measures are required and feasible ?

Alliander bouwt aan het digitale E-net. Enerzijds zorgt dit net voor betere besturing en beheer. Anderzijds heeft het nieuwe net voordelen voor de klant, zoals minder en kortere stroomstoringen en verbeterde mogelijkheid

> Slimme meter

How can a smart grid support the energy transition ?

Bedrijfsvoeringcentrum

tot teruglevering aan het net.

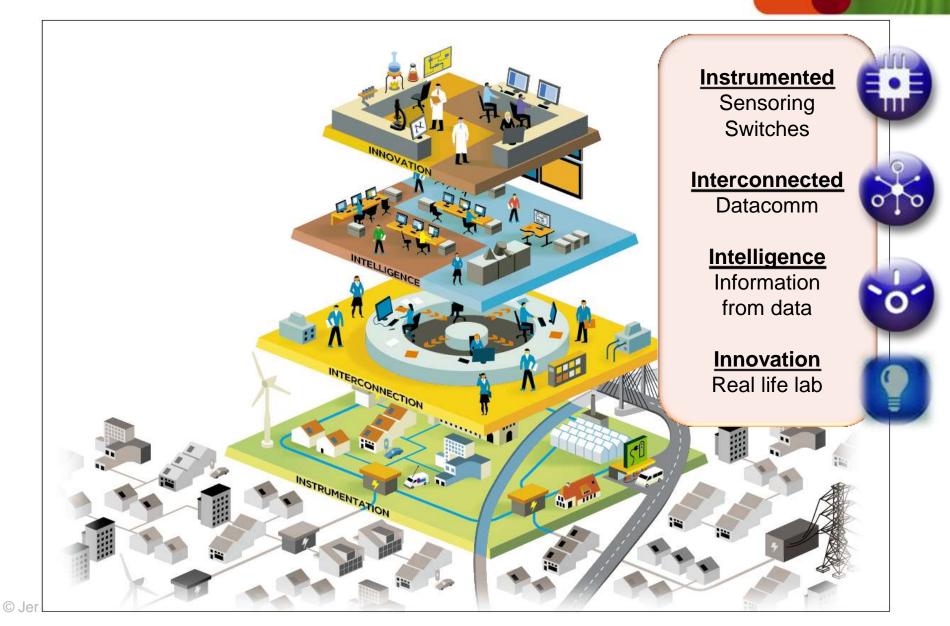
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#### Large variety of MV stations Resulting in a lot of (practical) challenges











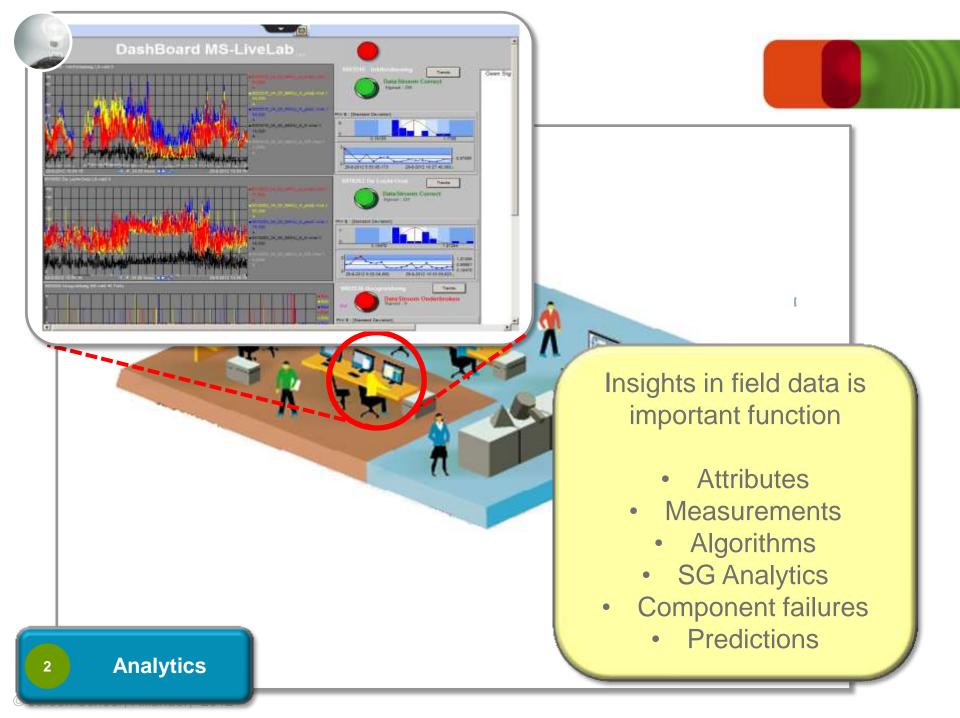
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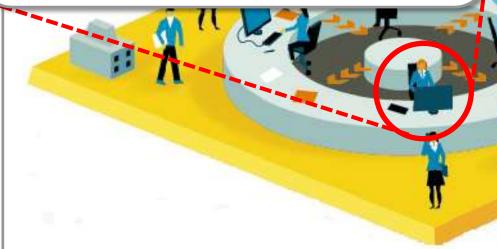
### Innovation is the Key driver

We want to gain knowledge on:

- grid behaviour
- customer behaviour, interaction between components
  - asset life cycle analysis
    - costs
    - benefits



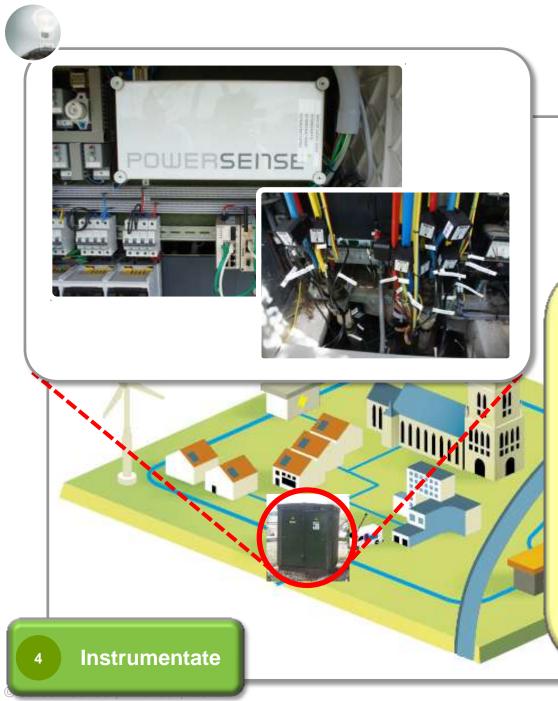




Learning how to communicate with all components in field, to collect, store, validate and distribute data

Status grid:

- Real time
- Near Real time
  - Offline



Placing sensors in field from many suppliers for comparison reasons. Basically starting in Zaltbommel, but easily extended to other regions



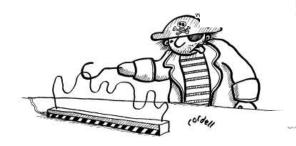




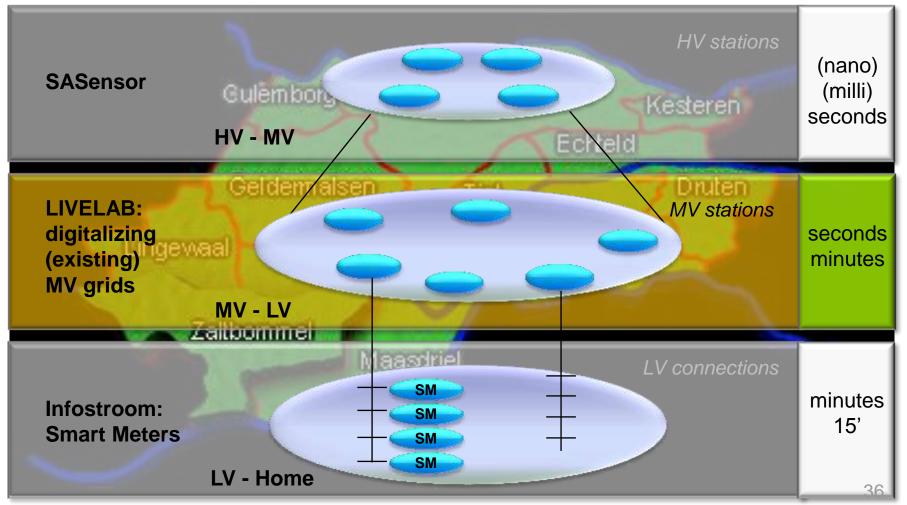


- End2End chain MV-LV
- In Real Life grid with:
  - Electrical Vehicles
  - Decentral Generation
    - Homes
    - SME (Greenhouse industry)
  - Entire residential area





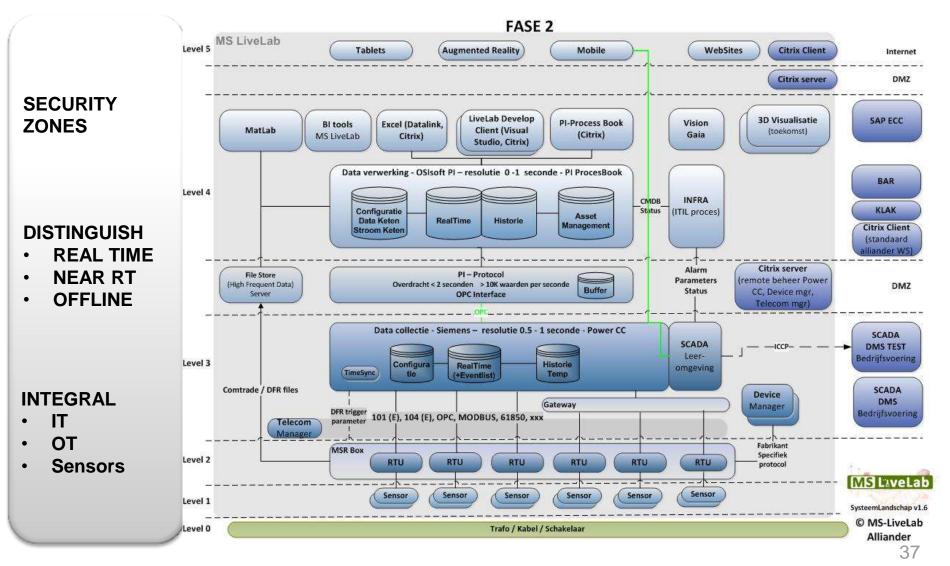




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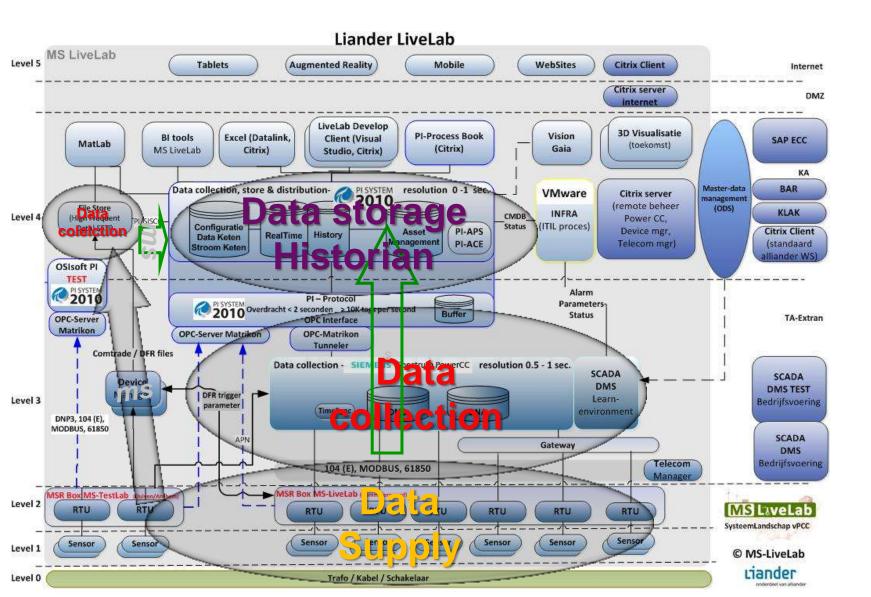




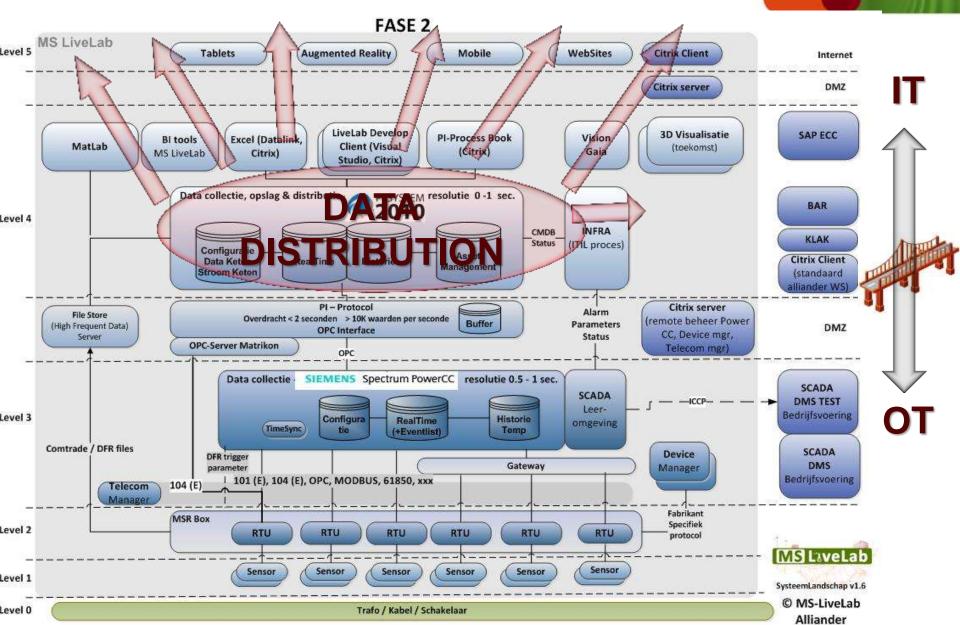








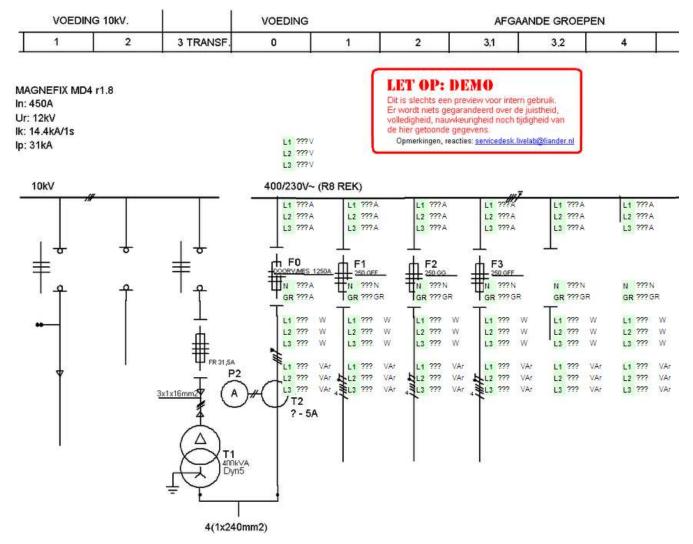








#### Actuele meetwaarden MSR De Lucht Oost



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## Our Signal list Per MV Substation 450 signals, 40,000 MV Stations

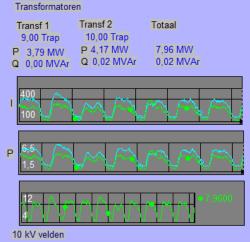
- Originally in Oracle RDBMS
- More than <u>13,000,000,000 values</u>, representing nearly 15 years of history
- From hours of query to seconds

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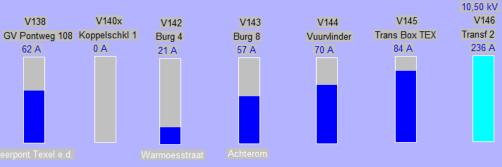






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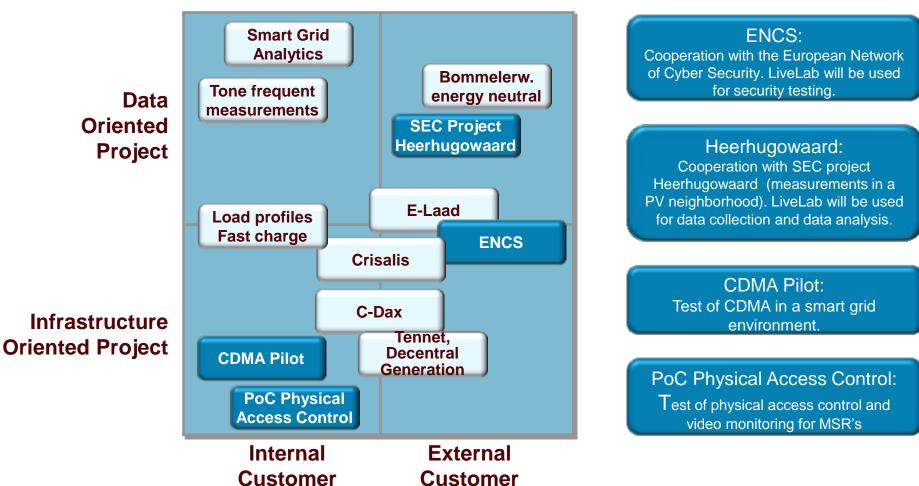
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#### Selection of Livelab Projects



## **Setting the Scene**



Energy Transition

Hurdles to Overcom

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fund the Property

WWWWWWWW



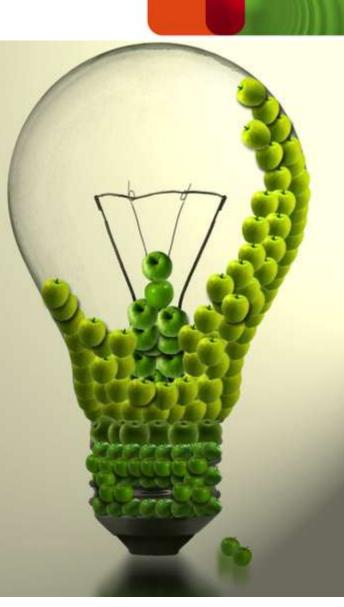
#### **Energy Transition means**

## SUFFICIENT SUSTAINABLE ENERGY

## which means that Energy will still be a

## COMMODITY

and not a High Interest Product...





## .... and that

## **changes**

## **EVERYTHING**

in our Industry

# CHANGE AHEAD





## **Our Delivery Strategy**



MAXIMALLY FACILITATED FLUID MARKET



## **Everything thrives on**

.

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## Energy companies become IT, besides E and G



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Energy markets must INTEGRATE CONSUMERS as Active Partners

IT = OT = IOT

Innovation as CATALYST THINK THE IMPOSSIBLE

**Everything Thrives on DATA** 

Combining all IOT worlds into One world





## IT IS <u>US</u> THAT NEED TO CHANGE AND ACT

## THEN WE CAN OVERCOME BARRIERS

# AND ENSURE PERFECT ENERGY

