

European Network on New Sensing Technologies for Air Pollution Control and Environmental Sustainability - *EuNetAir*

COST Action TD1105

WGs and MC Meeting at LINKÖPING, 3 - 5 June 2015

Action Start date: 01/07/2012 - Action End date: 30/06/2016

Year 3: 1 July 2014 - 30 June 2015 (*Ongoing Action*)

AN INDUSTRY VIEW IN THE COMMERCIALIZATION OF GAS SENSORS FOR ENVIRONMENTAL SUSTAINABILITY



Dr. Hans Martin (C.T.O.)

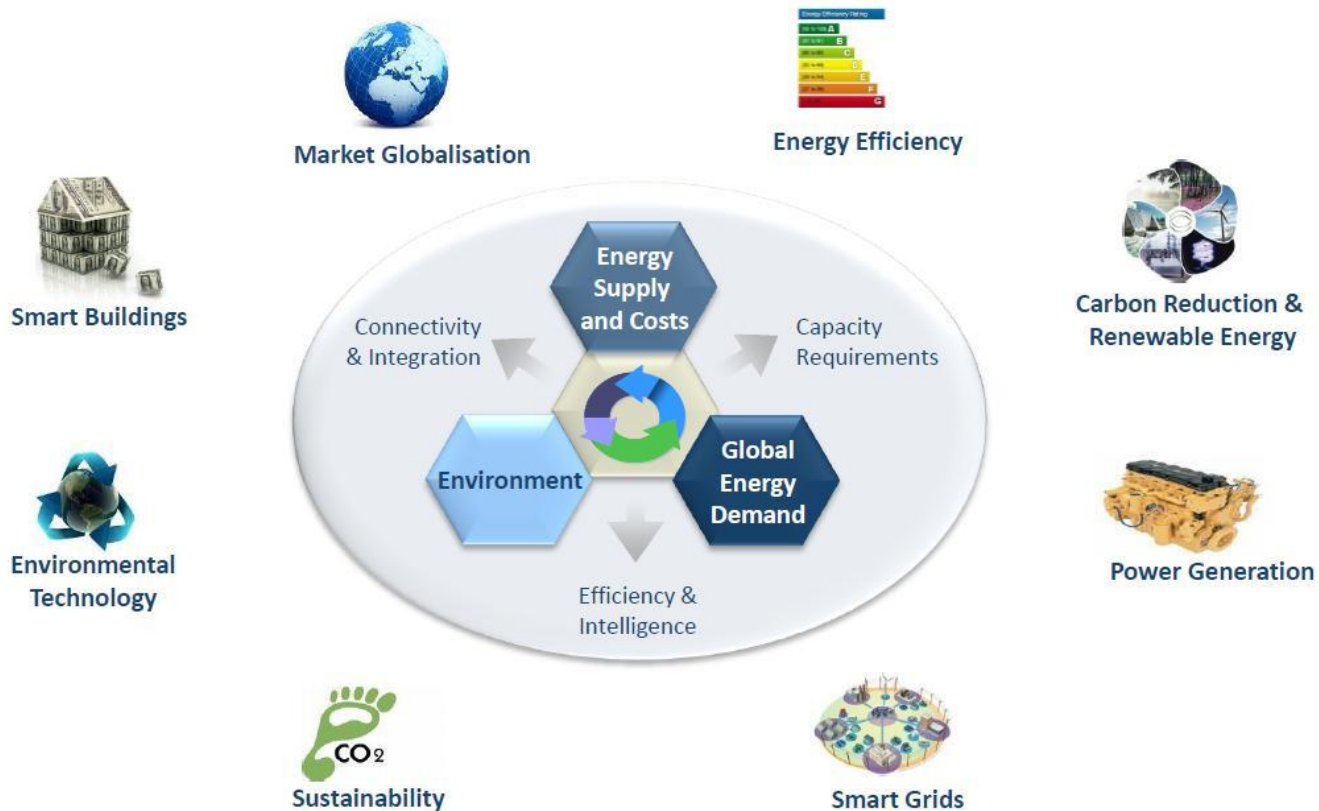
WG Member

SenseAir AB / Sweden

 **cost**
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY



Mega Trend Sculpting the Future of Energy & Environment



Source: Frost & Sullivan

Mega Trend Sculpting the Future of Energy & Environment

ABOUT ENVIRONMENTAL SUSTAINABILITY:

President of the European Commission Mr. Jean-Claude Juncker:
"we all know what is necessary to do,
we just don't know how to be elected afterwards"





CHALLENGE-DRIVEN INNOVATION

Societal challenges as a driving force for increased growth



“ European research must focus on the Grand Challenges of our time moving beyond current rigid thematic approaches. Responses to Grand Challenges should take the form of broad areas of issue-oriented research in relevant fields.

EU project

Work programme:
ECSEL-02-2014
“Innovation Actions”

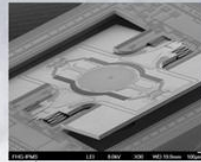
Admont

38 M€ project / 4 years:
“Advanced Distributed Pilot Line for
More-than-Moore Technologies”

ADMONT Pilot Line Dresden



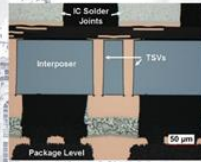
X-FAB HV-CMOS



FhG-IPMS Sensor



FhG-FEP OLED



FhG-IZM Si-System

Key Application for Europe



MIXED-SIGNAL FOUNDRY EXPERTS

Thermopile
in CMOS



System Integration



Mobile Gas Detection



Smart Health &
Safety
Smart Production

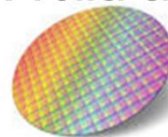
Smart
Sensors &
Actuators

Thermopile
in CMOS

CMUT
on CMOS

fP PEPPERL+FUCHS
SENSING YOUR NEEDS

HV-Power CMOS



MIXED-SIGNAL FOUNDRY EXPERTS

Fraunhofer
IPMS



CMUT Actuator

Fraunhofer
IZM



3D WLP



Energy efficient
ultrasonic Sensing



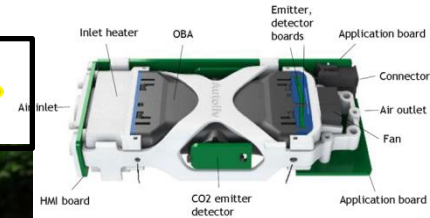
Develops Sweden's innovation capacity for sustainable growth and benefiting society

National project

Challenge-driven Innovation Societal challenges as a driving force for increased growth

6,5 M€ project / 2 years:

“Facilitating sustainable production of alcohol sensors targeting global reduction of alcohol related fatalities”





EU project

H2020 Work programme:

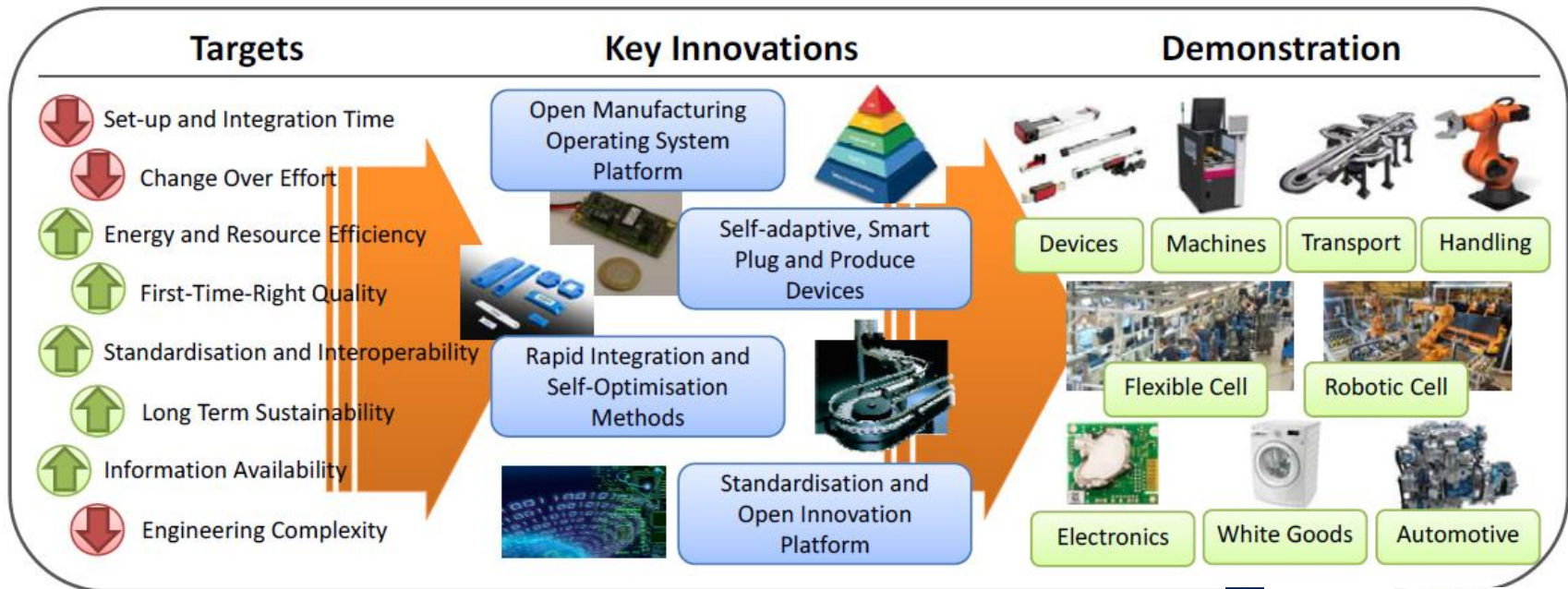
FoF11-2015

“Innovation Actions”

openMOS

6,3 M€ project / 3 years:

“Open dynamic Manufacturing Operating System for Smart Plug-and-Produce Automation Components”



Logics for Environmental Sustainability:

- Tough political decisions required
- need** - Reliable & complete environmental status picture
 - imply** - More measurement nodes
 - result in** - Lower per unit cost
 - realized by** - Batch production
 - require** - Miniaturization
 - offer** - Low power consumption
 - and** - IoT readiness
 - opens up** - Mobile/personal gas sensor market
 - by** - Cloud smart data management
 - we will get** - Clear environmental status picture available !!

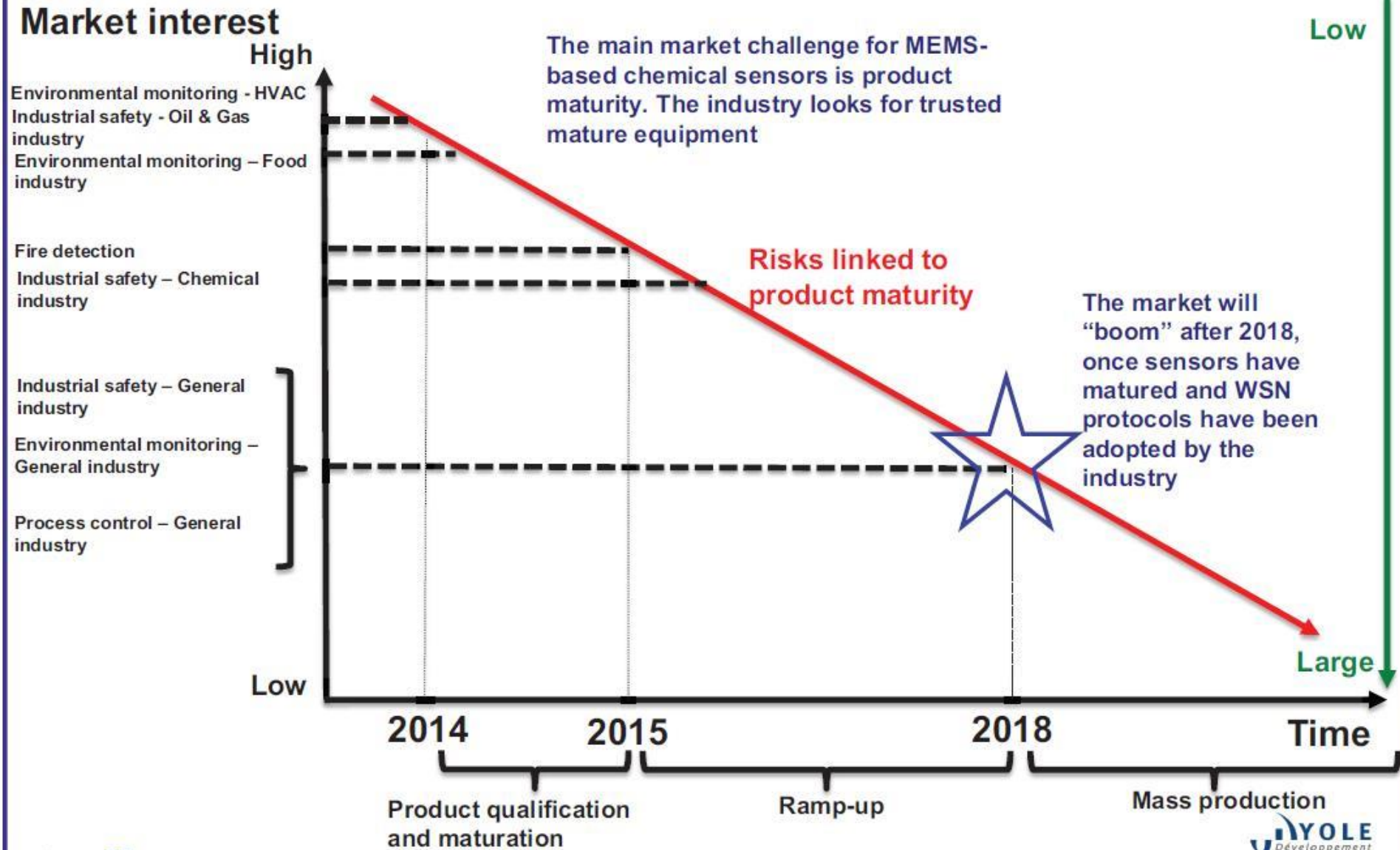
SIMPLE !!

Market Interest vs. Technology Maturity

Volumes

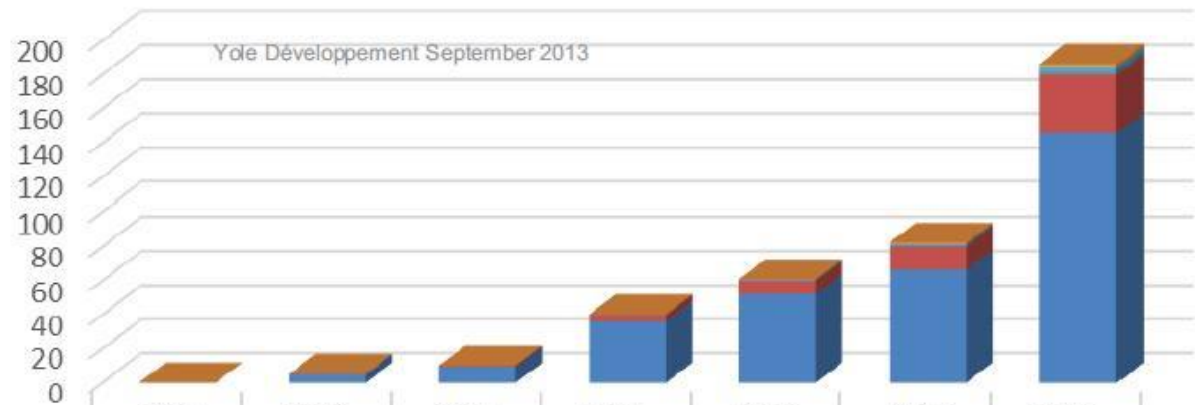
Low

Large



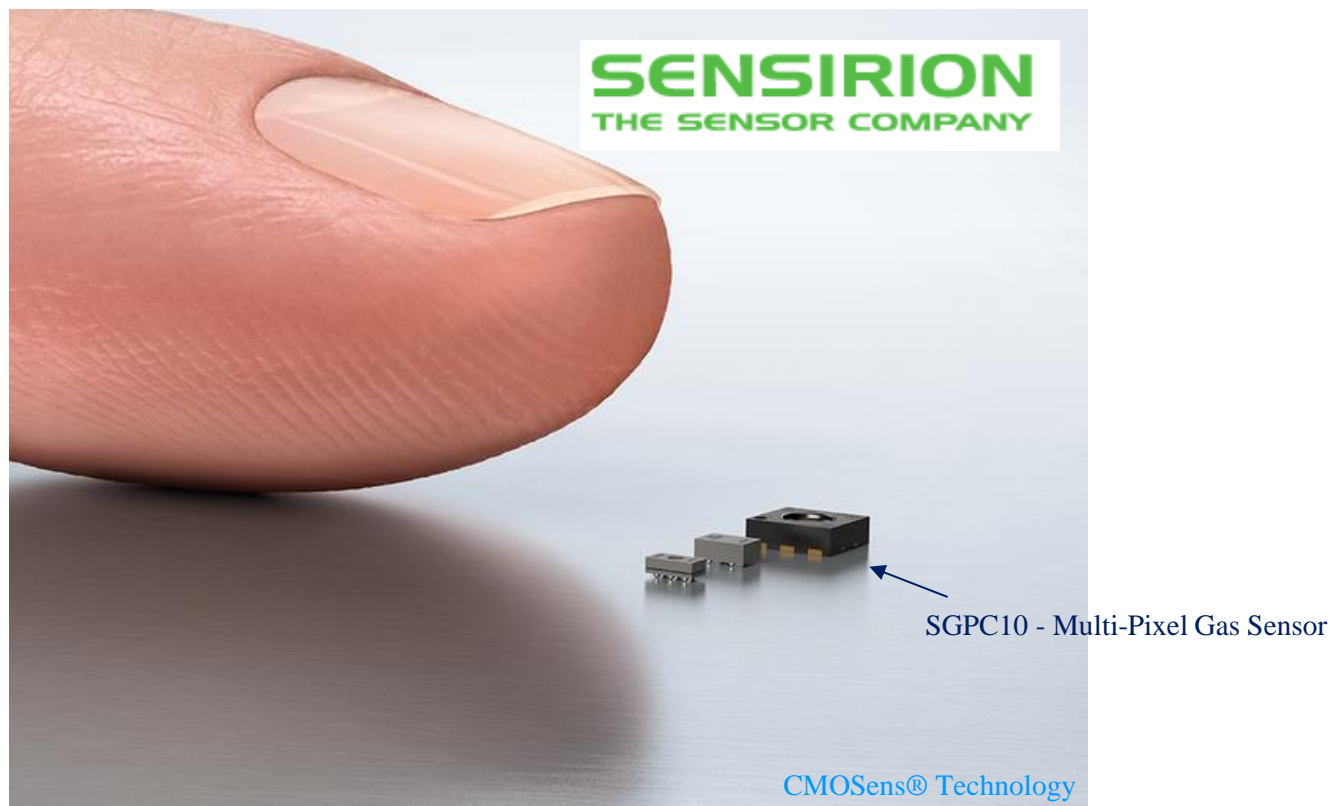
2012-2018 Market Forecast in Units

MEMS Chemical Sensors Market 2012-2018 in Million Units



| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|--|------|------|------|------|------|------|-------|
| Other | 0 | 0 | 0 | 0 | 0.1 | 0.5 | 2 |
| Wireless sensors - Building automation | 0 | 0 | 0 | 0.1 | 0.5 | 1 | 3 |
| Wireless sensors - Industrial | 0 | 0 | 0 | 0.1 | 0.3 | 0.5 | 1 |
| Personal care | 0 | 0 | 0 | 0 | 0.05 | 0.1 | 0.3 |
| Tablet | 0 | 0.1 | 0.6 | 4 | 7.8 | 13.6 | 34.2 |
| Mobile phones | 0 | 4.9 | 9.4 | 36 | 52.2 | 66.4 | 145.8 |

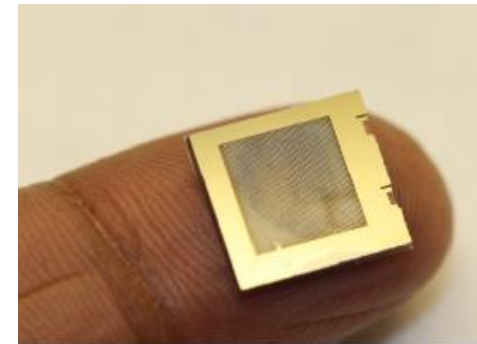
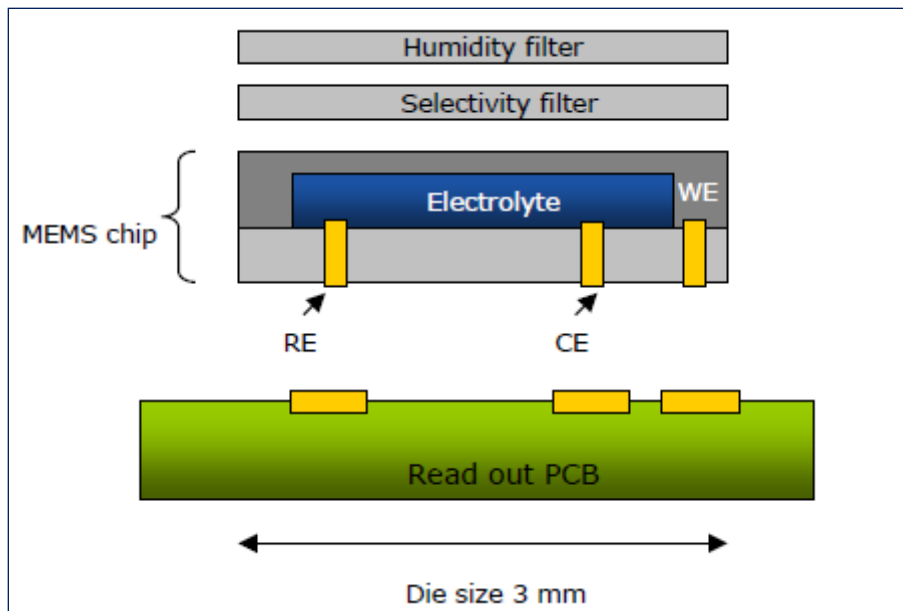
Miniaturized Metal Oxide gas sensors



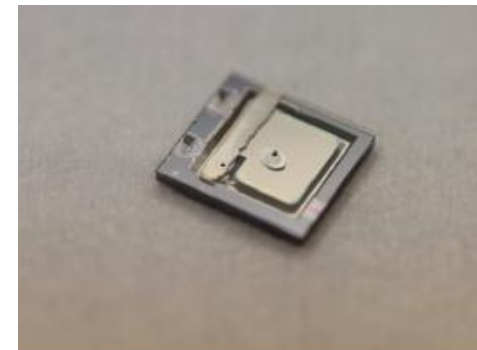
Miniaturized MEMS-based electrochemical sensors



Aerocrine



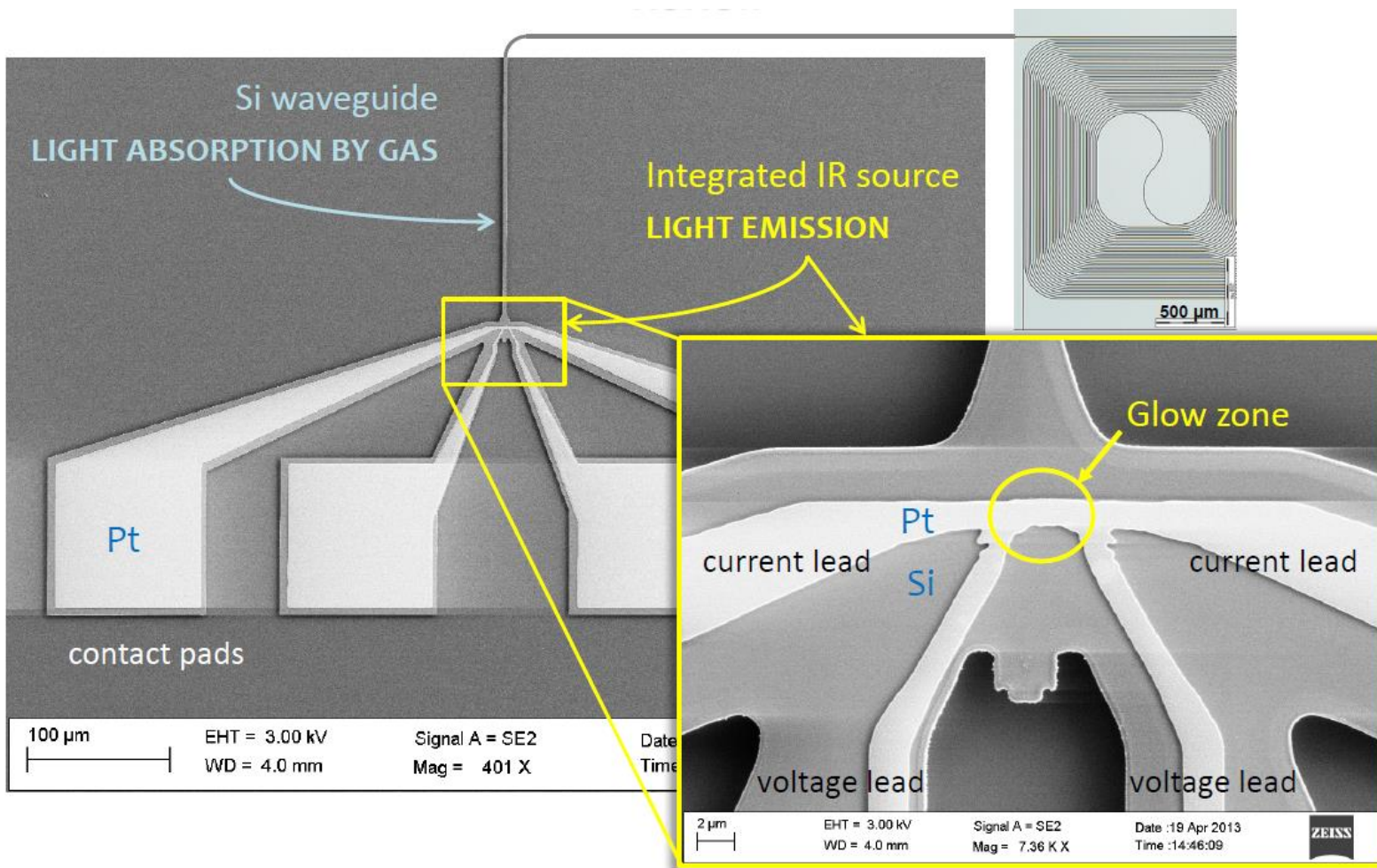
Diced sensor chip



Sensor chip backside

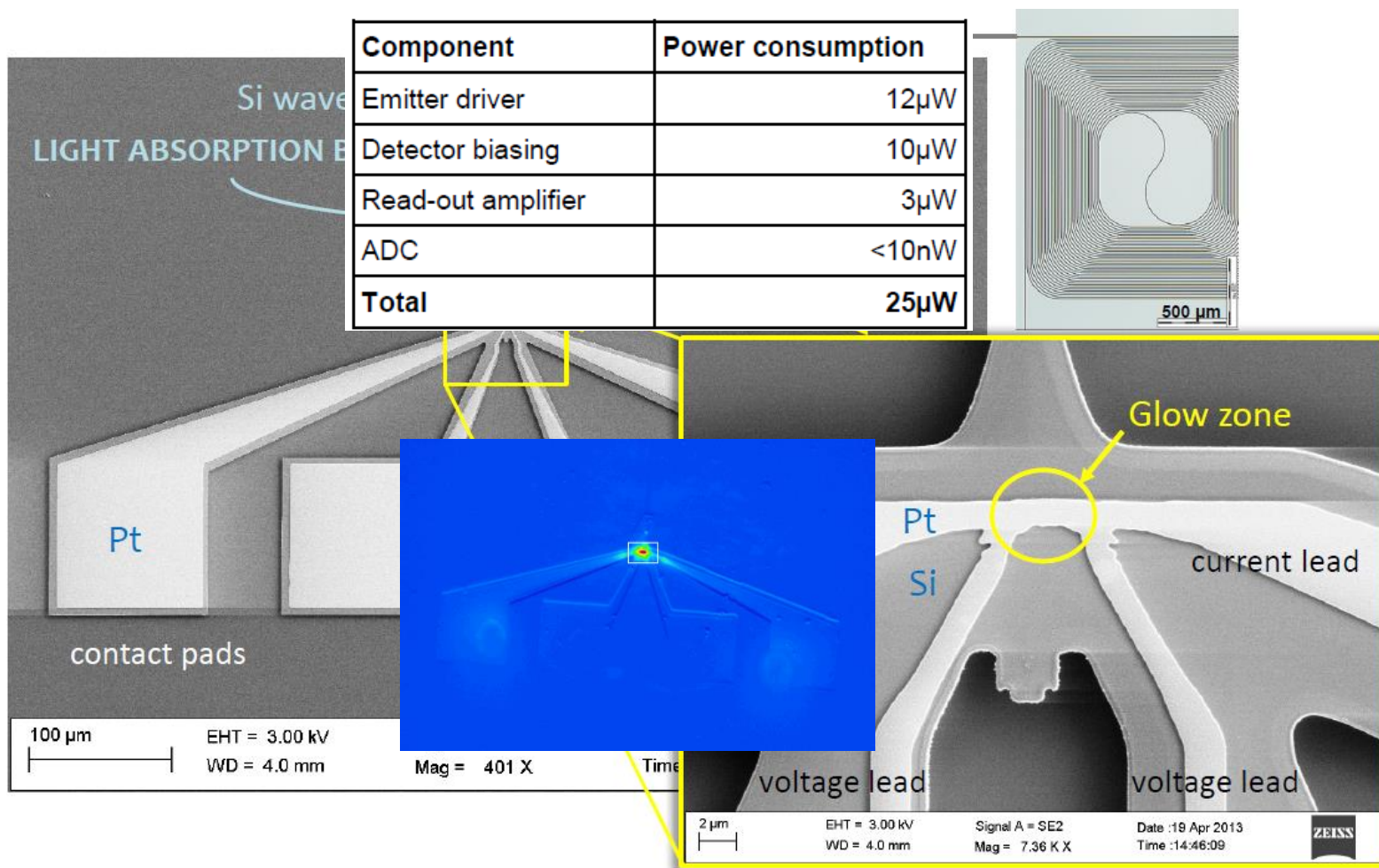
NDIR-on-a-chip

Waveguide-based gas sensor with integrated source



NDIR-on-a-chip

Waveguide-based gas sensor with integrated source



AN INDUSTRY VIEW IN THE COMMERCIALIZATION OF GAS SENSORS FOR ENVIRONMENTAL SUSTAINABILITY

.... Looking good !!

Thank you for your attention!