

# Veolia Research & Innovation 2015



# Safety Focus

“We want to create value through risk management”

- ✓ Safety of our employees is a value in VERI



**Safety = performance**

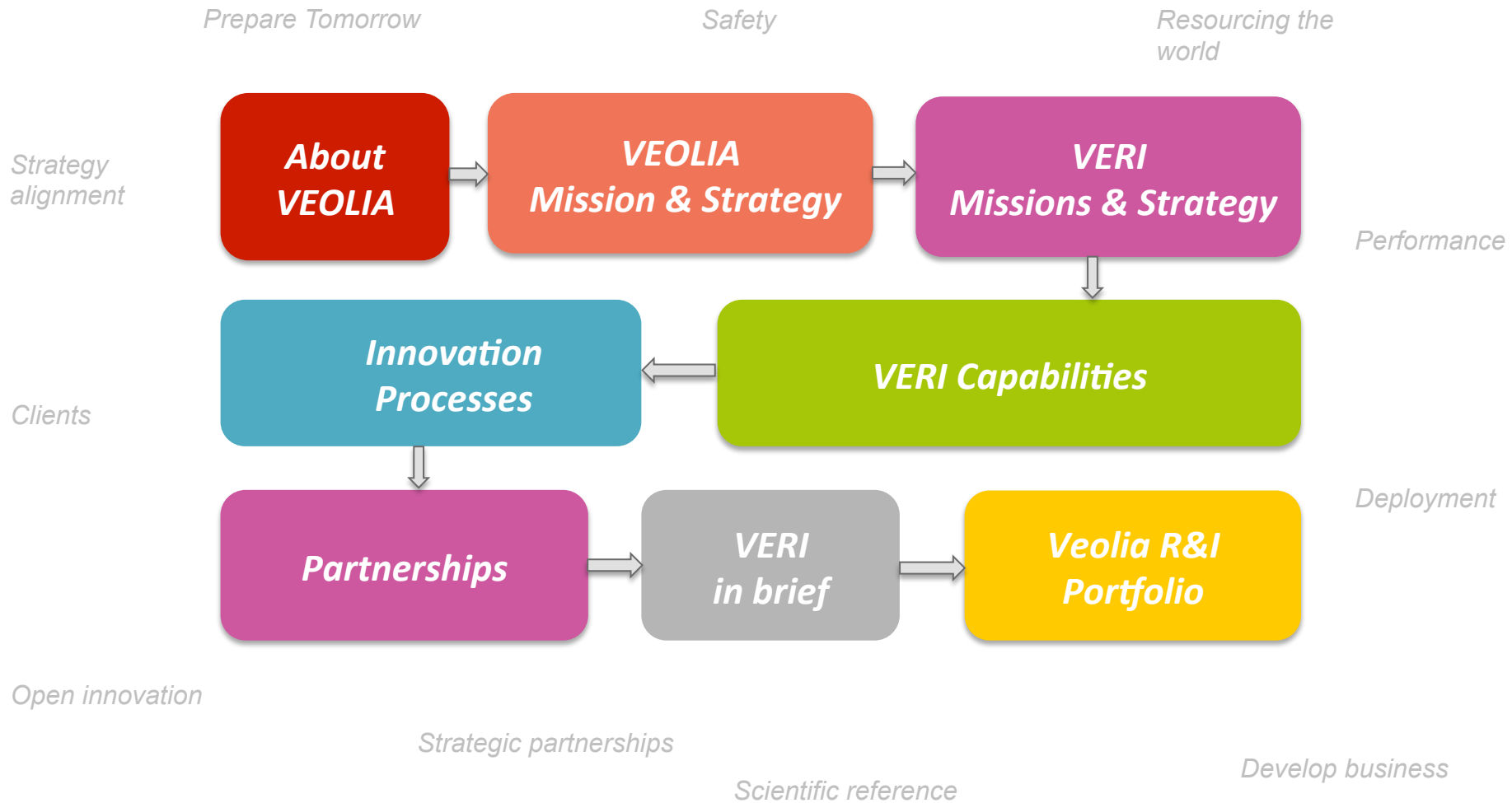
## **Focus Points**

- *Management Involvement*
- *Risk Identification and Management*
- *Monitoring & Reporting*
- *Incident Investigation*
- *Safety Behavior and Culture*

*Health & Safety Commitment based on 4 themes :*

1. *Non-negotiable Compliance*
2. *Improve skills*
3. *Involvement of all stakeholders,*
4. *Relate Health / Safety skills to success factors.*

# Overview



# *About VEOLIA*

# About Veolia: Activity and key figures for 2014

VEOLIA DESIGNS AND DEPLOYS CIRCULAR ECONOMY SOLUTIONS FOR **WATER**, **WASTE** AND **ENERGY** MANAGEMENT TO IMPROVE EFFICIENCY FOR CITIES, INDUSTRY AND CITIZENS.



**€23,880**  
million revenue

**179,000**  
employees  
on 5 continents

**6.8 M**  
tons equiv. CO<sub>2</sub>  
avoided and

**15.3 M**  
tons equiv. CO<sub>2</sub>  
reduced

**39.3 M**  
MWh of renewable or  
alternative energy  
consumed

**34%**  
of the company's total  
consumption

# Veolia, Leader to meet the challenges of the 21<sup>st</sup> century



## FOR THE PLANET

- **Economic dynamism and expansion of the middle classes** in emerging countries
- **Development** of mega cities
- More water stressed **areas**
- Water demand is growing **twice as fast** as the population
- **Growing demand** for energy and raw materials
- **Resource depletion**

## FOR OUR CUSTOMERS



### CITIES AND THEIR POPULATION

- **Universal access to essential services** in constantly growing and more complex cities
- **Energy efficiency**
- **Development of a circular economy** in urban services and lifestyle
- Increased sensitivity of people to consumption and the need to **conserve resources**




### INDUSTRY

- **Water, a strategic growth issue** for some industries and regions
- **The need to boost energy efficiency** for competitiveness
- **Integration of circular economy** solutions in production processes
- CSR agenda, condition for **business development**

# A complete mastery of the water / waste / energy cycle to serve our customers better

 **3,338**  
wastewater treatment plants managed

 **4,455**  
water production plants managed

 **59.6**  
million people connected to wastewater systems

**WATER**  
 **96**  
million people supplied with water

*Management of the global water cycle, from production and distribution of drinking water to the collection, treatment and recycling of wastewater.*

*Energy efficiency, efficient management of heating and cooling systems, green energy production, all unique expertise for a sustainable world.*



 **52**  
million MWh produced

 **2.4**  
million collective housing units managed

**ÉNERGY**  
 **529**  
heating and cooling networks managed

 **1,802**  
Industrial sites managed

**42.8**  
million people provided with collection services on behalf of municipalities

**31.3**  
million tons of waste recovered as materials or energy

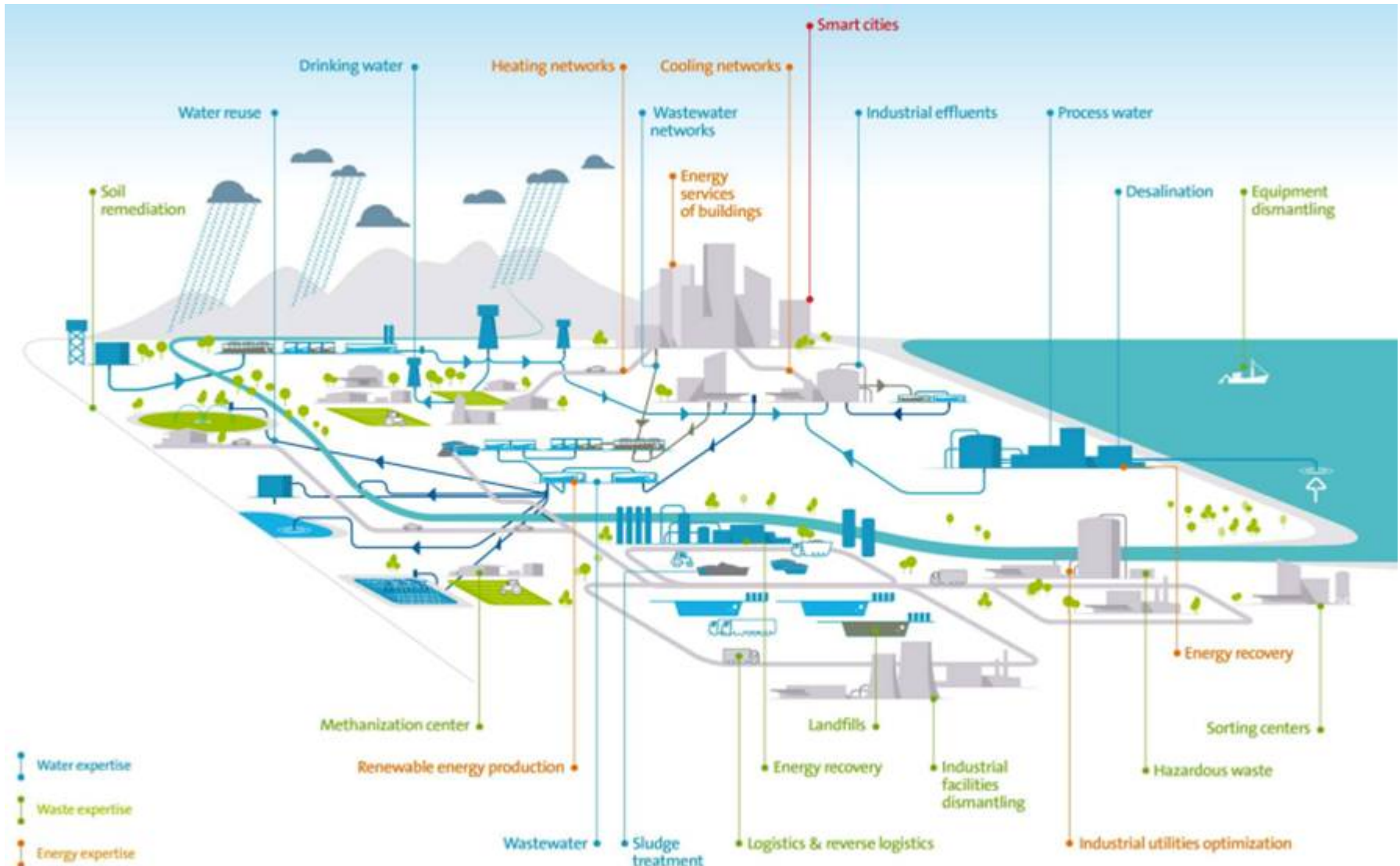
**730,000**  
business customers



**WASTE**  
**655**  
waste-processing facilities operated

*Liquid and solid non-hazardous and hazardous waste management*  
Our expertise covers the entire waste life cycle from collection to recycling, leading to the final recovery of waste as materials or energy.

# Expertise and services: supporting sustainable development for cities and industry





# *VEOLIA Mission & Strategy*

# VEOLIA MISSION “*RESOURCING THE WORLD*”

*Veolia contribute to increasing access to resources as well as preserving and renewing them*



## **DEVELOPING**

### **ACCESS TO RESOURCES:**

Veolia offers **operational solutions that consume fewer environmental resources and are more economically efficient**, so as to expand both the potential and the accessibility of the resources available.



## **PRESERVING**

### **RESOURCES:**

Veolia develops solutions **to conserve resources and optimize their use**, while protecting their quality and efficiency throughout the usage cycle.



## **REPLENISHING**

### **RESOURCES:**

Veolia provides **solutions for creating new “secondary” resources** that will gradually offset the increasing scarcity of natural “primary” resources, generating new opportunities for social and economic development that protect the environment.

# Strategic priorities: Growth sectors to focus on

Veolia offers a unique value proposition



## Oil & gas

The oil and gas industries sit at the crossroads between major regulatory, societal, economic and operational challenges. Veolia helps **ensure extraction is handled in an environmentally friendly manner.**



## Mining industry

For economic, regulatory and environmental reasons, **mining effluent treatment** is a major challenge.



## Food & Beverage industry

Population growth: The rapid growth in food needs and consumers' growing demands are placing pressure on the industry. Veolia works with them **to reduce their environmental footprint and contain their costs.**



## Dismantling industrial facilities

Passenger liners, aircraft, trains, production plants, oil platforms, etc.: Veolia **provides complete solutions** for complex situations while **guaranteeing the market's highest standards.**



## Circular economy

A sustainable alternative to the current production and consumption approach, the circular economy is already a reality. Industrial companies and local government authorities are starting **to produce alternative resources** and local supply loops are emerging.



## Innovative solutions for cities

Constantly **growing in size and under financial stress**, cities must optimize the management of their public services. As a partner of cities, we are inventing new, more efficient models.



## Difficult-to-manage materials

Low-level radioactive waste, chemical products and hydrocarbon derivatives, *etc.*: as certain types of waste are hazardous for human health and the environment, **high level expertise** and non-standard equipment are needed for their treatment



## Co-construct with our clients

*Continuously increasing needs for access to water, wastewater treatment, services energy, and waste, require ceaseless modernisation of infrastructures and services.* 11  
Veolia co-constructs innovative solutions with its clients.

# *VEOLIA Research & Innovation (VERI)*

## *Missions, Strategy & Organization*

# Veolia Research & Innovation missions

Relying on Scientific Excellence in our R&I programs to support:

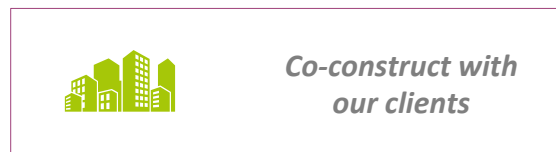
- the **development of business,**
- the **improvement of performance and productivity,**
- while preparing for a **competitive edge for tomorrow.**

# R&I Strategy : programs aligned with Group Strategy

7 growth sectors  
to focus on



Traditional models



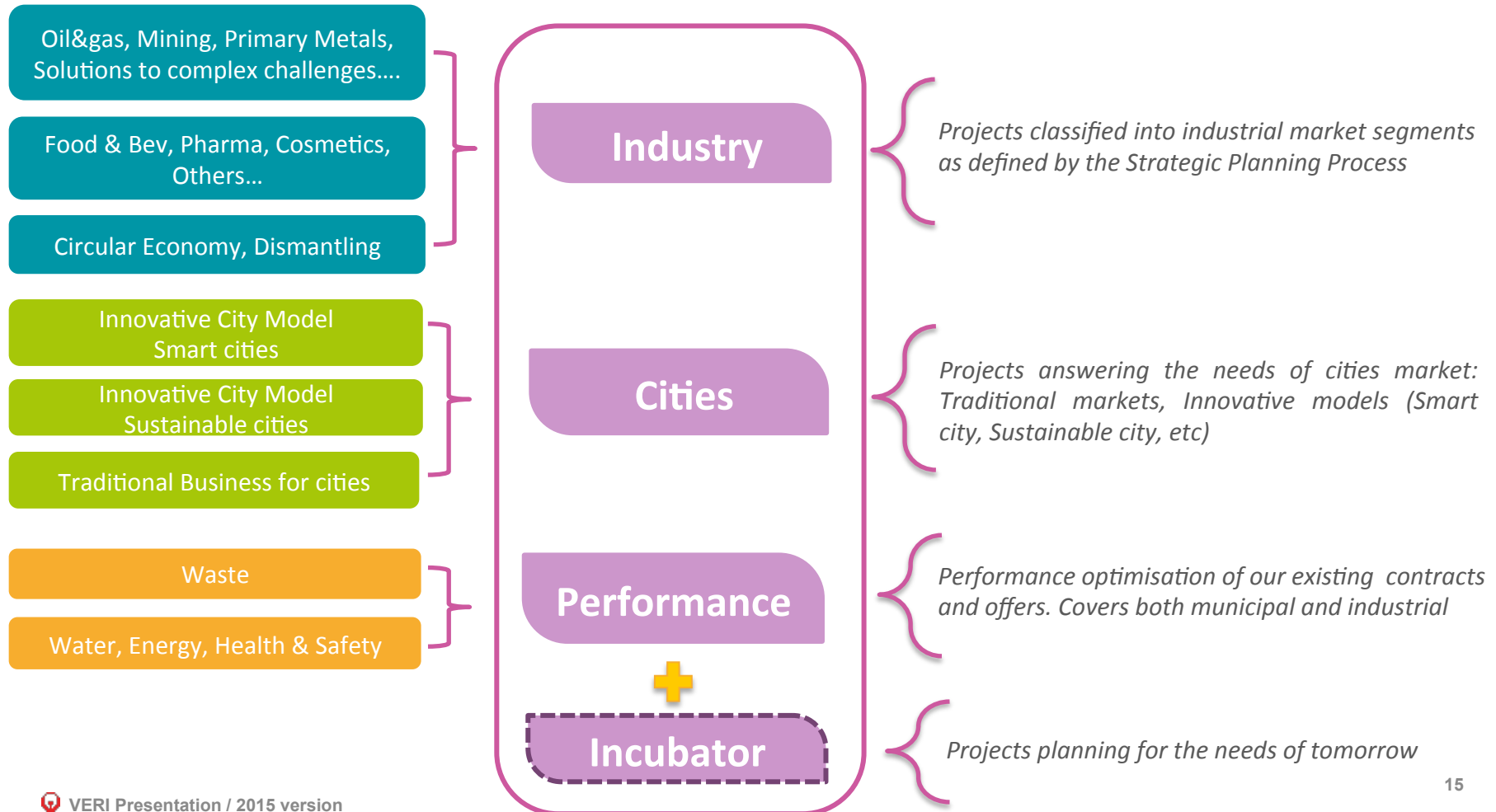
## R&I portfolio segmentation



# R&I programs to improve global performance and to fulfill industrial and cities clients needs

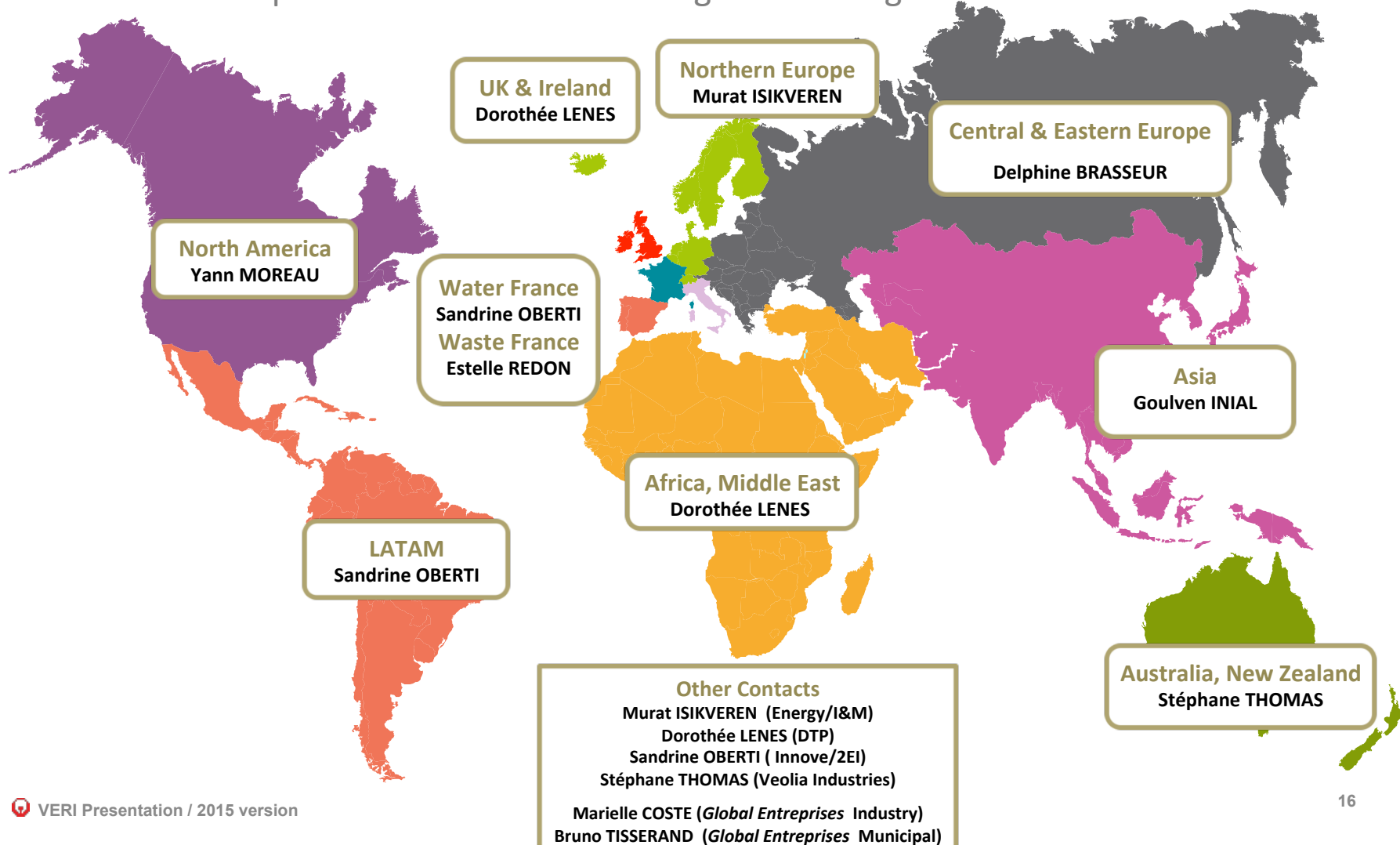
## R&I portfolio segmentation

## R&I Programs



# A worldwide R&I network

A unique network of Research and Innovation,  
matched with operational innovation throughout the organization





# “Innovation & Markets” vision & organization

The direction  
“Innovation & Markets”,  
a catalyst for growth

Strategic and structured development

Veolia source of enthusiasm and confidence

A corporate dynamic built around **innovation** and a **connected network**

*Vision*

*Organization*

Laurent AUGUSTE  
Executive Vice President

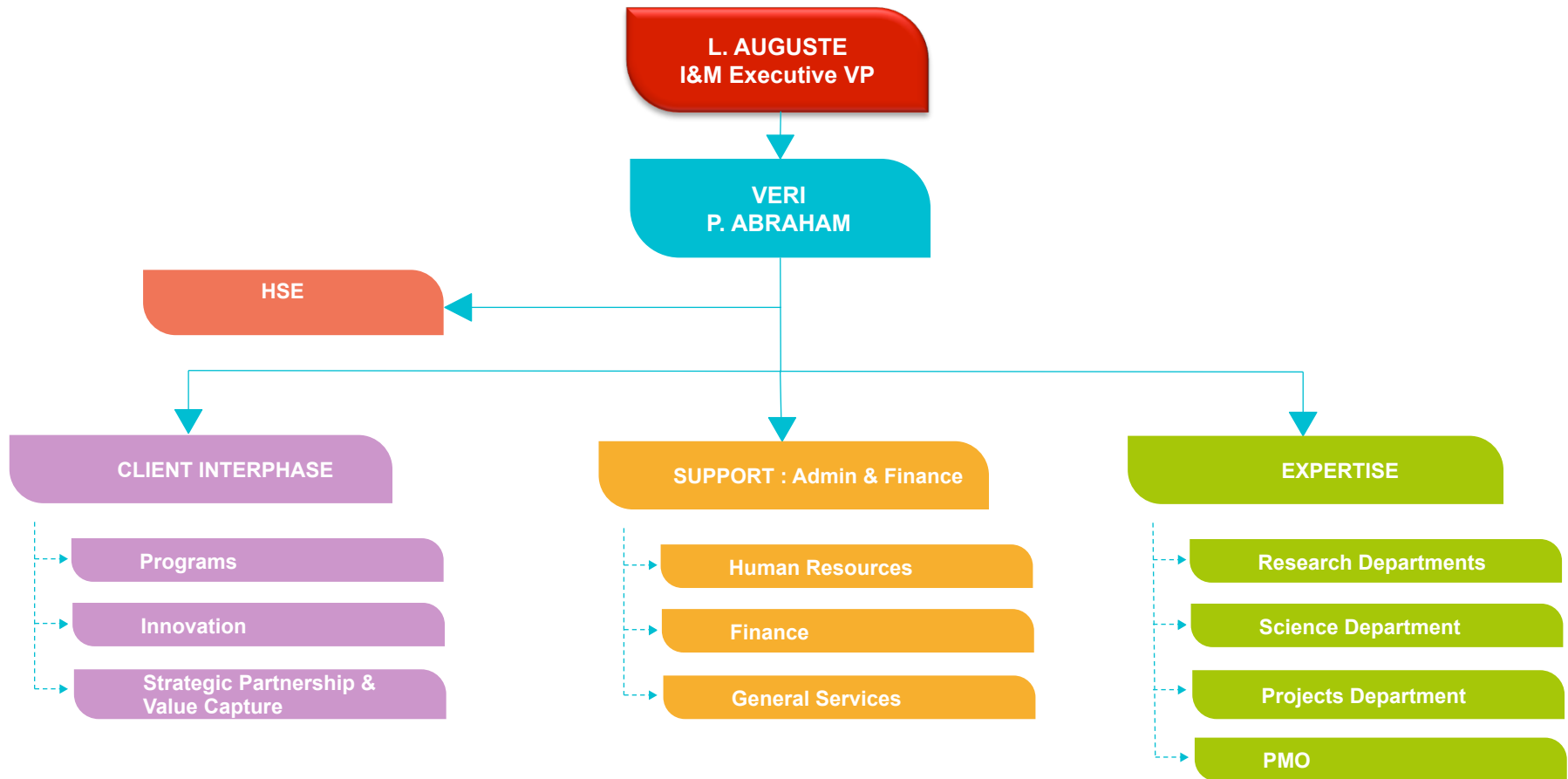
Strategy  
& Marketing

Business  
Development

2EI/Innovate

VERI

# A VERI organization ready to face the challenge



# *VERI CAPABILITIES*

# Veolia R&I key figures

## Research & Innovation within the Group consists into 3 pillars:

1. An internal R&D structure
2. A worldwide innovation internal network: VIBE
3. An open innovation approach: VIA

- **850** experts worldwide  
*(including 350 researchers)*
- **6** specialized research centers
- **3** test platforms
- **278** research pilot units
- **Over 2,000** patents

- **220** academic and industrial partners
- **5** research chairs
- **10** competitiveness centers  
participation in France
- **5** future investment programs  
participation in France

# R&I Means & Resources



France: 3 centers: Limay (78);Maisons-Laffitte (78) ; Saint-Maurice (94)  
2 test platforms: *Drinking water (Annet-sur-Marne 77);*  
*Municipal waste water (Saint-Thibault des Vignes 77)*



Warsaw  
*Heat distribution networks*  
 **Heat-Tech Center**  
Research and Innovation

Beijing *Emerging pollutants*

  
Joint Research Center  
for Advanced Environmental  
Technology  
清华大学—威立雅环境  
先进环境技术联合研究中心



Fujairah (UAE)  
*Desalination platform*

Singapore  
Center of Excellence  
*Urban modeling*

3 specialized international centers  
3 research centers in France operating as a network  
3 test platforms  
278 pilots

# EXPERTISE : 5 departments

EXPERTISE



Shared into  
**5 departments**  
developing their skills  
to meet the Group needs

*Biosystems &  
Biotechnology*

*Biotechnologies, Microbial Ecology,  
Engineering Microbial Consortia*

*Environment & Health*

*Environmental analysis solutions  
Resources & Environmental Impacts  
Environment & Socio-Economy*

*Process Engineering*

*Physico-chemical processes, Membrane processes,  
Thermal processes for biomass and waste  
valorization, Air quality control and gas treatment  
& recovery Processes, Mass & Energy integration*

*Modeling & Information  
Technologies*

*Fluid Mechanics & Modeling Systems  
Signal, Data, Optimization  
Control & monitoring of performance  
Information Systems & Communication*

*Industrial Technologies  
Support*

*Materials Engineering, Robotics and  
Mechatronics; Sensors and metrology  
Pilots Engineering & Construction*

# 3 support departments to ensure a rigorous, streamlined method & process



## A Projects Team housing Project Managers:

To manage research projects **from building the specifications**  
Right up to having a responsibility to ensure that the deliverables  
are in line with the clients needs and ready for **deployment**



## A Science Team housing experts:

To be a peer review team ensuring the **scientific quality** of work  
To participate in the qualification of projects  
To provide **expertise and scientific support**



## Project Management Office

To support the Project Department for methods & tools  
To make recommendations on the definition of **quality standards**

# R&I to provide innovative solutions for clients, to increase productivity and develop business

## → Increase productivity

- Optimization of technologies & processes
- Design and development of innovative technical solutions
- Detection of technological evolutions
- Realization of feasibility tests and proof of concepts



## → VERI alternative solutions

- Exploration of alternative R&I ways
- Stimulation of creativity
- ...

## → Develop business

- Test of external innovations within VERI
- Support to Technical & Performance Direction and operations for field deployment of prototypes and first launches
- Participation in the development of new offers by pushing innovations







# INNOVATION PROCESSES



## Veolia Innovation BoostEr (VIBE)

Internal innovation network launched end 2014

### Objectives:

- To promote **collaborative innovation** internally
- To achieve improvements in productivity and performance
- To **develop relations and foster exchanges** of information between all participants
- To support and encourage the development of **local innovation initiatives** by sharing best practices or making available specific tools.
- To increase total innovation capability and foster momentum for **generating, sharing and applying innovations.**



**Innovation is an integral part of Veolia's assets**

## “The VIBE Challenge”

1<sup>st</sup> global internal innovation challenge

### Aims :

- To strengthen shared values and the Group's innovation culture
- To motivate innovators and internal entrepreneurs
- To accelerate the deployment and adoption of innovations

Set up of an **internal innovation investment fund** to support the initiative :

- To help fund the deployment or duplication of innovations within the Group
- Managed by 7 "co-managers" from different Group entities

Each **Veolia zone to submit innovation projects** :

- Falling within the "resourcing the world" theme
- Having significant commercial potential and/or transforming our economic models
- while remaining aligned with the Group's overall strategy



## 2015 VIBE Challenge

**41** innovation projects were presented by the Veolia zones. Entry book published

**5** projects selected by the investment fund co-managers for the final:

ENVIOS, Reclyc'Inn, THaMAPAS, GlassWool, WemSys.

**3** winners :

→ **ENVIOS** - Reduced consumption of chemicals in wastewater treatment plants.  
Project Leader: Nathalie MARTIN-IONESCO (Hydrex) zone "Global Enterprises

→ **THaMAPAS** - Energy and nutrients recovery in wastewater treatment plants.  
Project Leader: Sylvie NOVAK, Northern Europe

→ **WemSys** (in coordination with Sense, Metior, VEE) –  
IT platform for the collection, integration, analysis and visualization of water and energy data.  
Project Leader: David DOLPHIN, zone North America



## Veolia Innovation Accelerator

**Objective** → Accelerate Veolia's capacity for innovation

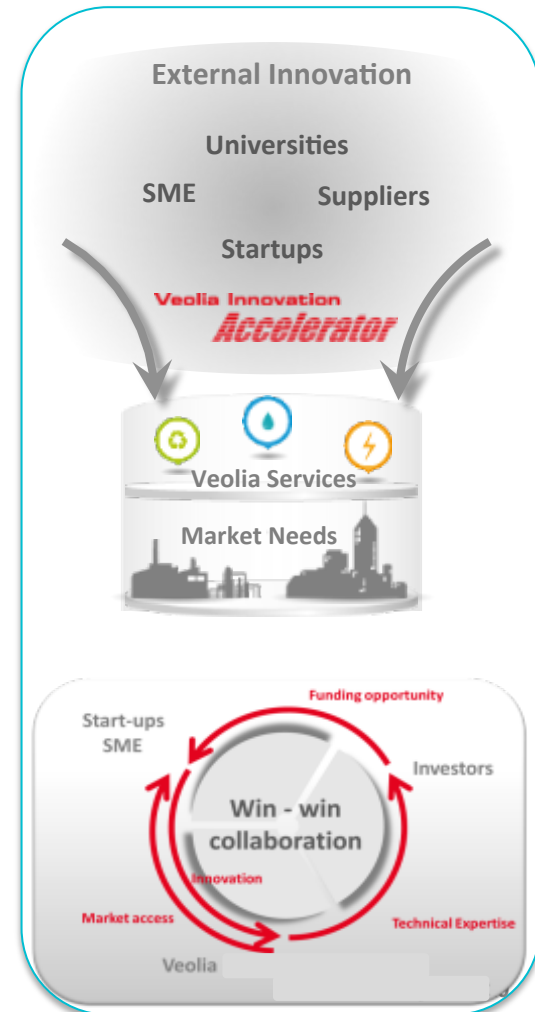
- A dedicated process (VIA 2.0): Program designed and developed by VERI to identify and implement the best eco-innovations in conjunction with entrepreneurs
- To set up a more effective sourcing coverage
- To better support the integration of external solutions
- To better feature success stories or positive impacts of open innovation activity
- [www.via.veolia.com](http://www.via.veolia.com)

### Territorial & Local initiatives

Territorial Innovation  
*Accelerator*

**NIA** NORDIC  
INNOVATION  
ACCELERATOR  
hosted by UNIB and Veolia

### VIA Model



## “Call for innovative solutions” or “challenges”

- Challenges targeted on technical needs for research projects
- Entrepreneurs submit applications via **Veolia Innovation Accelerator** web platform : [via.veolia.com](http://via.veolia.com)
- Latest 5 challenges:

**Challenge 1 :**  
**Wastewater sludge dewatering**

**Challenge 2:**  
**Desalination and reduced energy consumption**



**Challenge 3:**  
**Biomass ash management**



**Challenge 4 :**  
**Software solution for planning the collection of ordinary industrial waste**

**Challenge 5 :**  
**«Moisture Measurement» - with Veolia Energy and Veolia Environnement Services**

# PARTNERSHIPS

# Strategic Partnerships

**To enhance the quality of scientific knowledge  
& to prepare the R&I needs of tomorrow**

- ✓ More than **220 partnerships worldwide** with academics (**130**), industries (**90**), laboratories, associations and public authorities
- ✓ Partner in nationally funded (ANR, Ademe, etc.) and international funded projects (European Union, Life, WERF, ARC, DOE, etc.)
- ✓ Participation *in France* in **5 future investment programs** and **10 competitiveness clusters**. (Water/Energy/Waste/Others)
- ✓ **5 research chairs** on major issues (Life Cycle Analysis, biodiversity, hydrosciences, radar meteo and greenhouse gas emission and survey) :
  - Mathematics & biodiversity // French National Museum of Natural History & Ecole Polytechnique (FR)
  - Life Cycle Analysis // Polytechnique Montréal (CA)
  - Hydrosciences // University of Montpellier (FR)
  - Radar Meteo // Ecole Nationale des Ponts (FR)
  - Greenhouse gas emission and survey // CEA, CNRS, Thales, Alénia, SpaceFrance & University of Versailles (FR)



# VERI in brief



# Some projects in the Group portfolio

BUSINESS  
DEVELOPMENT

Heating District  
Network (HDN) Robot

SALTO

ANITA-MOX

PROCOBIA

REFRAVE

SWARM

HIPRODE

IMPROVING  
PERFORMANCE

Move2Chem

STRUVIA

Valorization of  
agro-industrial by-  
products service

SOFTns

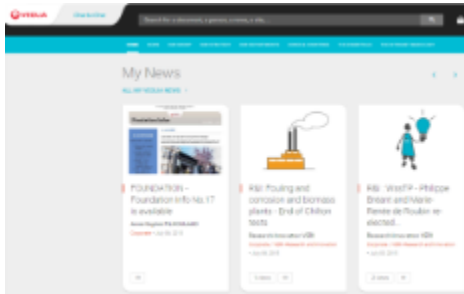
REFLEXE

I-Sort3R

Green Chemicals  
for Clarification

COOPERE

# How to keep in touch (internally)?



✓ Veolia One to one Intranet

✓ R&I Intranet Portal

✓ I&M platform



✓ A dedicated VERI Newsletter : VERI'Sphere

✓ "R&I highlights", annual edition



✓ VERI presentation

# How to keep in touch ?



✓ Veolia internet : [www.veolia.com](http://www.veolia.com)

✓ Living circular

✓ Planet



✓ Reference Document

✓ VIA site : [www.via.veolia.com](http://www.via.veolia.com)

#LivingCircular  
Powered by  VEOLIA



# Veolia Research & Innovation



**THANK YOU !**

**QUESTIONS ?**