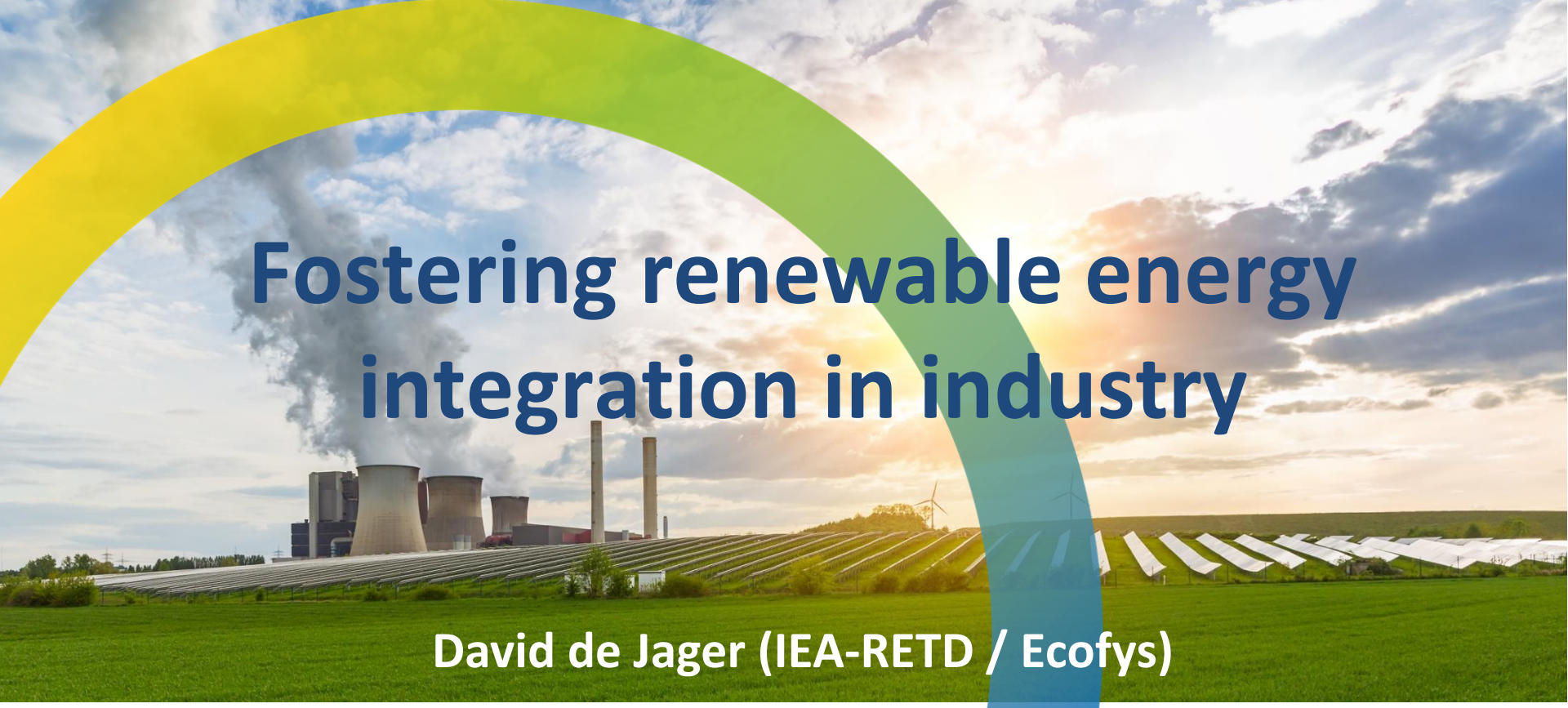


Fostering renewable energy integration in industry

David de Jager (IEA-RETD / Ecofys)

IEA REWP Workshop

Scaling-up renewables through decentralised energy solutions

Paris, 28 March 2017

IEA-RETD
Renewable Energy Technology Deployment

iea Energy Technology Network

Launch of RE-INDUSTRY study

Context

- Industry can and has to play an important role in the energy transition through integrating renewable energy (RE) production assets at their sites

Objectives

- Provide inspiration and state-of-the-art applications of RE in industry
- Present best practices and key developments of RE in the industry: existing and emerging technologies, drivers, barriers, policies and lessons learned
- Formulate policy recommendations to foster RE integration in industry

Study Authors

enea energy committed

KERDS ENERGY SOLUTION CENTRE

Integration of RE on industrial assets brings direct benefits to industrial players

- **Reduced energy cost** and prices hedging from future increases of fuel and grid prices

CODELCO

€5.3 million annual savings from road-transported fuel consumption reduction

- **Improved energy reliability**

ATP

CHP from grape waste to have a more grid-independent and stable power supply

- **Increased productivity**

Tenon Wood Solutions to the World

Productivity increased by 5% after its 27 MW_{th} geothermal project

- **Additional revenue-generating opportunities**

Pepperidge Farm

Surplus of solar power is sold to the grid at retail price (net-metering)

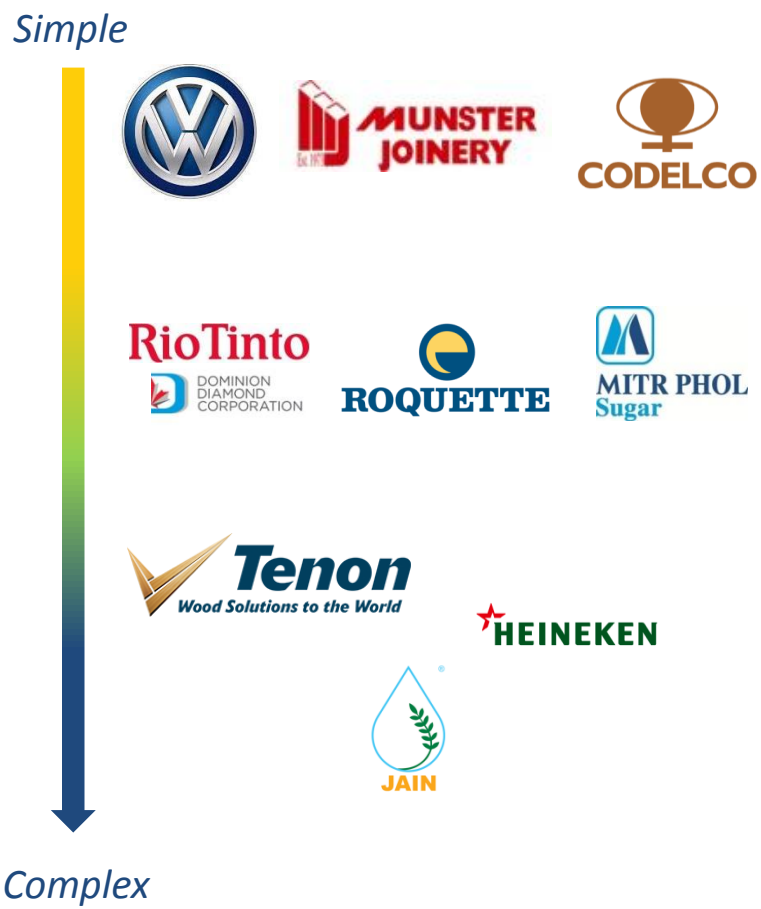
- **Greater coherence with corporate commitments** on environmental and local development

LafargeHolcim

Beyond economic profitability, biomass project is a waste recovering solution for communities

Most industrial RE applications today are simple 'add-on'

- **Green power procurement** with a third party power producer on the premises of the industrial asset
- **On-site installation of fully owned** and operated RE generation assets
- **On-site installation of RE production assets** and process adaptation
- **Paradigm shift**: Renewable raw materials, energy, and by-products valorization
- **System integration / sector coupling** (no examples in case studies)



Overview of the 8 main issues identified

1. Energy production regulatory regime
2. Investment
3. Return on investment
4. Technology maturity
5. Operability and integration
6. Risk mitigation and insurance mechanisms
7. Contractual schemes complexity
8. Awareness

Provide guarantees to reduce investment risks

Issues

- Risks, technology maturity issues and lack of knowledge from investors
- Direct subsidies reduction in the current context of public budget cutbacks

Policy implementation

- Opportunity for policy makers to shift from direct public funding to private financial support
- Government or independent banks can offer guarantees on loans contracted with private commercial banks through a dedicated guarantee fund

Targeted beneficiaries

- Industrial project developers
- Commercial banks
- Public finances

Expected impacts

- Remove external funding barriers
- Help project developers finance RE assets at lower cost by minimizing risks and interest rates

Wood biomass boiler and deep geothermal source steam plant at starch factory (France)

ROQUETTE
Offering the best of nature™

Biomass boiler: 43 MW_{th}
Deep geothermal: 24 MW_{th}

ADEME
Agence de l'Environnement et de la Maîtrise de l'Energie

€13 million guarantee from "Guarantee Fund Geodeep" partly financed by ADEME, aims at providing guarantees against risks of insufficient geothermal resource. It is thus a genuine aid to the commitment of investment by reducing the risk borne by the project.

Allow third party power production to reduce pay-back time and operational implementation

Issues

- Industrial players are willing to transfer ownership of their RE projects to third party power producers to reduce investment, simplify project implementation and remove auxiliary assets from their balance sheets
- In some countries, industrial players can only buy power from the State's utility or self consume

Policy implementation

- Allow third party producers and facilitate third party producers activities
- Prepare model contracts to be used by industrial actors willing to contract with a third party producer

Targeted beneficiaries

- Industrial actors with limited investment capacities or willing to deconsolidate their investments
- Third party power producers

Expected impacts

- Industrial players can transform CAPEX into OPEX and reduce payback time, making them more willing to integrate RE
- Secure long-term energy prices

Hydrogen fuel cell and solar PV at a food processing plant (US)

PEPPERIDGE FARM

Solar PV: 1 MW_e
Fuel cells: 2.6 MW_e

15-year flat rate Power Purchase Agreement with BNB Renewables to purchase 100% of the solar PV plant production at competitive rates with the retail electricity market

Implement localized policy demonstration projects and clusters to test ideal regulatory solutions

Issues

- Policy makers are eager to see the development of new technologies and expertise in their territories but do not wish to adopt measures that could have important impacts on the grid and their revenues from taxes

Policy implementation

- Create a unique administrative desk for permitting, financing and advising
- Test different types of policies/support mechanism and practices in the experimental eco-park
- Experiment promising technologies and use the eco-park as a showcase

Targeted beneficiaries

- All stakeholders involved in a project of RE integration
- Policy makers

Expected impacts

- By providing implementation feedback, policy makers can have a clear idea of the extent of those risks and thus continue to hinder the development of new energy production schemes
- Foster the development of disruptive technologies and ideas

Conclusions of RE-INDUSTRY study

- RE can play a crucial role in decarbonising the energy consumption of industry
- The integration of RE production assets in the industry is already a real dynamic across diverse industrial sectors worldwide
- Nevertheless, public support and technical, contractual and business innovation are still required to make RE integration a widespread practice in the industry globally
- Policy makers should ensure that regulation allows and even fosters different RE integration schemes

Conclusions in the context of this REWP workshop

- The 200+ cases in the RE-INDUSTRY study show **no** real **sector coupling**

- The future role of industry in sector coupling
  - Electrification of heat supply
  - (Low- and high-temperature) Heat storage (hours to seasons)
  - RE fuel storage (H2/NH3/…)
  - Chemical / energy-intensive industry to play a crucial role
  - **More on-site production is <u>not</u> necessarily the best system solution**

- Policies needed
  - to set the rules and targets during the energy transition (co-creation process)
  - to provide the right market signals to stakeholders
  - pilots & RD&D

THANK YOU!

For additional information on RETD

Online: www.iea-retd.org
Contact: info@iea-retd.org

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