

STATUS OF GLOBAL RENEWABLES DEPLOYMENT

The importance of conformity assessment

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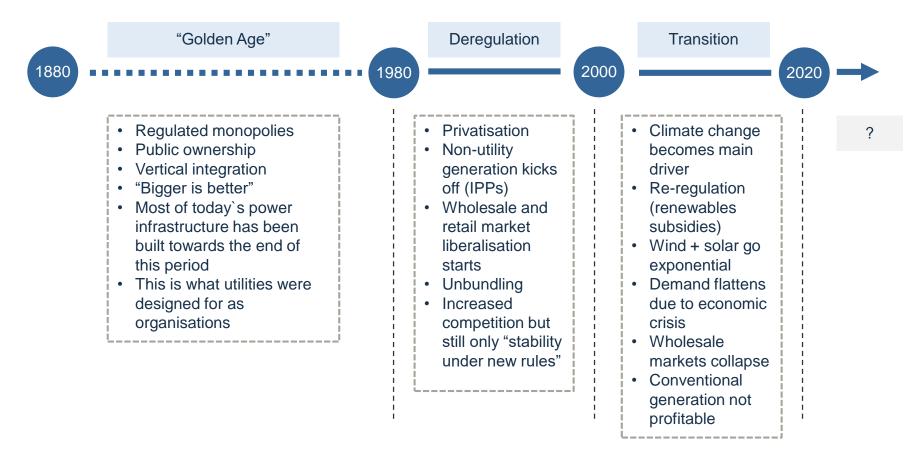
1. Global industry snapshot



A brief history



► The industry is in the midst of its most disruptive moment since the start of electrification



▶ Utilities have been struggling for some years now to find their place in the new market environment; new players with new business models are constantly emerging

The patterns of change



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COP 21 Paris reconfirms climate change policy

Renewables are dominant but coal remains on the agenda of emerging markets

The world is divided on nuclear policy

There is little doubt conventional power generation will have disappeared by 2100

Low carbon has now much higher priority than competitiveness and security of supply (political drivers in tension)

Gas is the "transition fuel" – shale gas will bounce back

Re-regulation due to renewables regulation

Multi-billion writeoffs of mothballed power stations

Continued shift from large central stations to smaller distributed generation

CO2 market mechanism does not work

Persistent
record low
wholesale
electricity
prices

No incentive to build
much required reserve /
balancing capacity –
relatively low levels of
energy security

Energy efficiency and demand response have become key topics

Increasing number of conventional power end-of-life retirements that need replacement

Combating climate change is becoming an undisputed target recognized globally

Still

passionate

and polarising

political

debate around

affordability

New business models and players emerge

The new "normal"?

Electricity market designs are failing and need an urgent overhaul

No revolutionary technology in sight - mid term will see incremental improvement

Vertically integrated utilities have an increased focus on energy services capitalising on customer relationships and distribution grids

Privatised industry

Liberalised end user markets

Non-utility generators continue to grow and diversify as a group

Low government spend & weak balance sheets

New entrants don't have legacy problems

Energy efficiency

Fore- & backward integration among OEMs, developers and operators

Prosumer group grows

Digital customer engagement

East is coming west (China)

Grids need to be stronger, smarter & more flexible

Fusion at advanced R&D stage

Storage will slowly become affordable

Industry 4.0

Cost of solar and wind will continue to go down

Not much exciting to be expected in coal and gas

CCS (carbon capture) appears to be dead

Nuclear is focused on increased safety at affordable cost Increased focus on lifetime extension and performance upgrades rather than new build

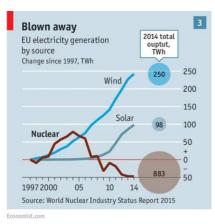
Digitalisation will facilitate demand side management

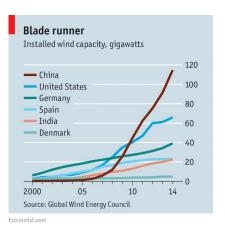
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The patterns of change

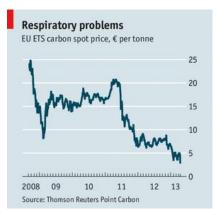


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Combating climate change is becoming an Undisputed target recognized globally

New business models and players emerge

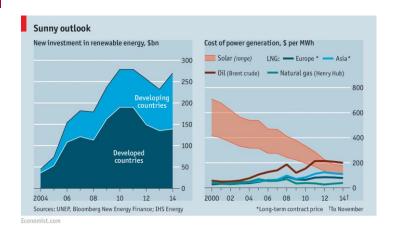
The new "normal"?

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Still a lot of regional disparities in the global landscape....



EUROPE:

- Acute market failure
- Renewables dominant
- Conventional virtually dead

RUSSIA, CIS & TURKEY:

- Gas/coal heavy, some hydro
- Nuclear export campaign

JAPAN:

- Driven by Fukushima
- Policy debate coal, LNG & renewables?

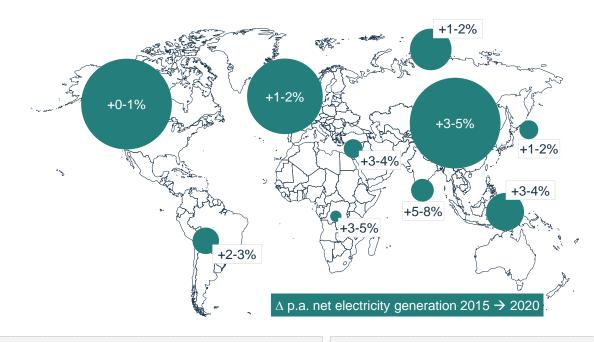
NORTH AMERICA:

- Better than Europe with private investment
- Renewables have significantly gained momentum

.....

SOUTH AMERICA:Very strong in hydro

- Renewables gaining momentum
- Again more private investment – targeted by China



SUB SAHARA AFRICA:

- Lately increased investor focus
- Broad technology/policy mix
- Targeted by China

MIDDLE EAST / NORTH AFRICA:

- Government dominated
- Gas/oil heavy, big hopes on renewables

CHINA:

- Biggest investor in coal in last decade
- Now on dual track policy with focus on renewables
- Going global

INDIA:

- Coal centric
- The next China?

(OTHER) ASIA PACIFIC:

- Heavy positions in coal/gas
- Diverse in ownership & business models

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... although there are some macro-trends



Disruptive changes in the energy mix

- ► The world has set itself up for phasing out fossils by 2100
- ► Political consensus after Paris COP 21
- Renewables have already gone exponential
- ► Gas will grow, Coal will lose momentum, nuclear remains flat

Non-OECD takes the lead

- ► Most of new power generation will be added in non-OECD countries
- Emerging markets will be the primary drivers on nuclear and coal
- ► They will however also lead on wind and solar

Market re-design

- ▶ The incentive system will be corrected to channel funds into desired policy outcomes
- Carbon markets will be revived
- Less regulation, more market

Changing

patterns of market

players

- ► The character and purpose of utilities will change significantly
- New players and new business models will be in place



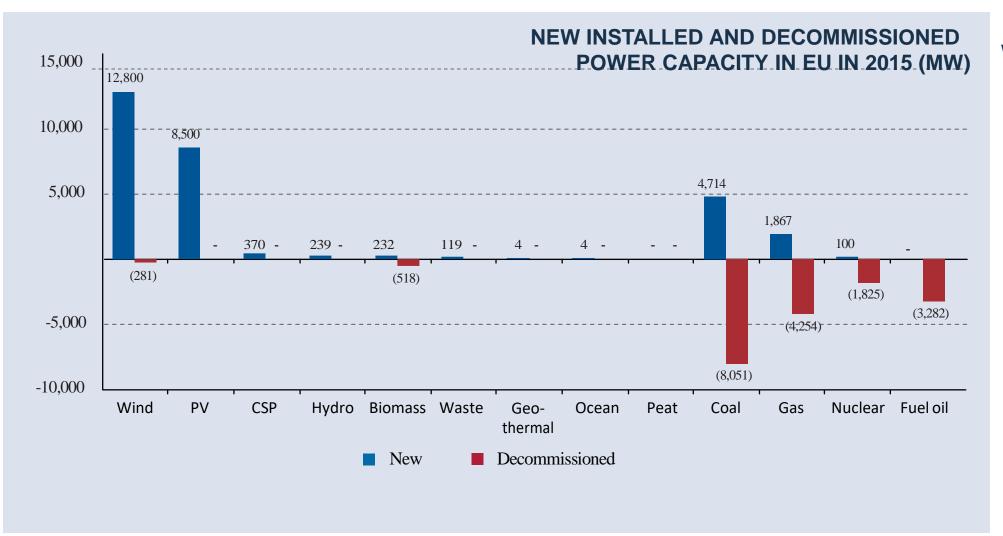
2. Renewables in Europe



RENEWABLES IN EUROPE







Wind Global TOP 6:

China: 30.7 GW

▶ US: 8.5 GW

Germany: 6.0 GW

► Brazil: 2.8 GW

India: 2.6 GW

Canada: 1.5 GW

- The renewables industry is increasingly focusing on outside Europe in terms of new installed capacity
- Not much happens outside Wind and PV

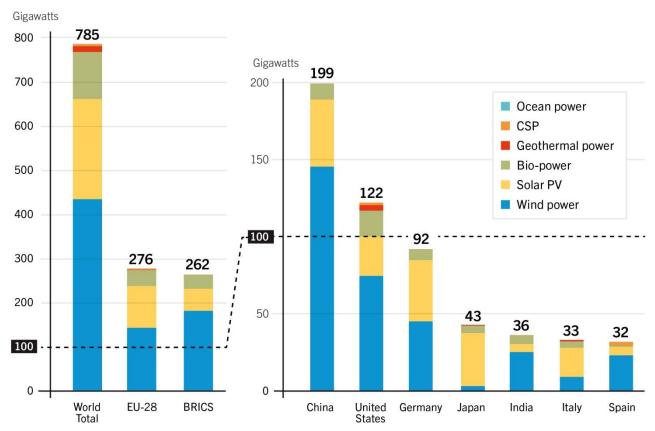
Source: Wind in Power – 2015 European Statistics (EWEA)

RENEWABLES IN EUROPE



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.... but certainly still at the forefront of taking renewables deployment to the next stage



Note: The five BRICS countries are Brazil, the Russian Federation, India, China and South Africa. Not including hydropower.

REN21 Renewables 2016 Global Status Report



Europe remains with the biggest problems to be solved and will act as a blue print for the rest of the world:

- Market failure most acute: a redesign will happen with again more market, less subsidies (CO2revival?)
- Significant investment in grid infrastructure is necessary – digitalisation will have strong impact (Utility 4.0)
- Aging fleet: the majority of installed wind turbines will get to end of design life within the next years
- Changes in the O&M supply chain pending – what will be the future role of OEMs?



3. What does it mean for Romania?



WHAT DOES IT MEAN FOR ROMANIA?

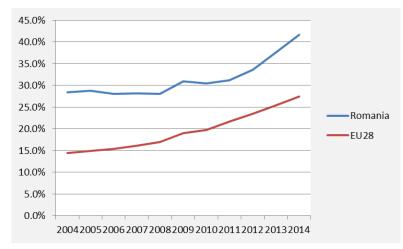


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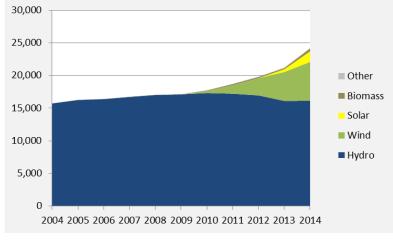
Not a great time for the industry? Or only a fair adjustment to past failures in law making?

INSTALLED CAPACITY [GW]	2013	2014	2015
Wind	2.8	3.2	3.1
Solar	1.3	1.0	1.3
Hydro	0.6	0.5	0.6
Biomass	0.1	0.1	0.1

Projects receiving Green Certificates. Source: Transelectrica



Renewables in Total Electricty Generation [%]



Total installed renewables capacity [MW]

The industry had a great boom in 2010 to 2013

- ▶ A record 3 GW of wind farms were put in place in very little time
- >6bn EUR of investment

The industry has been struggling since then:

- Unclear legislation and policy making
- Ex post facto law making
- Lack of predictability
- → Some of the investments made face bankruptcy
- New investment practically came to a total halt

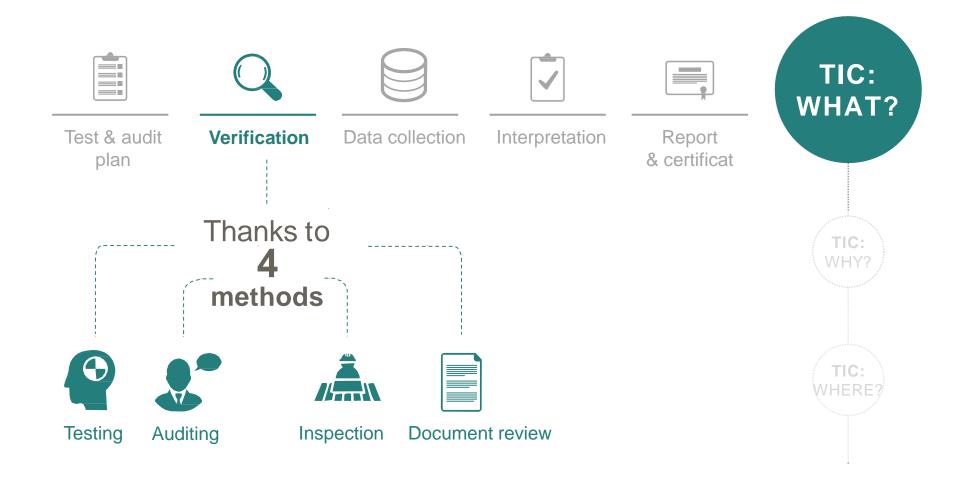


4. The importance of conformity assessment



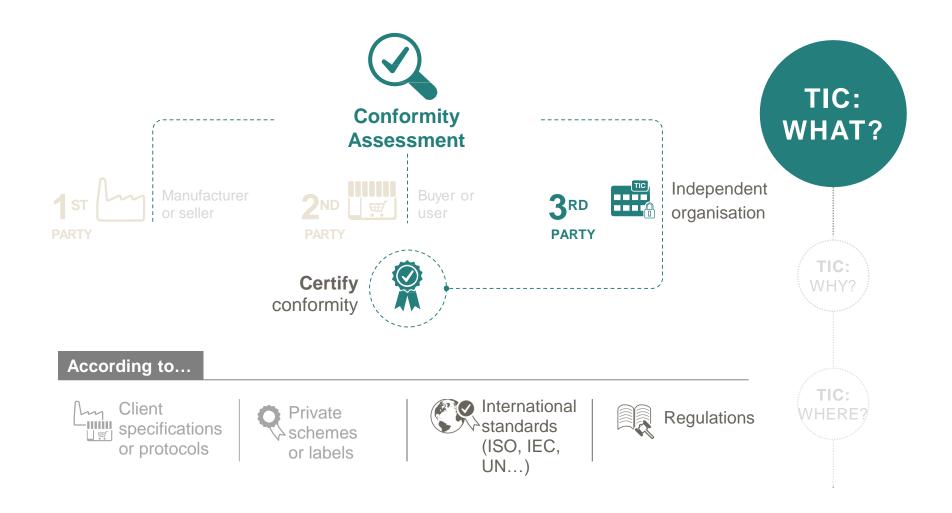
Facilitation of trade and reduction of transaction cost





Facilitation of trade and reduction of transaction cost

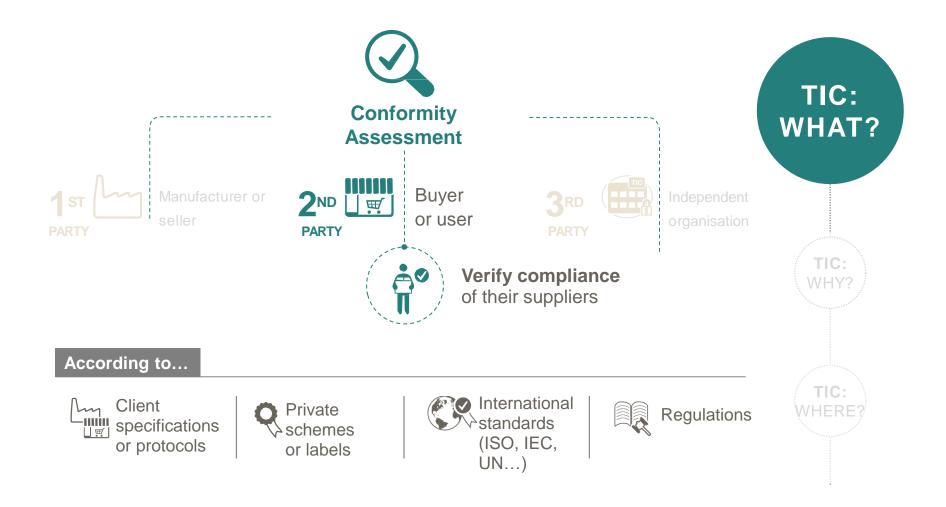




Facilitation of trade and reduction of transaction cost

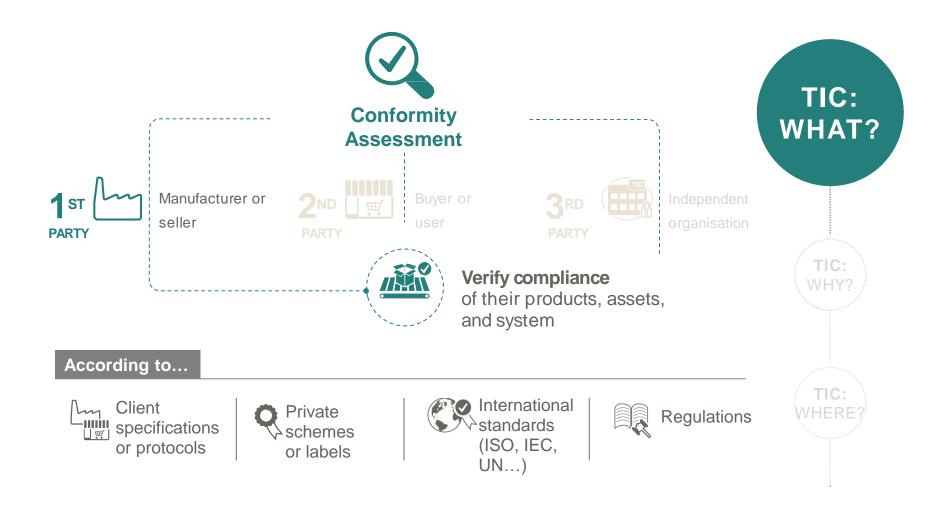


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Facilitation of trade and reduction of transaction cost

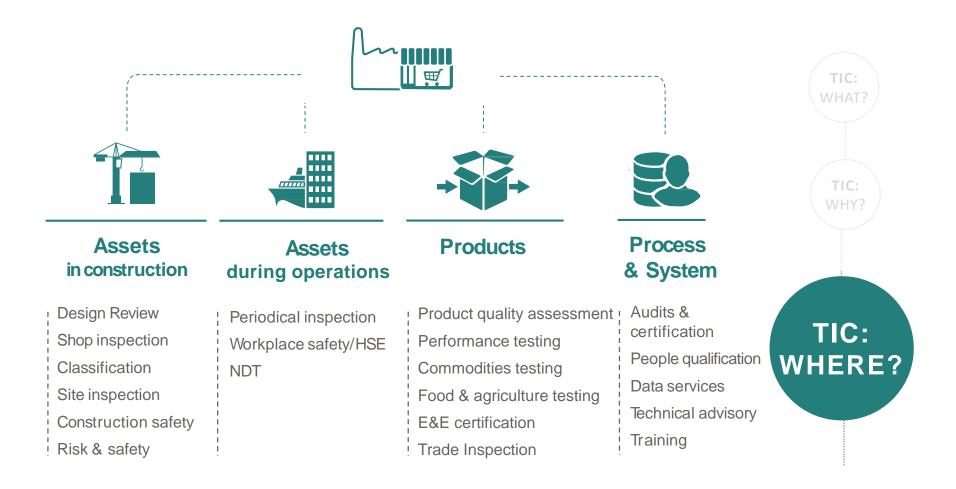




Facilitation of trade and reduction of transaction cost

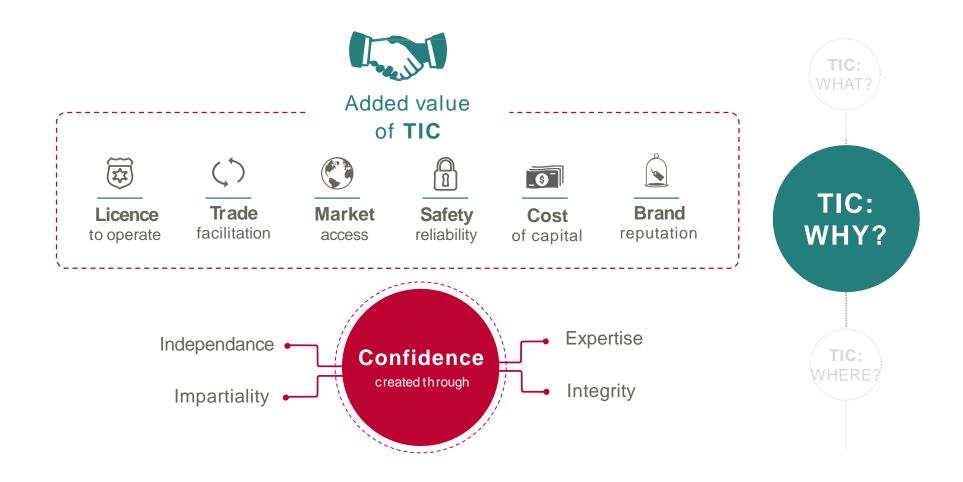


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Facilitation of trade and reduction of transaction cost









1.	Product manufacturing & procurement	Access to a global, but reliable supply chain	 Supplier technical assessment 2nd / 3rd party inspections Expediting Product & system certification
2.	EPC delivery & system integration	Keep quality at spec, cost to budget & time to schedule	 Design review On site QA/QC, HSE, Construction Mgt. Commissioning support
3.	Installed product maintenance	Shorten outage time	 Risk based inspections On site QA/QC, HSE, Outage Mgt. Sub contractor technical assessment
4.	Installed product optimisation	Extend the life time Improve performance Ensure availability	 Asset integrity management Condition monitoring Remaining life assessment

Bureau Veritas at a glance



- Testing
- Inspection
- Certification
- Technical assistance

- Conventional Power
- Renewables
- ► T&D







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