



# OCG's Industry Outlook for the Asset Intensive Industries, *zoom on TSOs*

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Group CEO

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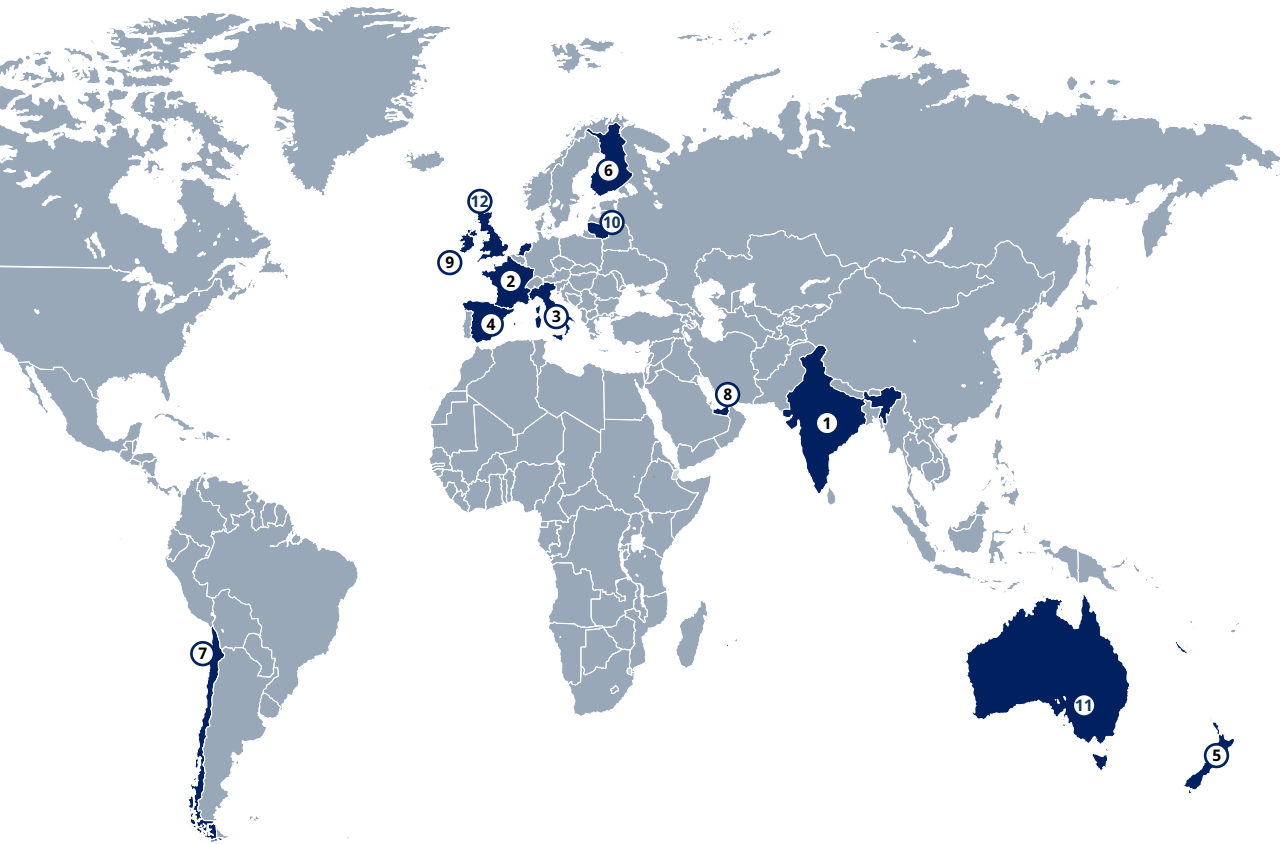
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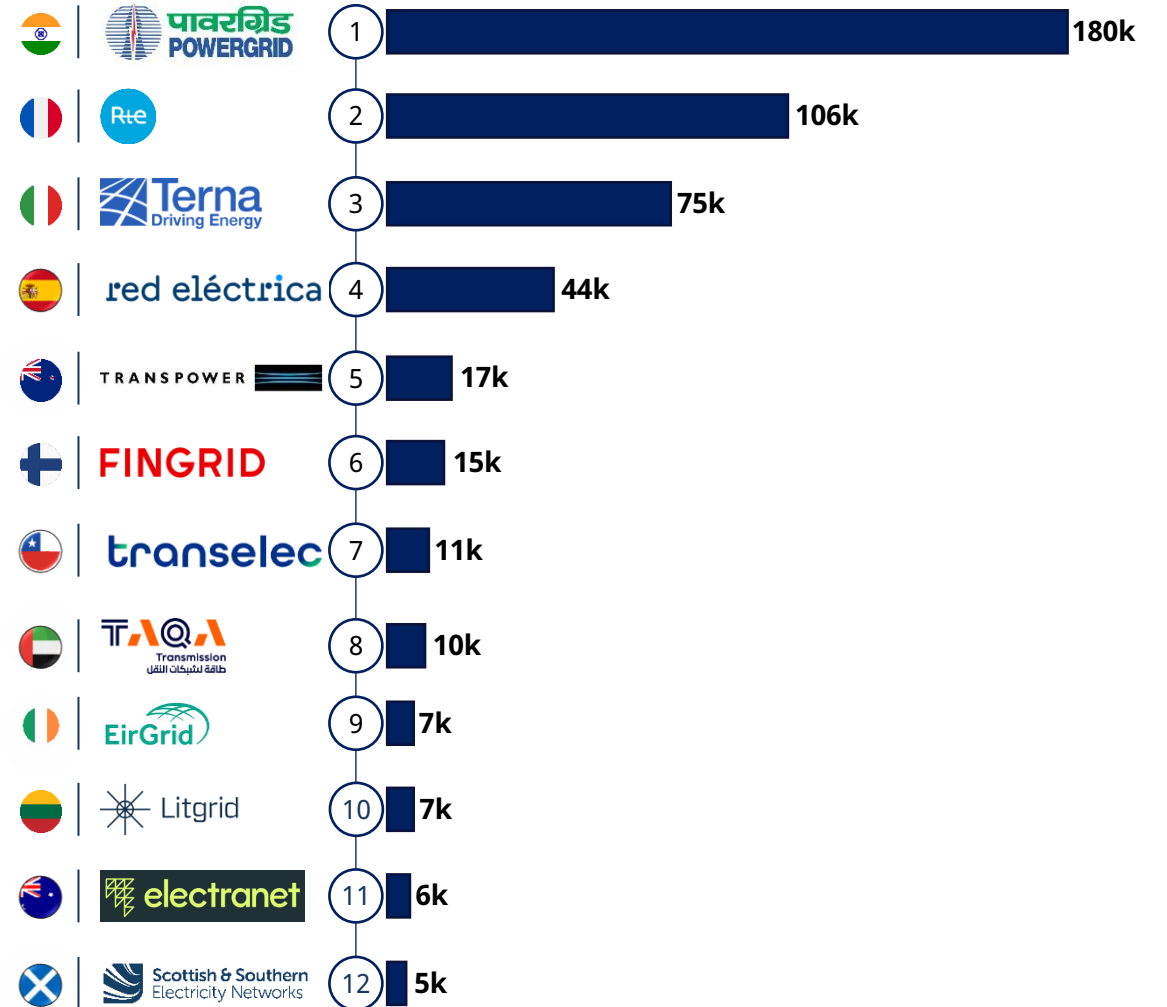
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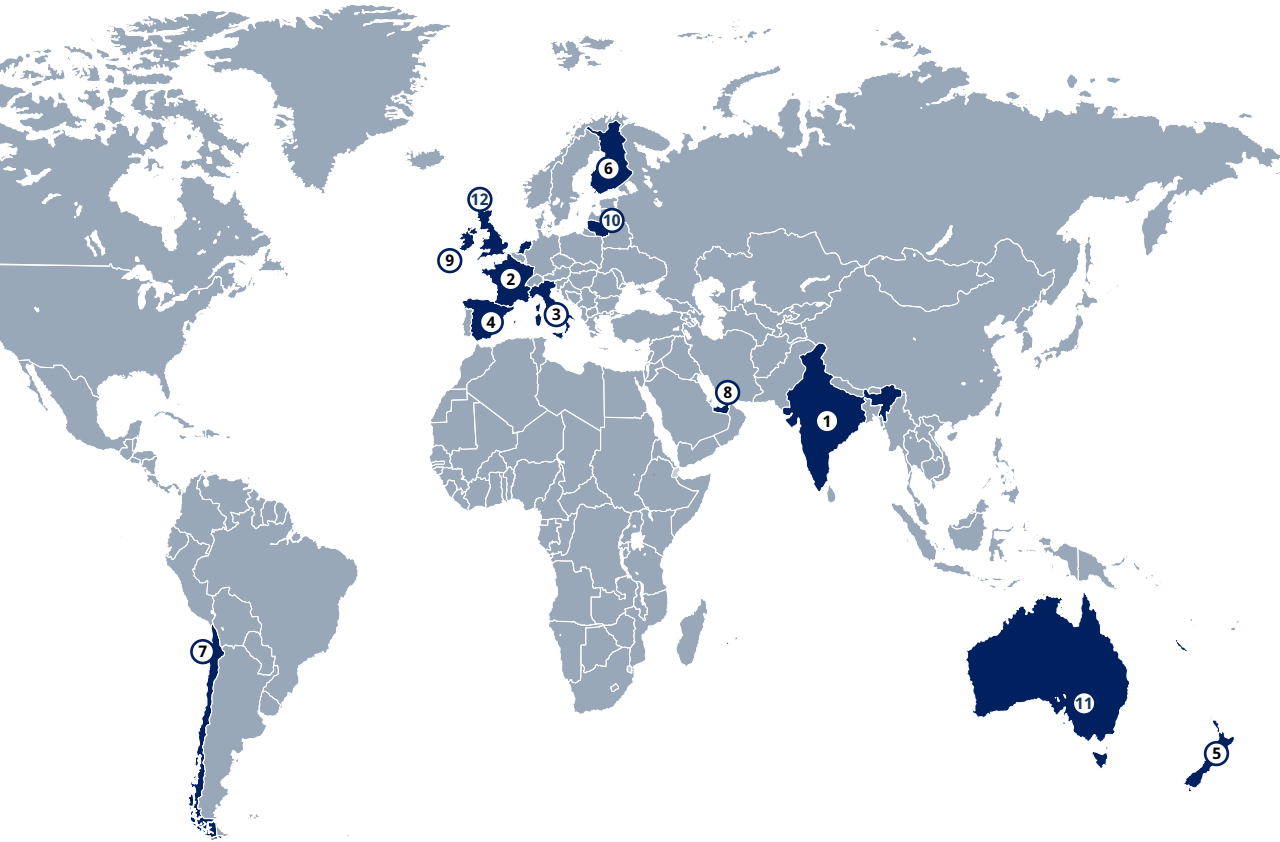
# ITAMS 2024 Peer Group



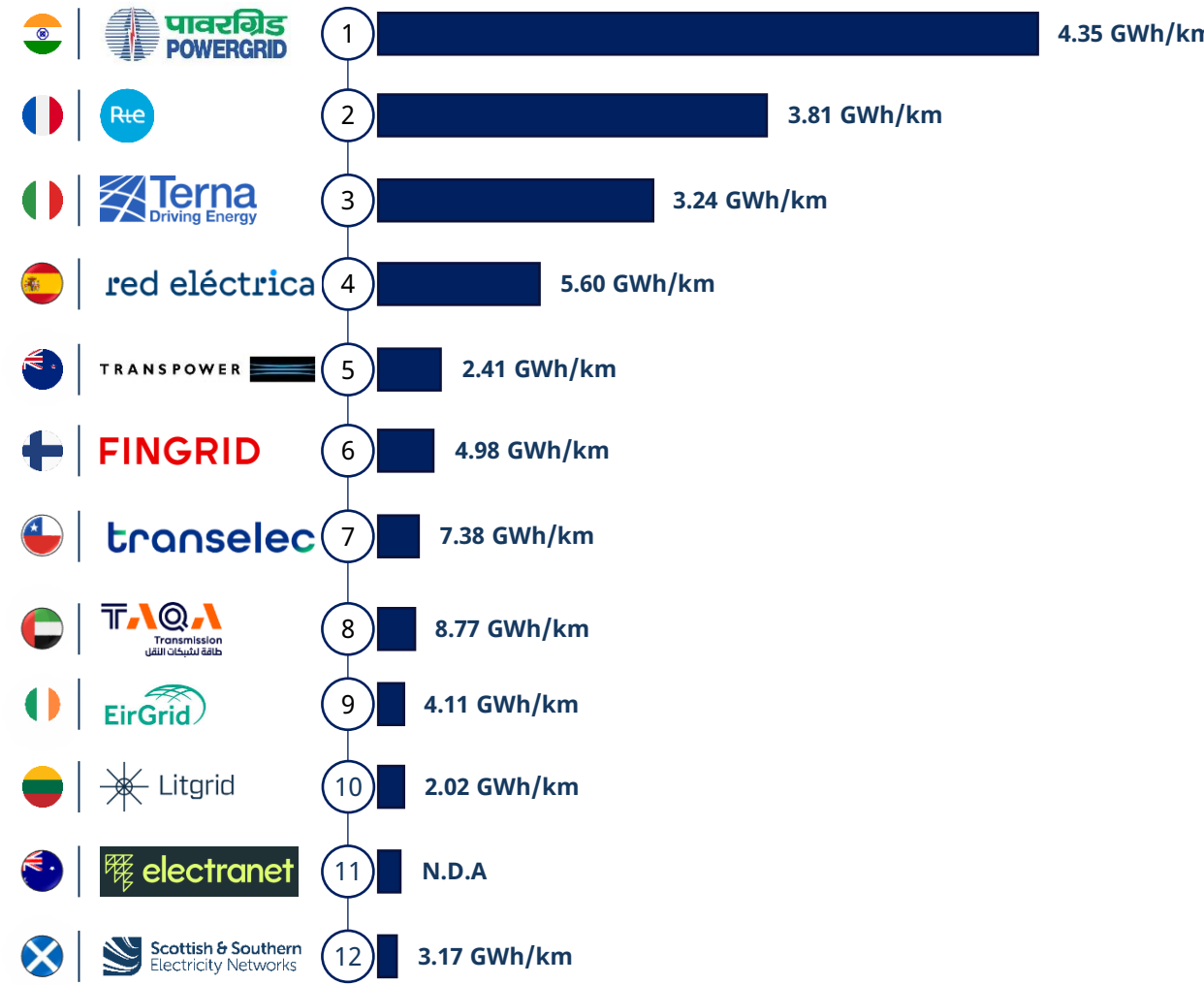
## ITAMS participants - Key dimensions [circuit km]



# ITAMS 2024 Peer Group



## ITAMS participants - Key dimensions [Energy Throughput]





# Industry Pressures



## Energy Transition: Renewable Integration & Grid Capacity

- The **influx of renewable generation** is seeing exponential growth.
- The influx of renewables **requires flexible operations** of non-renewable generation.
- **Net congestion** is becoming a larger problem.
- Customers experience **bottlenecks** due to the congestion.



## Digitalization: Data as an Asset & Cybersecurity

- Data is becoming a **more accessible asset** through industry wide digitalization efforts.
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- For data and digital assets, **cyber security** is the new perimeter.



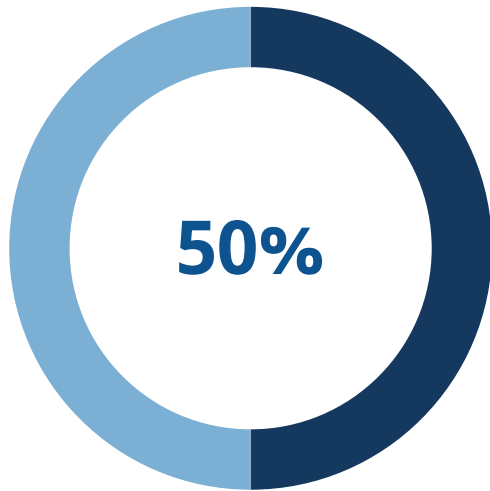
## Resilience: Climate Risks & Organizational Resilience

- The **global climate** is changing significantly, with **extreme weather** occurring more often.
- **Geopolitical turmoil** pressures the current way of business
- **Common practices** need to be adjusted to deal with the unprecedented circumstances.
- **Resilience initiatives** are required across the board to maintain reliability of the grid.

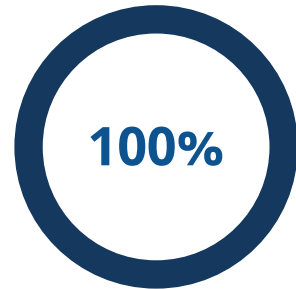
# Energy Transition – Current situation of the peer group

At the current pace, RES integration is **unsustainable**: the renewable input outpaces the grid's capacity, feeding the **congestion challenges**

## Projected investment in the Energy Transition ('24-'28)

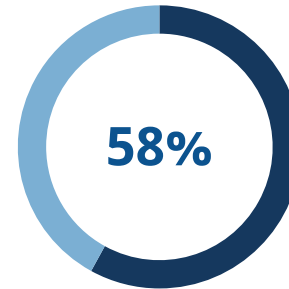


**Energy transition as a top challenge**



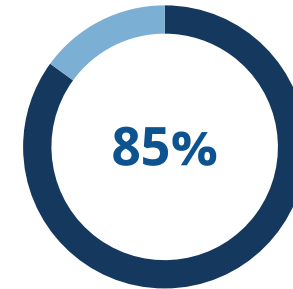
**Renewable energy sources (RES) integration**

- **Solar:** 100% invested in '22-'23 and will continue in '24-'28
- **Off-shore wind:** 25% invest in '22-'23 and will continue in 24-28
- **Onshore wind:** 83% have invested in '22-'23 and 90% will in '24-'28



**Retire Fossil Fuels**

- **Coal plants:** 33% will retire coal plants in '24-'28
- **Other fossil fuels:** 40% will retire other fossil fuel-powered plants in '24-'28



**Energy Storage Solutions**

- **67%** already invested in '22-'23
- **Best Practices** have invested in '22-'23 and continue to invest in '24-'28

**+ 216 GW**

**Net Energy input**

- Total of **226 GW of new RES** input
- Total of **10 GW of fossil fuels** input will be retired
- Total of **28,000 km of OHL** will be added or reinforced

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## Energy Transition – Roadblocks

### TSOs face challenging **roadblock** in their pursuit **to support the Energy Transition**



**Supply constraints from manufacturing and contractors**



**Lack of grid capacity to facilitate the infeed of RES**



**Regulation and legislation don't fit the situational landscape**

# Energy Transition – Roadblocks

## Supply constraints from manufacturing and contractors



See supply constraints as a roadblock



#1 impactful roadblock to the Energy Transition



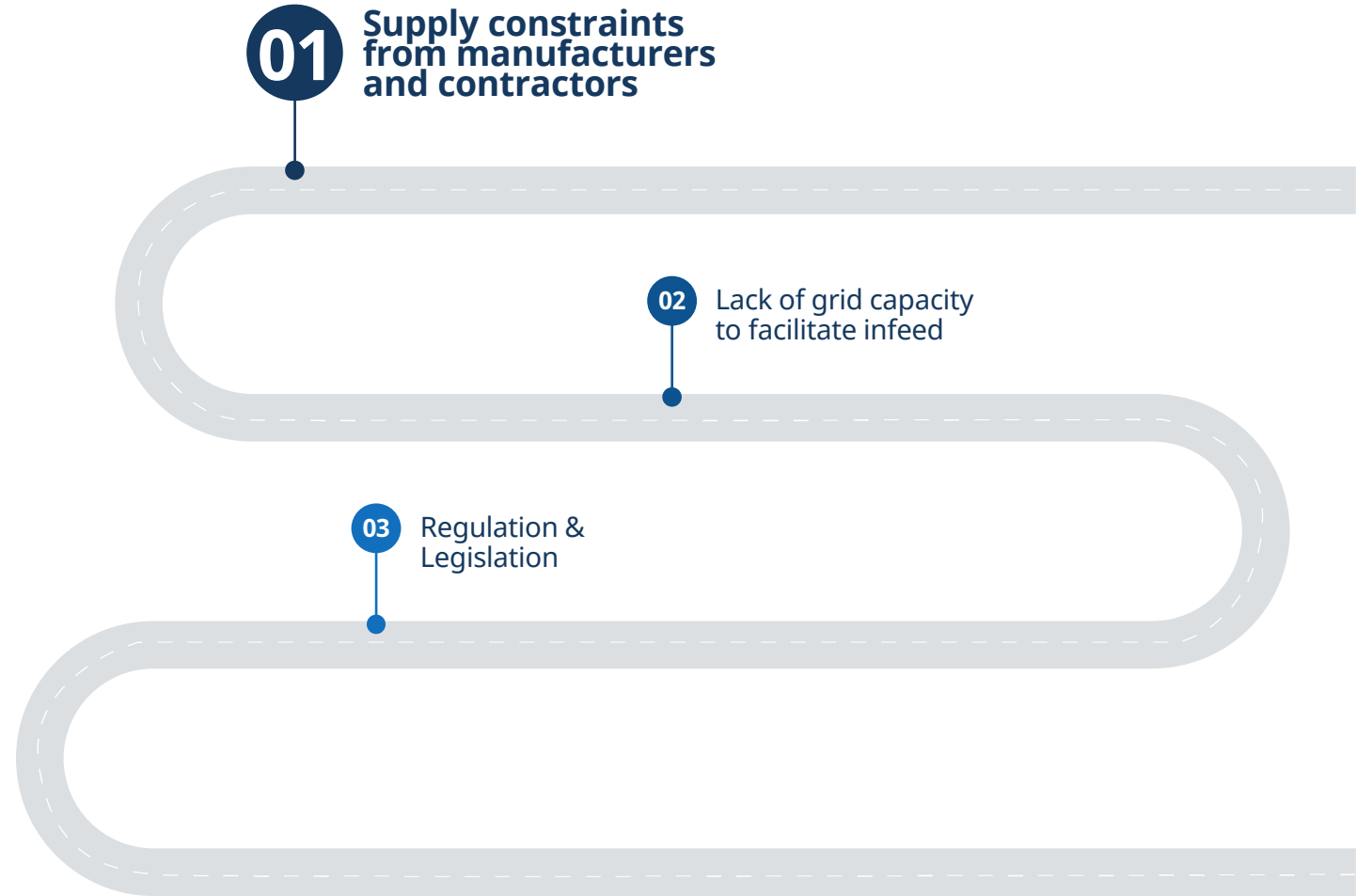
Requires strong **supply chain resilience**



**Breakout Session #1:**  
*“Resilience Labs”*

**nationalgrid**

**Keynote speaker:**  
*“Powering the Future:  
Lessons From The Frontlines  
Of Energy Transition,  
Resilience & Digitalisation”*



# Energy Transition – Roadblocks

## Lack of grid capacity to facilitate the infeed of RES



see grid capacity as a roadblock



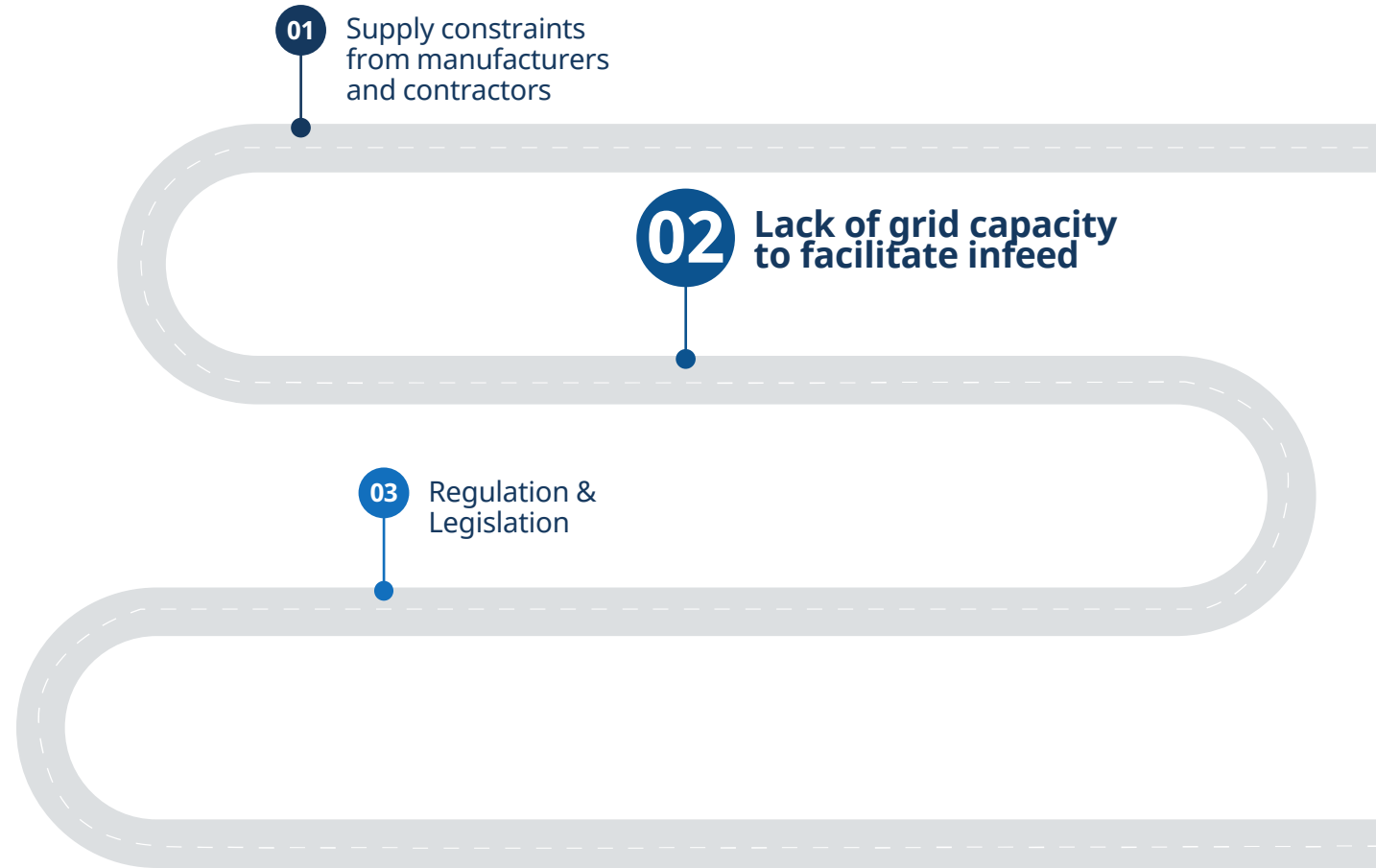
2<sup>nd</sup> most impactful roadblock to their Energy Transition



Requires strong **sustainable investment** into the grid capacity

**transelec**

Joint discussion:  
*"Lessons learned from the blackout"*



# Energy Transition – Roadblocks

## Regulation and legislation don't fit the situational landscape

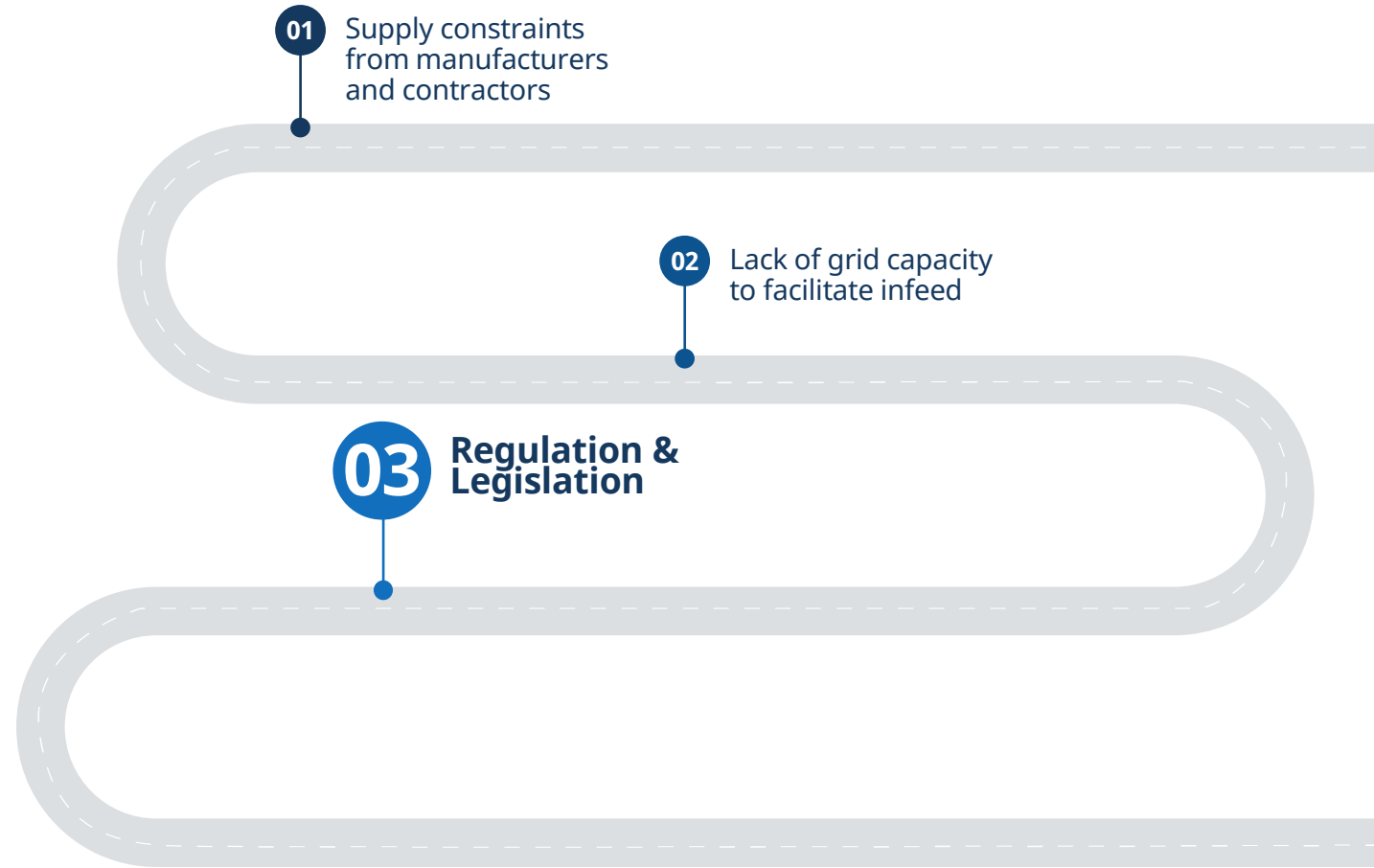
**75%** see regulations & legislation as a roadblock

**3<sup>rd</sup> most impactful roadblock** to their Energy Transition

Requires active **lobbying of regulatory** and governmental authorities



**Joint Discussion:**  
*"From the Iberian Blackout to Resilient Grids: Asset Management for a Renewable Future"*



# Industry Pressures



## Energy Transition: Renewable Integration & Grid Capacity

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## Digitalization: Data as an Asset & Cyber Security

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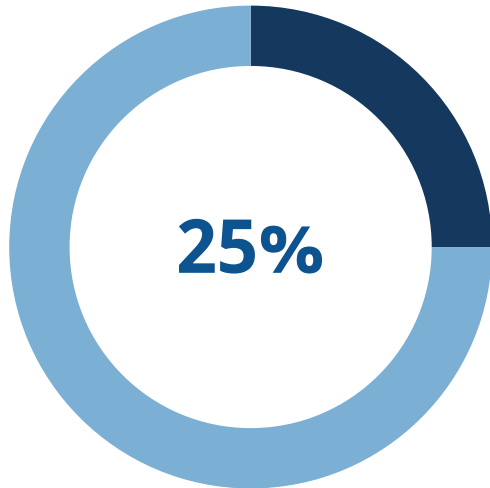


## Resilience: Climate Risks & Organizational Resilience

- The **global climate** is changing significantly, with **extreme weather** occurs more often.
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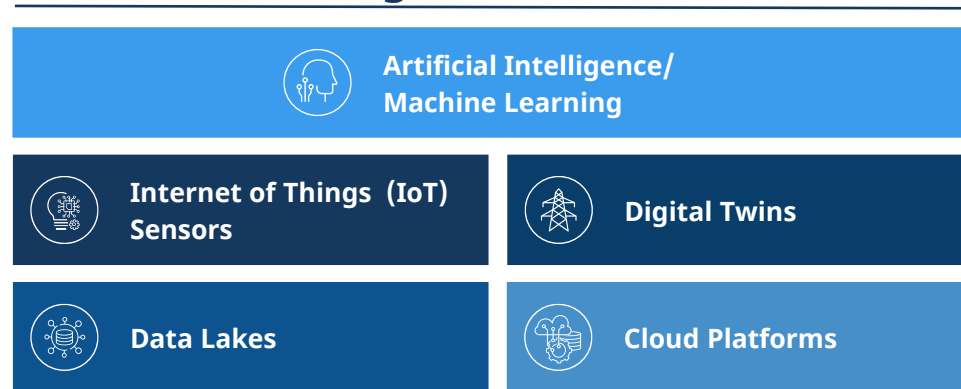
## Digitalization – Current situation of the peer group

**Data is the newest asset TSOs need to exploit, demanding data quality, data security, and data governance**



**Digitalization as a top challenge**

### Digital Toolbox



**Data as a strategic Asset**

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# Digitalization – Value at Stake

Many organizations overlook the impact of poor Asset Data Quality on their business

**Best Practices:** Poor **Asset Data Quality** is the **#1 barrier to value creation**, affecting all major processes

01

## Asset Strategy

- Misalignment of long-term plans
- Prevents Asset Prioritization
- Weakens business cases for innovation

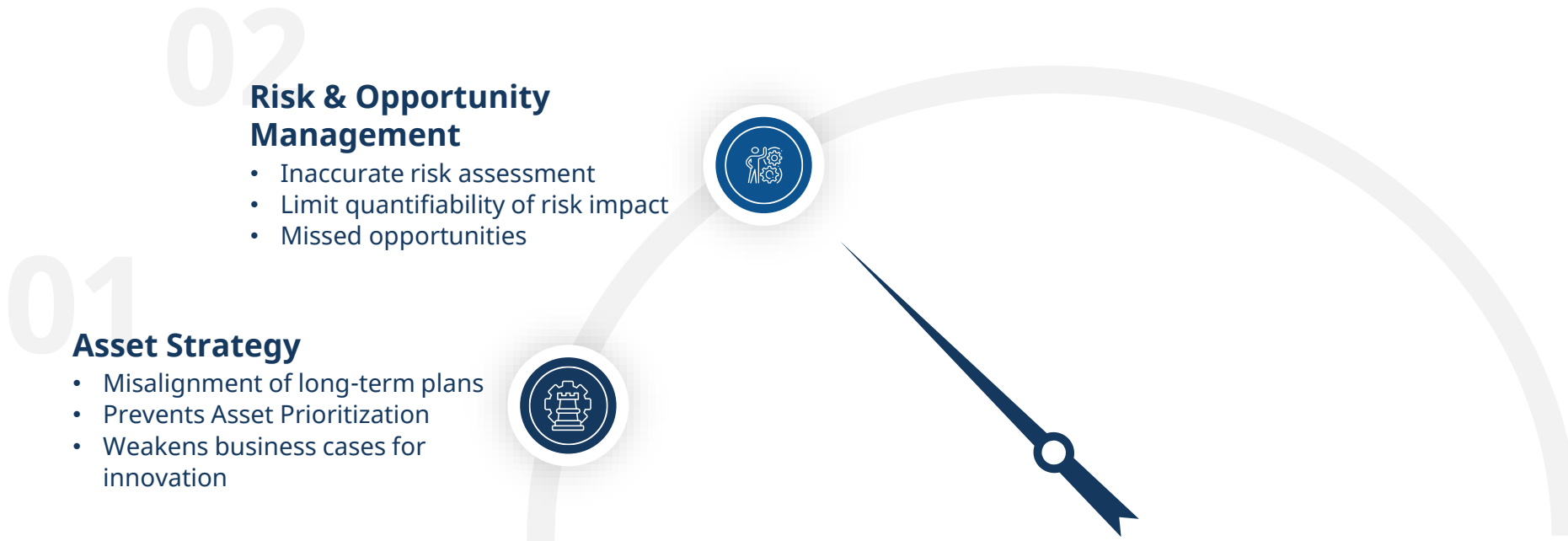


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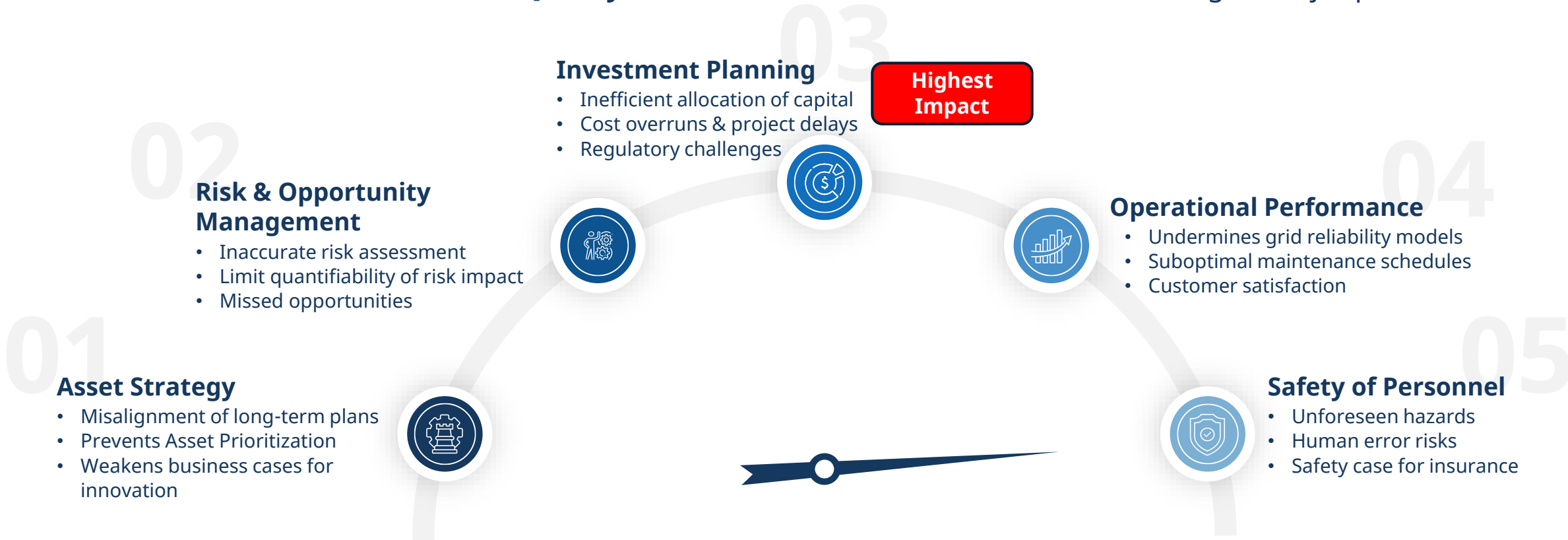
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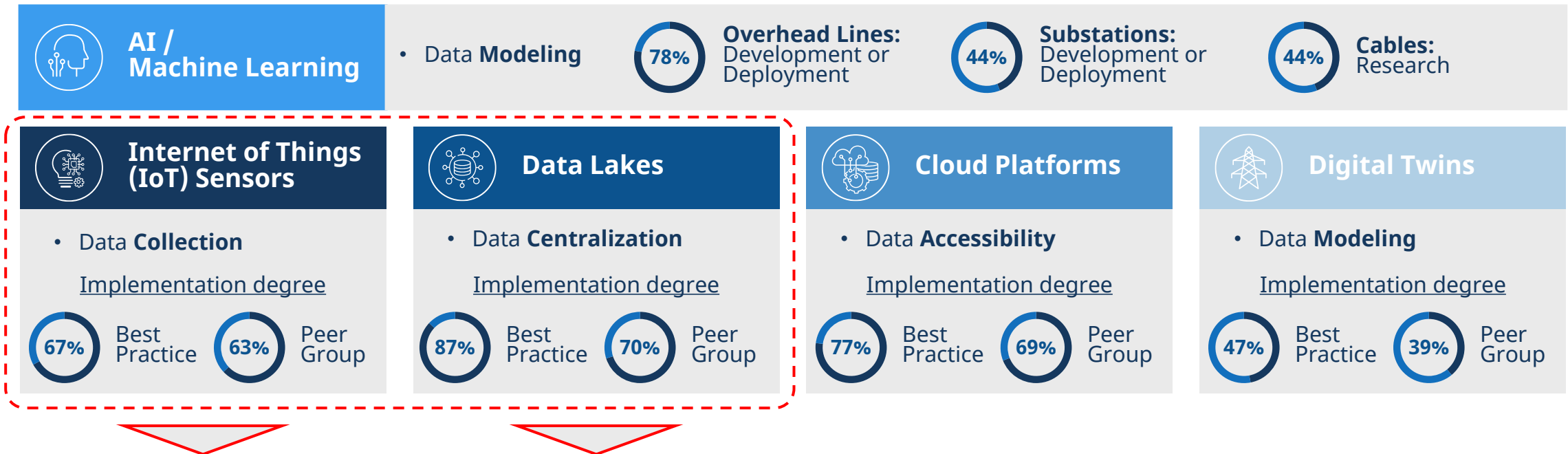
**Best Practices:** Poor **Asset Data Quality** is the #1 **barrier to value creation**, affecting all major processes



Without **trustworthy data**, digital investments can't deliver **value-creating decisions**

# Digitalization – Peer Group Digital Toolbox

TSOs need to move beyond **siloes data** to a unified system view that enhances **asset value chain decision making**



Data Completeness

Data Fragmentation



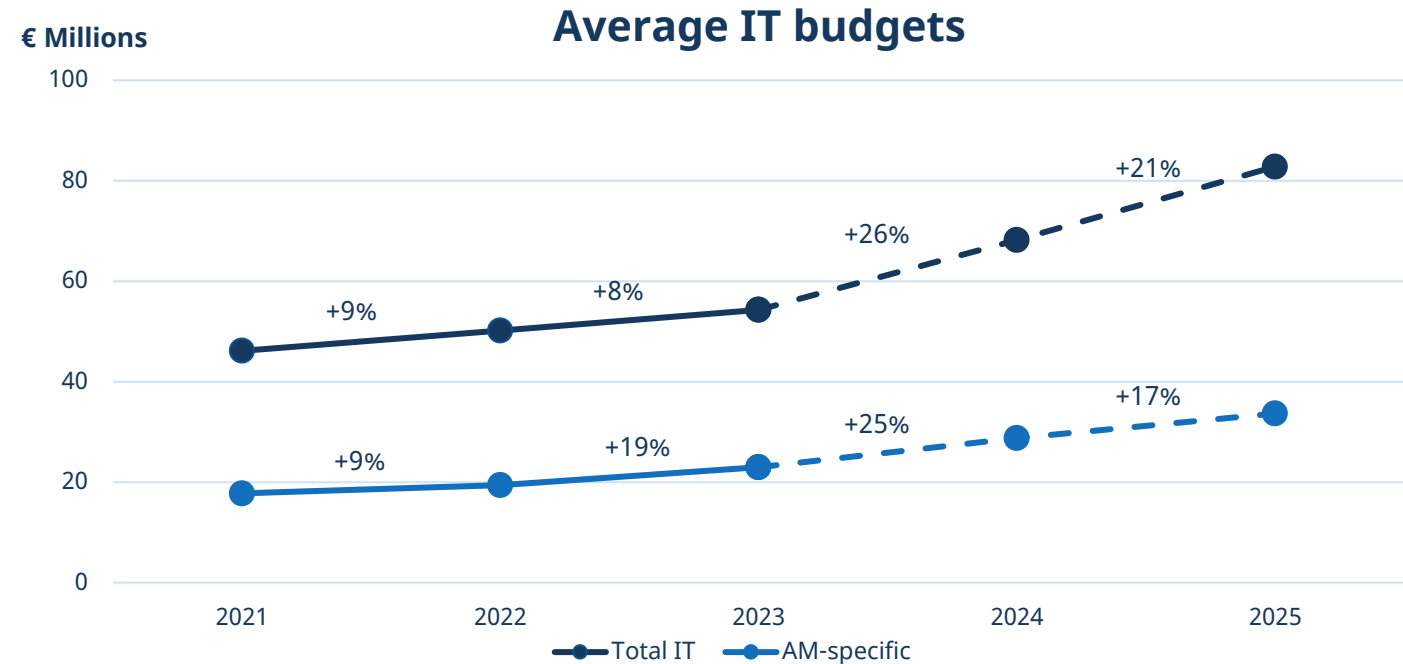
Keynote speeches:  
"Fiber-Optic Based Partial Discharge Monitoring and Localization"



Keynote speeches:  
"Autonomous Drones: Beyond the visual line of sight"

# Digitalization – Data Governance

- The **IT-budgets** of peers are **growing**
- **Large percentage** of IT budget is spent on **Asset Management**
- **IT support** is key to **transform data** into actionable insights
- Strong **data governance** is needed to **guide data** along the **supply chain efficiently** to derive value



- Asset Management related positions:
  - **Data Analyst**
  - **Data Quality Manager**
  - **Business Analyst**
- **Best Practice** extend further with **Application Managers** and **System Architects** in their AM teams



**Keynote speeches:**  
"AI towards Asset Management transformation"



**Best Practice:**  
"Enterprise Asset Management Implementation"

# Industry Pressures



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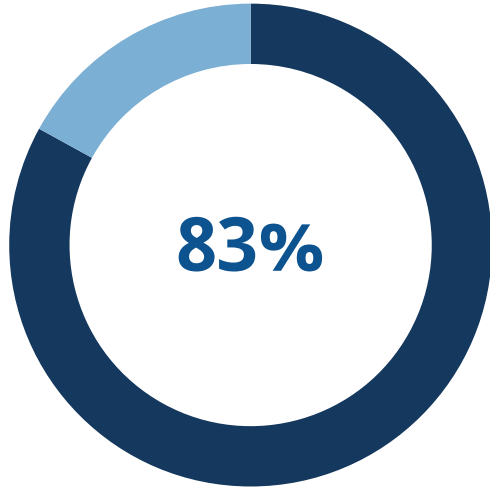
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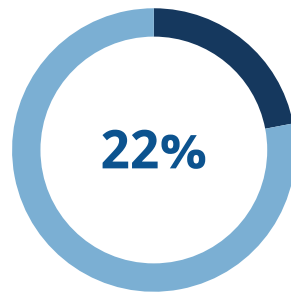
## Resilience – Current situation of the peer group

TSOs are confronted with an **aging** grid infrastructure precisely when unprecedented system transformation is demanded, from **renewables integration** to **climate** and **security threats**

### End-of-life transmission assets

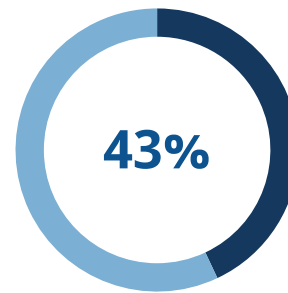


**Resilience as a top challenge**



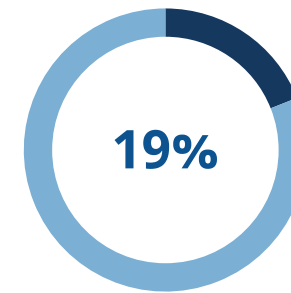
#### Towers

- **Widespread aging** asset base
- Ageing **Tower** still have a **“Good”** condition



#### Conductors

- **Widespread aging** asset base
- Ageing **Conductors** have a **“Fair”** condition



#### Transformers

- **Widespread aging** asset base
- Ageing **Transformers** have a **“Fair”** condition



**27%**

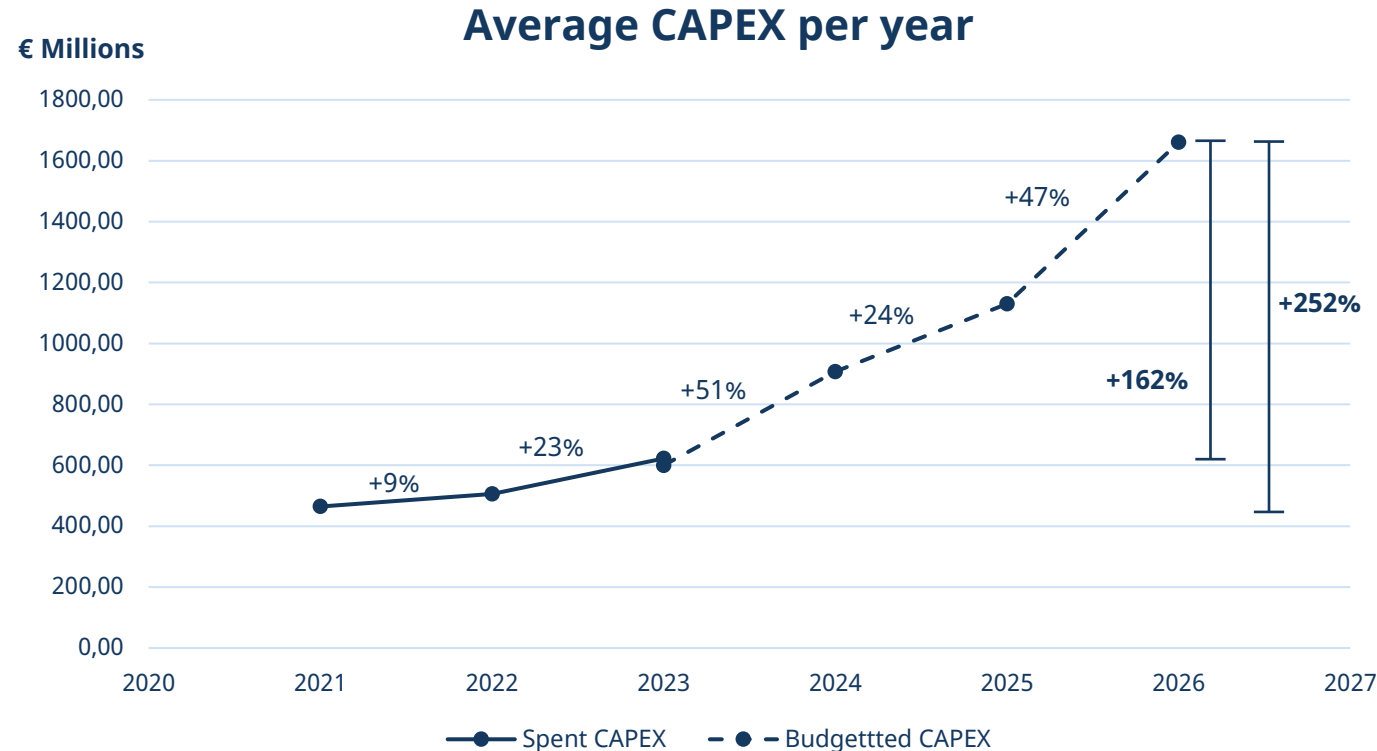
#### CAPEX Budget

- More than a **quarter of the CAPEX** budget is dedicated to **Replacement** in 2023
- TSOs must navigate critical trade-offs: urgent **asset renewal** and parallel **grid expansion** compete for limited CAPEX.

## Resilience – Sustainable investment in the grid

Capital is properly prepared for the future, but without a **resilient supply chain the capital can't be invested**

- **CAPEX budgets** increasing at **exponential** rate
- Budgets expected to more than **triple by 2026-27**
- **CAPEX – Replacement** averages around **29%** of the total **CAPEX budget**
- **Strategic approach** to the **CAPEX challenge** of the future:
  - Portfolio Optimization
  - Life Cycle Costing
  - Total Cost of Ownership



Keynote speeches:

“Critical Infrastructure Management for Resilience”

# Resilience – Securing the Supply Chain

With multi-year lead-time for critical assets, it is crucial to have a **secure supply chains** to avoid inability to respond to critical failures.

- **#1 roadblock** for the Energy transition are the **supply constraints** from manufacturers and contractors
  - Increasing global demand
  - Geopolitical pressures on global stock of key resources
  - Suppliers face backlogs
- **Lead times** have **increased** for critical assets and their components
- **Vulnerable** supply chain negatively affects **risk position**



Keynote speeches:  
"Tennet's Efforts on Target Grid on a 15-Year Planning Horizon"



Keynote speeches:  
"Resilience in Transmission Asset Management"

The time for action is now

**ITAMS facilitates a platform to foster peer collaboration, knowledge exchange, and performance improvements to be able to deal with the challenges of tomorrow**



**Energy Transition:** Renewable Integration & Grid Capacity



**Digitalization:** Data as an Asset & Cybersecurity



**Resilience:** Climate Risks & Organizational Resilience

**Improve together**

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REN Tennet पावरग्रिड POWERGRID Rte olivoENERGY OPTICS EirGrid GROUP

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# Thank You