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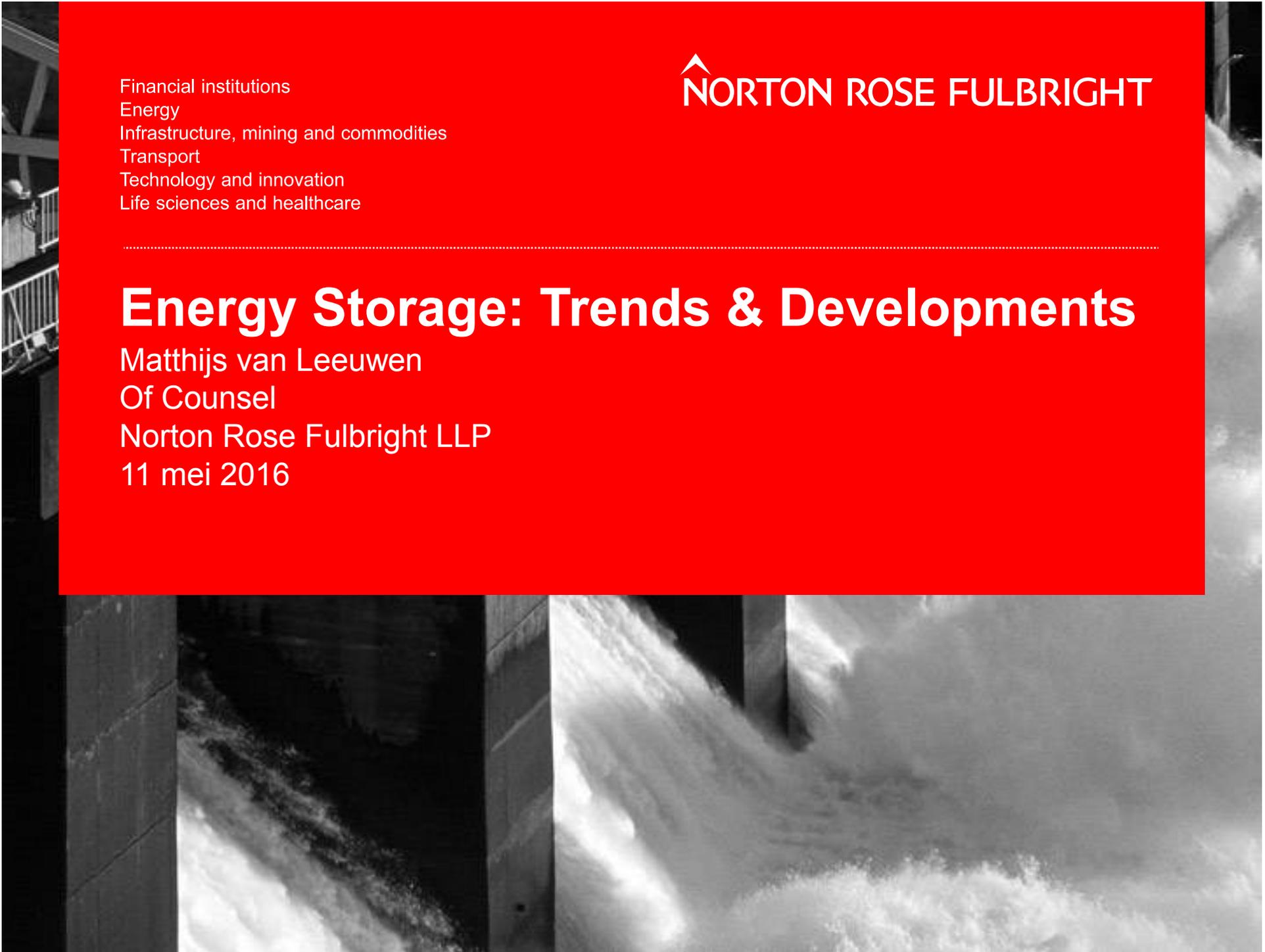
Energy Storage: Trends & Developments

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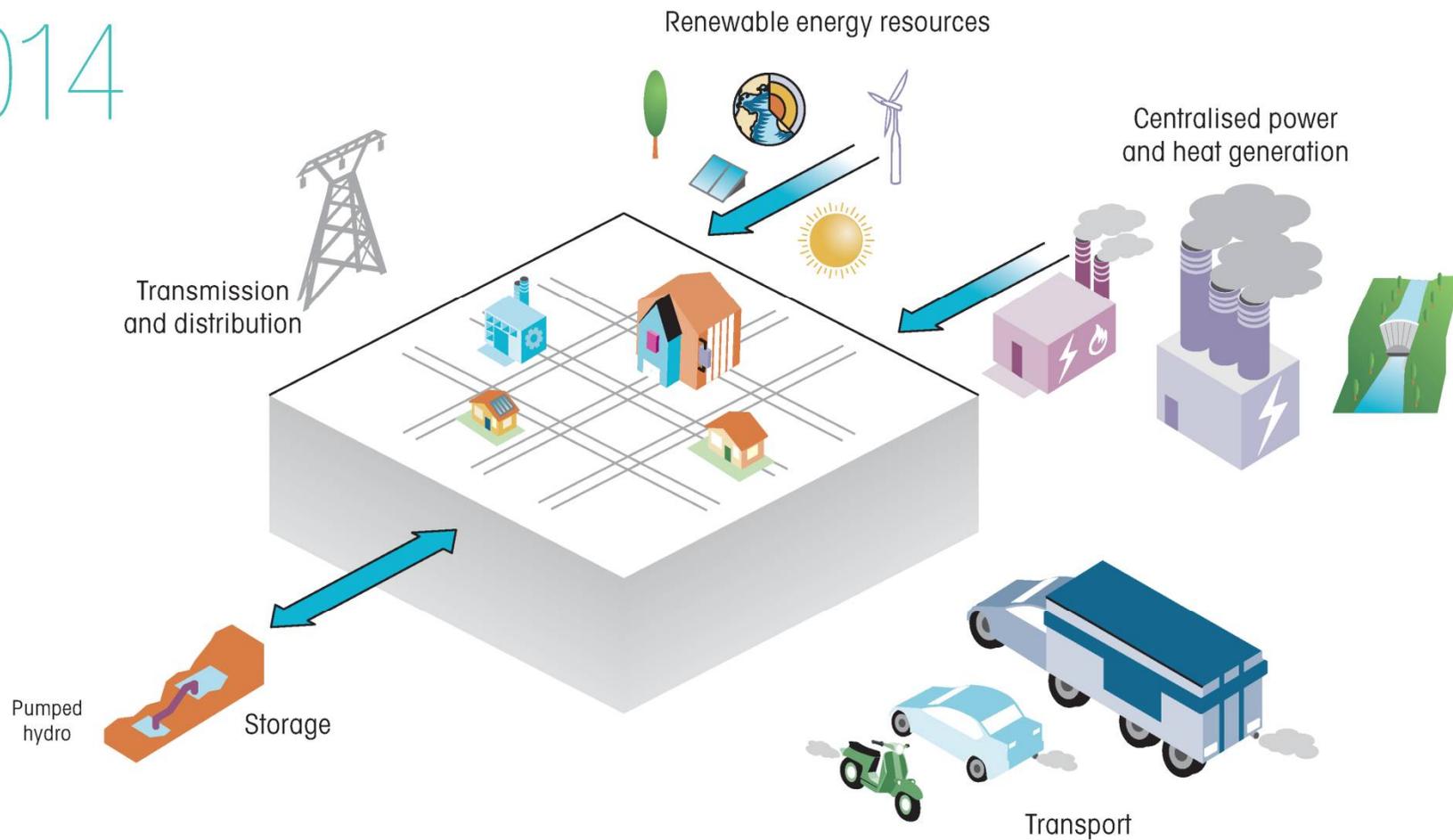


Overview

1. Introduction
2. E-Storage: international trends in applications
3. Market and regulatory conditions
4. Financing: project risks
5. Policy and Legislation

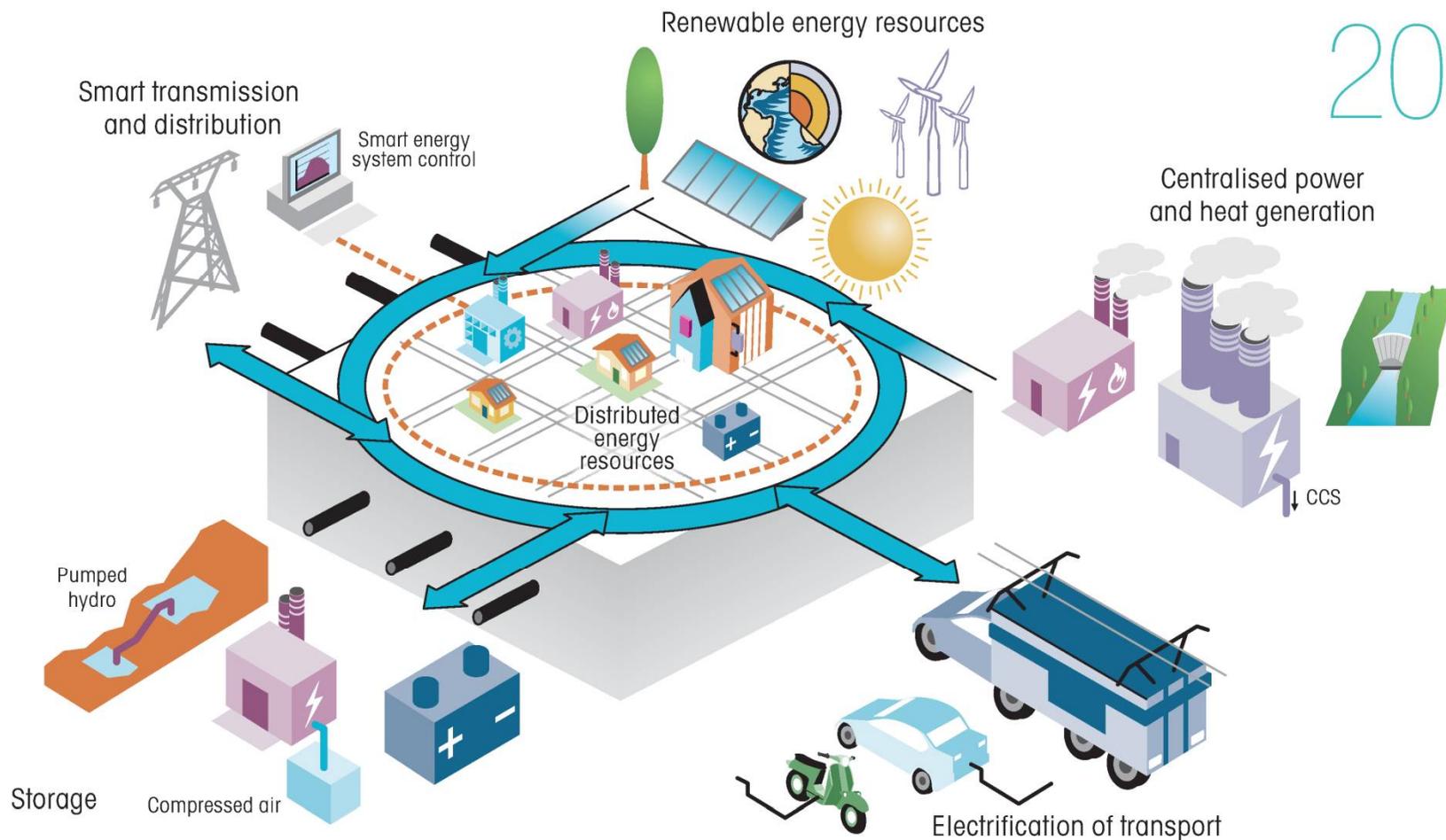
Current energy system

2014



Bron: International Energy Agency

Future energy system



Bron: International Energy Agency

E-Storage: overview

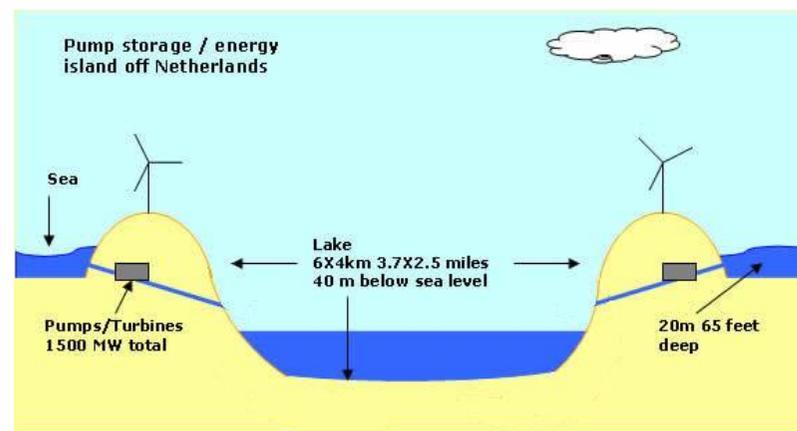
“If renewable energy becomes competitive then it will be a wonderful opportunity. There will be disruption but more opportunity than disruption.” (Warren E. Buffett)

- Market development: 24GW (2020), tot 113 GW (2050/EU)
- Reallocation of subsidies?
- Complex conditions for stimulating investments:
 - Low electricity prices
 - Absence of viable CO₂(e)-pricing
 - Fossil fuel pricing



E-Storage: applications

- Current:
 - Behind the meter
 - Renewable + storage: 'internal hedge'
 - Deferral or avoidance of grid investments
 - Off-grid
 - Balancing and grid services
 - Energy management
 - Power-to-products
- Future
 - Energy islands
 - Offshore power-to-gas



E-Storage: market and regulatory conditions

- Successful implementation of e-storage project benefits from:
 - Smart metering
 - (financial) incentives for technology development
 - Proper valuation of flexibility
 - Benefit stacking
 - Renewable energy share: ~>30%
 - Adequacy of grid infrastructure
 - Access to imbalance markets
 - Arbitrage potential
 - System approach
 - Comprehensive policy: long-term stability, predictability and foreseeability
 - Technology neutral
 - Clear definition of participants roles
 - Available capital
 - Proper legislation

Financing: project risks

- Depending on:
 - Technology utilised for specific application
 - Behind the meter or *grid-scale*
- Business model
- Contracting structure
- Construction
- Planning / Health, Safety and Environment
- Operational and technical specifications
- Technology: warranty structure
- Control over asset?
- Privacy and data protection

Policy and Legislation: international

- IEA: *'regulatory and market conditions often ill-equipped to compensate storage for the suite of services it can provide'*
- EU 2030 Energy & Climate Framework
- Recent developments:
 - Flexible pricing of electricity network tariffs
 - Net-metering
 - Incentivising storage for consumers
 - Tenders for long-term supply of grid services
 - Review of business models network operators

Policy and Legislation: Netherlands

- Frontier Economics: necessity from 2035, now R&D
- SDE+: negative pricing of electricity?
- *Besluit Experimenten Decentrale Duurzame elektriciteitsopwekking*
- *Wetsvoorstel Voortgang Energietransitie*
 - Focus on experiments
 - Network operators versus market participants
 - Grid investments versus e-storage?
 - Availability of system information
 - Investment plans grid managers

Further information and contact



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Energy Storage Updater 1st edition:

<http://www.nortonrosefulbright.com/knowledge/publications/136741/energy-storage-updater>

Article published in Project Finance International: Energy storage projects – A global overview:

<http://www.pfie.com/energy-storage-projects-a-global-overview/21242630.article>

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