

# ENERGY SYSTEM PROBLEMS WORTH SOLVING

At least as we see it in Energinet 😊

## OUR PROBLEM IS THIS

- Achieving a truly climate neutral energy system,
- While maintaining security of supply to society,
- While reducing average cost of energy per KWh,
- At a relentless pace compared to current velocity

## *Closer integration of System operation and market*

### SYSTEM OPERATION

- Automation of system operation including automatic activation of flexible demand
- Grid connection terms for new plants
- Dynamic Line Rating



### MARKET

- Closer coupling of market and physics (grid)
- Flexible electricity demand as grid reserve
- TSO-DSO collaboration in market and bottleneck management



## *Infrastructure to link power, gas, fuel, heat*

### INFRASTRUCTURE

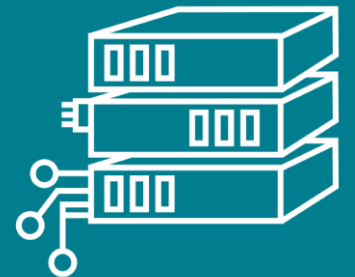
- Offshore grid connection concepts
- Landing zones/energy clusters with sector coupling of electricity, gas, heat and liquified fuels
- Hydrogen infrastructure, hydrogen storage and CO<sub>2</sub> infrastructure



## *Data architecture to link market & operation*

### DIGITALISATION

- Linking data from plants and infrastructure with market and system operation
- Collection and display of data (Energy Data Service) to support decision-making
- Cyber security



# THE UNDERLYING FOUNDATION THAT WILL MAKE OR BRAKE THIS JOURNEY IS SHIFTING THE ENERGY SECTOR INTO THE NETWORK ECONOMY

## Today & Tomorrow

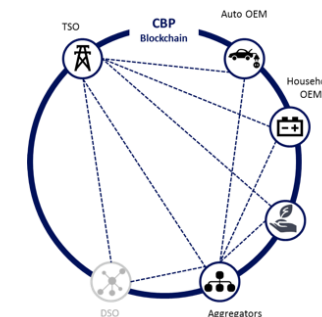


The data management paradigm is open access IoT networks based on *centralized* (cloud) platforms. Ex. DataHub, NordPool, NOIS etc.

## The Future



Energy sector networks with spokes to other sectors. The paradigm is open access IoT networks based on *distributed* clouds. The distributed cloud will act based on software-based contracts in an integrated network.



# WHAT PIECE OF THE PUZZLE SHOULD WE START WITH?



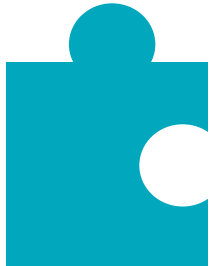
SLT/DLT at scale in production



DLT based DID's in production



Smart contracts and Power of attorneys in production



Lobbying for clearing houses and trust anchors to be digitalized



Opening regulatory-, markets- and system silos for integration

WE START BY PUTTING THE DANISH AND  
FINALLY EUROPEAN SYSTEM OF  
GUARANTEES OF ORIGIN IN PLAY AS OUR  
REAL WORLD INNOVATION SPACE

WE DEPLOY OUR ALPHA VERSION MAY 1<sup>ST</sup>  
2020 BUILD ON HYPERLEDGER  
SAWTOOTH

AND WISH TO CREATE PROOF THAT THE TANGLE IS  
THE RIGHT BASKET TO PUT OUR EGGS IN WITHIN THE  
NEXT THREE MONTHS

