Hydrogen Territories / Valleys: a pilot for Europe
BIG HIT Project

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Mission Innovation H2 Valleys Workshop

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AGENDA

1) Hydrogen in the Energy Transition:
   Locally-Integrated Energy Systems (H2 Territories/Valleys)

2) Case study: the BIG HIT project

3) Lessons learnt & next steps

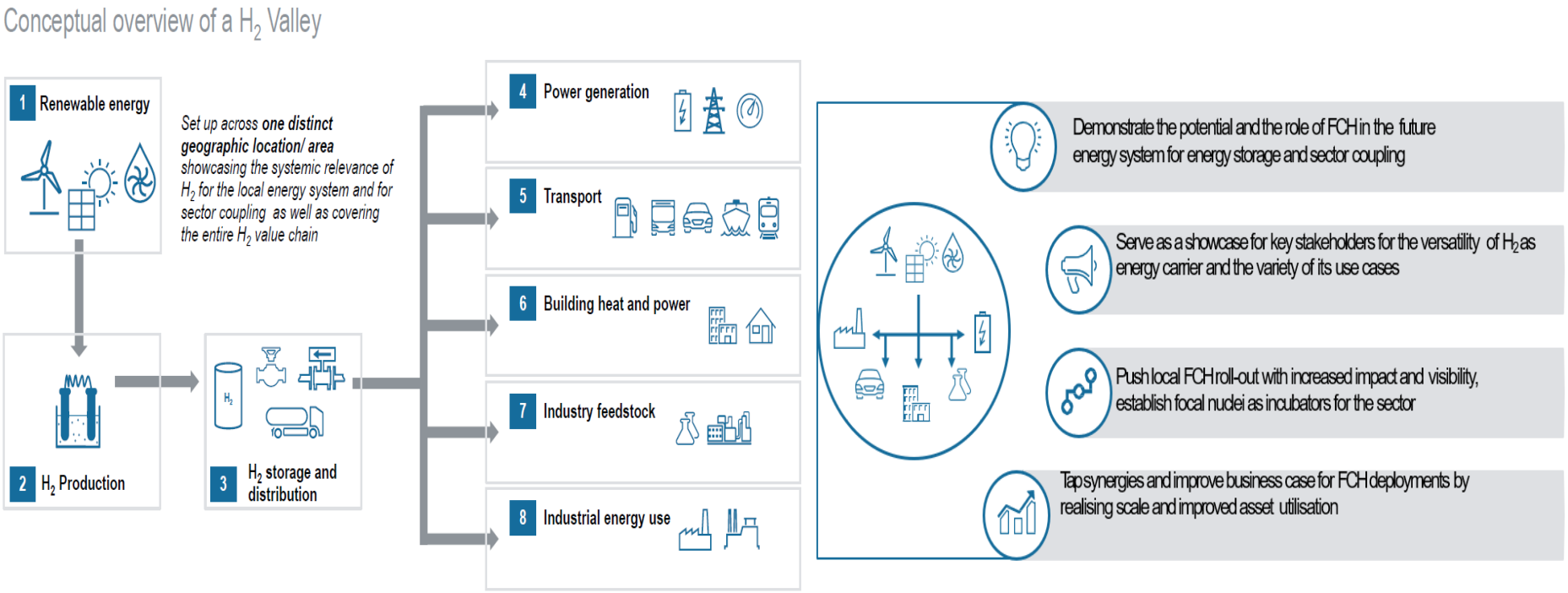
Energy Transition & Local Energy Systems

Next steps:

1) Integration of heat & power, transport, industrial low carbon end-uses
2) Energy vectors (electricity, hydrogen, biogas)
3) Development of integrated RES-based energy systems

Requires integrated supply/demand infrastructure

Hydrogen Territories/Valleys concept



[Credit/REF: FCH JU study by Roland Berger 2018]

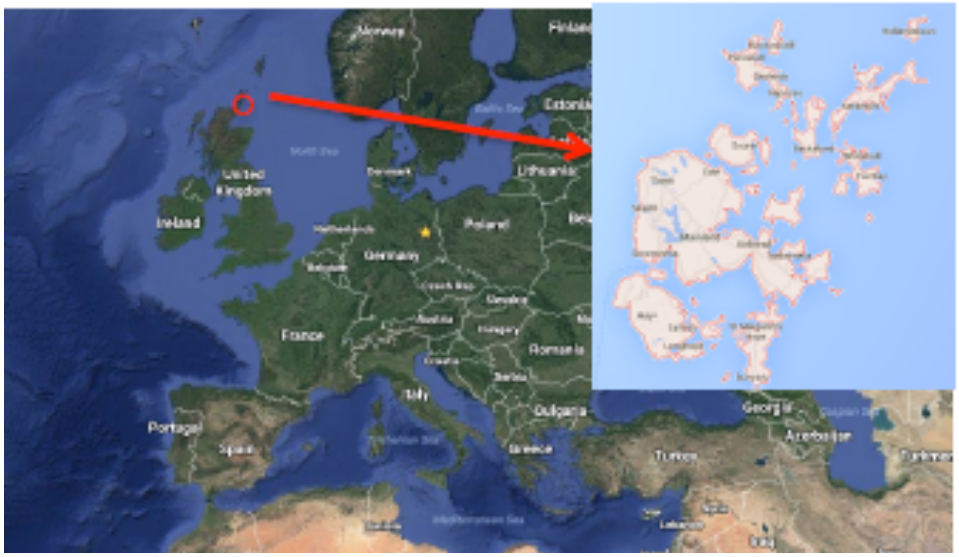
PROJECT SUMMARY

- Project topic: Hydrogen Territories, H2020 FCH JU & Scottish Gvmt co-funded
- 12 partners from across EU + project supporters
- Main goal: demonstration of an integrated energy system based on hydrogen
- Project dates: 2016-2021
- % stage of implementation 01/02/2019: [50%]
- Total project budget: [circa. 13m€]
- EU/FCH JU grant contribution: [5m€]

PROJECT RATIONALE

Orkney Islands

- ✓ 20 islands, population 21 000
- ✓ 58 MW of RES (wave/tidal + wind)
- ✓ Orkney-UK interconnector 30MW capacity



Electricity grid overloaded (> 100% of demand from RES) = Significant curtailment

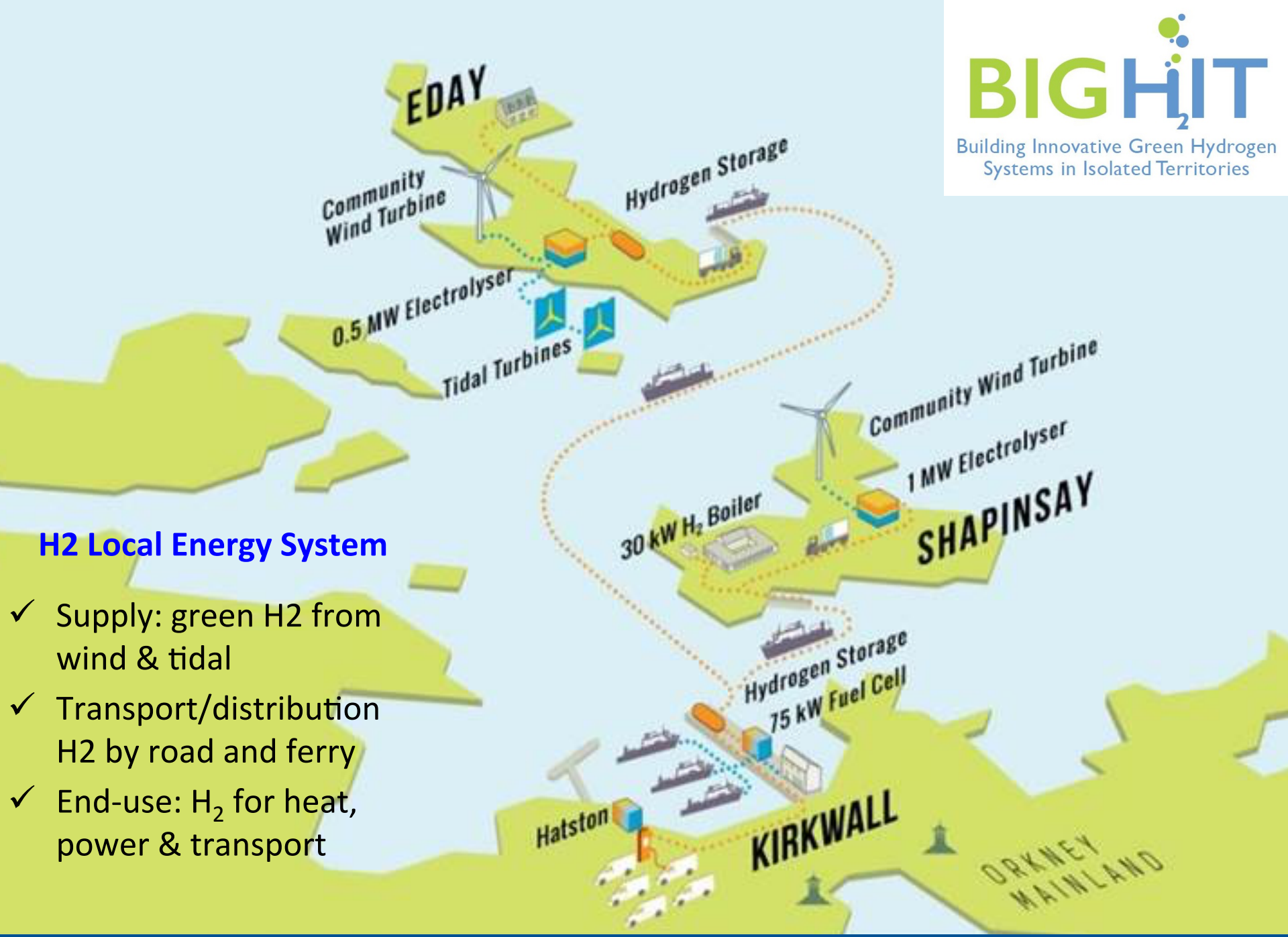
Transition to low C economy, meeting electricity, transport and heat locally via hydrogen

OUTCOMES & WIDER IMPACTS

- ✓ Pioneer pilot project – first in Europe as validated by EC (visibility, exposure & **public awareness** of potential of H2 as energy vector)
- ✓ **Validates commercial/business models** for integration of RES locally via local hydrogen (H2 Valleys case study)
- ✓ Delivers local & national Low C Economic Strategy
- ✓ **Socio-economic benefits**: boosts local economy including development of local skills & qualified jobs in emerging technologies
- ✓ Overcomes grid constraints and harness local (otherwise curtailed) renewable resources (wind & marine)
- ✓ Reduces (grid) investment & improves load management (optimizes use of electricity assets and local grid)

BIG H2IT

Building Innovative Green Hydrogen Systems in Isolated Territories

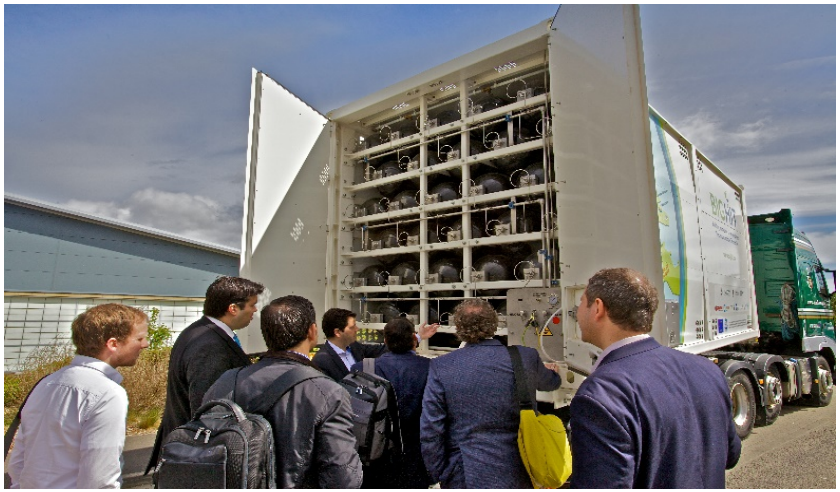


H2 Local Energy System

- ✓ Supply: green H2 from wind & tidal
- ✓ Transport/distribution H2 by road and ferry
- ✓ End-use: H_2 for heat, power & transport


BIGHIT


BIGHIT
HYDROGEN REFUELLING STATION
BIGHIT
BIGHIT

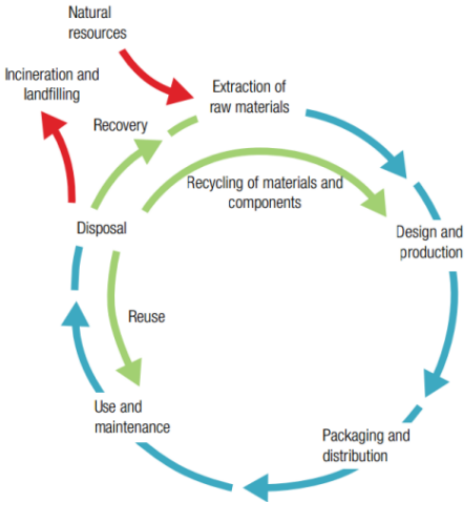


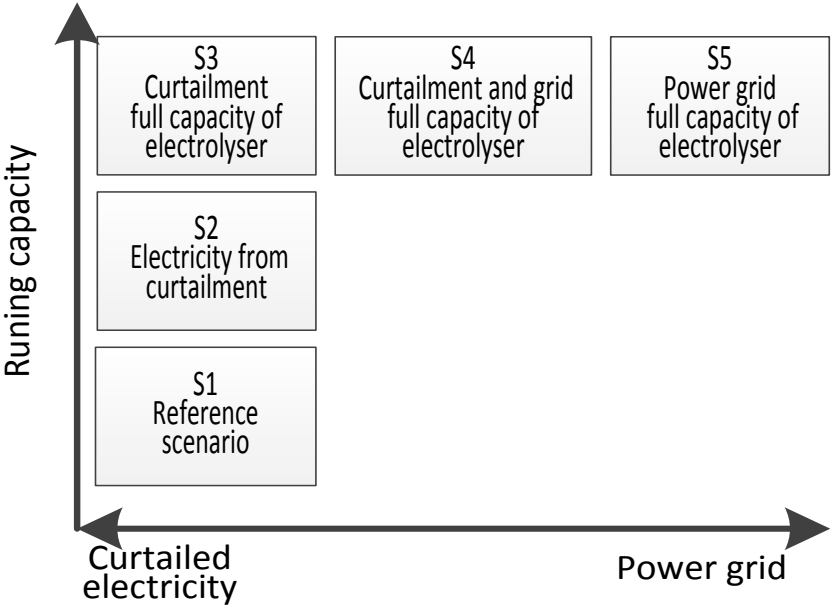
LOGISTICS: Transportation of Hydrogen Across Islands

- ADR & Maritime certification – new legislation/standards being created!
- Weight, space & safety restrictions
- Training - ferry crews and emergency services

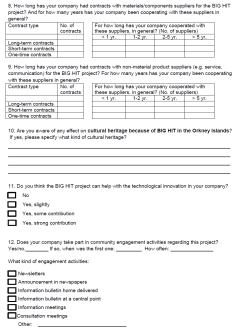
Lessons learnt replicable to other demo projects & regions!

SOCIO-ECONOMIC IMPACT ANALYSIS
COMMERCIAL & LOCAL BUSINESS MODELS






Social impact survey to partners / suppliers of BIG HIT project




Hydrogen Fuel Cell Technology in the Local Community Heat and Power

Demographic

Lessons learnt - Project Risks and Challenges

Financial & Regulatory challenges

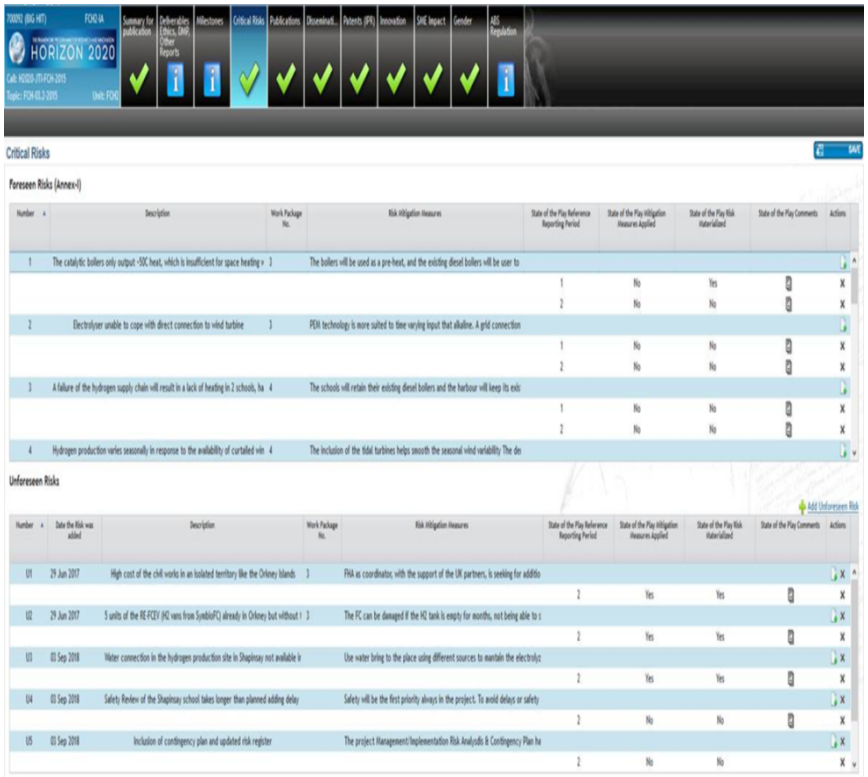
- ✓ Co-funding complexity
- ✓ Contingency in budget & timescales

Technical & Operational risks

- ✓ Allowances for complex Project Management, Engineering & Integration
- ✓ Operational competence: local training & up-skilling
- ✓ Logistical challenges (geography, materials, climate)

Stakeholder Engagement

- ✓ Manage stakeholder expectations
- ✓ (don't overpromise)
- ✓ Ongoing local community involvement



COMPLEX BUT IT IS POSSIBLE, HAPPENING AND IT IS REPLICABLE!

Building upon BIG HIT – Next Steps

- ✓ 2018: > 45m€ investment in place for hydrogen deployment in Orkney
- ✓ Next: replication & co-operation with other EU regions

Hydrogen Local Energy System Development

<u>Ongoing</u>

- FC-H2 Ferry demo H2020 HYSEAS III Project
- H2-ICE ferry feasibility HyDIME project
- Grid load management Interreg ITEG Project
- Industrial H2/O2 applications study

<u>Under planning/assessment</u>

- Mobility: HGVs, mini-buses
- Commercial & domestic/community heating
- FCH-based port equipment & onshore power

THANKS FOR YOUR ATTENTION – QUESTIONS?

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