A changing power market after Paris

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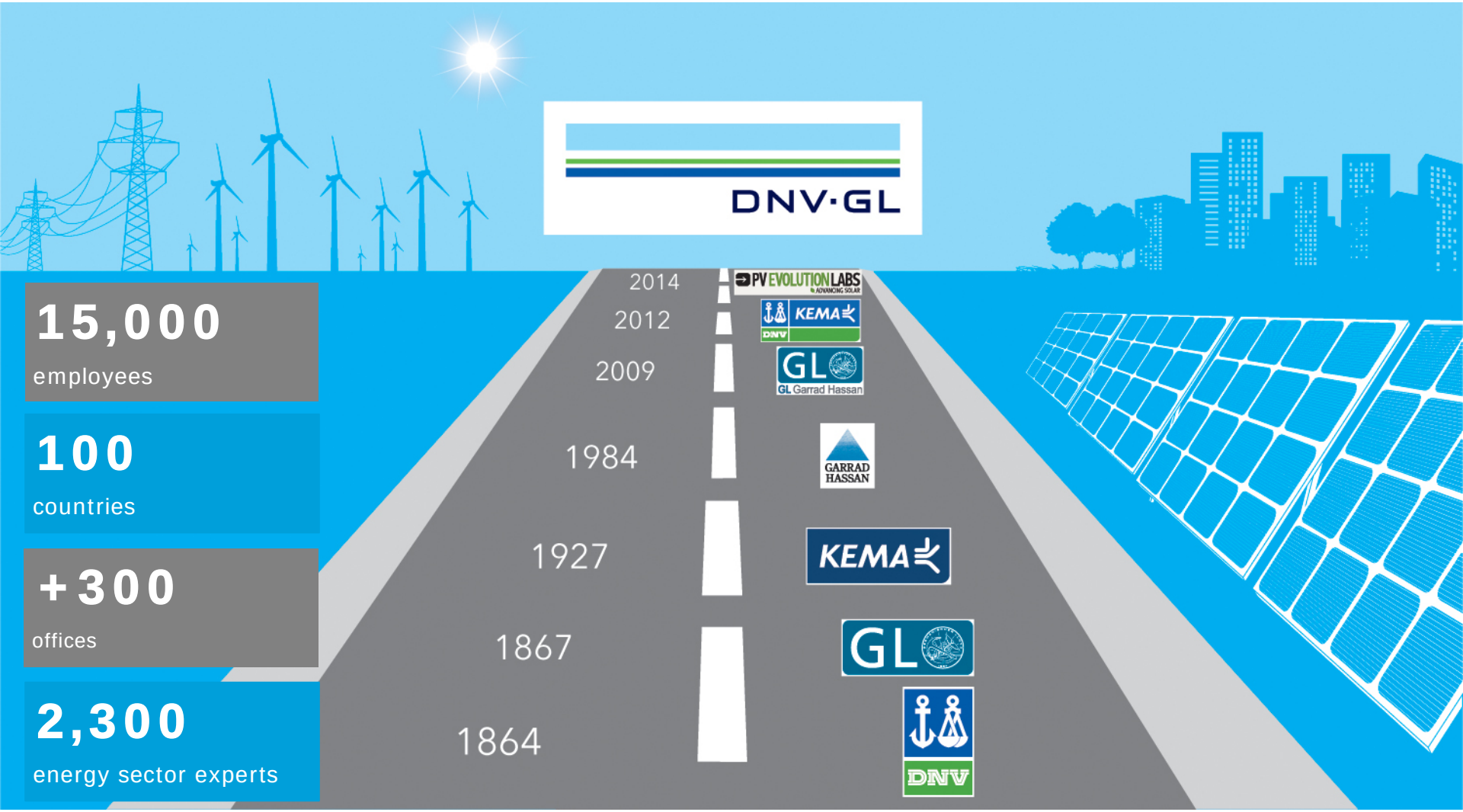
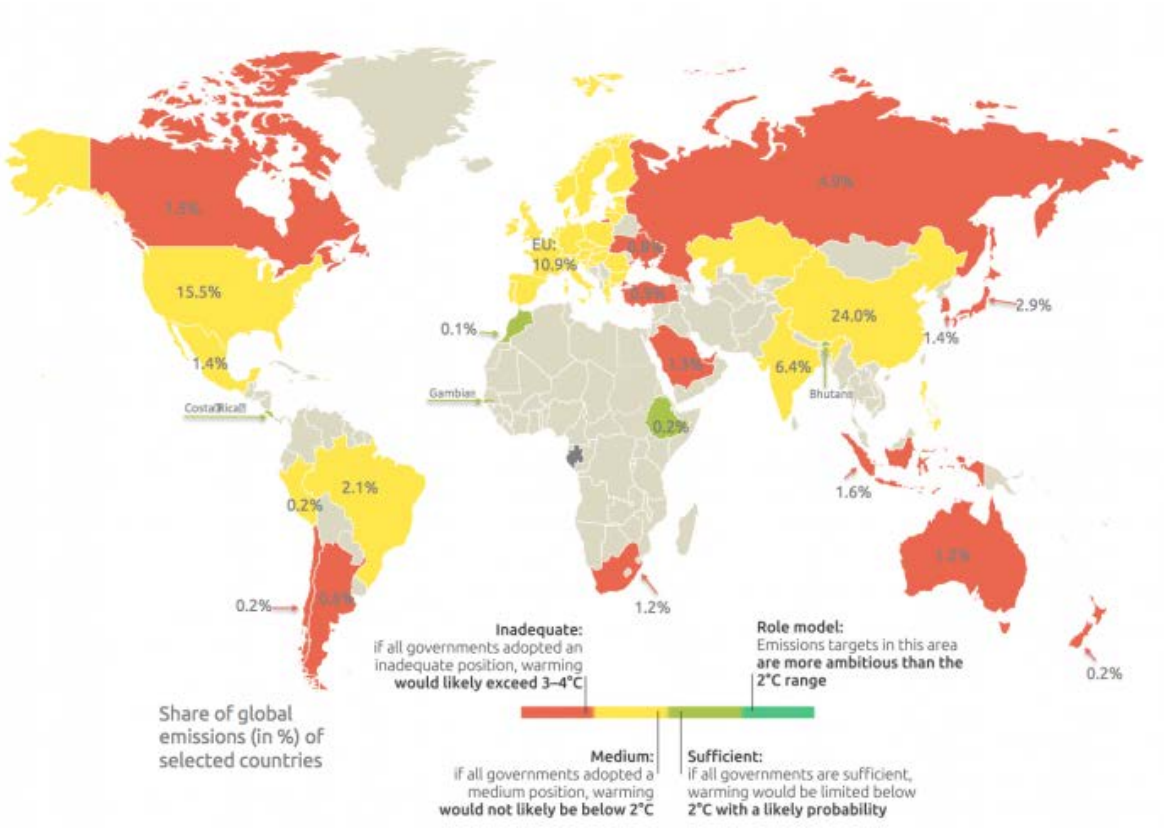
DNV GL: Combining strengths to serve the power sector



Paris climate pledges will bring us to 2.7 deg C of warming

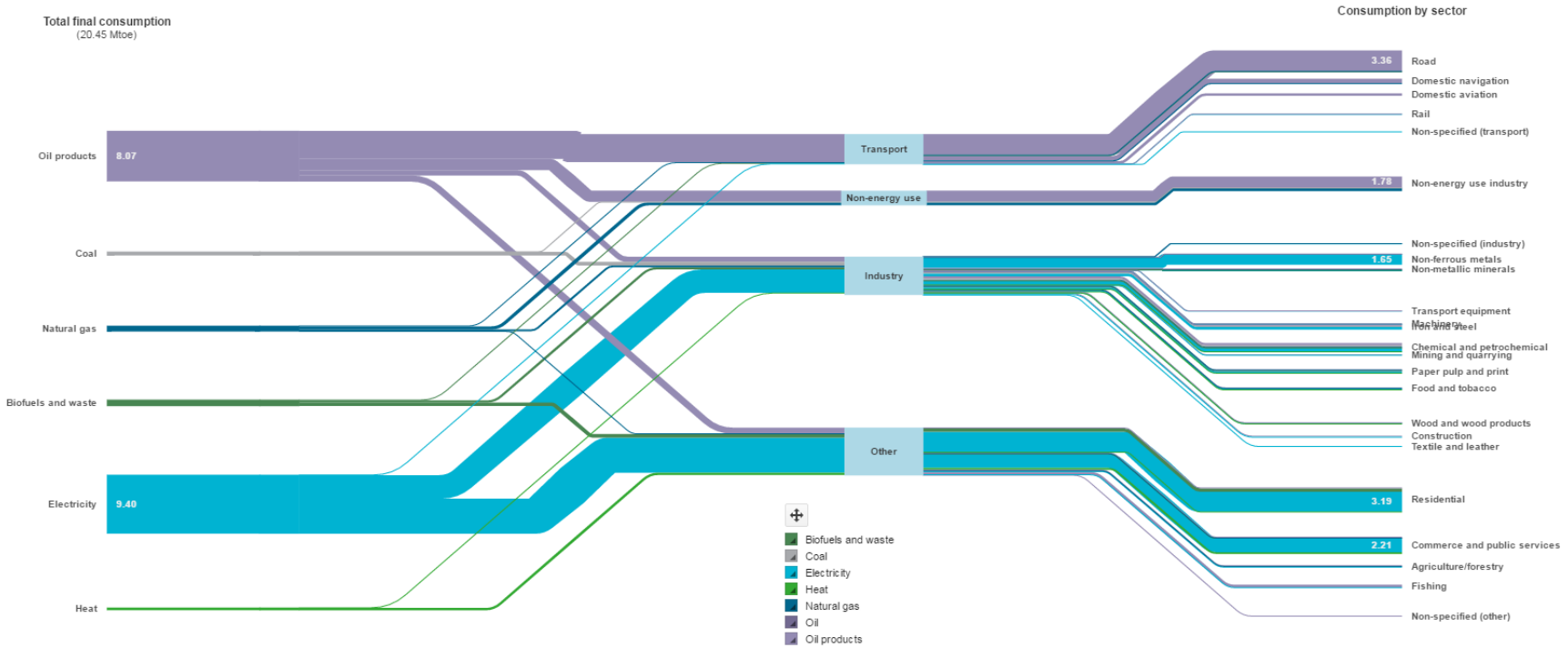


Source: climateanalytics.org (December 2015)

There is a clear need to aggressively pursue most effective measures to reduce GHG emissions world wide – need to over-deliver on Paris agreement.

Norway's energy flow (final consumption, excluding exports)

- Electrical power production in Norway is almost fully renewable: 2.5% fossil (SSB, 2014)
- Energy consumption dominated by electricity (52%), oil and gas (38%) (SSB, 2014)
- Main consumer of non-renewable energy: transport (see picture, IEA, 2013)



Source: iea.org (2013)

The Norwegian situation

- Global need for GHG reduction → global demand for RES electricity production
- Norway has a fully renewable electricity production, and potential for more
- Local demand for renewable electricity production has been met → limited investment incentive for renewable power production

Possible solutions:

- Increase access to global demand by increasing international transmission capacity
- Realize the value of hydro power and other flexible power
- Increase local demand by (among others) electrification of the transport sector

Interconnectors

Value of flexibility

Electrification of transport

Interconnectors – value, feasibility, economics

What is needed to realize more interconnectors?

Source: britned.com

Update on the Bidding Zones Study

As the result of the BZ Advisory group meeting of June (WS on methodology by the consultant):

- ENTSO-E continues its approach of ensuring transparency
- In order to continue ensuring transparency, ENTSO-E will prepare a first list of assumptions for further discussion that will be distributed to the stakeholders in the next meeting
- Stakeholders request of analyzing the wholesale and retail markets and liquidity in all timeframes will be further followed up and specific WS will be organized for the matter.
- ENTSO-E will organize a similar workshop with stakeholders on model based scenarios.
- Next meeting of the BZ Advisory group in Autumn

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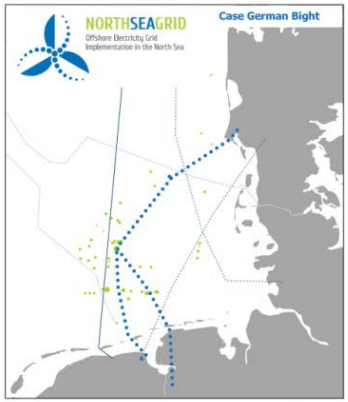
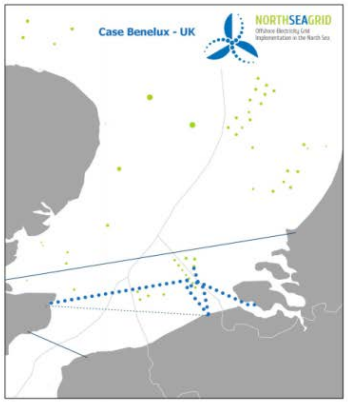
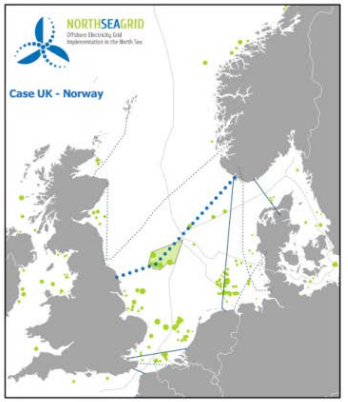
German Bight



Benelux - UK



UK - NO

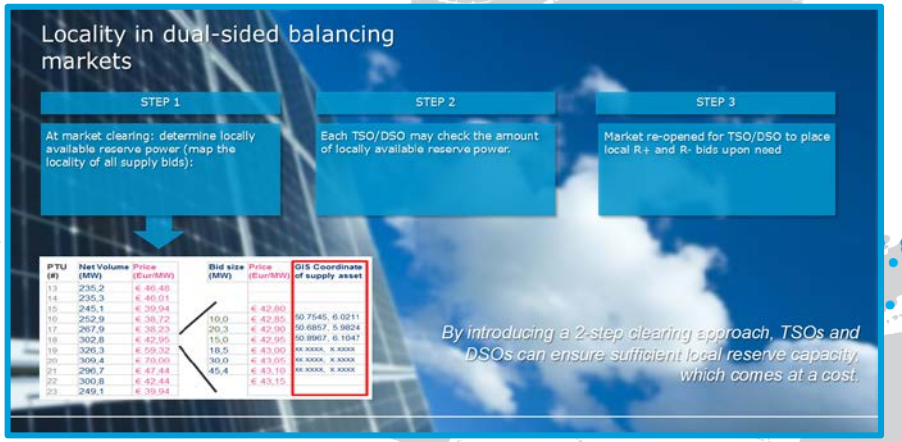


Source: north sea grid project

Realize the value of hydro power

Value of flexibility

Hydro power as undervalued power producer



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ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

- Kraftmarkeds-modell for Europa
- Makroøkonomisk analyse
- Analyse av aktivitet

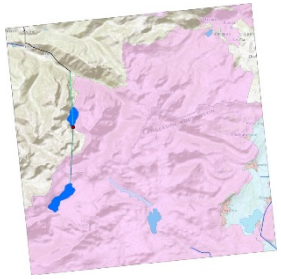
→ Verdi av vannkraft i Europa

STORAGE

Revenue optimization due to stochastic and co-optimized bidding in spot and balancing market

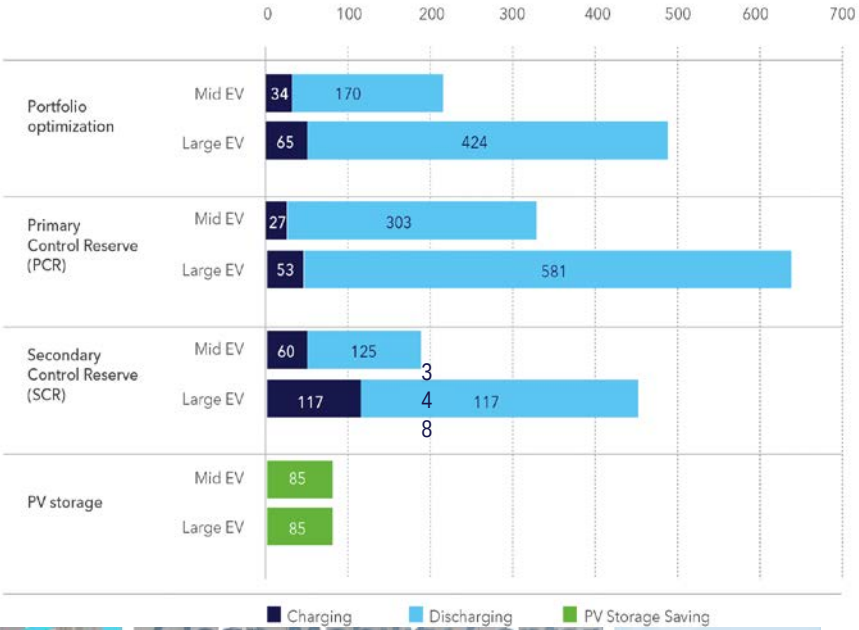
STORAGE

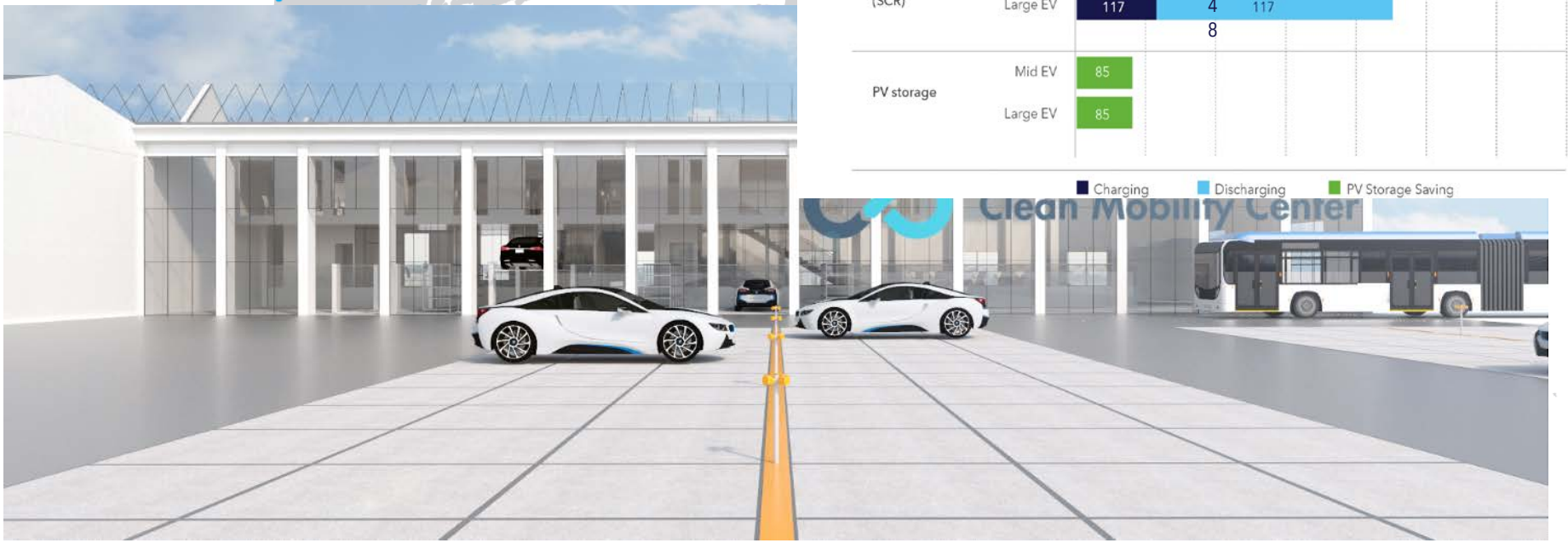
GIS-based estimate of pumping potential



Electrification of the transport sector

Realizing the value of EV





Conclusion

Norway is well positioned to contribute even more to a power market after Paris by focusing on:

- Interconnectors
- Value of flexibility
- Electrification of transport

OUR PURPOSE

TO SAFEGUARD LIFE, PROPERTY AND THE ENVIRONMENT

Takk for oppmerksomheten!

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