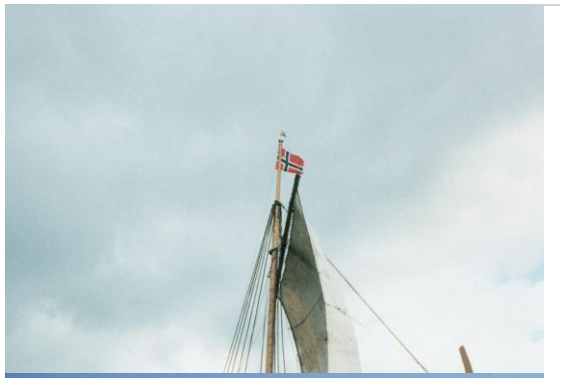


From lab to impact – the innovation processes of upscaling

Tuukka Mäkitie
Research Scientist, SINTEF Digital

Technology for a better society

What is the greatest Norwegian innovation?











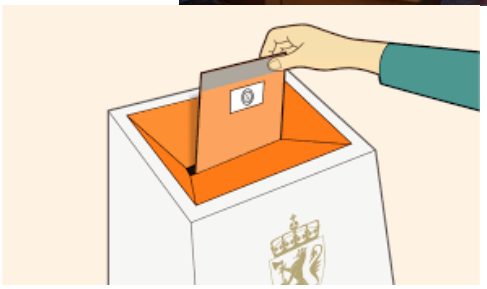
Illustrations: Runar Storeide, Yara, Leif Berge/ Equinor, Mario Duran-Ortiz, Lekolar

Innovation as the development, spreading and use of novel solutions over time

Who are the innovators?













A system of different kinds of actors, shaped by "rules" and culture, drives the upscaling of new technologies

What are the innovation processes? A Norwegian CCS story.

Contents lists available at ScienceDirect
International Journal of Greenhouse Gas Control
journal homepage: www.elsevier.com/locate/ijggc

CCS technological innovation system dynamics in Norway

Markus Steen [a,*], Allan Dahl Andersen [b,c], Jørgen Finstad [b], Teis Hansen [a,c], Jens Hanson [a], Kristin Jordal [d], Tuukka Mäkitie [a,b], Amber Nordholm [e], Marianne Ryghaug [a,f], Artur Santoalha [b]

Development and diffusion of knowledge





Mobilization of financial and human capital

CLIMIT



Experimentation



Market and demand formation



Legitimacy and acceptance





Illustrations: SINTEF, Bair175, Technology Centre Mongstad, Heidelberg Materials, Zhaojiankang, Gassnova, Northern Lights, Forsvaret

Multiple and mutually interdependent innovation processes

How can digital innovations contribute to sustainability transitions?

Contents lists available at ScienceDirect

Technology in Society

journal homepage: www.elsevier.com/locate/techsoc

Digital innovation's contribution to sustainability transitions

Tuukka Mäkitie *, Jens Hanson, Sigrid Damman, Mari Wardeberg

Department of Technology Management, SINTEF Digital, Norway

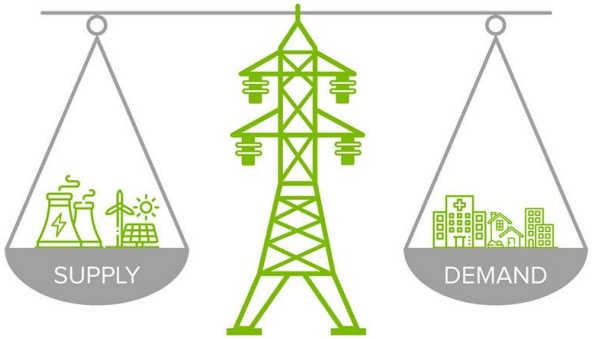
Not sustainable in itself…

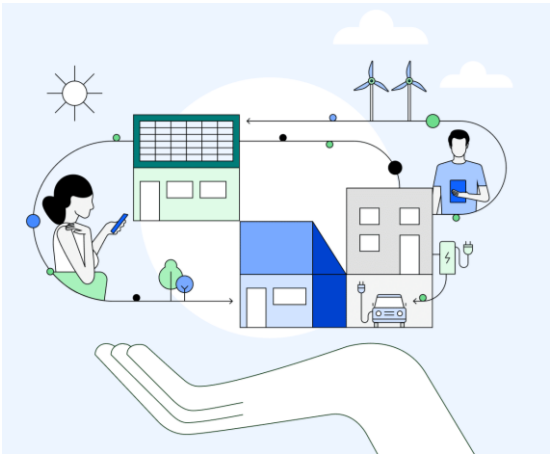


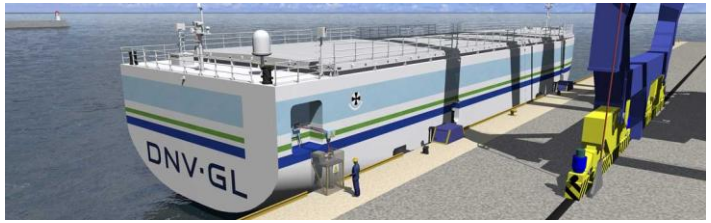




…but applications that **enable green transitions** are very interesting







Illustrations: AP News, Bulk, CapitalEAP, DNV, Alliance for Energy Efficient Economy, IBM


osti

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