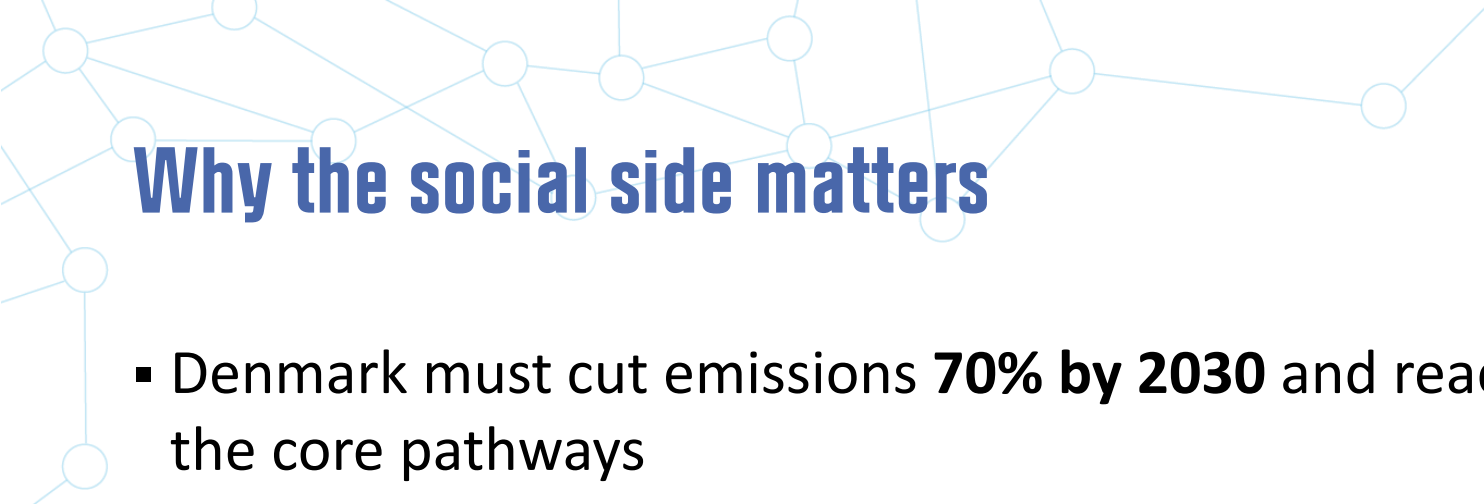


THE SOCIAL SIDE OF CCUS

Acceptance, knowledge and willingness to pay in Denmark



Based on Tolstrup, Ladenburg & Lex (2025), Swain (2025) and the Bifrost and PAoCCUS surveys



Why the social side matters

- Denmark must cut emissions **70% by 2030** and reach net zero by 2045 – CCS is one of the core pathways
- Acceptance works on three levels: **political, market and local** – all three are needed
- Weak local support delays **permits, sites and pipelines**
- Taxpayers fund the subsidies, so public understanding is part of the **licence to operate**



The evidence base

- **18 stakeholder interviews** (2022–23): green NGOs, emitters, industry associations, authorities and climate experts
- **Bifrost survey 2022**: 8,319 Danes, response rate 22.5%
- **PAoCCUS survey 2023**: 5,419 Danes, response rate 20.3%

Sources: Tolstrup, Ladenburg & Lex (2025), International Journal of Greenhouse Gas Control 144; Bifrost and PAoCCUS national surveys, DTU; Swain (2025), Springer Handbook of Climate Change Mitigation and Adaptation.

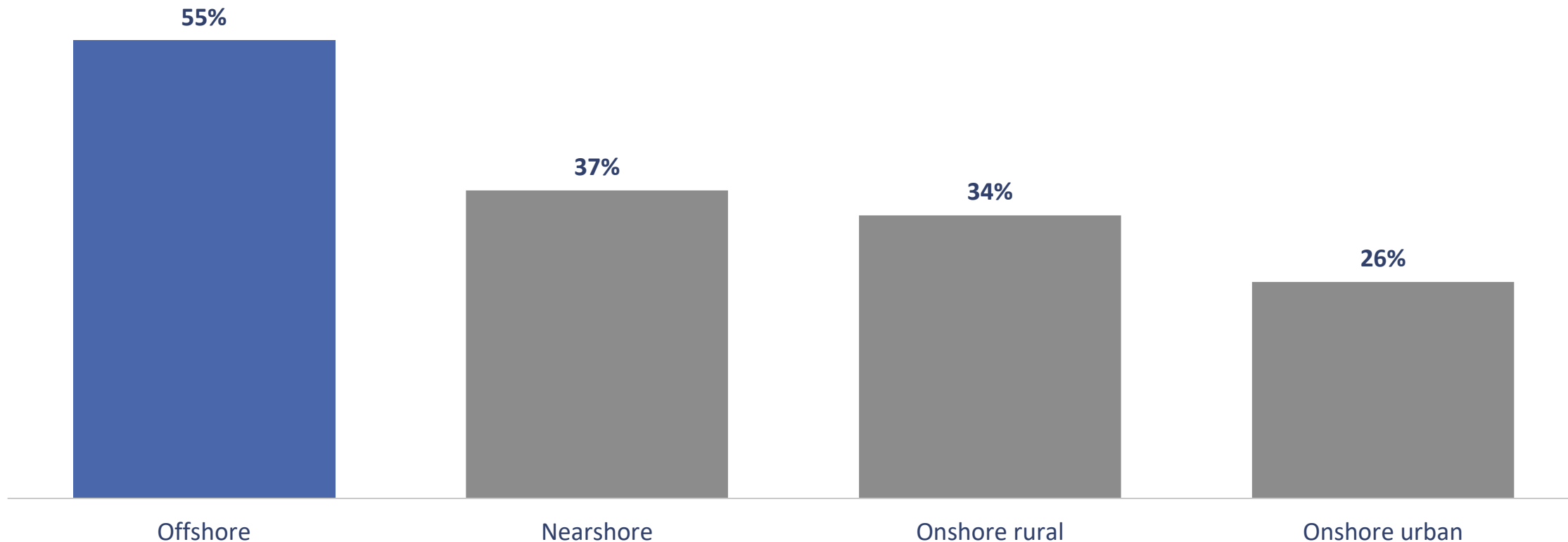
Stakeholders back CCS, but on conditions

- **None of the 18 stakeholders opposed CCS:** views ran from enthusiasm to accepting it as a necessary evil
- Condition: CCS must not legitimise fossil business or crowd out cheaper green solutions
- Shared worries: a *fragmented value chain* and a public that knows little about CCS

Source: Tolstrup, Ladenburg & Lex (2025), 18 semi-structured interviews, Denmark 2022–23.

Acceptance depends on where the CO2 goes

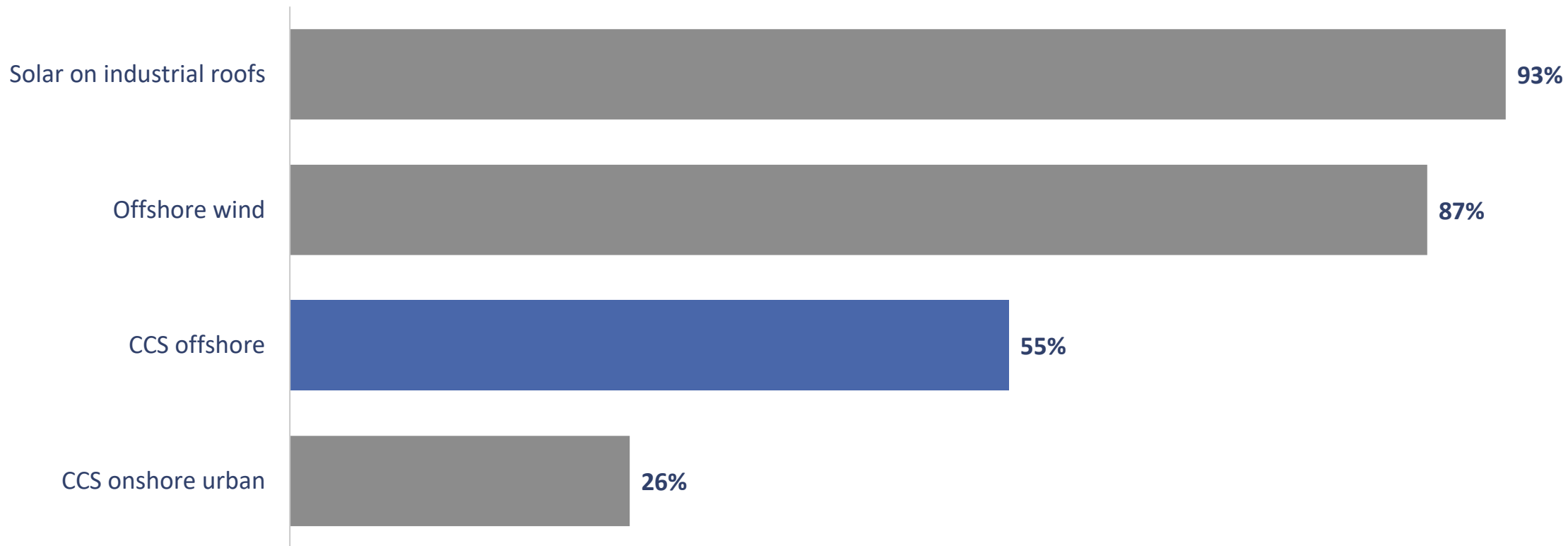
Support for CCS by storage location, share answering “to a large” or “very large extent”, Denmark 2022



Source: Bifrost survey 2022, N=3,879, nationally representative sample of Danish households.

CCS is accepted, but trails wind and solar

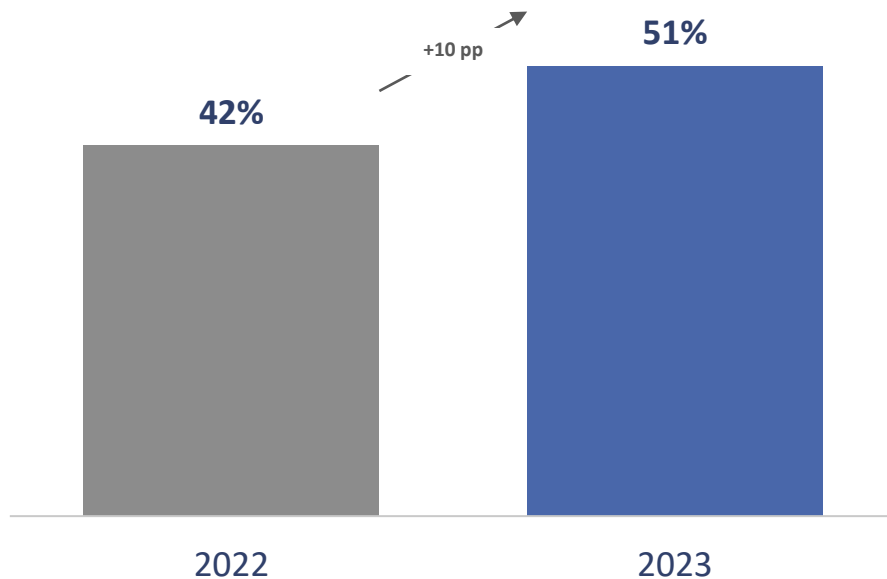
Support for technologies to reduce CO2 emissions, share answering “to a large” or “very large extent”, Denmark 2022



Source: Bifrost survey 2022, N=3,879, nationally representative sample of Danish households.

Knowledge is rising from a low base

Share of Danes familiar with CCS, 2022 (N=8,319) and 2023 (N=5,419)

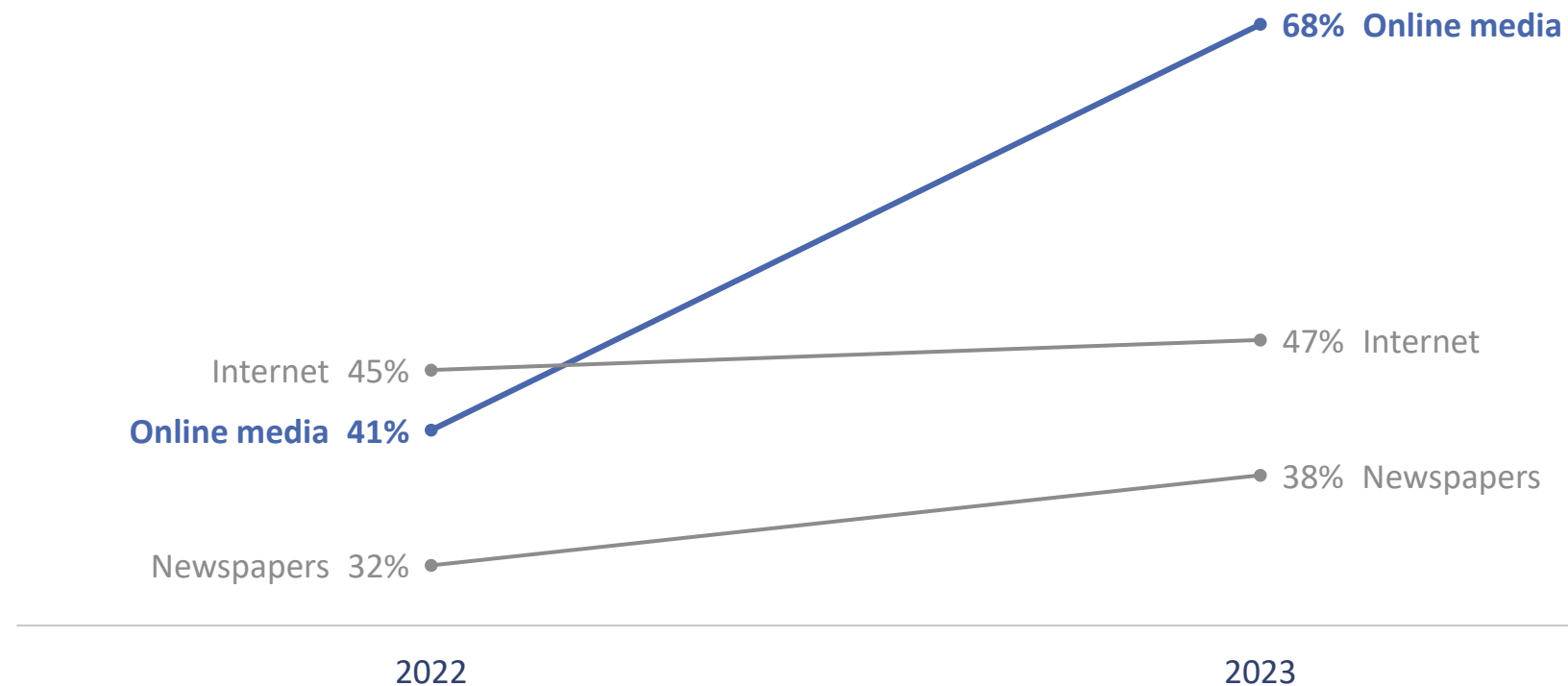


Half the population still says it does not know what CCS is – and people with no knowledge are the most sceptical.

Source: Bifrost survey 2022 and PAoCCUS survey 2023, DTU.

Online media now carry most CCS information

Share naming each source of CCS information, 2022 (N=3,452) and 2023 (N=2,778)



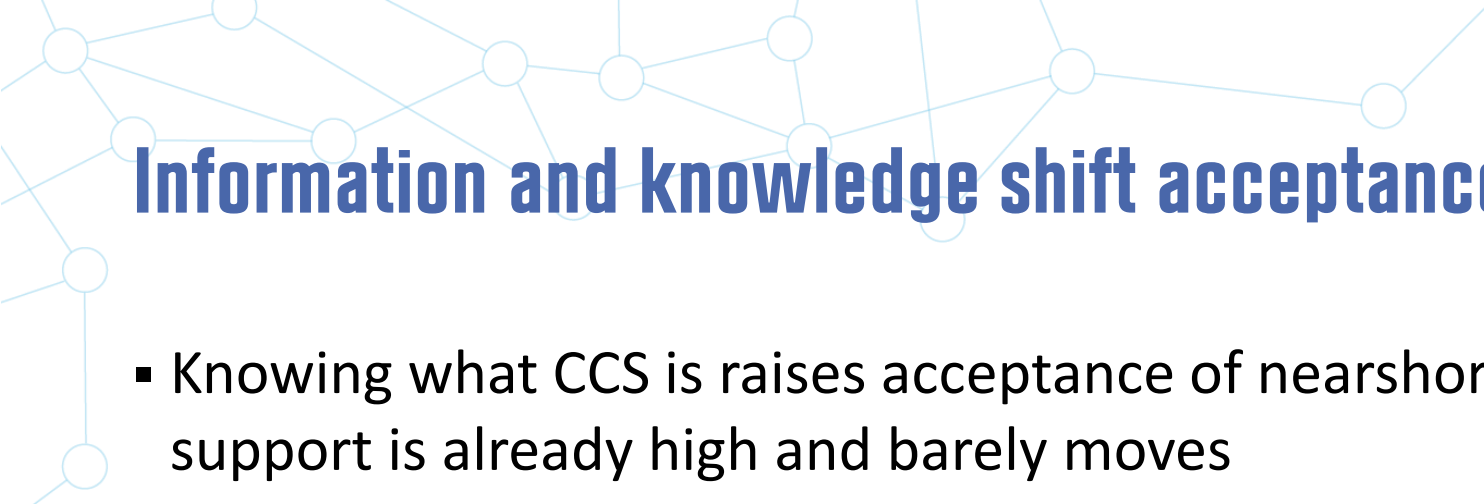
Source: Bifrost 2022 and PAoCCUS 2023 surveys, DTU. Several sources could be named. Professional papers, social media, friends and workplace each stayed at 12–15%.



Two competing stories in the media

- **Bridge:** CCUS as the way through the transition for industries that cannot cut emissions otherwise
- **Perpetuation:** CCUS as greenwashing that keeps fossil production alive – the same worry Danish NGOs raised
- Coverage leans positive and downplays risk, which leaves the public unprepared for local objections
- Recurring frames across countries: **jobs and growth, energy security, environmental benefit**

Source: Swain (2025), How Media Framing Shapes Public Understanding of Carbon Capture, Handbook of Climate Change Mitigation and Adaptation, Springer.



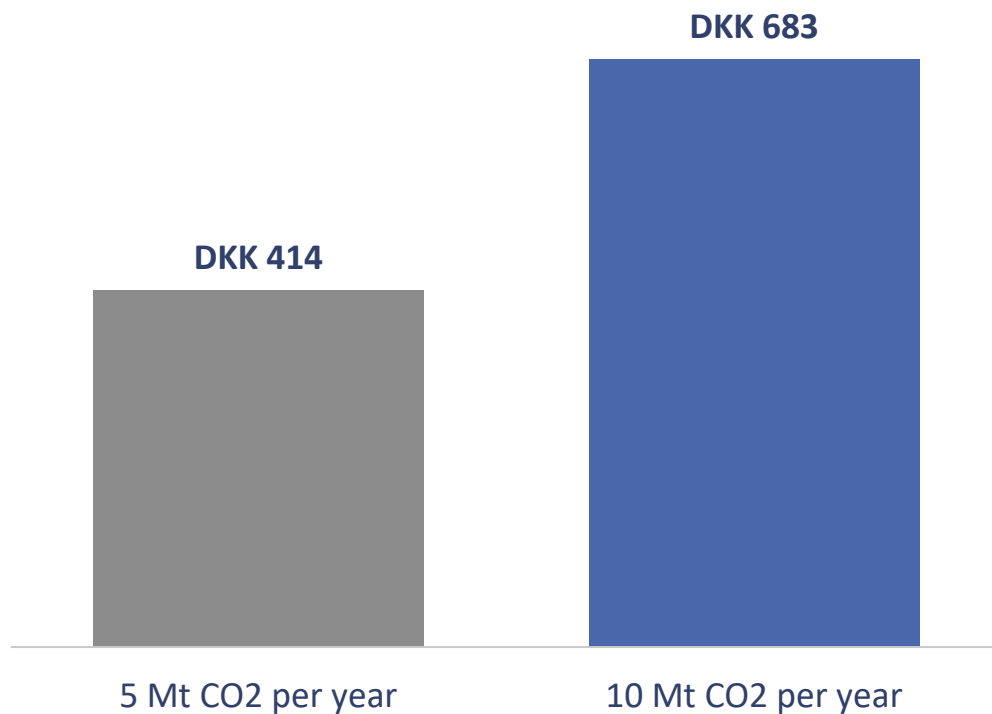
Information and knowledge shift acceptance

- Knowing what CCS is raises acceptance of nearshore and onshore storage; offshore support is already high and barely moves
- Among people who know nothing about CCS, **a few lines of plain information** raise acceptance
- Having seen **one national TV feature** goes with higher acceptance at all four locations
- Knowledge also makes people **more certain** of their own answer

Sources: Bifrost and PAoCCUS survey analyses, DTU; Zuch & Ladenburg (2023), Renewable and Sustainable Energy Reviews.

Households are willing to pay for CCS

Mean willingness to pay per household per year for offshore CCS, by volume stored, Denmark 2023



Respondents who had seen the national TV feature about CCS were willing to pay about EUR 12 more per year for the 10 Mt scenario.

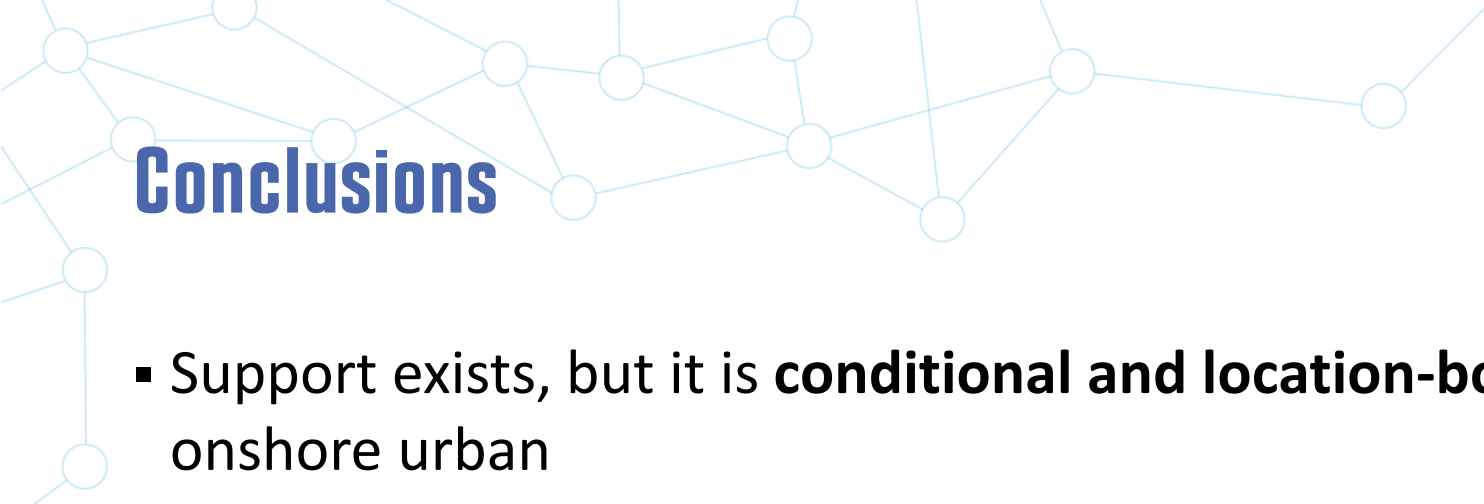
Source: PAoCCUS contingent valuation survey; means truncated at the maximum bid. Willingness to pay is stated, not actual, payment.



What stakeholders say builds acceptance

- **Engage early** – talk to neighbours before contracts are signed, not after
- **Talk with, not at** – two-way engagement through workshops and site visits beats leaflets and reports
- **Use trusted local voices** and address values and worries, not only technical facts
- **Be honest about risk** – explain what can happen at sea and on land, and avoid spin
- **Share the benefit** – local involvement and co-ownership, as with wind and solar
- **Tell one consistent story** – the same few slides answering the same questions

Sources: Tolstrup, Ladenburg & Lex (2025), stakeholder interviews, Denmark 2022-23; Swain (2025), Springer Handbook of Climate Change Mitigation and Adaptation.



Conclusions

- Support exists, but it is **conditional and location-bound**: 55% for offshore, 26% for onshore urban
- Stakeholders and the public agree CCS is needed – **no one interviewed opposed it**
- Knowledge is the **main lever**: it lifts acceptance onshore, raises willingness to pay and makes support firmer
- Half the population still does not know what CCS is, so **communication is infrastructure**

