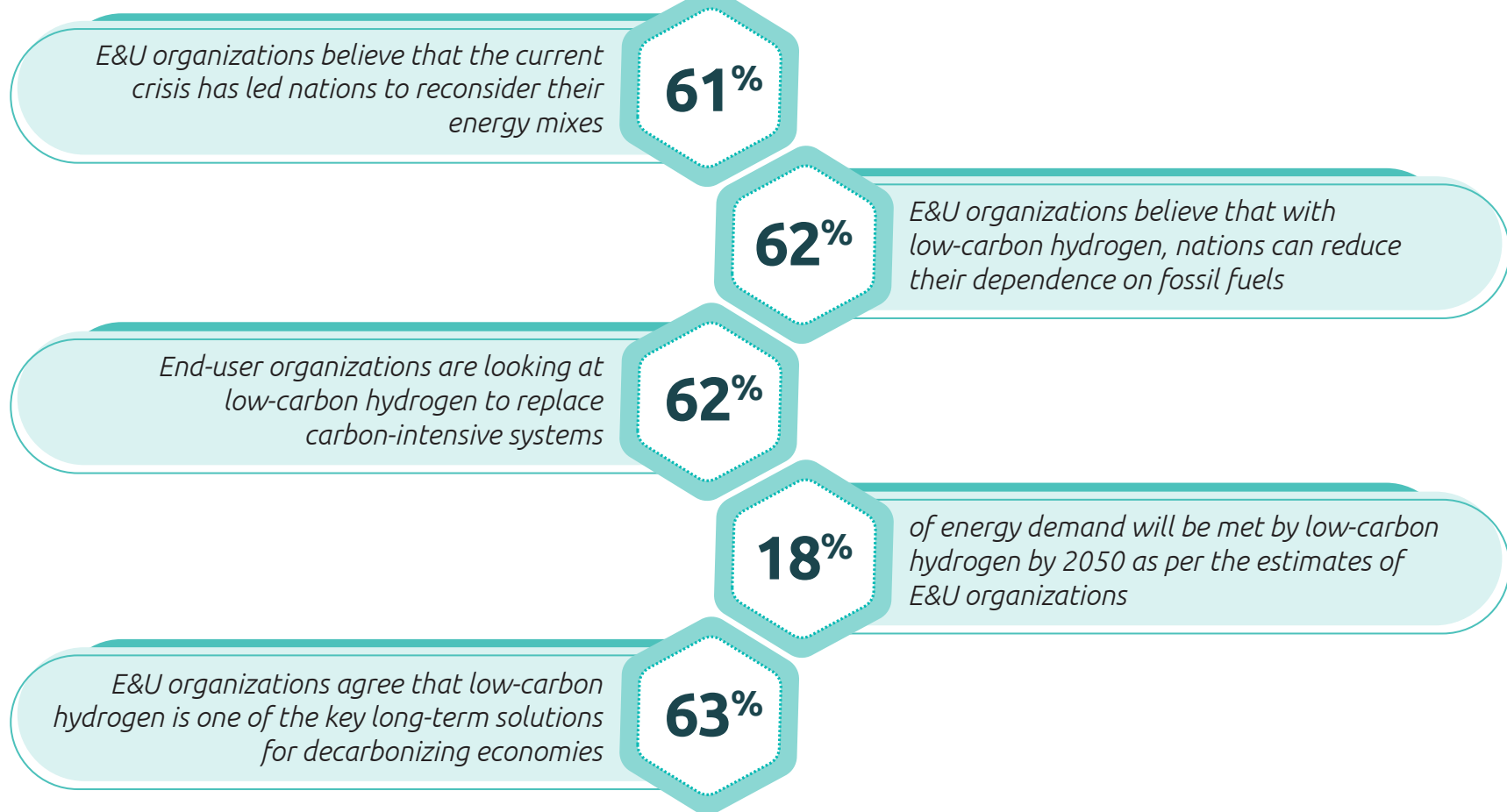


low-carbon hydrogen

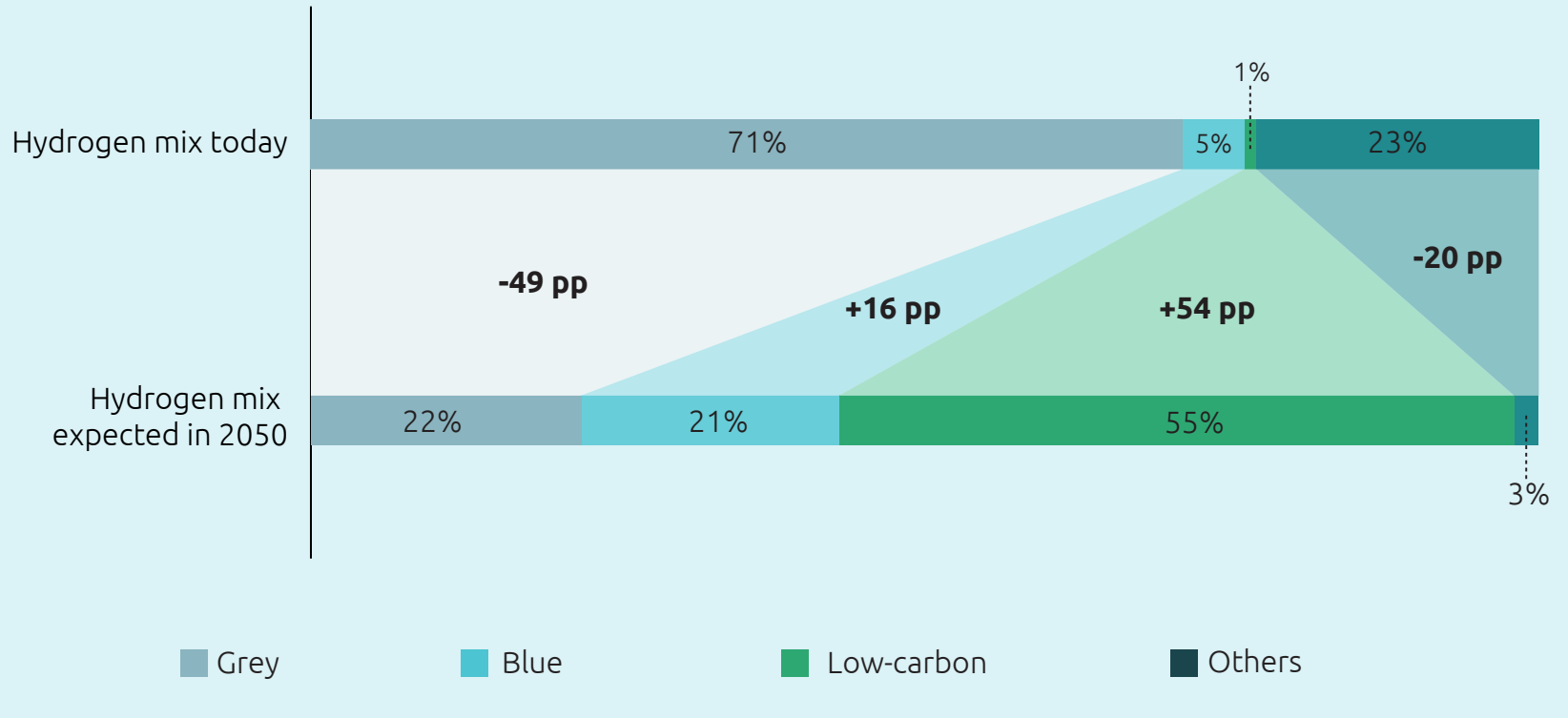
A PATH TO A GREENER FUTURE

ORGANIZATIONS ARE OPTIMISTIC AND AMBITIOUS ABOUT LOW-CARBON HYDROGEN



Source: Capgemini Research Institute, low-carbon hydrogen survey, November–December 2022; N=360 respondents from unique end-user organizations; N=500 respondents from unique energy and utilities organizations.

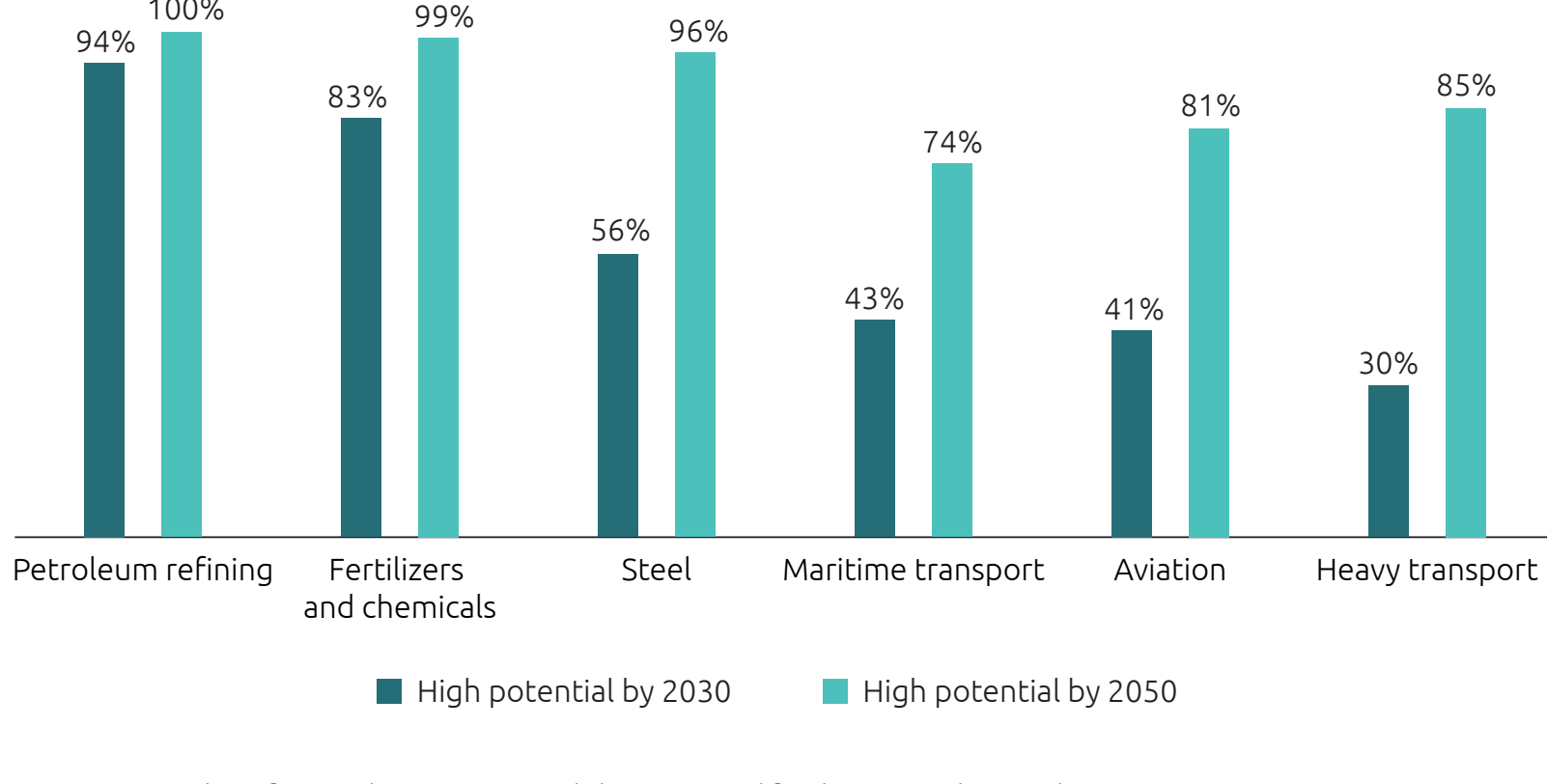
E&U ORGANIZATIONS EXPECT LOW-CARBON HYDROGEN'S SHARE OF THE TOTAL HYDROGEN MIX TO INCREASE SIGNIFICANTLY BY 2050



Note: This represent subjective organizational expectations for low-carbon hydrogen and is not based on present capabilities and investment levels. Source: IEA, Hydrogen Tracking Report, September 2022; Capgemini Research Institute, low-carbon hydrogen survey, November–December 2022; N=500 respondents from unique energy and utilities organizations.

INDUSTRIES SUCH AS REFINING, FERTILIZERS, AND CHEMICALS WILL WIDELY HARNESS LOW-CARBON HYDROGEN

% OF RESPONDENTS WHO SEE HIGH POTENTIAL FOR LOW-CARBON HYDROGEN IN THEIR RESPECTIVE INDUSTRIES

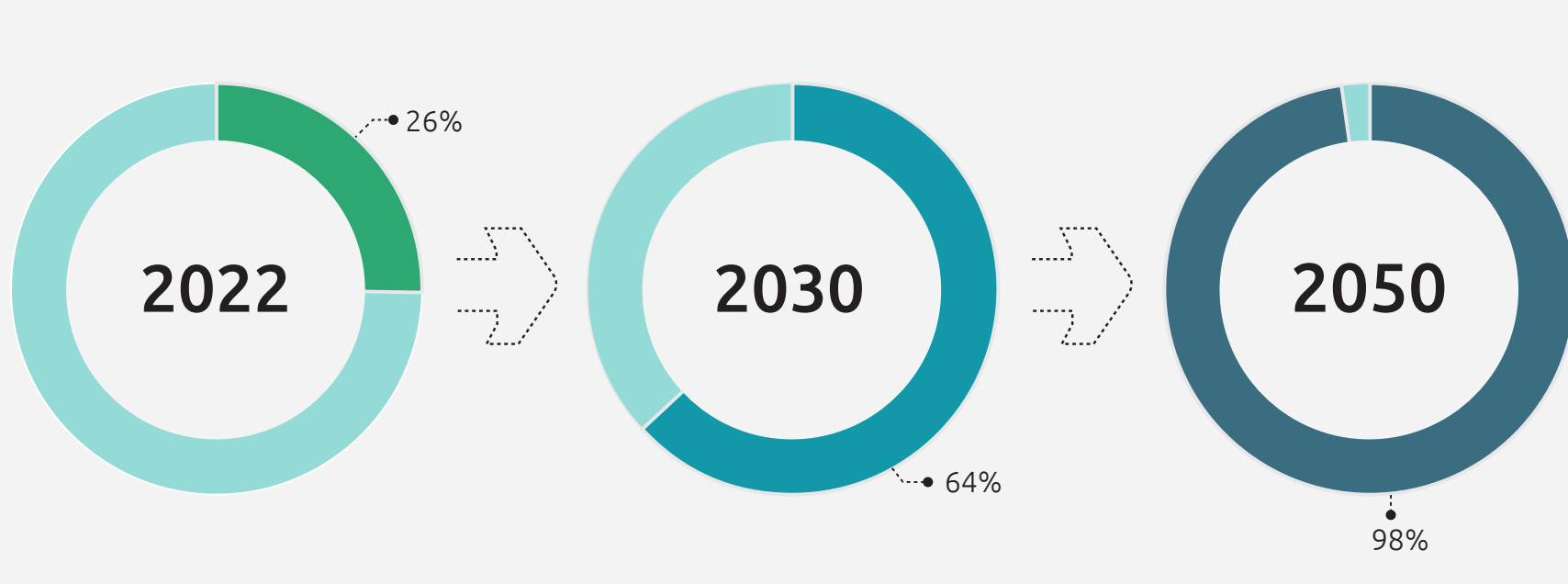


Note: Respondents from each sector answered about potential for their own industry only. Source: Capgemini Research Institute, low-carbon hydrogen survey, November–December 2022; N=360 respondents from unique end-user organizations.

INVESTMENT IN LOW-CARBON HYDROGEN IS ON THE RISE

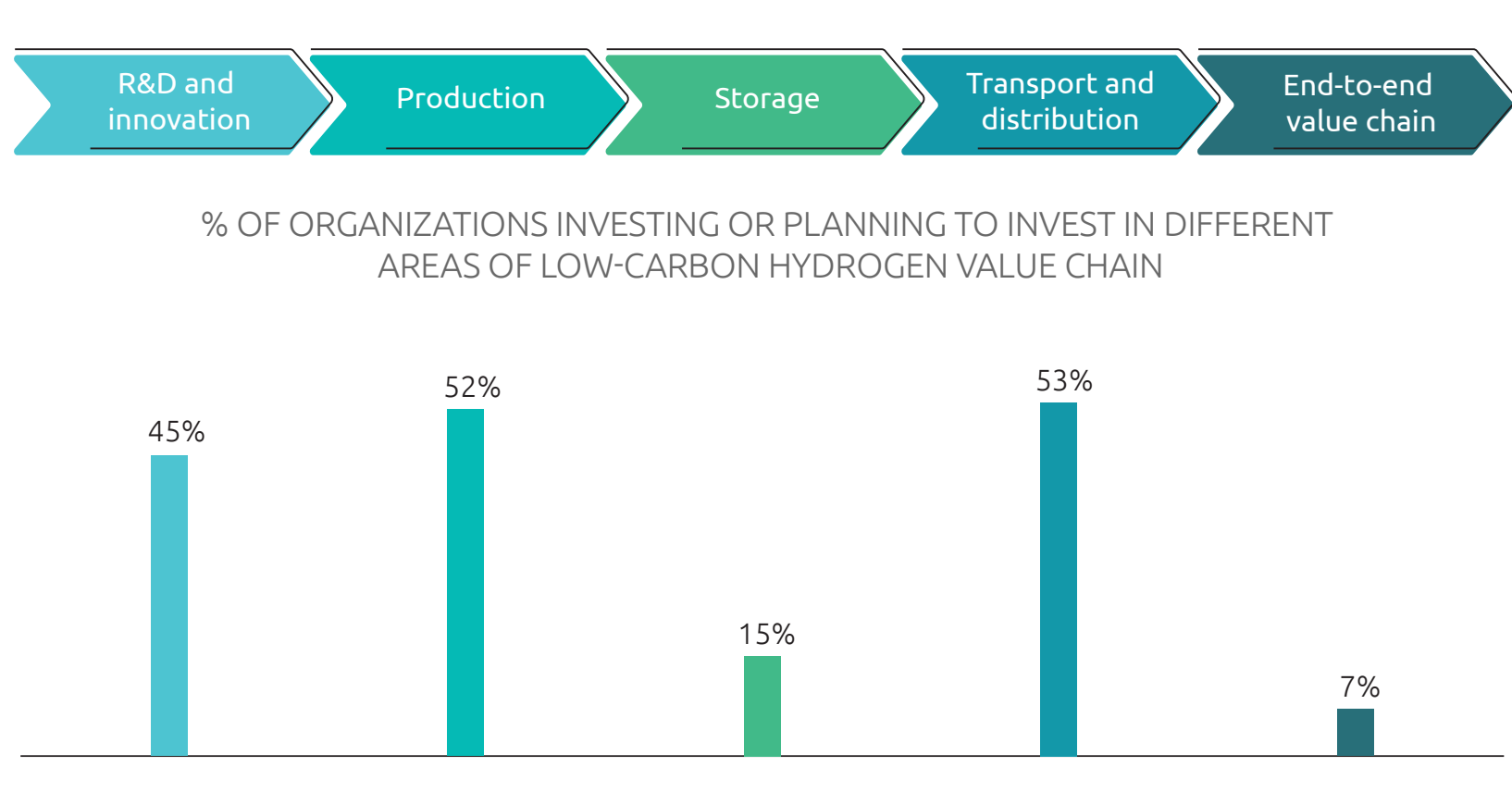
A MAJORITY OF E&U ORGANIZATIONS ARE PLANNING TO INVEST IN LOW-CARBON HYDROGEN INITIATIVES

% OF ORGANIZATIONS THAT ARE INVESTING/PLANNING TO INVEST IN LOW-CARBON HYDROGEN



Source: Capgemini Research Institute, low-carbon hydrogen survey, November–December 2022; N=447 respondents from unique energy and utilities organizations.

E&U ORGANIZATIONS ARE MAKING INVESTMENTS ACROSS THE LOW-CARBON HYDROGEN VALUE CHAIN



Source: Capgemini Research Institute, low-carbon hydrogen survey, November–December 2022; N=500 respondents from unique energy and utilities organizations.

COST, ENGINEERING, AND SKILLS CHALLENGES ARE YET TO BE ADDRESSED

Cost Challenges

Low-carbon hydrogen is 2-3 times more expensive to produce than fossil fuels

Engineering & Infrastructure Challenges

- Half of E&U organizations rank **high energy consumption during production** as one of the top production challenges
- A majority of E&U organizations rank **safety concerns, specificity of storage conditions and insufficient existing hydrogen pipeline infrastructure** among the top challenges

Skills Challenges

Around half of E&U and end user organizations rank **lack of skills and expertise** among the top five challenges to scale hydrogen

HOW CAN ORGANIZATIONS CAPITALIZE ON THE LOW-CARBON HYDROGEN OPPORTUNITY?

- Tailor the business-case assessment to your organization
- Establish governance models to support new business models
- Establish hydrogen-competence centers for skills development

- Clearly articulate partnership strategy and design appropriate trade-offs while partnering with:
 - Primary energy producers
 - Equipment suppliers
 - Storage-system developers
 - Infrastructure providers
 - End-users
 - End-to-end value chain

- Harness the potential of digital-twin technologies to reduce cost and operational risks
- Develop robust data and technology foundations to maximize agility and resilience in the supply chain

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