

Knowledge about final disposal of high nuclear waste among citizens and politicians

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Nuclear waste in Sweden

- Today Sweden store 6 500 ton nuclear waste in deep storage pools
- Estimated to be 12 000 ton
- Swedish nuclear industry is responsible for finding a place and a method
- The nuclear industry has formed the company Swedish Nuclear Fuel and Waste Management Company (SKB)

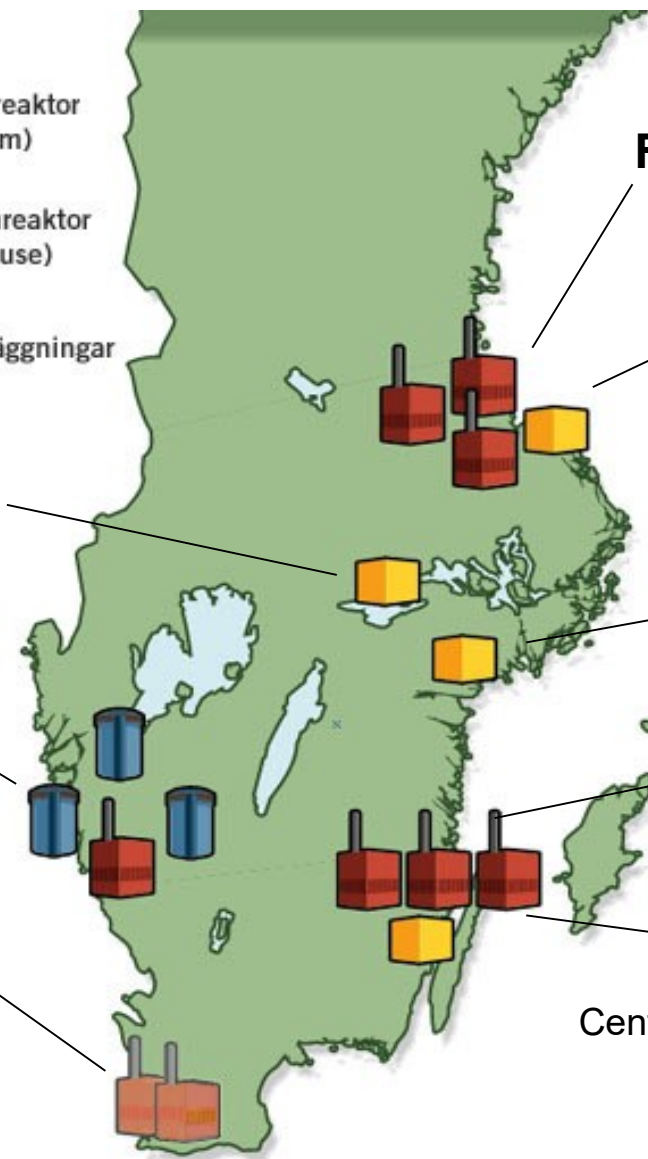
Suggested method

- SKB has proposed a method of final disposal:
 - 1) The spent nuclear fuel is to be stored for 40 years in water to reduce the heat and immanent radioactivity
 - 2) Thereafter it is placed in cast iron inserts inside copper canisters
 - 3) These canisters are deposited 500 meters deep in the granite bedrock with
 - 4) A buffer of bentonite clay, intended to absorb the surrounding water and protect against harmful effects
- Location Östhammar

Swedish nuclear facilities

-  Kokvattenreaktor (ASEA Atom)
-  Tryckvattenreaktor (Westinghouse)
-  Övriga anläggningar

Westinghouse Electric Sweden
Fuel manufacturing



Forsmark NPP site (3)

Östhammar

Suggested location

Today:

disposal of short-lived
low & intermediate level waste

Studsvik

Treatment of radioactive waste
Decommissioning services
(Research reactors closed)

Ringhals NPP site (4)

Oskarshamn NPP site (3)

a facility for encapsulation

(Barsebäck NPP site (2))

(Closed)

CLAB

Central storage for spent fuel

The process right now

- Swedish control authority SSM has said yes to SKB's application
- Land and Environment court has considered the application under the Environmental Code
 - The court said yes to the location, to place the waste in Östhammar
 - But – no to the copper canister (at this stage). The court meant it was not proven that the copper canister safely could store nuclear waste in the long run. Needs more information
- Now up to the Swedish government to take a final decision

Need of a democratic process

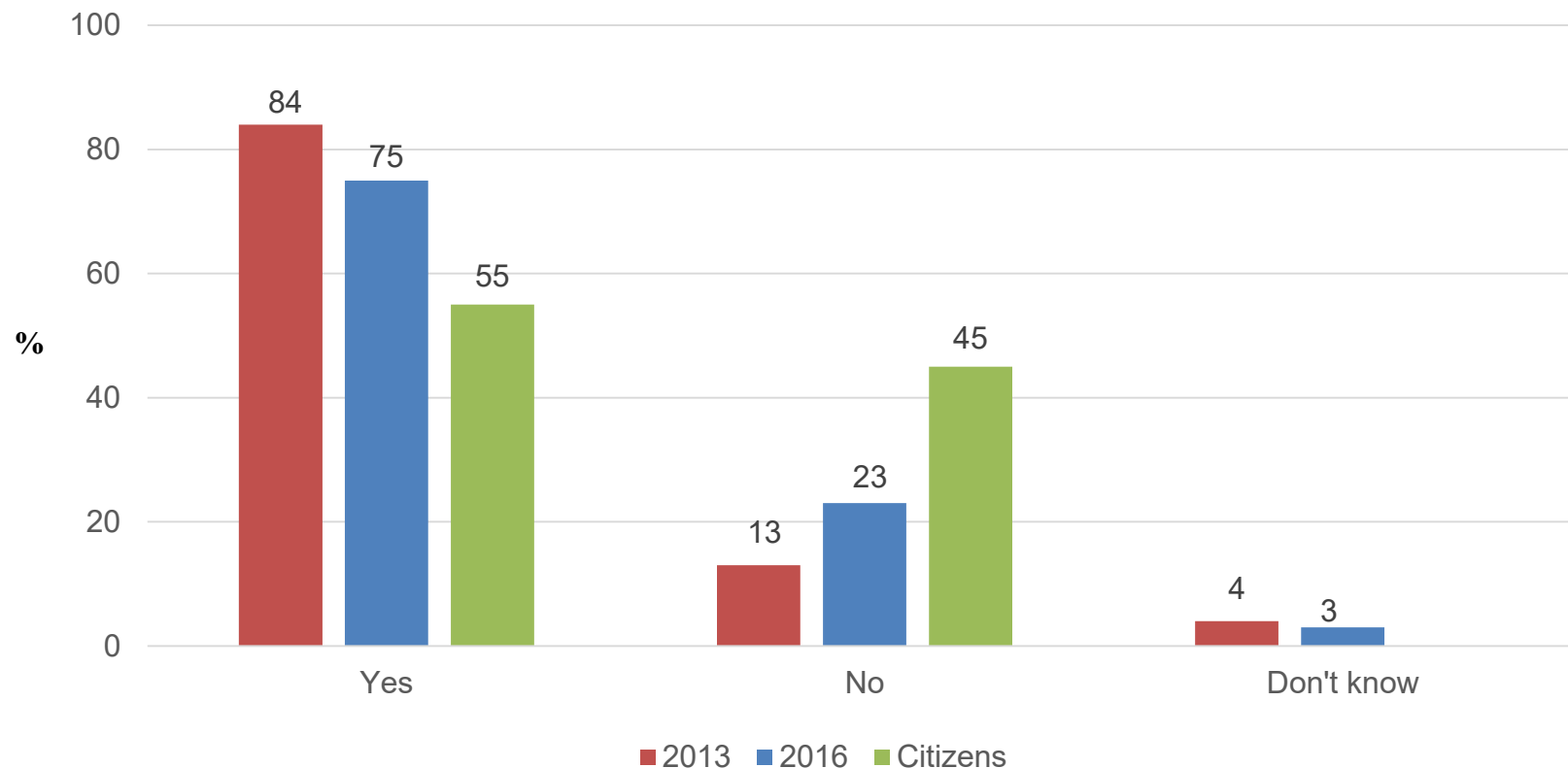
- Broad participation and transparency are important to legitimate the storage
- Weak interest from the citizens
- Difficult for the NGOs to find funding for information dissemination – a democratic deficit
- The NGOs experience limited and one-sided information flows
- Surveys to politicians and citizens

Telephone interviews

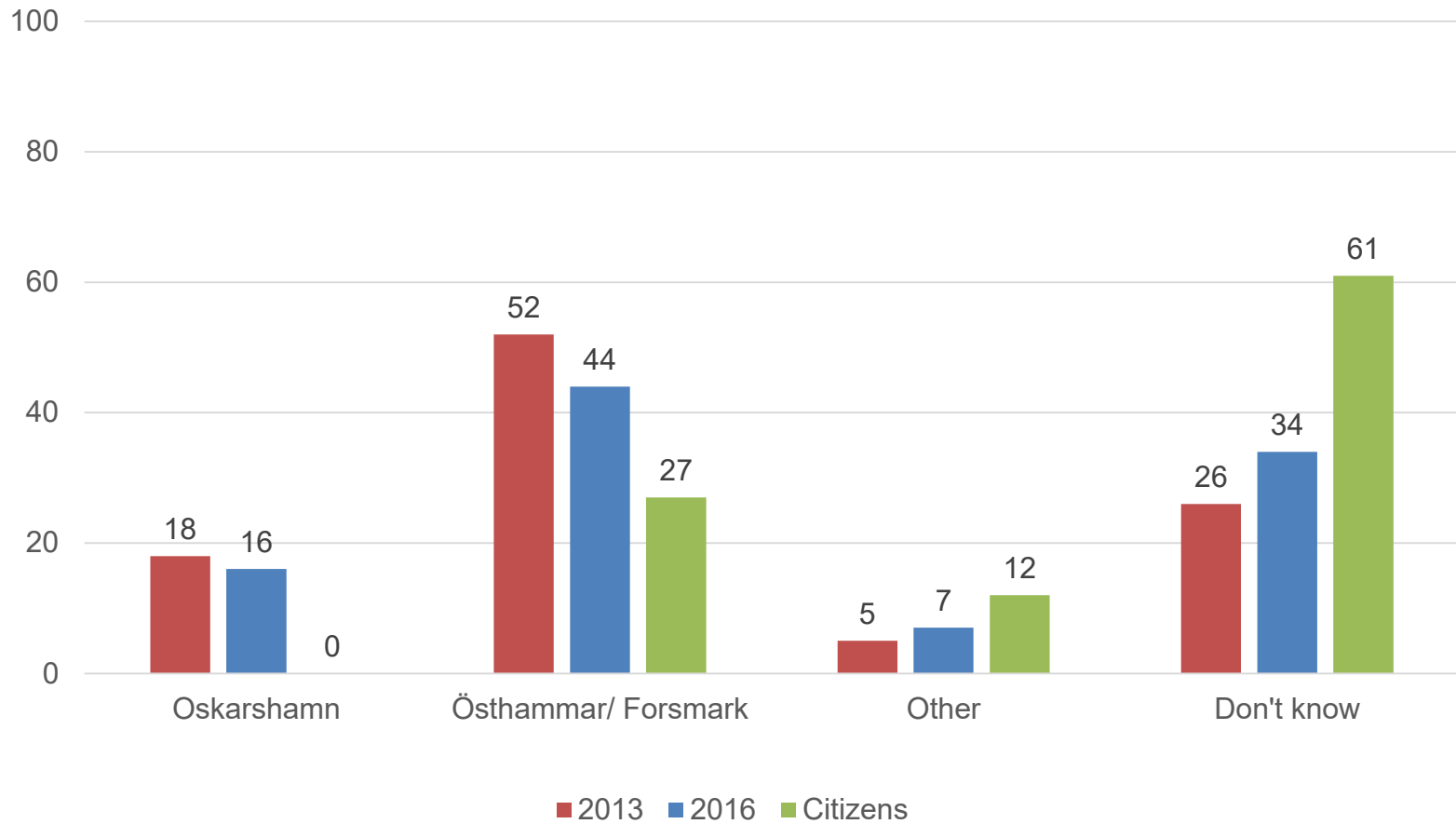
Year the Survey was Conducted	Target Group	Total Population	Response Rate
2013	Members of Parliament	349	60% (200)
2016	Members of Parliament	349	60% (200)
2018/19	Citizens between 18–75 years	1000	67% (670)

MP: Are you aware that SKB applied to the Land and Environment Court and the Swedish Radiation Safety Authority for permission to plan for the disposal of high level nuclear waste?

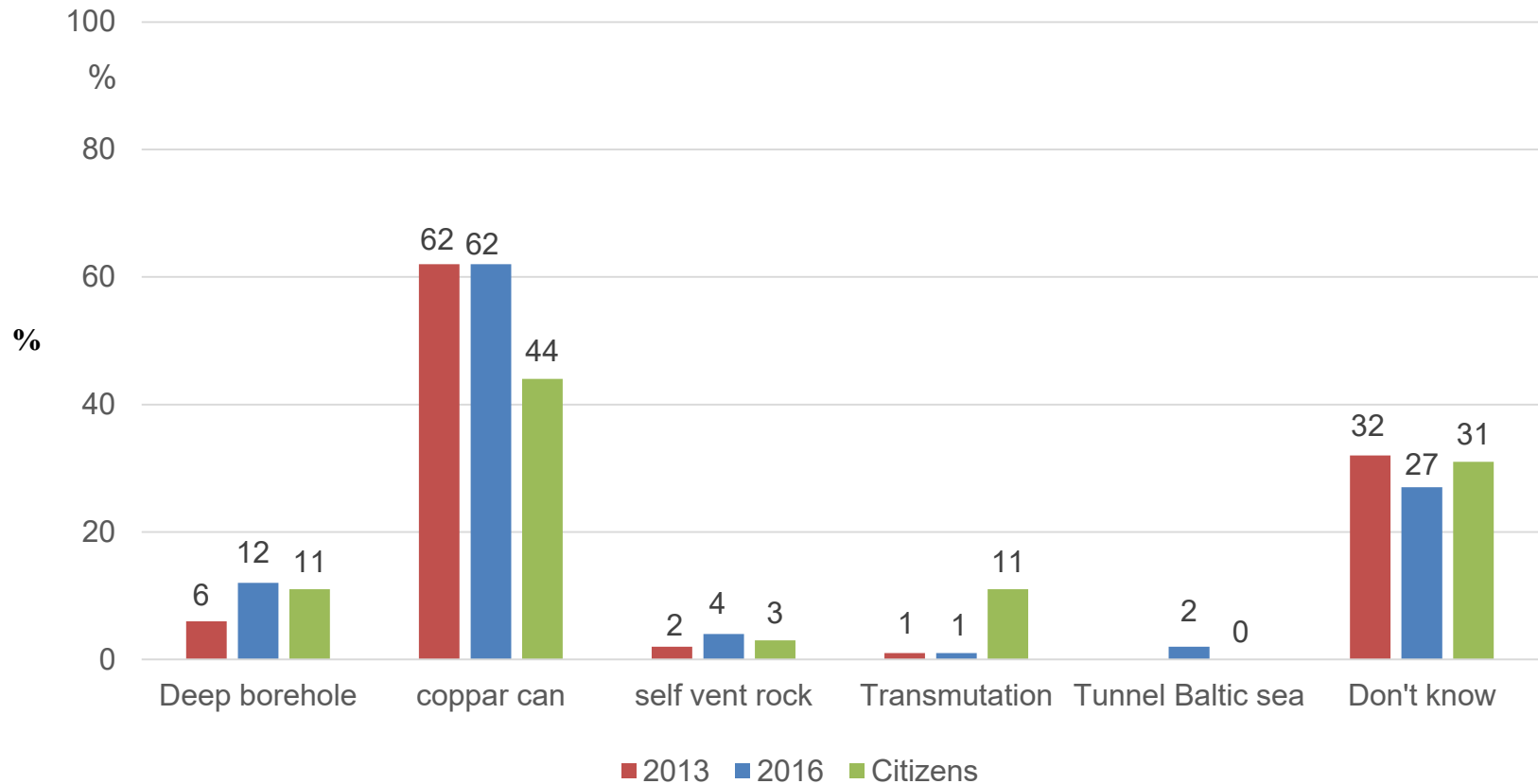
Citizens: Do you know that a final repository for nuclear waste is planned in Sweden?



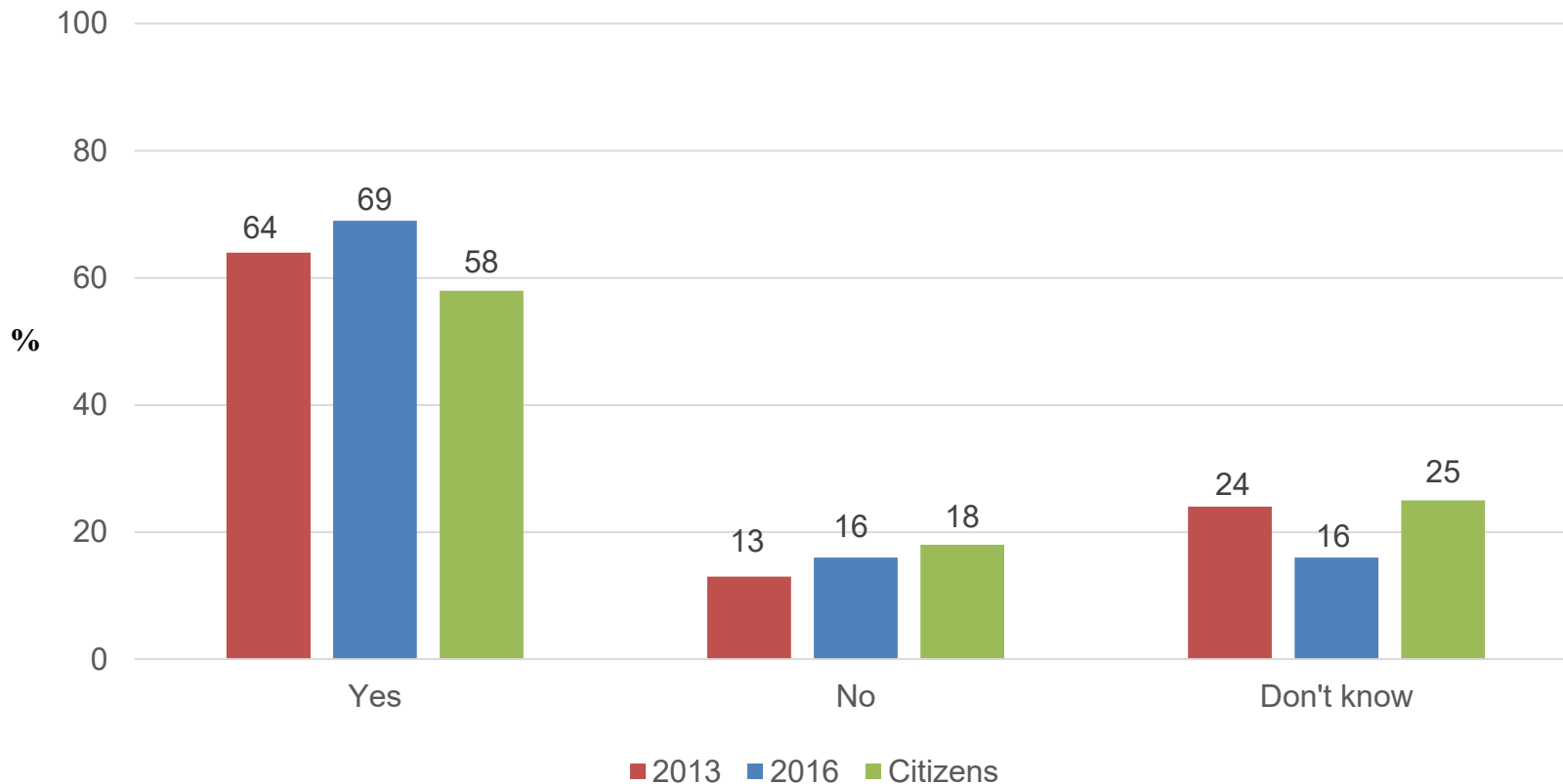
Do you know where the repository will be located? (In the citizens' survey Oskarshamn was not noted)



Which solution for final repository does SKB suggest in its application concerning spent nuclear fuel?

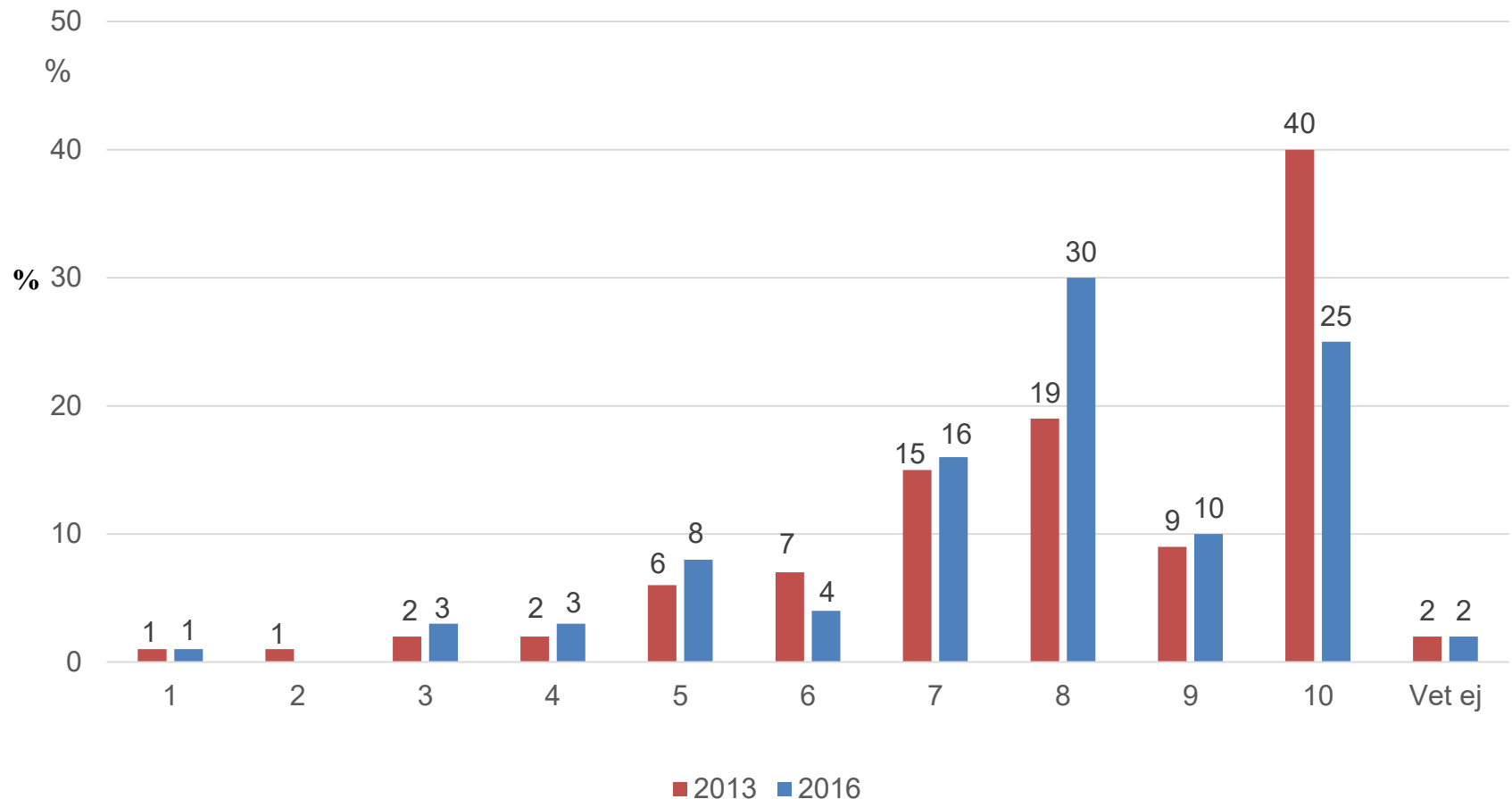


Do you think that we in Sweden can manage and dispose nuclear waste safely or not?



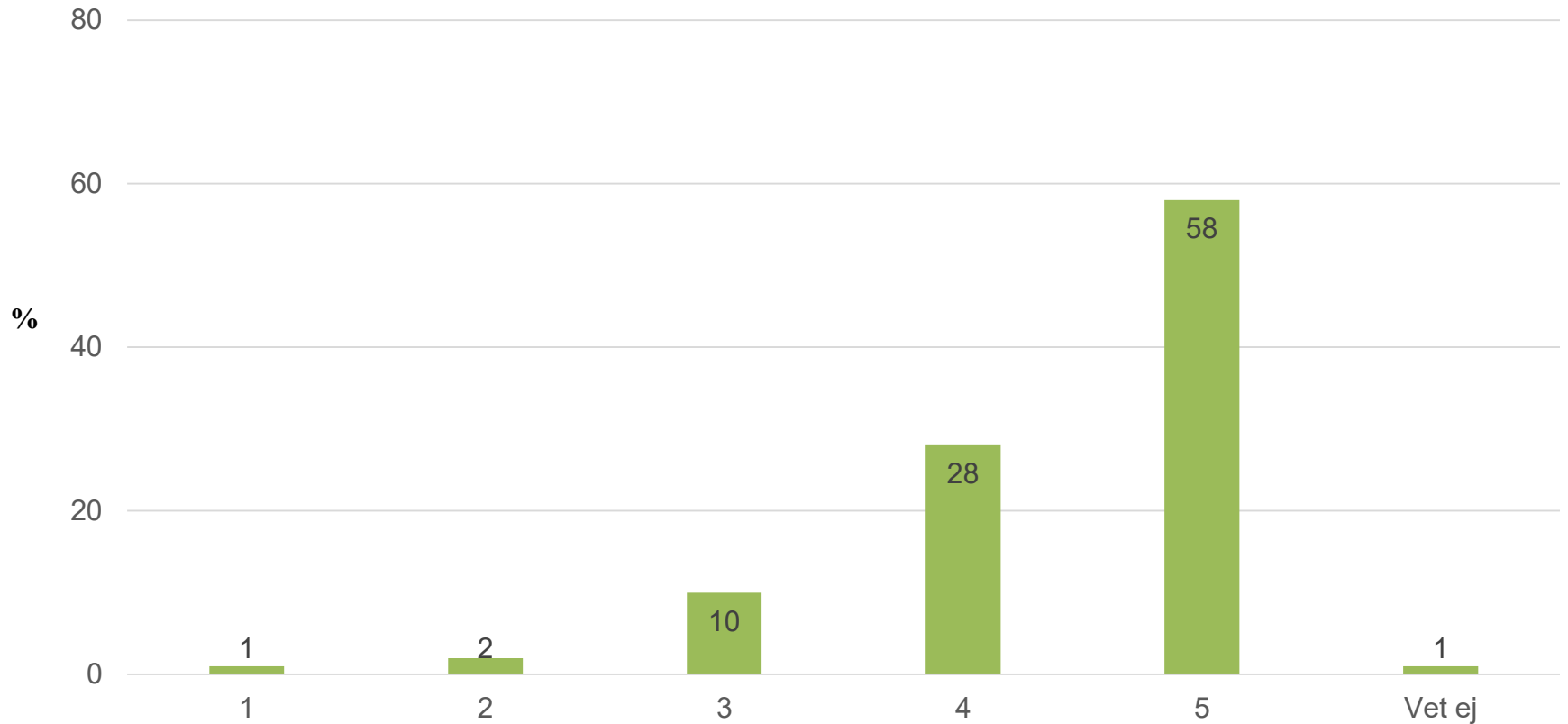
MP: How important political issue do you think the final disposal of spent nuclear fuel?

Scale of 1-10 is used in where 10 stands for very important political issue and 1 for not at all important political issue.

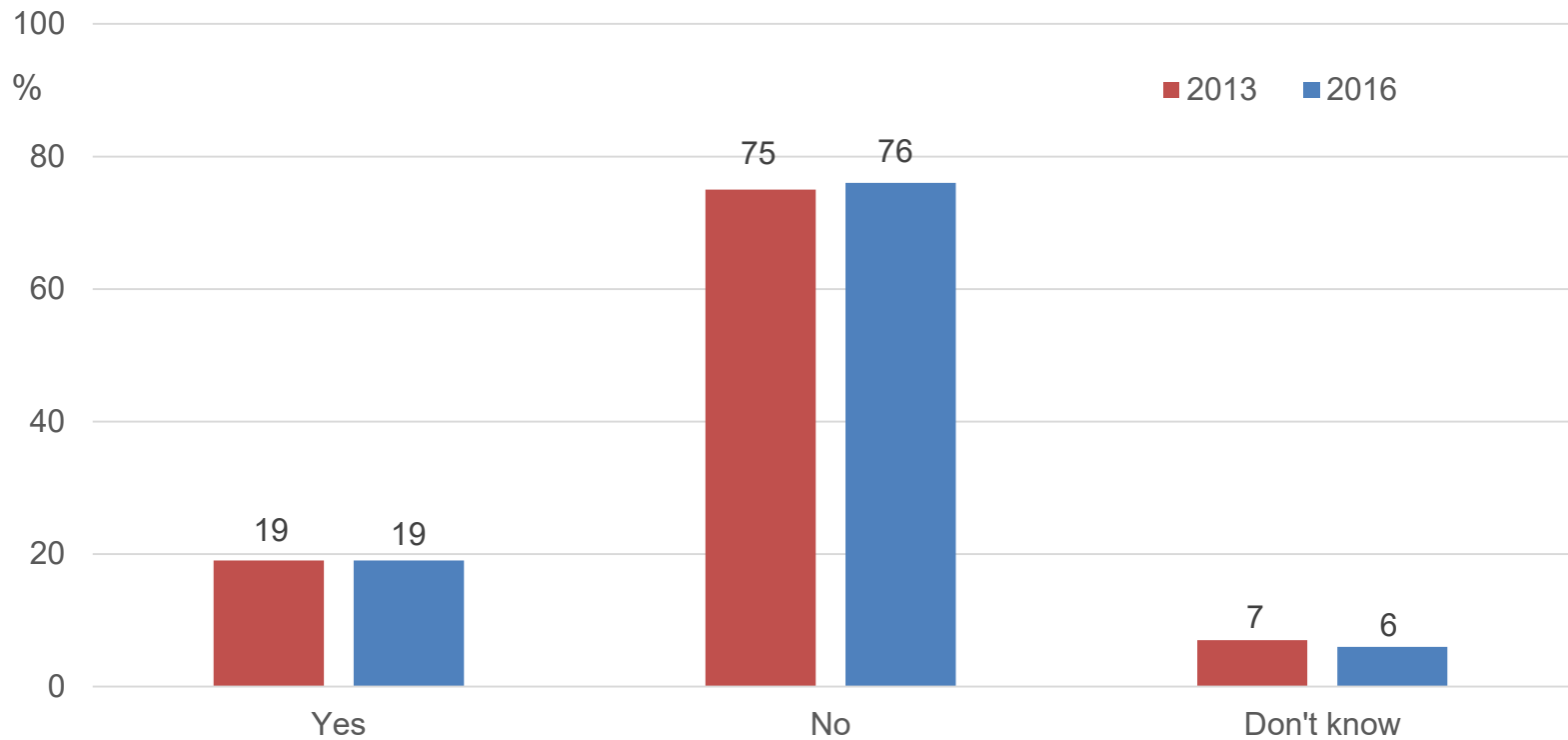


The citizens: Do you think this is an important issue or not?

Scale of 1-5 is used in where 5 stands for very important issue and 1 for not at all important issue.

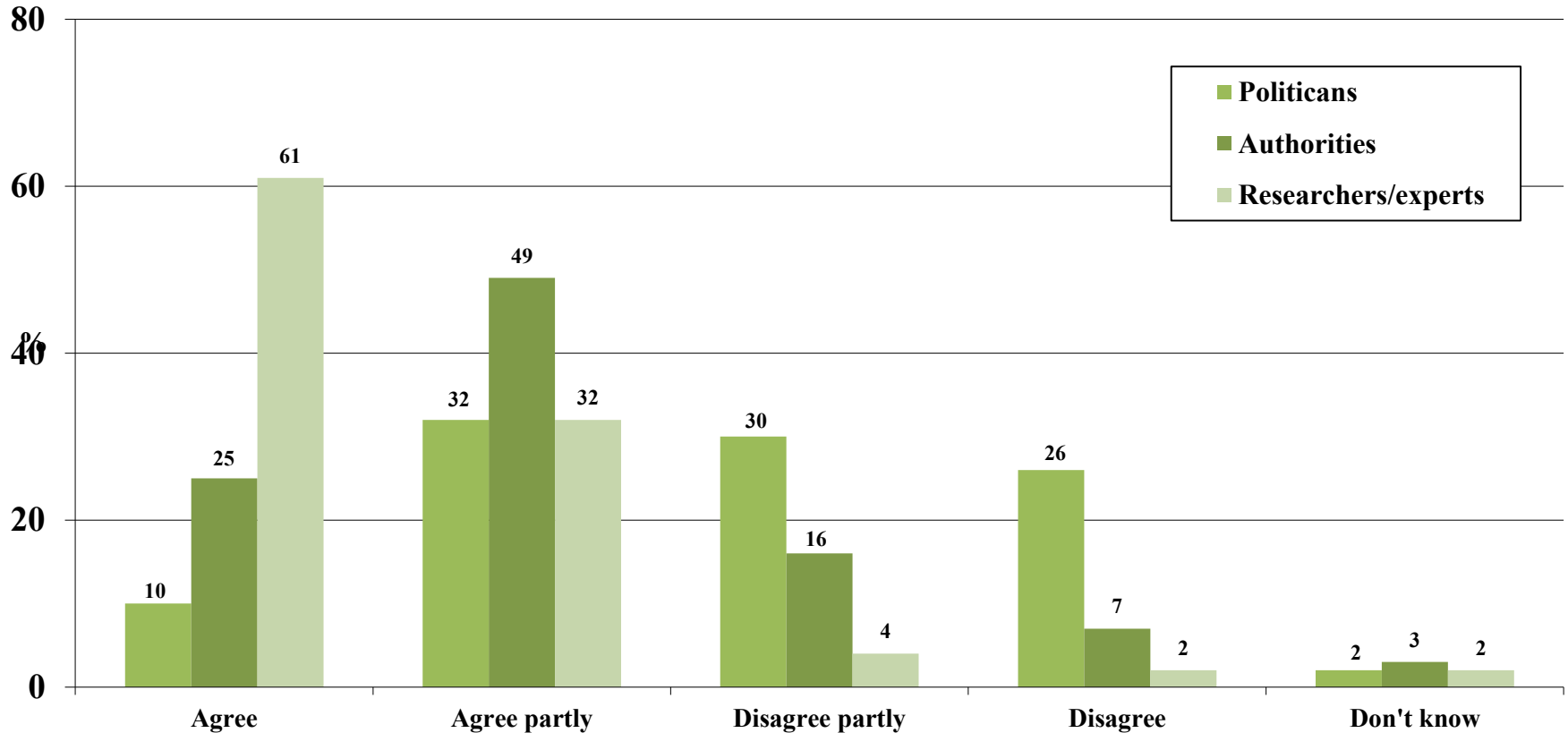


MP: Do you think we should leave to the experts on nuclear waste to decide about how we should manage our nuclear waste?

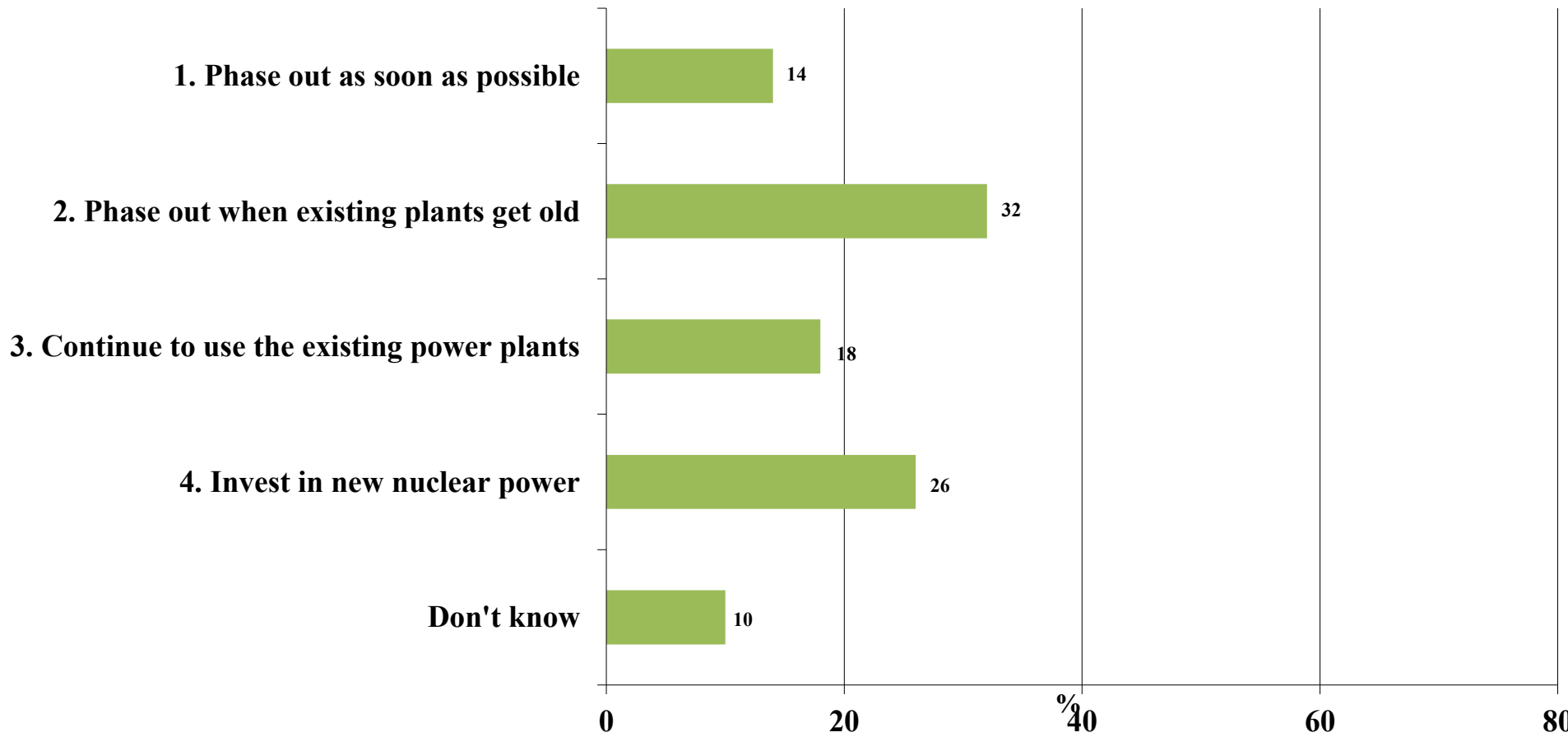


Citizens:

I trust the politicians' decisions/investigations by the authorities/researchers and experts on where and how to build a final repository



If we today would have a referendum about future nuclear power, how would you vote?

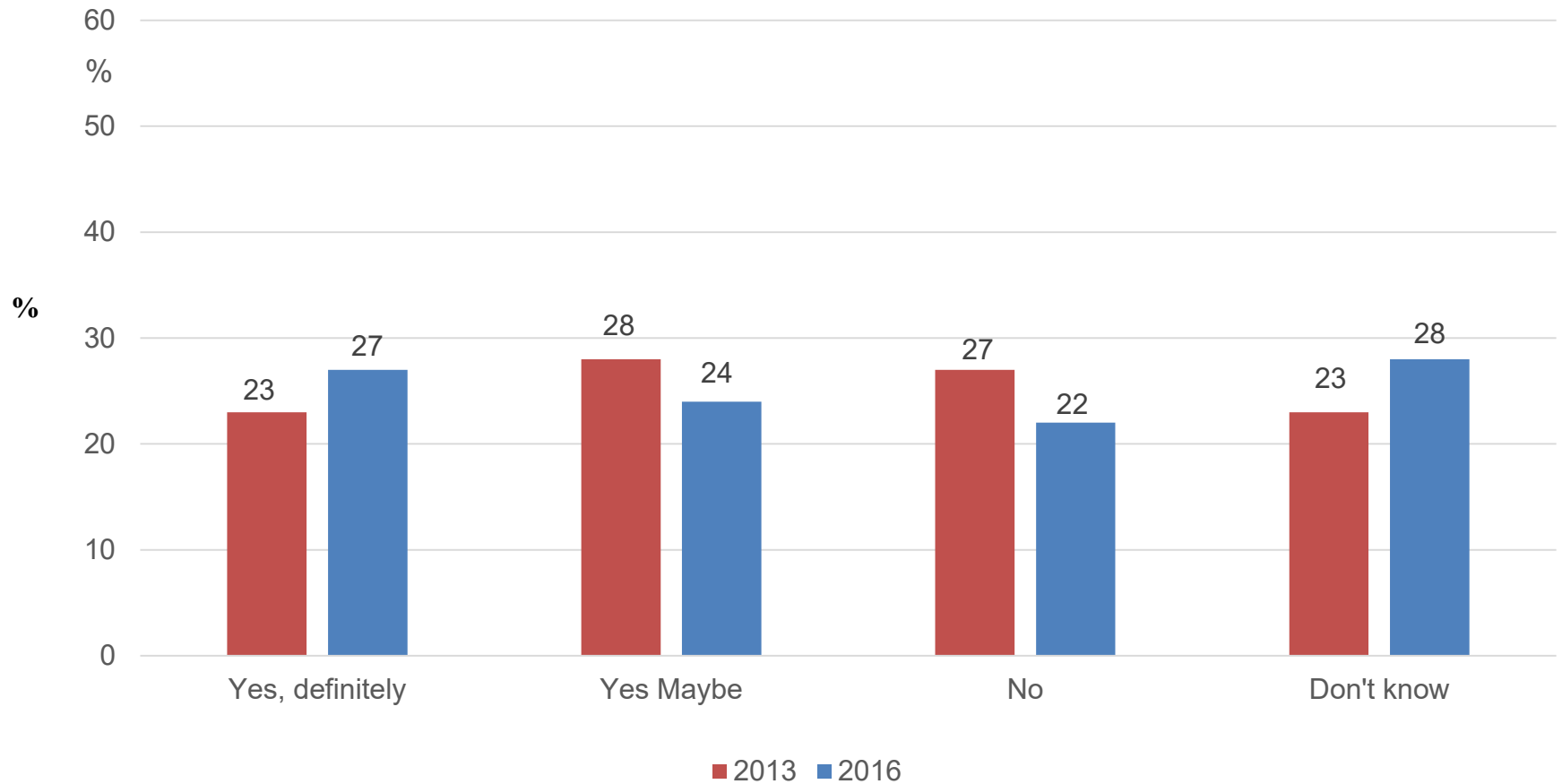


Retrievability

- Since 1982, Swedish policy has been to aim at a final disposal with no reprocessing
- No prohibition of reprocessing

MP:

Do you think nuclear waste should be disposed in a manner that allows it to be readmitted, for example to be reused in new types of nuclear reactors?



Concluding reflections

- Nuclear waste was seen as an important issue
- indicates a potential for thriving discussions
- so far this has not been the case in Sweden
- The MPs did not want to leave for the experts to decide
- But the among the citizens, the trust in politicians' decisions on where and how to build a final repository were low
- The Government will decide – a challenge for the legitimacy of the decision

Concluding reflections

- Gender differences: women more unsure; men had more knowledge
- I.e. the issue has so far attracted less interest from women than from men

Concluding reflections

- Nuclear waste has been framed as a technical issue and non-political problem
- Reflected in the surveys. More respondents knew the capsule material than knew that the suggested location was Östhammar
- Technical aspects are hard for both the politicians and a general public to have an opinion on
- More appropriate to discuss issues as location

Concluding reflections

- Important not only to involve politicians and citizens, but also to approach them with relevant issues
- I.e. is not on issues concerning corrosion in the copper canister...
- But issues like:
 - how to deal with safety in processes that has implications for 100 000 years
 - how to inform future generations
 - should we design the repository so that the withdrawal of nuclear waste can be done

Thanks!

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The results from the surveys are published here:

Palm, J. (2020). Knowledge about the Final Disposal of Nuclear Fuel in Sweden: Surveys to Members of Parliament and Citizens. *Energies*, 13(2), 374

Open access: <https://www.mdpi.com/1996-1073/13/2/374>