



# Hydrogen Production, Storage and Distribution

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DEPLOYMENT OF HYDROGEN:

## OPPORTUNITIES FOR RENEWABLES

- Hydrogen can play a key role in decarbonisation in sectors where full electrification is not possible – in transport, heat and industry
- What is the role for Green Hydrogen?
- Deployment of hydrogen production alongside a renewable source of electricity can lead a complex set of interactions that need to be considered by project developers



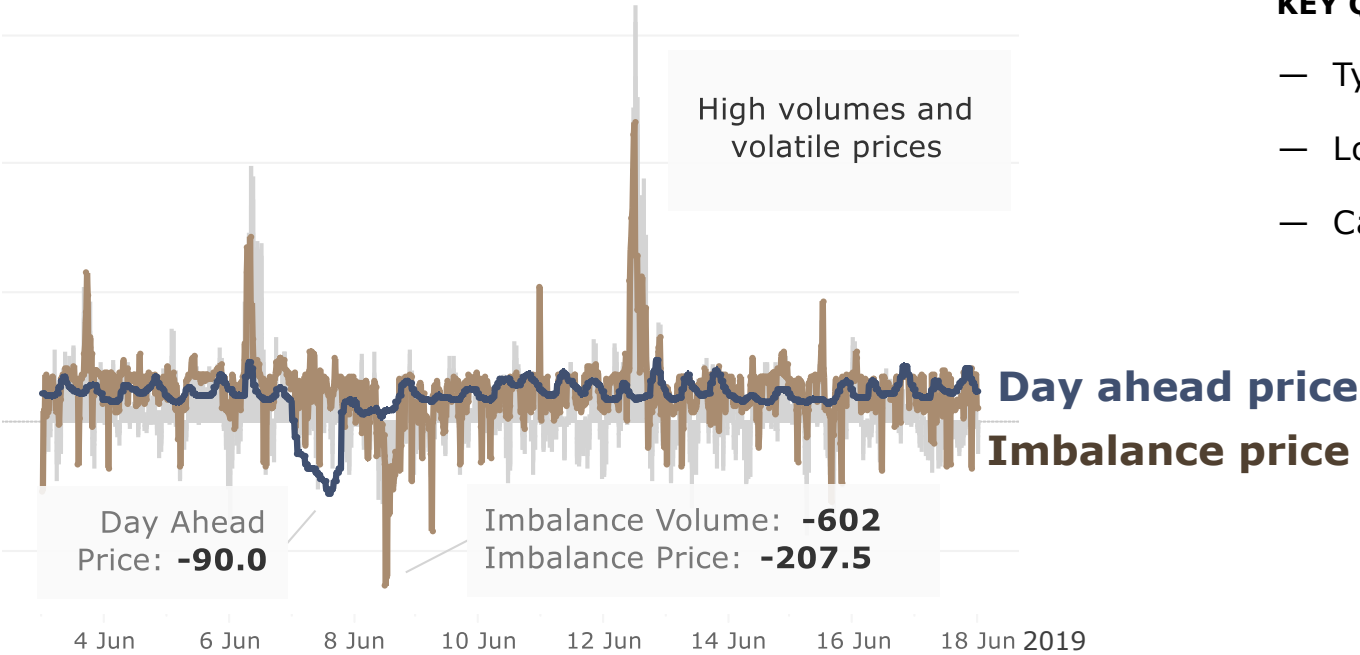
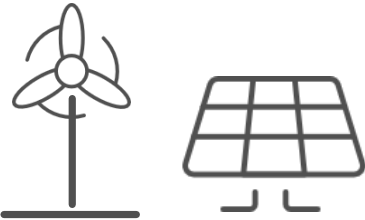
DEPLOYMENT OF HYDROGEN:

## KEY QUESTIONS FOR RENEWABLE ENERGY PROVIDERS

- There are decision points at each stage, such as the size of grid connection, choice of storage or transportation options
- Cost considerations are critical at every stage of a project, and can determine the viability of different options
- Alongside these decisions, the policy and market landscape will also play a key role in determining the success of co-deployment of hydrogen alongside renewables



# RES development



### KEY QUESTION

- Type of RES
- Location of res
- Capacity

# Connection to the Grid

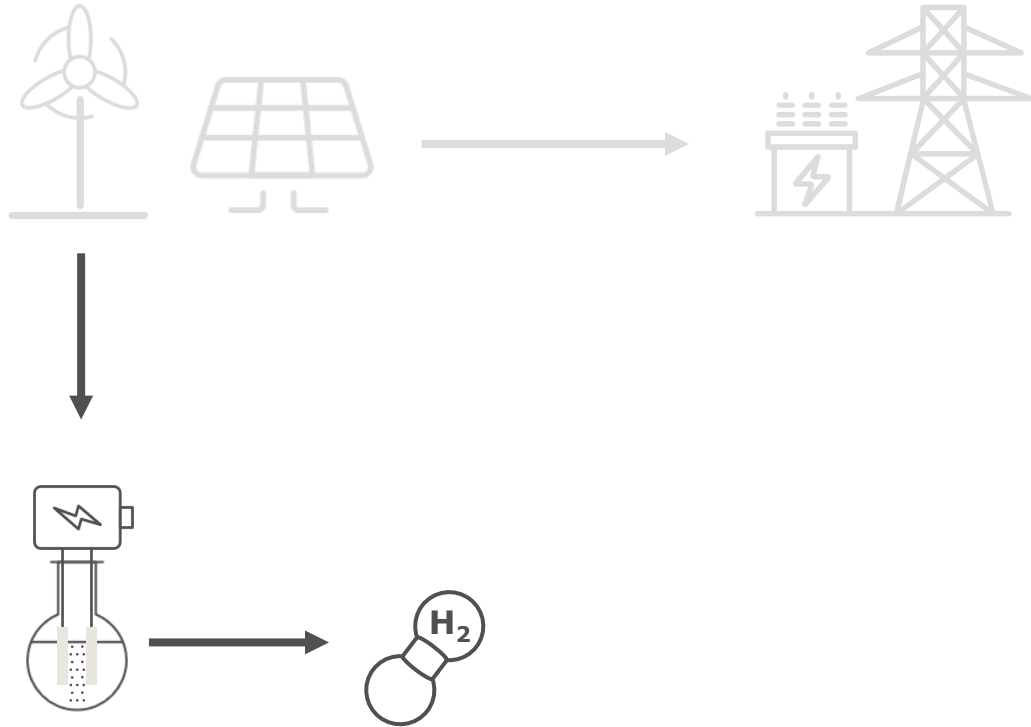


## KEY QUESTION

What revenue will I get from RES?

- Market prices?
- Support mechanisms?

# Electrolysis

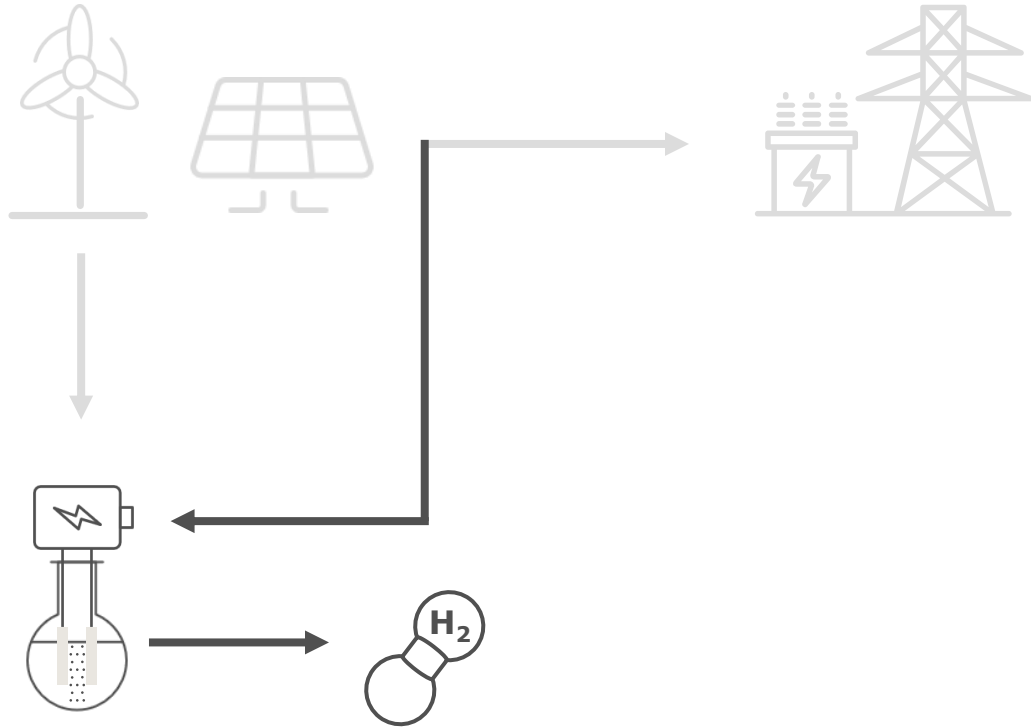


## KEY QUESTION

Should you add an electrolyser?

- What size and type should it be?
- How often will it run?
- Will I recover my costs?

# Grid connection for the electrolyser?

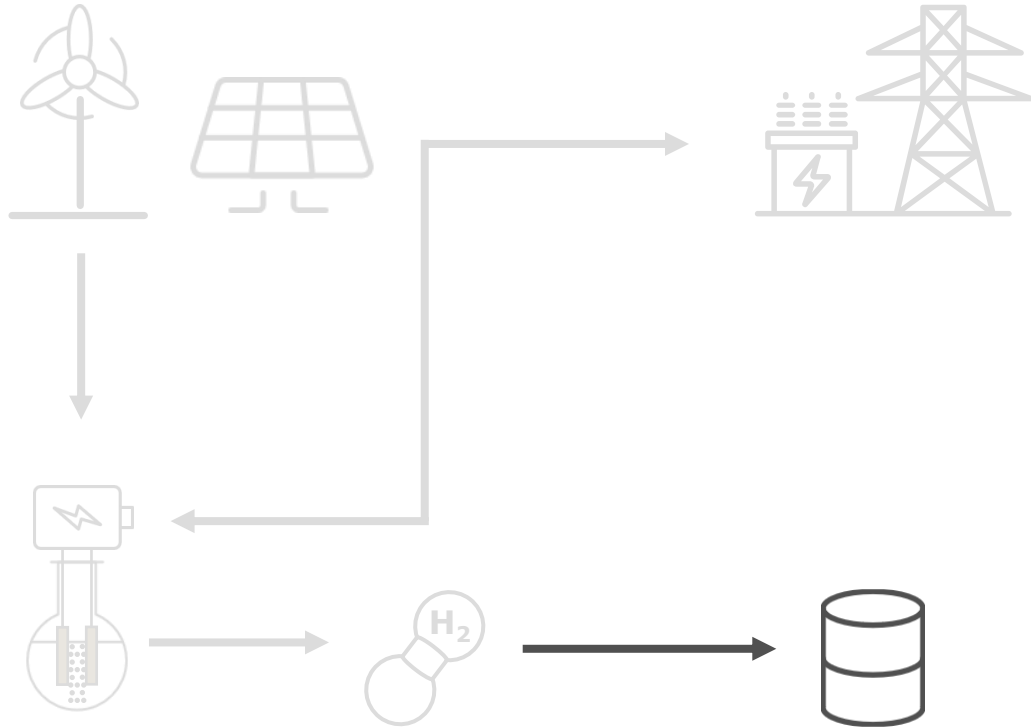


## KEY QUESTION

Should I add a grid connection for the electrolyser?

- How will this change the utilisation/load factor?
- What production cost can I achieve?
- Will I recover my costs?
- How do I ensure my electricity is green?

# Hydrogen Storage?



## KEY QUESTION

- Do I need to add storage tanks for hydrogen?
- Size and cost of the storage?
- Will I recover my costs?



# Hydrogen end users

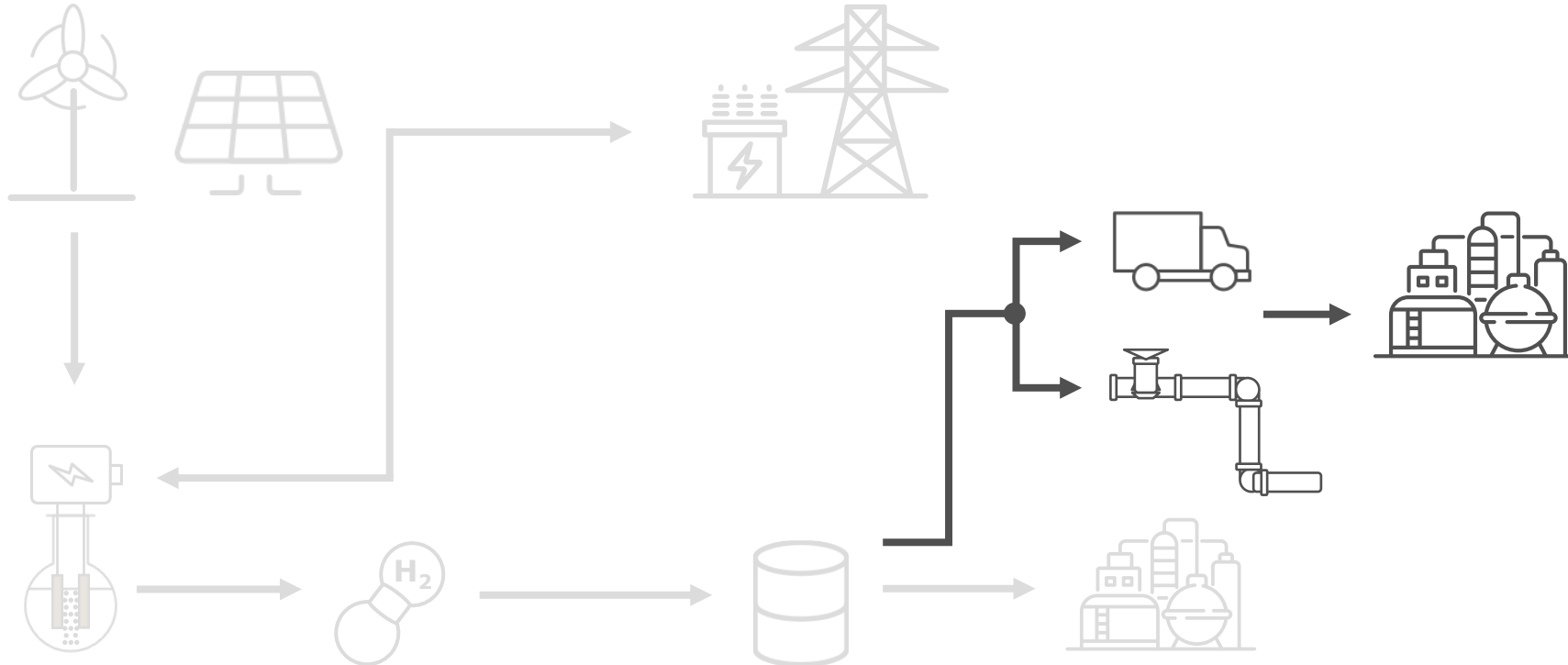


## KEY QUESTION

Where do I sell hydrogen?

- Is there an end user close to hydrogen production?
- Does this determine where I locate RES?
- What is the best location that guarantees to be close to the user and to have access to good natural resources?
- Is my hydrogen competitive with alternative suppliers?

# Hydrogen Transportation

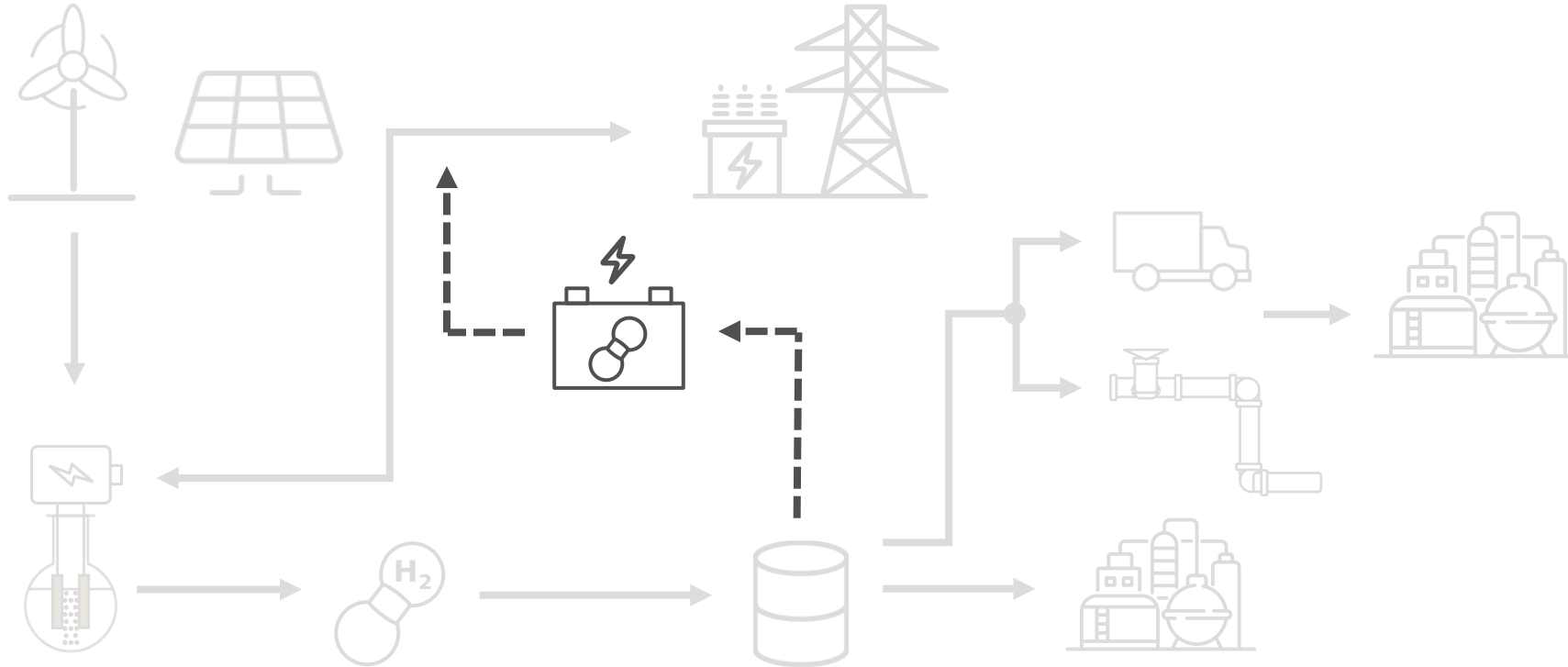


## KEY QUESTION

Where do I sell hydrogen?

- Where are the customers?
- How do I get hydrogen from production to my customer?
- Will I recover costs?
- Is my hydrogen competitive with alternative suppliers with the addition of transport costs?
- Can I partner with a hydrogen transport specialist?

# Addition of Fuel Cell?

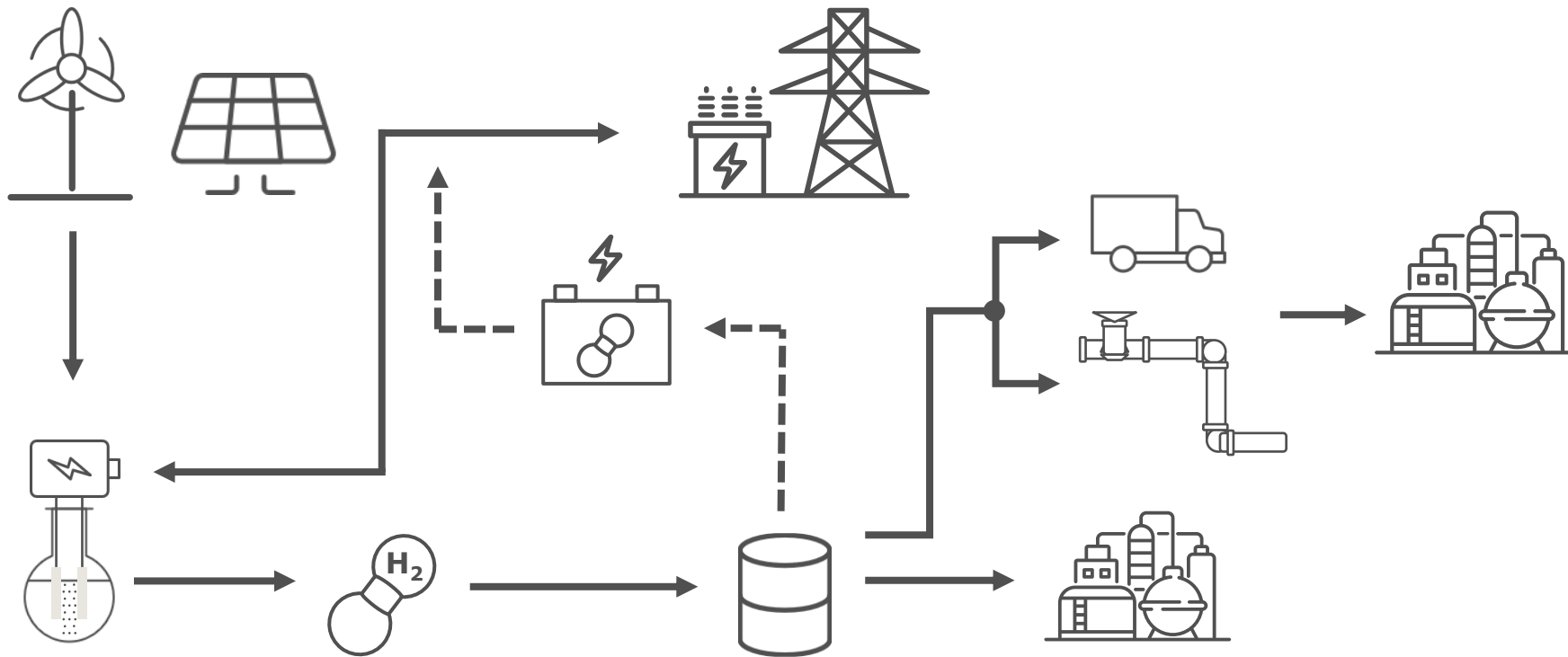


## KEY QUESTION

Should I add a fuel cell and sell electricity back to the grid?

- Scope for system services?
- What price do I need for electricity?
- Can I cover costs and make a return?

# Going off-grid?



## KEY QUESTION

How does this change the project economics?

- No grid connection costs
- All electricity production directed to electrolysis
- Good RES and good load factors essential
- Transportation costs essential to consider



# Making Future