



A roadmap for financing Hydrogen Refueling Stations

PRD 11-11-2014



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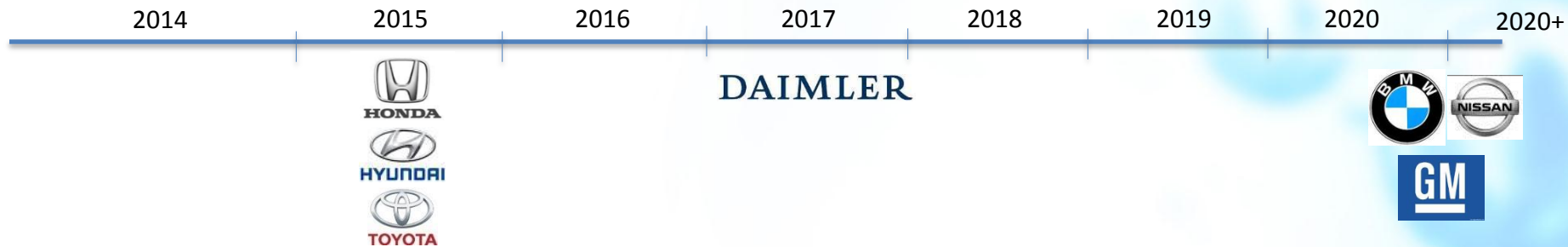
- **Scope**

- When can we expect bank finance to support HRS deployment ?
- At what conditions?
- What are the roles of
 - Strategic Investors (Industry)
 - Car OEMs, H2 providers, HRS builders and operators, etc.
 - Public authorities
 - Financiers (public and private)

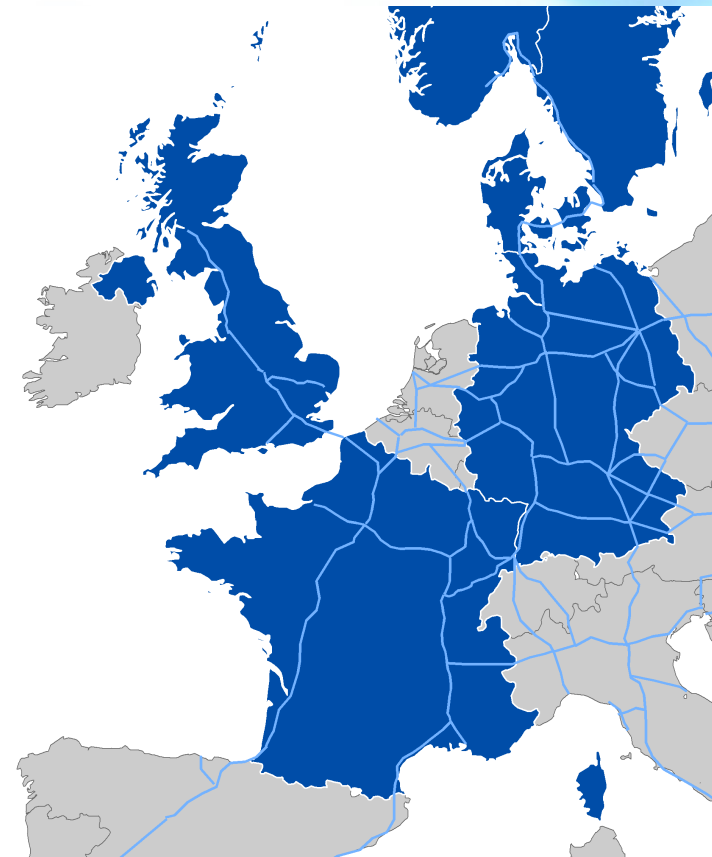
- **Who**

- Consultant Roland Berger
- H2M UK and Germany
- FCH JU
- European Investment Bank (EIB)
- Consultation of banks and financing institutions:
 - Allianz Capital Partners GmbH
 - Clean Infra Partners LLP
 - IKB Deutsche Industriebank AG
 - Infrastructure Development Partnership (IDP)
 - Macquarie Capital (Europe) Limited

Now we have....



1. Car OEMs announcing the commercialisation of FCEV
2. Several national **H₂Mobility initiatives** beginning the creation of nationwide hydrogen infrastructure



H₂Mobility

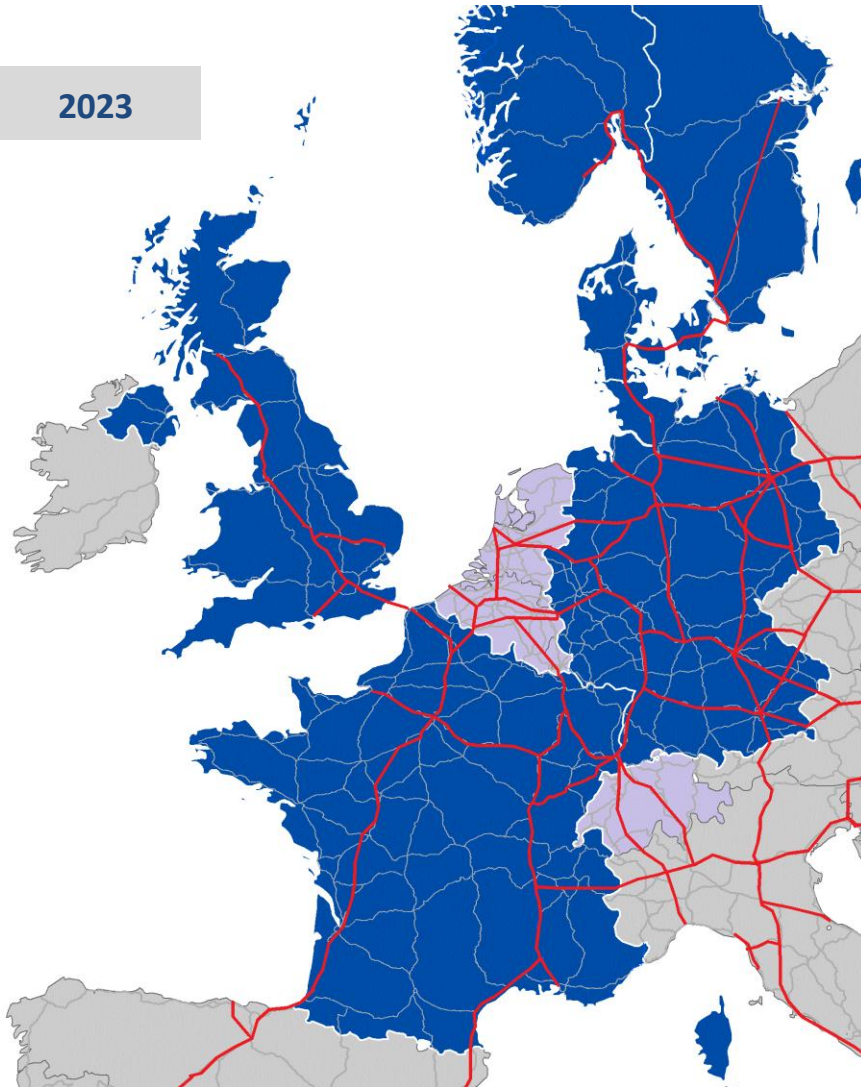


UK H₂Mobility



In 10 years, we expect an European network of 600+ H2 HRS

2023



Scandinavia over 50 HRS by 2023



UK over 100 HRS by 2023



Germany ~250 HRS by 2023



France over 100 HRS by 2023



**Surrounding countries joining
(Benelux, Austria, Finland, etc.)**

Key:

— Major Roads covered by HRS

— TEN-T Corridors

— TEN-T Corridors linked by early HRS

■ Nations with H₂Mobility initiatives

■ Nations without H₂Mobility initiatives

■ Next Phase of H₂Mobility initiatives
HRS removed for illustrative purposes

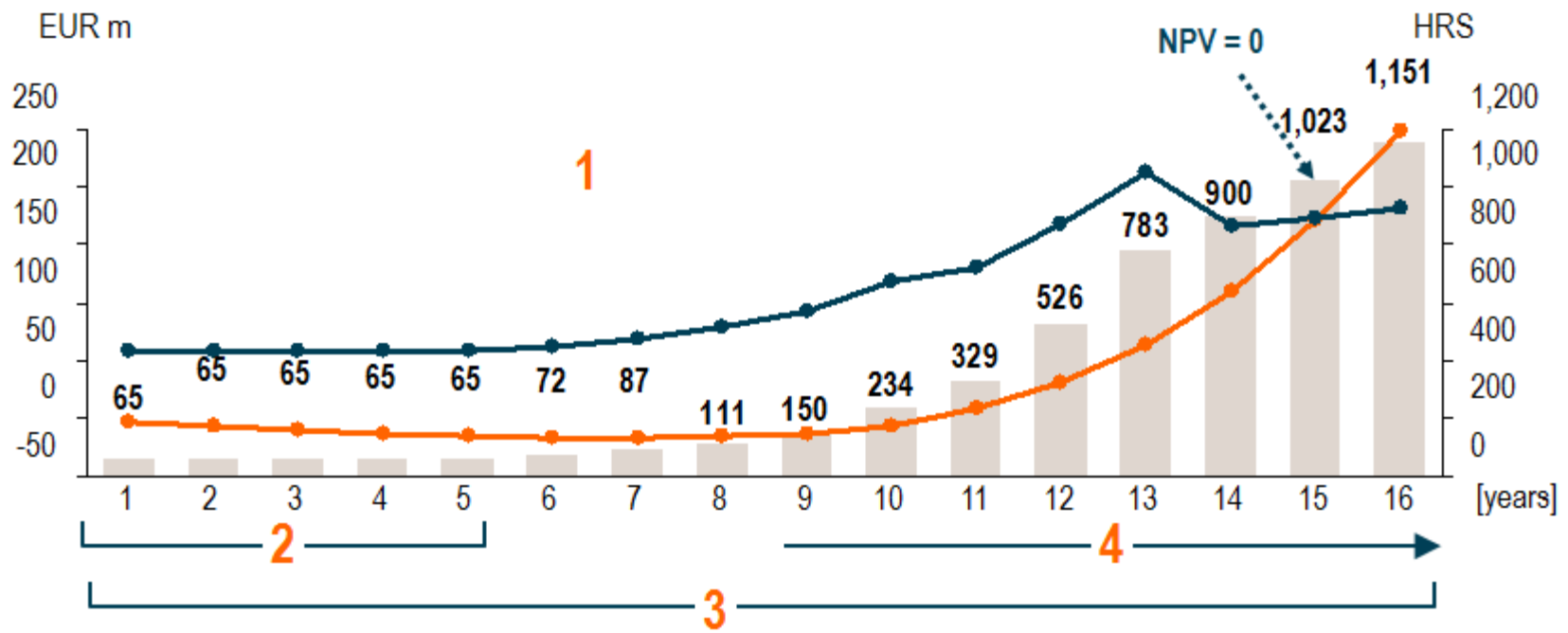
This represents

- a total budget of ~€600M
 - (600* €1M/station)
- A small budgetif we see what is a stake
 - The launch of a new European fuel infrastructure
 - The deployment of a new type of cars.
- But.... a big financing challenge

A private financier perspective:

4 risks kill attractiveness of the investment

- **High risk level:**
 1. Revenues depend on cars uptake
- **Late profitability**
 2. Under-utilisation at start
 3. NPV positive after 10-15 years.
- **First mover disadvantage**
 4. no protection against competition when business case becomes sure and profitable

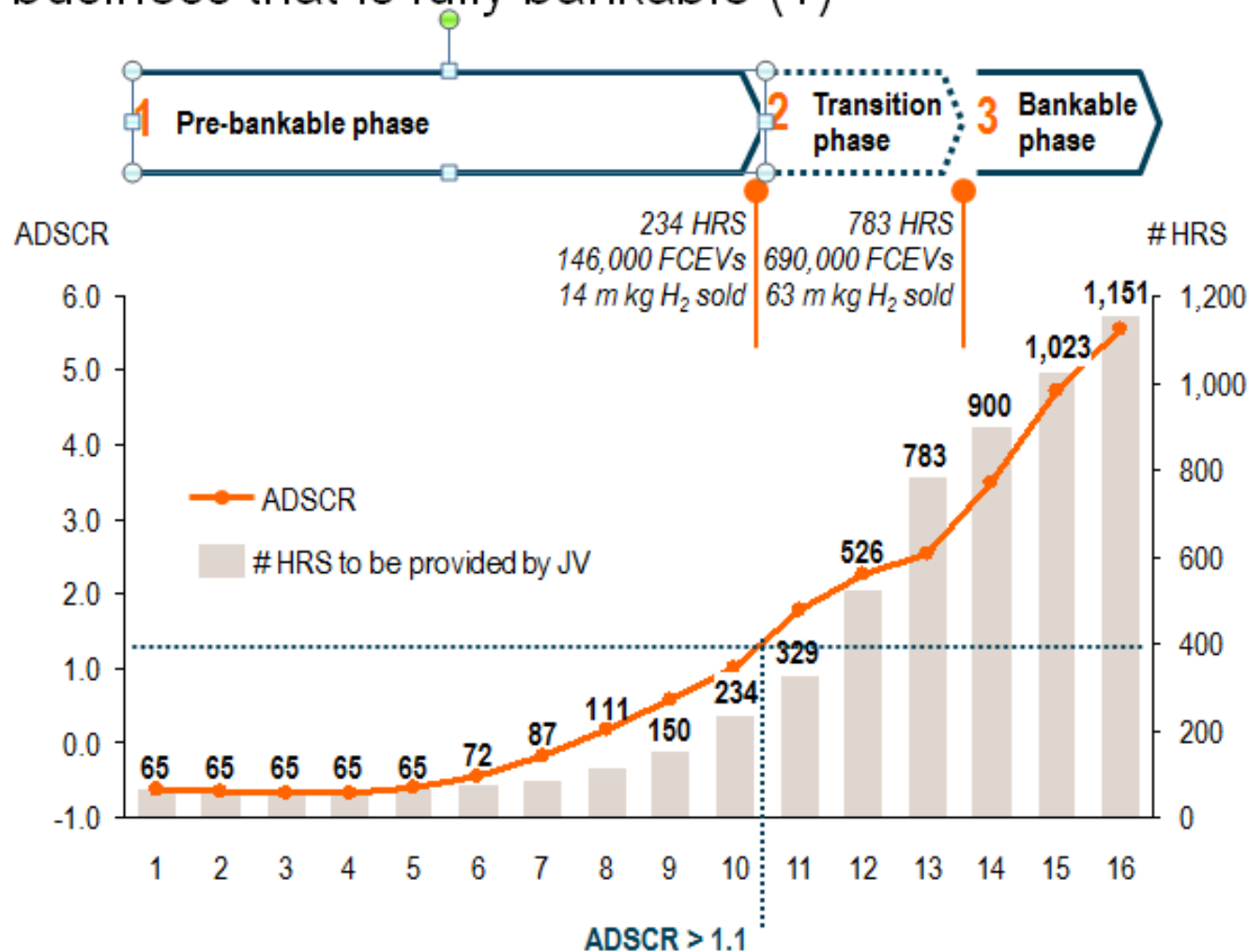


– illustrative Calculation based on the business case for the UK

Source: Roland Berger (study for FCH JU)

Is this the end
of the discussions with banks ?

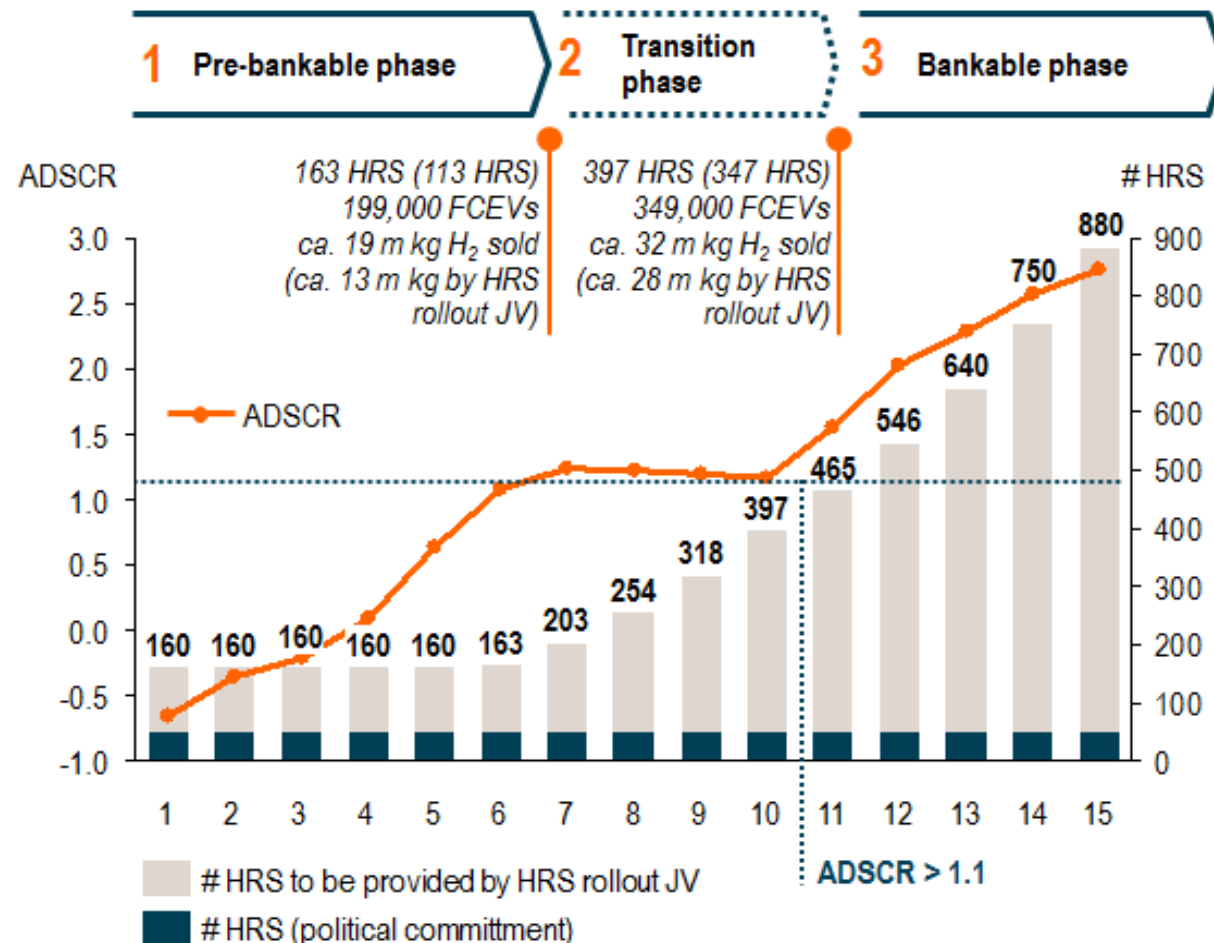
In a step-by-step approach, HRS roll-out can become a viable business that is fully bankable (1)



Features of the phases:

- 1 Pre-bankable Phase:**
Strategic equity and governmental support – funds from financiers not yet available
- 2 Transition Phase:**
Financing instruments with capacity to absorb larger risks from public banks are available (e.g. EIB-RSFF) – HRS rollout starts to build up a credit history
- 3 Bankable Phase:**
Financing from public and private lenders and from private investors is available

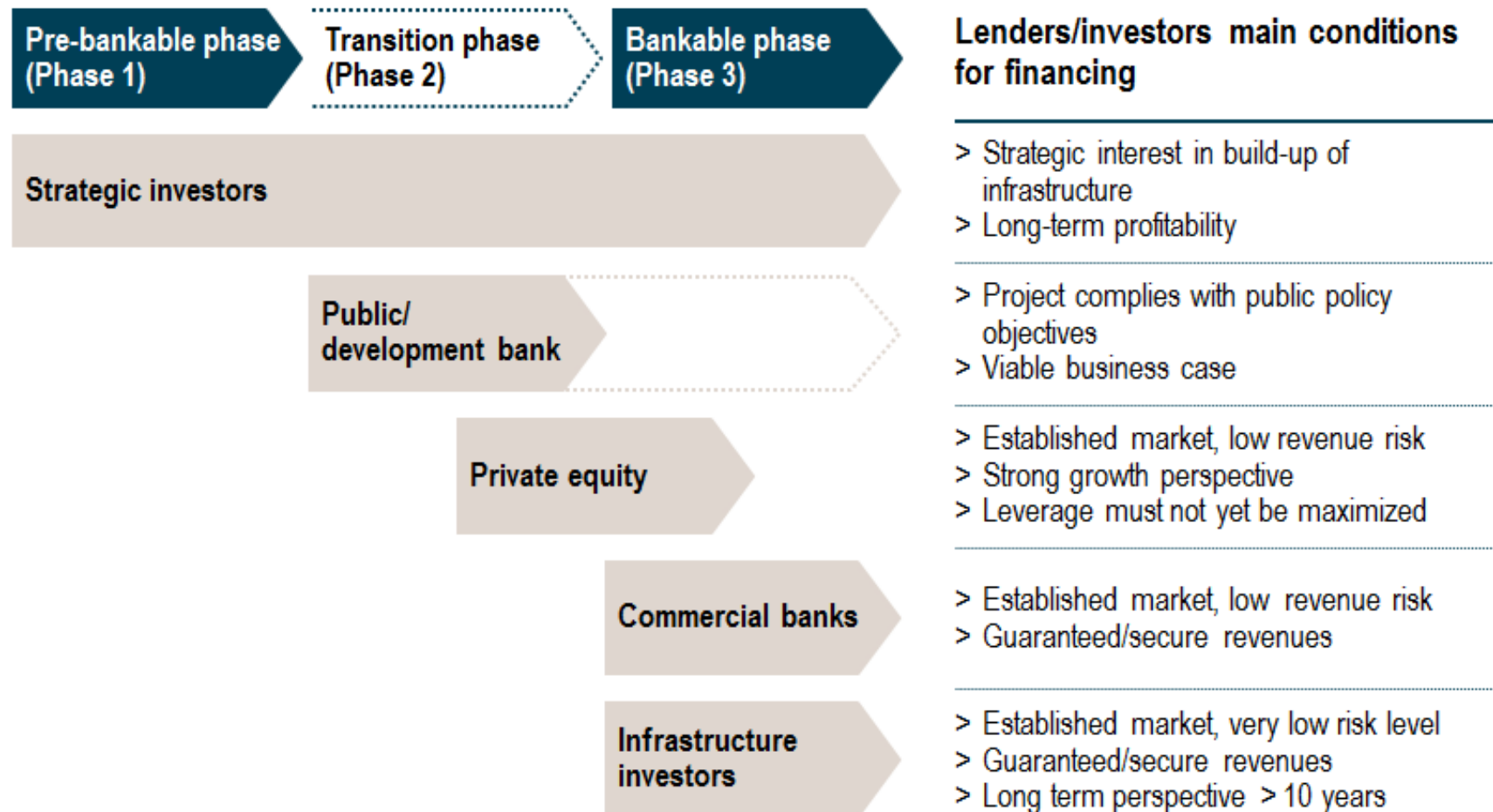
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Different stakeholders interested in different stages



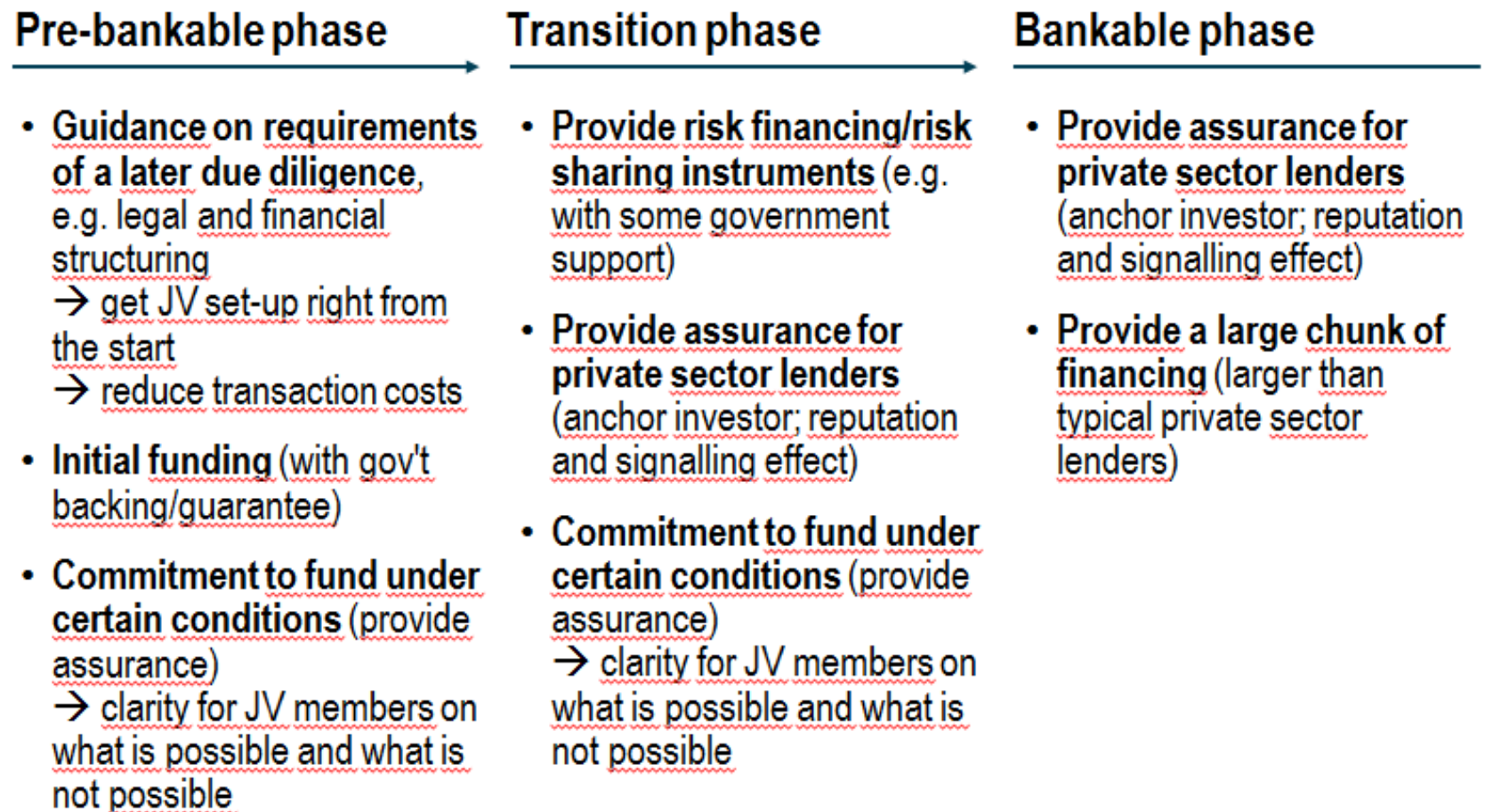
Roles of strategic investors, governments & financiers

Governments — + — Strategic investors — + — (Public) Financiers

- | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">> Create first mover advantage and stimulate swift rollout> Absorb share of financial challenges> Address FCEV ramp-up risk through regulation / incentives> Increase strategic value of the HRS rollout through regulation | <ul style="list-style-type: none">> Finance and handle HRS rollout from the start> Absorb share of financial challenges> Mitigate project risks – especially FCEV ramp-up risk | <ul style="list-style-type: none">> <u>Reduce financing costs through public bank loans</u>> Support <u>establishing a financing track-record as early as possible</u>> Create blueprint for a market-based rollout across the EU |
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Public Banks

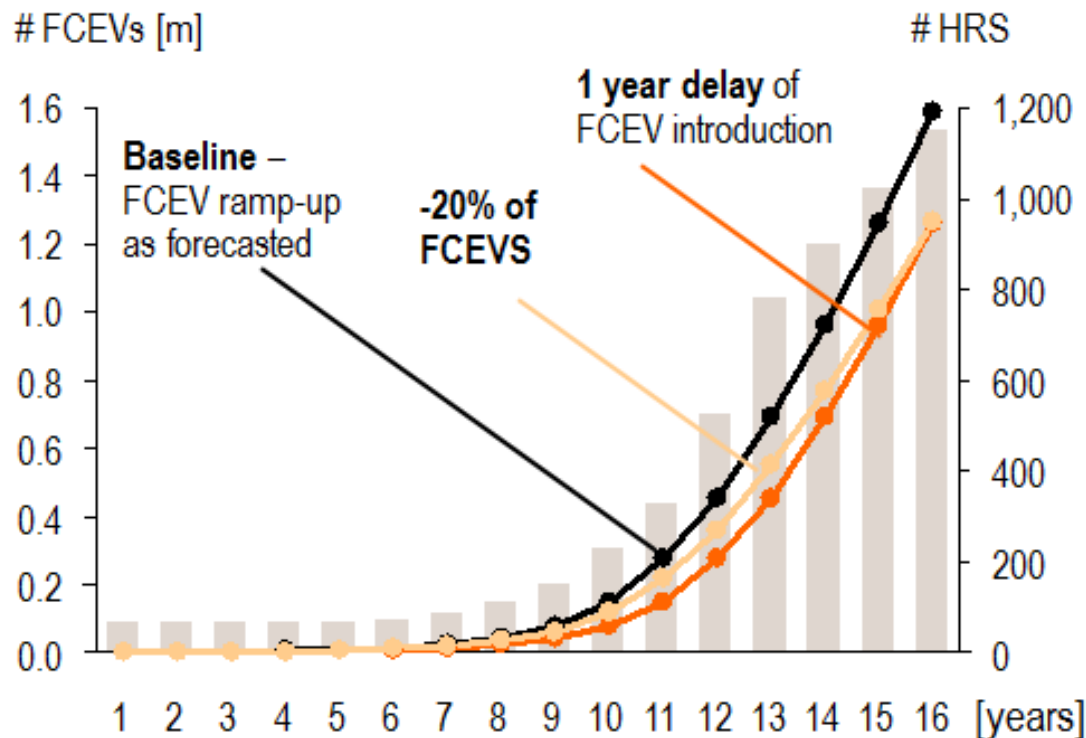
Public banks can support by supporting the roll-out from the beginning



Strategic Investors

Commitment from OEMs on FCEV sales is an absolute necessity

A slight deviation from the forecasted FCEV ramp-up...



... has a major impact on the business case

Is the investment financially viable?

Scenario	NPV	
Baseline	EUR 67.1 m	✓
-20% of FCEVs over 16 years	EUR -4.2 m	✗
1 year delay of FCEV ramp-up	EUR -36.5 m	✗

Slower FCEV pickup results in additional need for loss absorption – mitigation is of crucial importance

Strategic Investors

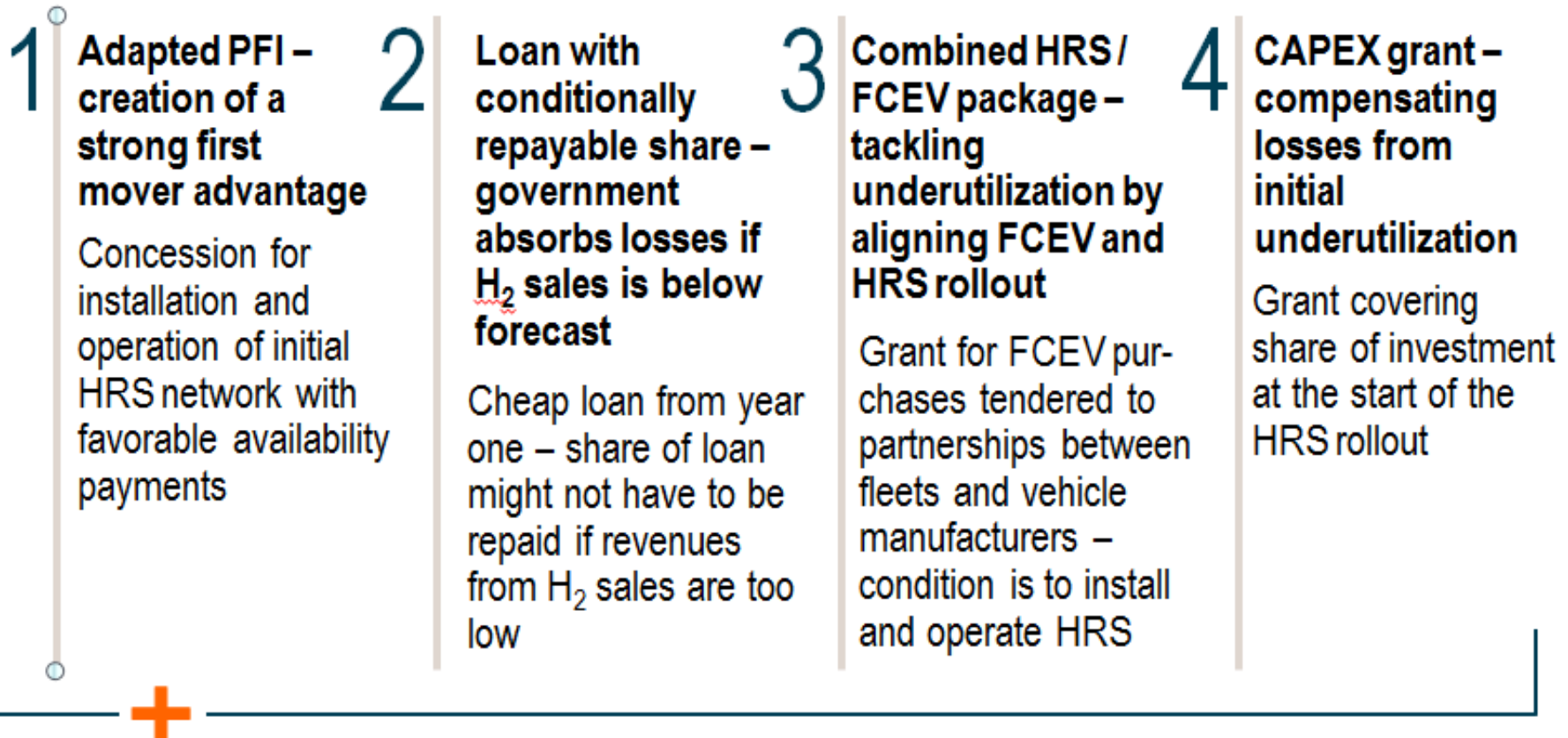
Financier perspective: commitment from car OEMs better than regulation if it provides guaranteed revenue

Effective-ness	high low		
Category	1 Guaranteed revenue	2 Regulations on FCEV purchase	3 Incentives for FCEV purchase
Selected mitigants	<p>Contract with large scale off-taker (fleets) concluded</p> <p>Pre-purchase of H₂ by carmakers in line with planned FCEV ramp-up ("Take or pay")</p>	<p>Regulation requiring minimum share of alternative fuel vehicles in fleets</p>	<p>Government incentives for FCEV purchase bridging price gap to conventional vehicles</p> <p>Tax credits for fleet operators integrating FCEVs in their fleet</p> <p>Higher weight of CO₂ emissions in vehicle tax</p>
Impact	Makes project finance accessible	Helpful (a deferred positive effect on financing through a higher H ₂ off-take from the start of the rollout and the resulting improvement of business case KPIs is possible), but insufficient to access project finance	

Governments

Beyond regulation, Governments can 4 kick start the HRS roll out

Study examines 4 pathways



mechanisms to align vehicle manufacturers' and refueling network operators' efforts for FCEV market introduction and HRS network rollout

- All details available on www.fch-eu.eu
- The study in perspective

