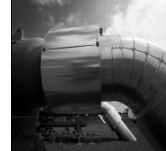


Carbon Markets, Price Floors, mechanisms for differences and Targets: Under Which Circumstances Are Low Carbon Investments for financial investors Still a Winning Proposition?

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How to meet the objectives of the countries : ensuring a reliable supply of electricity, meeting environmental objectives at the lowest cost.

Traditionnal Large Utility model

Large scale utilities control the market

- In the traditional European model, utilities are the equity investors in the power generation
 - They are also the sellers of energy
 - Dominant position on the market (at least locally)
 - Capacity to mutualize the projects, and optimise the energy mix at any time
 - Capacity to optimise the capacity mix on the long term (long term investment plan)
- They have to ensure the reliability of the system at any time.

New competition model

Liberalized market : focus on competition :

- Increase competition, numerous but smaller producers (depending on a limited number of production assets)
- Free market and competition => marginal cost should at any time optimize the mix produced
- New objectives for the power market : environmental targets in addition to reliable supply.
- Much more difficulty to make sure that long term cost (investment) are correctly remunerated (difficulty to plan the “right capacity mix”)
 - ⇒ Financing at the company level is more difficult.
 - ⇒ Project finance and new investors

Regulation : Governments control the utilities

- Strong link between the utilities and governments / Authorities
- The authorities plan the system
- the utility develop the long term systems (mix, environment) in link with the administration.
- Strong scrutiny on the tariffs by the authorities, focusing on the long term cost of electricity.

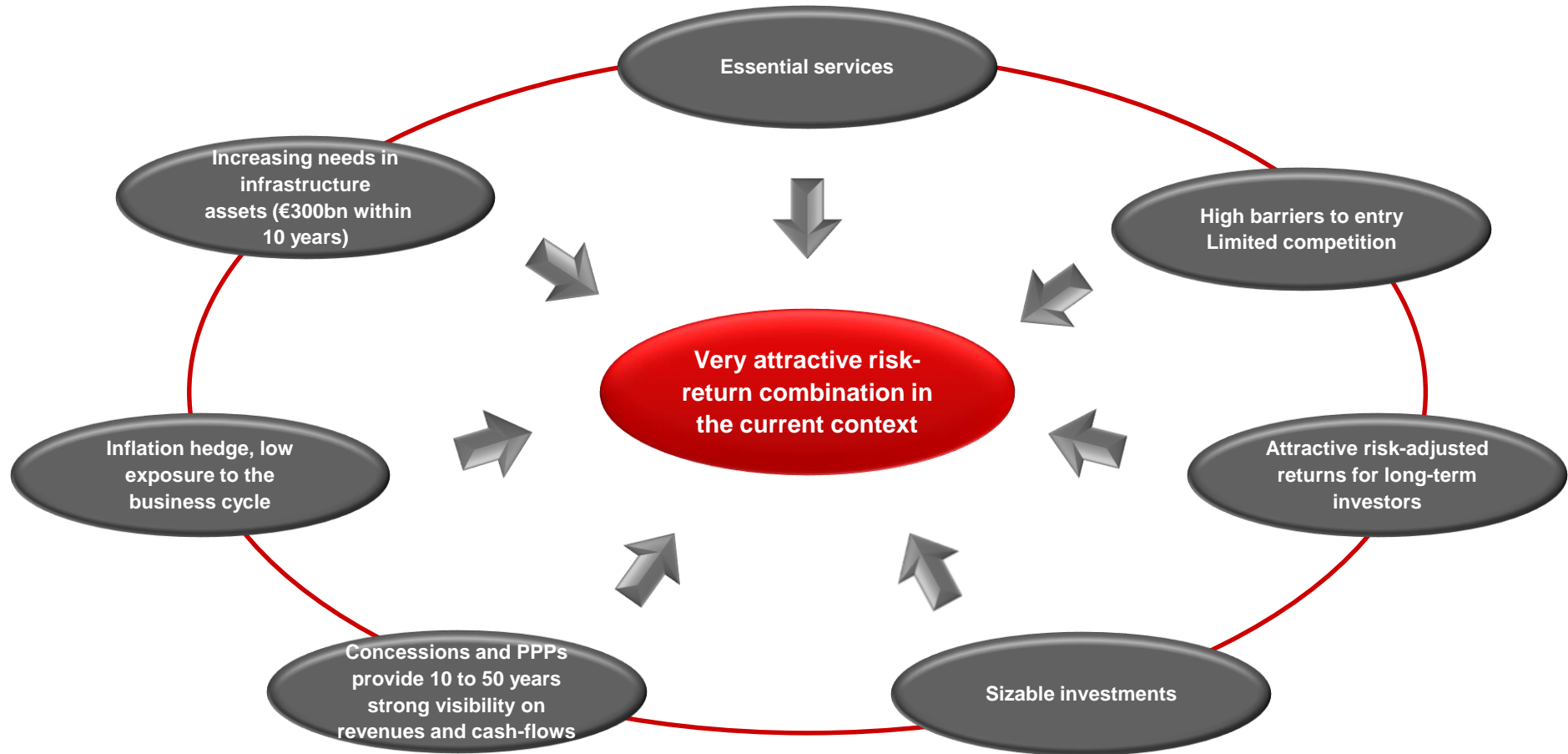
Regulation of the market by independent regulators

Different tools and regulations

Market tools to design the right price incentive to meet the objectives (reliability of the system in terms of capacity and environmental targets)

- Capacity” market
 - CO2 market
 - Mandatory targets for sellers (% of green electricity for instance)
- Regulatory tools to ensure that the long term cost can be recovered
- Tax breaks
 - Tariffs
 - Contract for differences...

Why investing in infrastructure assets



In case debt is not raised at the utility level, project finance enables to deliver the best cost of capital.

Key principle is the non-recourse financing : all the commitments for financing must be decided upfront (or come from the project)

- Bank financing is scarce today (even if it comes back under certain circumstances) but bond market has a strong appetite for infra debt.
- However, projects must be investment grade => the capacity to meet the service of the debt must be demonstrated and secured.

⇒ dimensioning the economics of the project is depending on the debt that can be raised

- Conservative assumptions : the bank case model
- Capacity to pay interest and principal early in the project
- Duration of the debt is very dependent on the duration of the “secured revenues”
- Leverage ratio will depend on level of debt service coverage ratio, and other commitments
 - from the equity investors
 - pass through from the contractors // the procuring authority (or the private offtaker)

⇒ The more uncertainties, the lower the debt, the higher the average cost of investment.

On the equity side, different type of investors with different “risk / return” profiles.

- Utilities
- Insurers
- Infrastructure funds
- Private equity

- The higher the risk, the higher the commitment of equity is needed :

⇒ Lower leverage and higher return so that the revenues available to cover the risks (the one that normally go to the equity investor) generated by the projects are high enough.

⇒ Contingent equity (there is a commitment upfront from the equity investor to cover additional risks).

Key for financial investors :

- Long term understanding and non retro-activity.
- Nationwide targets => useless if not translated into actual regulation or mandatory targets for actors.

Direct Market tools : carbon market // market for capacity :

- If it is really a direct short term market,
 - risk that the revenue disappear (ex CO2 market based on quotas)
 - risk that the revenues vary a lot depending on the year and on the competition (certain capacity markets).
- ⇒ difficult to base a financing scheme on that.

Indirect market tools

- Quantitative targets given to utilities = the utilities make tenders and offer a PPA for the investors
 - ⇒ Revenue are secured, and if the utility is investment grade => very easy to project finance
 - ⇒ The utility must be able to compete in the market (against utility of the same type).

Direct regulatory tools

- Regulated Feed in tariffs / capacity tariffs => enables to secure good project financing on the length of the regulated tariffs (the longer the more competitive)
- Tender for tariffs => enables to get the best available tariffs for the procurement authority but risk that the price are under estimated and eventually not feasible.
- Price floor => financing may be based on the floor, and when prices are over the floor this would entail upsides for equity (overall more expensive)
- Mechanisms for differences :
 - If compensate the different between actual price and target price => more or less equivalent to FIT
 - If equivalent of a price floor then less interesting.

- External economic factor risks
 - Level of inflation, of the indexes used...
- Refinancing risk
- Construction risk (with a good contractual framework)
 - EPC contract are usual in project finance
 - New more complex form with higher risks : multiple contracts, more maintenance / operating risks (f.i. offshore windfarms)
- Some volume risks (production factor)
 - Wind level in wind farms
- Post regulation price
 - Debt must be extinct with the end of PPA (or almost at this date)
 - Today the IRR of the project for equity investors have a strong part that is made during this period.
 - Assumptions vary between investors, based on market studies (with some references) => nobody really knows.
- Off-take risk : Risk of selling the power
 - Contract with long term marketer
 - For part of the output, uncertainties on the level of off-take.

Still difficult to get the best of two worlds

- The regulators / authorities must ensure that the regulation works for all
- If the rule is the competition by the price
 - -> the targets must be given to the market (f.i. Utilities must include x% of green energy in their average production mix)
 - Competition by the marginal price under these constraints (the constraints ensure the targeted energy mix)
 - Each market competitor shall ensure it meets the target
 - Utilities remain the key players (smaller producers produce for the utilities)
- Alternatively if we want to regulate different markets
 - The authorities shall put all the player on the same level
 - Regulation by the capacities, players compete on the long term cost.
 - Tariffs with a capacity cap each year
 - Auctions for different type of energy production
 - Contract for differences
 - -> the regulators must have a very good view of the mix / capacity needed.
 - -> find a way to cope with the existing assets.
- Quid of the CO2 market ?
- => but we need stability and no retroactivity

