Hydro FiTs & ROCs

Industry evidence for 2012 FiTs & ROCs consultations – January 2012

12th January 2012

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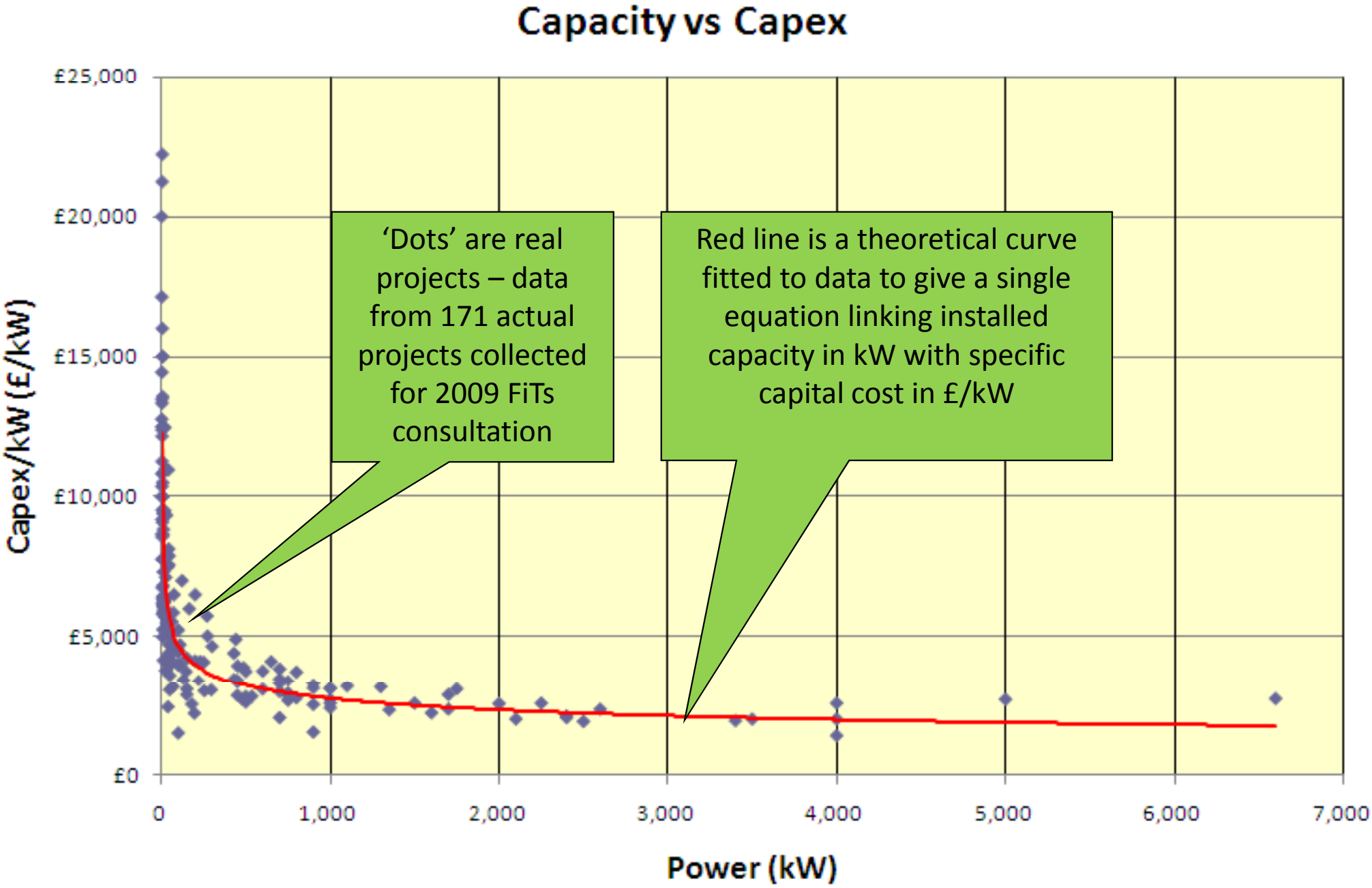
Note on revisions

- The original draft version of this presentation (dated 1st Jan 2012) was presented to DECC at a meeting on the 5th Jan 2012.
- This analysis has been revised as requested and is now based upon the wholesale energy prices and other assumptions defined in the DECC Impact Assessment ie:
  - Levy exemption certificates: assumed to have a value of £4.72 in 2010/11, and for this value to remain constant in real terms;
  - Wholesale electricity prices: an output of the Pöyry modelling. Investors are assumed to have five years of foresight of wholesale price changes, then assume the price stays constant in real terms for the rest of the project life;
  - ROC value to a supplier: assumed to average at the buyout price plus 10%, which is the expected value when the headroom calculation sets the level of the Obligation, i.e. £36.99 x 1.1 = £40.69/MWh.= in 2010/11 prices;
- The Pöyry assumptions on wholesale electricity prices are higher than we would use internally and higher than banks would be willing to use in project financing
- However, we have used the precise figures to eliminate any disagreement on energy prices – the analysis still suggests that 0.5 ROCs is too low

BHA capital cost database

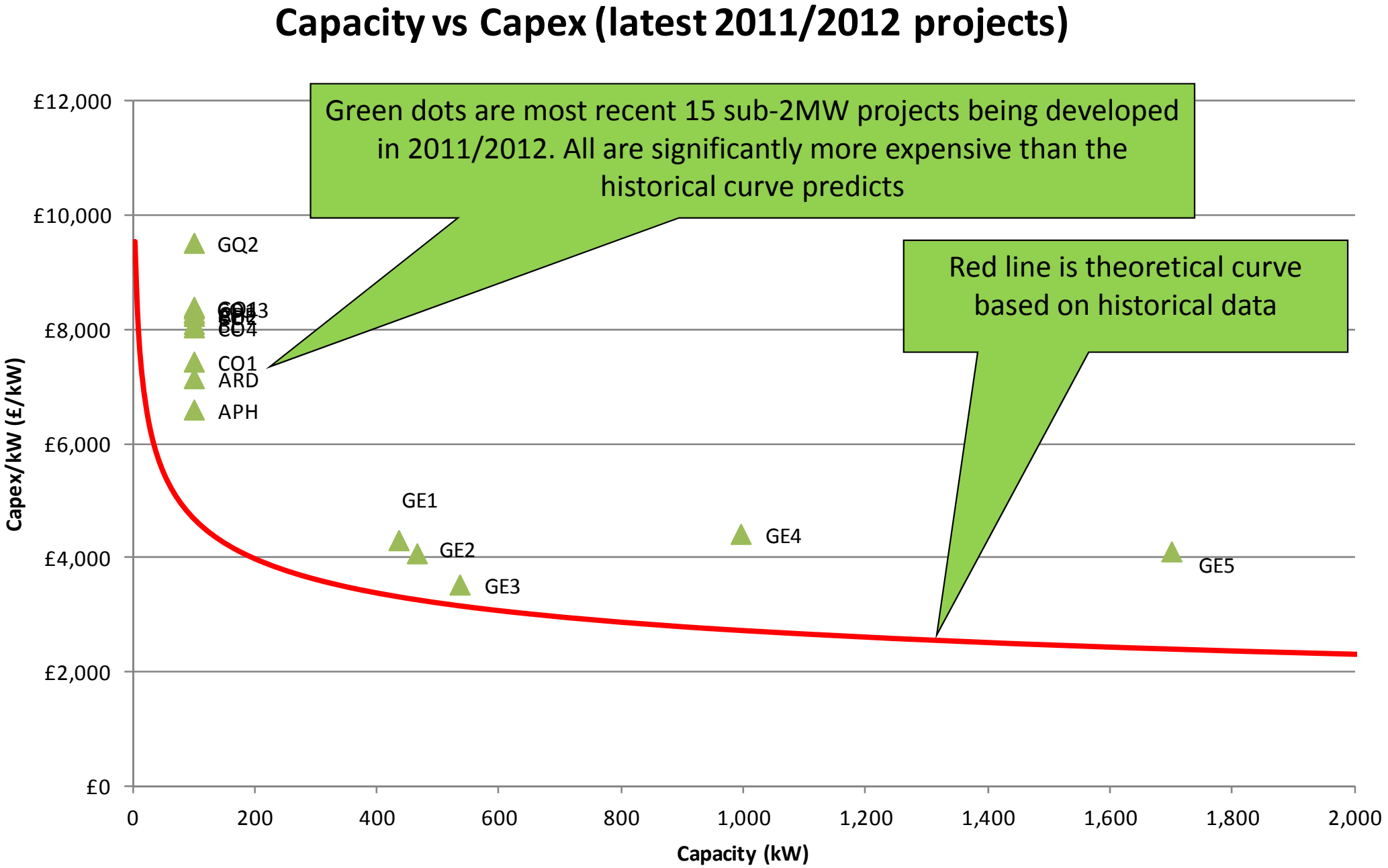
(based on 171 actual hydro projects)



However costs are inflating for hydro due to:

- Best schemes have already been ‘cherry-picked’
- Remaining schemes have higher capital costs:
  - No economies of scale or “learning curves” for hydro – each scheme is bespoke with little standardization (as in wind and solar)
  - Increased civil costs (more difficult terrain)
  - Increased grid connection costs (further distances /less developed territory)
  - Increased permitting, planning and environmental costs (fish passes and other mitigation measures)
  - Higher material costs: concrete, steel, copper, plastic
- And increased operating costs
  - Step increase in business rates in 2010
  - Ever increasing rentals from landowners and communities
  - Ever increasing environmental mitigation (higher compensation flows)

Some recent example projects



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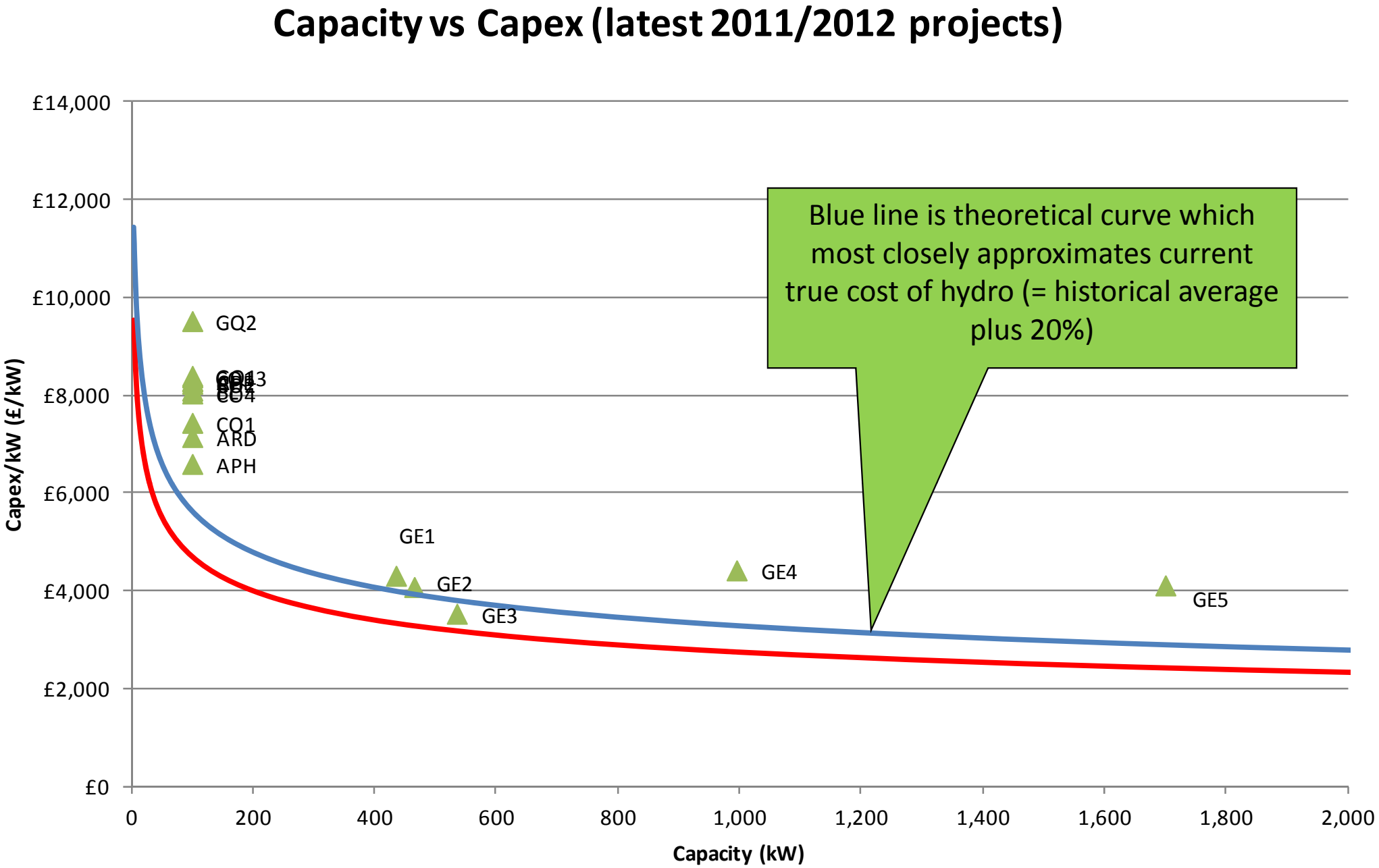
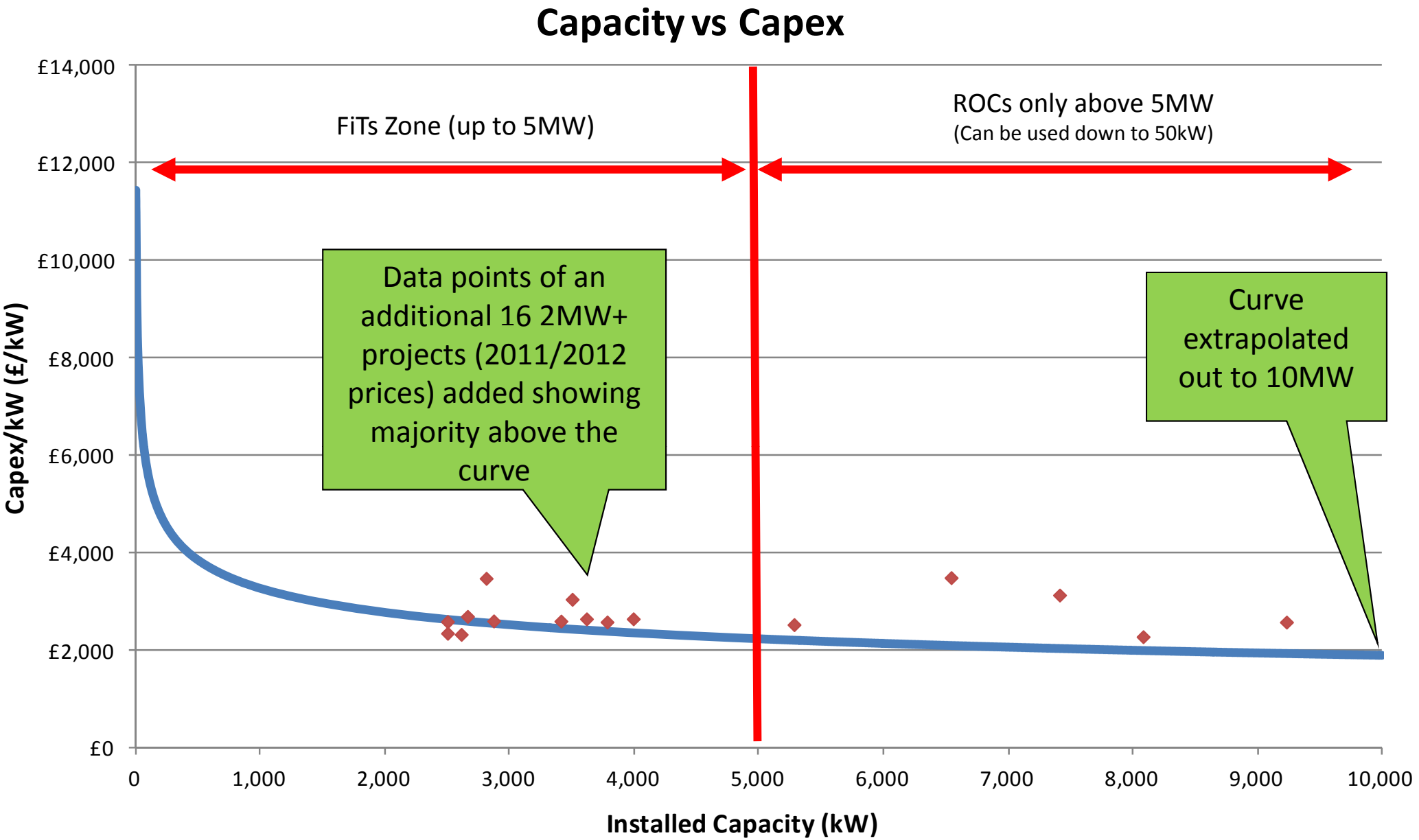


Additional data-points above 2MW

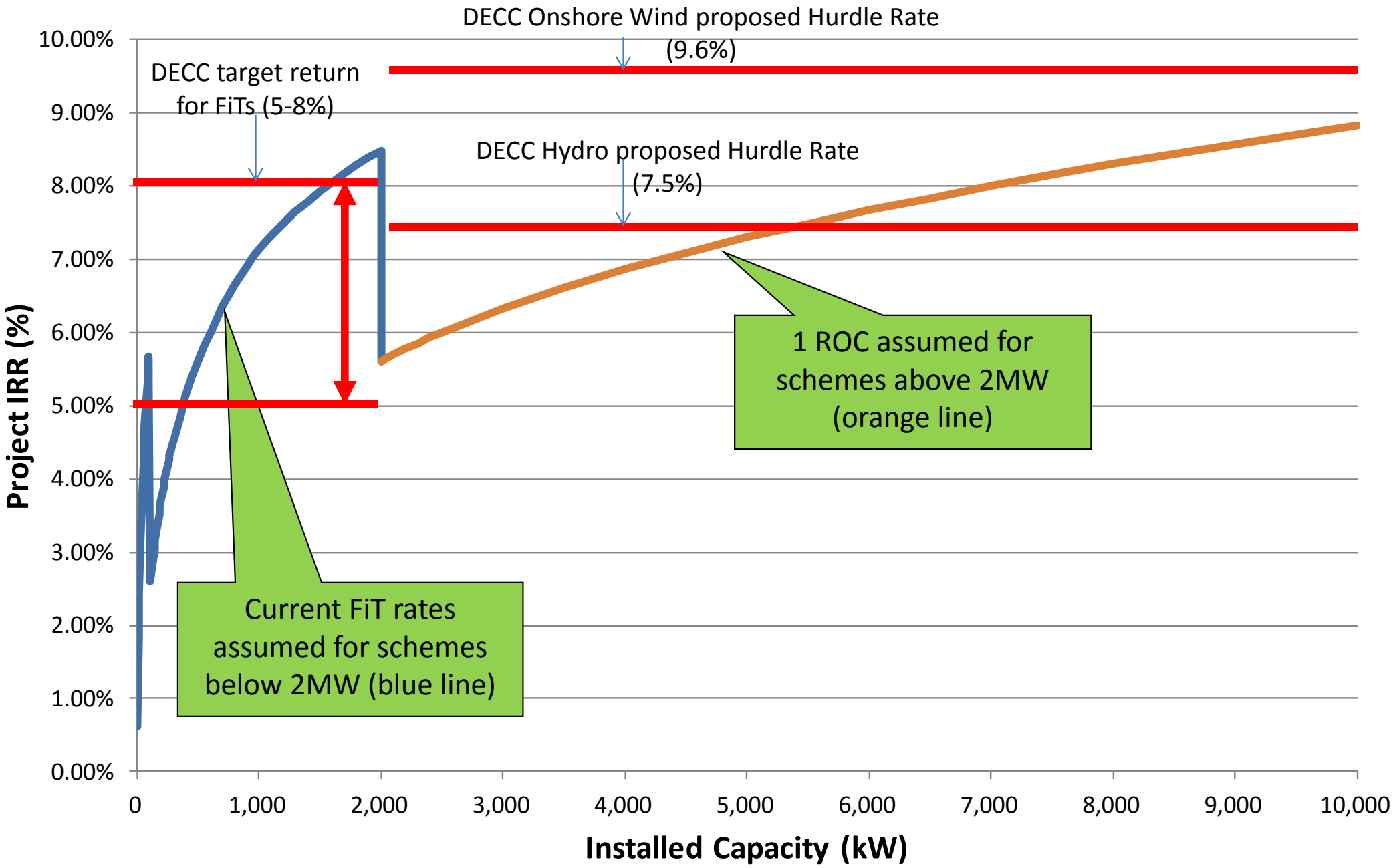


Cost curve used to generate potential IRRs

- Detailed 20 year financial model was run for every project size from 5kW to 10MW
- Assumptions:
  - Load Factor of 35% (typical)
  - Capital cost from theoretical curve
  - Power prices from DECC Impact Assessment
  - Feed in Tariffs assumed <2MW, ROCs assumed >2MW (FiTs assumed to be existing (2011) values & ROC values as per DECC Impact Assessment)
  - Operating costs = 22.5% of Gross Revenue (reality normally between 20% and 25% including an allowance for rental payment to landowners)
  - Corporation tax at UK rates using current HMRC approach on capital allowances
  - IRRs shown are Project IRRs assuming no debt (in reality cost of debt will be close to project IRR ~7% so leverage will not materially improve the Equity IRR)
  - Modest inflation (1%) applied to power price and operating costs
  - 1 year allowance for construction period

Project IRR vs Installed Capacity

- Based on current FiT/ROC levels and theoretical cost curve



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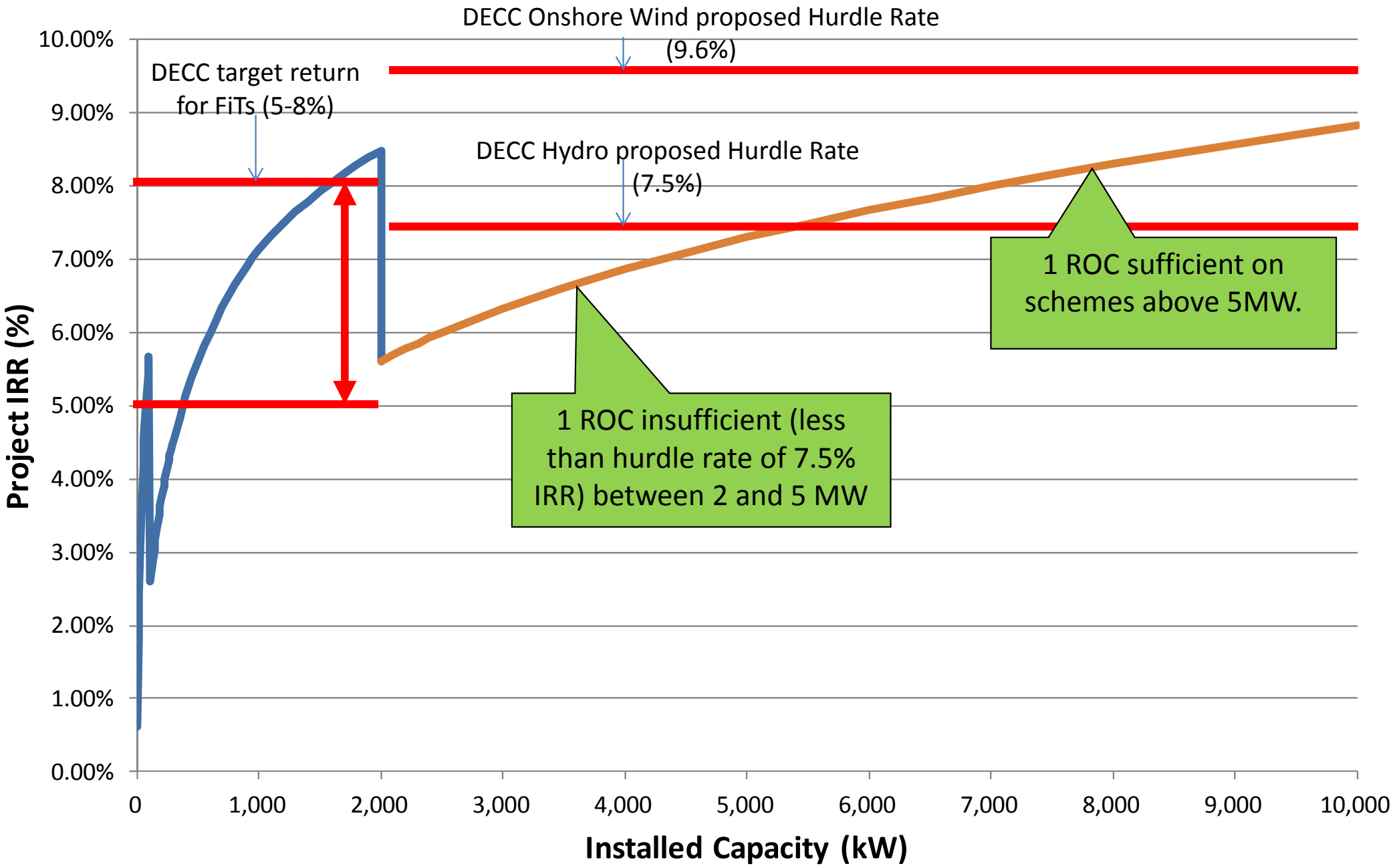
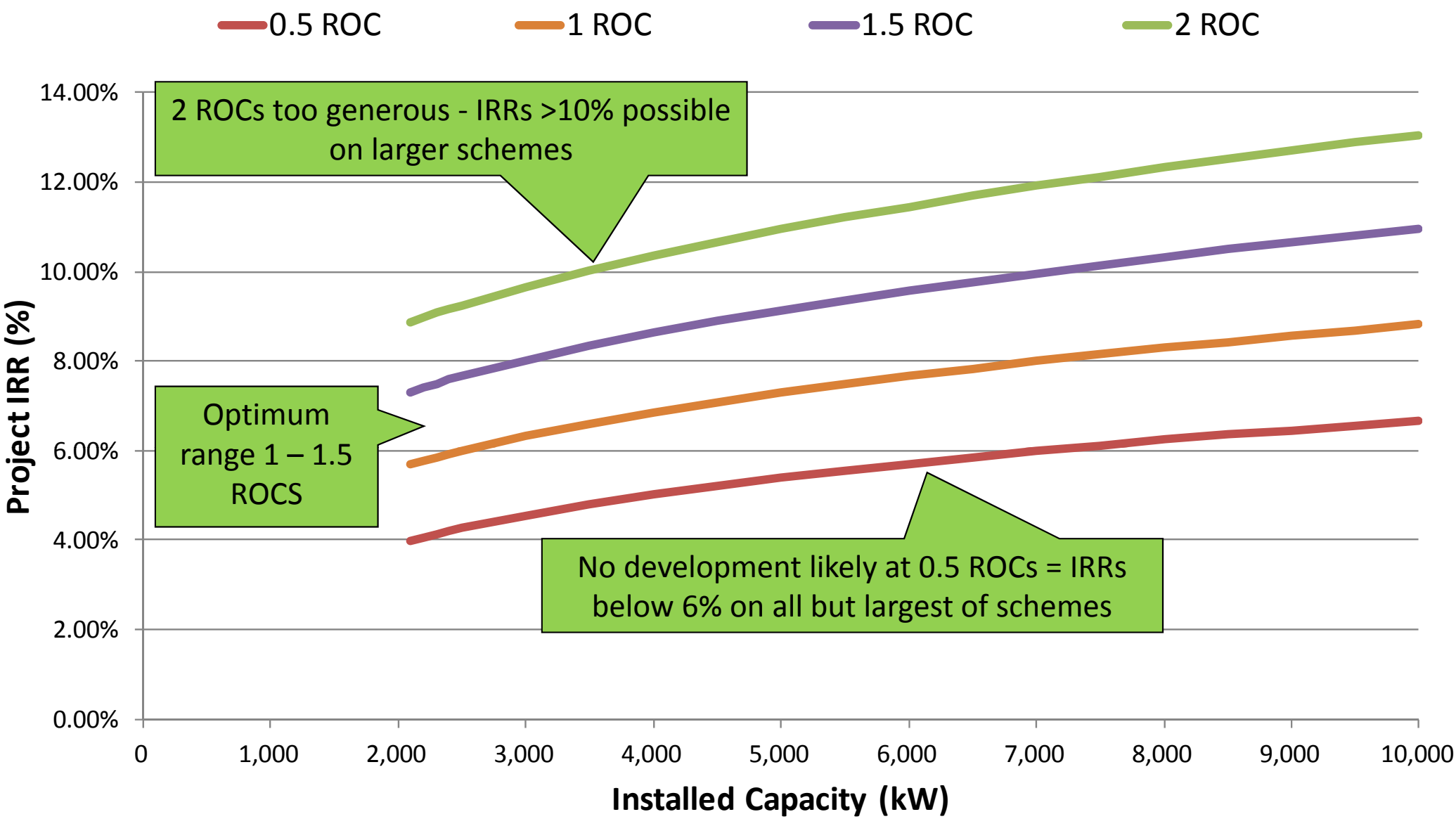
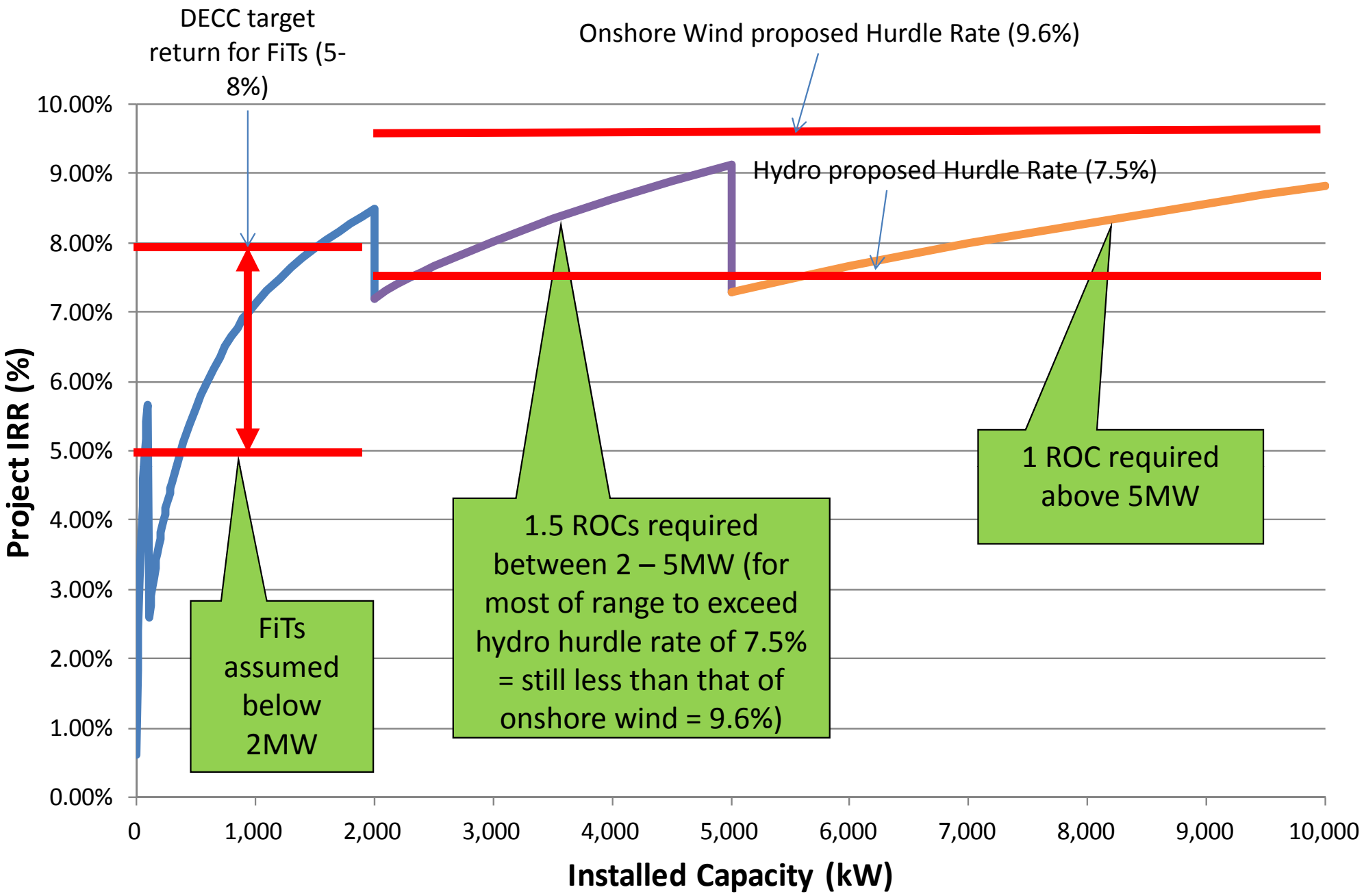


Effect of different ROC multiples



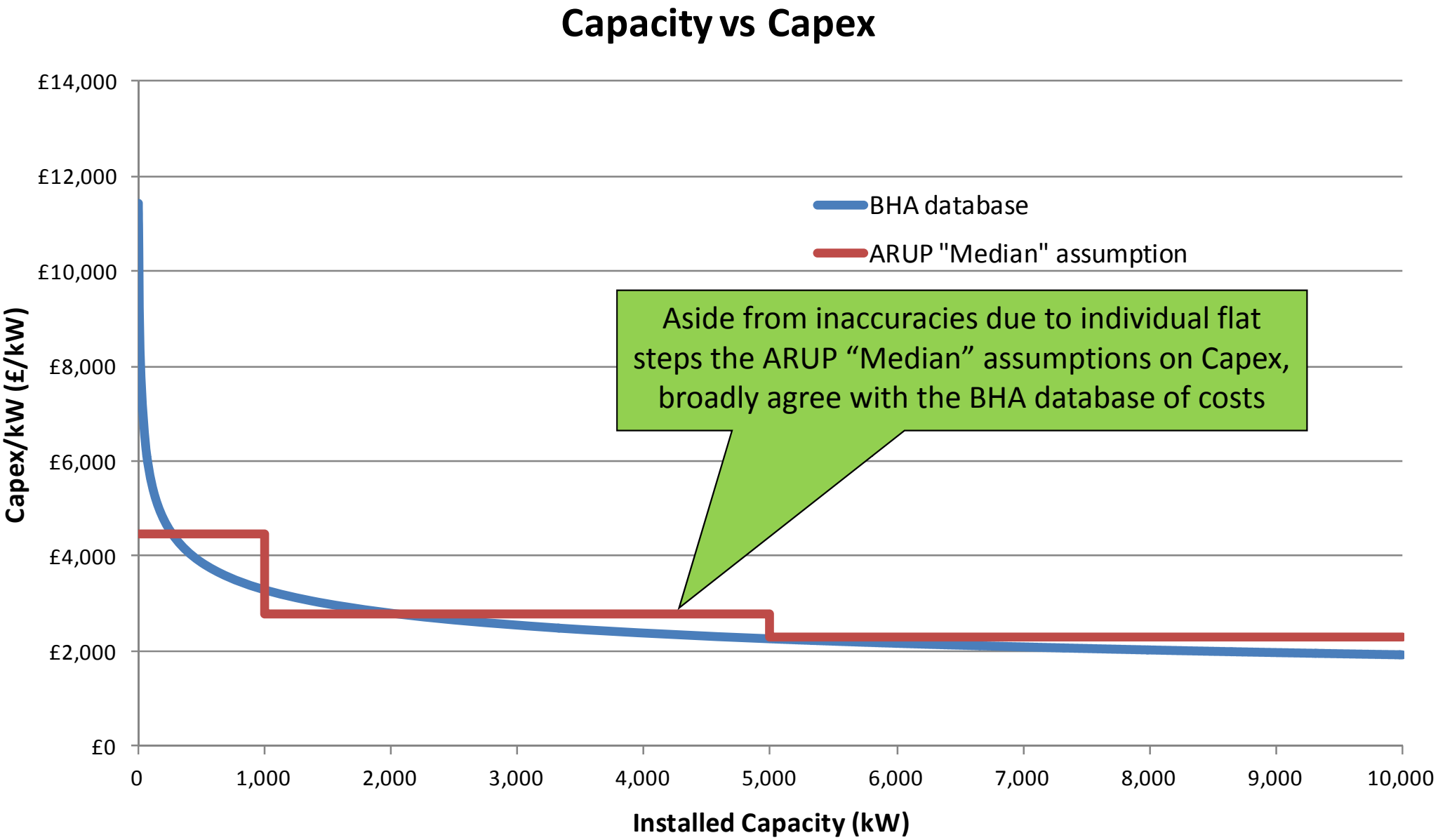
Proposed optimum solution



Why 0.5 ROCs is insufficient

- The Capex assumption presented by ARUP broadly agree with the BHA database (see next slide)
- However 3 other areas of the Arup report appear to be either incorrect or unfair:
  - **Load Factor** (P142 of Consultation Paper) is assumed to be 45.8%. The reality on most run of river schemes (the majority of new schemes) is in the range 33-35%
  - **Operational expenses** (P134 of Consultation Paper) seem low. 20%-25% of Gross Revenue at £150/MWh is usually an accurate assumption as a guideline for all opex including land rentals, business rates, insurance, maintenance, duos charges etc.
  - **Hurdle Rate** (P142). Hydro (along with PV) is assigned a hurdle rate of 7.5%, Onshore Wind is 9.6%, Wave 13.8% etc. This is subjective but there is a strong argument that the hurdle rate for Hydro should be at least the same as Onshore Wind (ie 9.6%) as both technologies have similar maturities, development processes, types of investor etc.
- All the above three will underestimate the ROC level required to stimulate investment into Hydro
- Also - from consultation paper *"Cost evidence for small-scale (<5MW) hydro power suggest a ROC range of 0.2-5.3 is required. As small-scale hydro is eligible for the small-scale Feed-In Tariff (FIT), we do not believe that it is necessary to create a separate band for small scale hydro under the RO."*
- Currently the FiT level (generation tariff of £47/MWh) is insufficient to encourage investment in the 2-5MW range (most schemes are downsized to 2MW). This range is effectively neglected by both the FiT and ROC regimes.

Comparison with ARUP Capex assumptions



Summary of hydro FiT & ROC levels

- The Feed In Tariff for Hydro was working: stimulating investment across most of the size range (0-2MW) without providing “super-returns” to investors. **Currently stalled pending consultation publication.**
- Using cost curve generated from 171 real hydro projects (and updated with 31 additional projects in 2011/2012) it can be demonstrated that returns are in the range 5-8% for most of range 0-2MW. Therefore: **no changes required to sub-2MW FiT levels.**
- FiTs above 2MW (£47/MWh) insufficient returns to stimulate investment
- The proposed 0.5 ROC for hydro provides even lower returns (sub 6% IRR) and will therefore likely result in zero investment in hydro projects >2MW
- Based upon the data the following structure is proposed:
  - **Current FiT rates below 2MW**
  - **1.5 ROCs between 2 and 5MW**
  - **1 ROC above 5MW**

Other considerations

- Hydro, although modest in terms of available resource, should be part of the overall UK energy mix, due to:
  - **Longevity** – hydro lasts considerably longer than other technologies (typically 50+ years compared with ~25 for Wind & PV). When calculating IRR (and the Hurdle Rate) the value of the cash flows in later years are so discounted they have a negligible effect on IRR. Hence, nowhere is this longevity evaluated or 'rewarded' in the calculations. In theory this longevity could be used to justify a higher Hurdle Rate and therefore a higher ROC multiple than Wind as a way of valuing the longevity and associated long term contribution to targets, carbon-saving etc.
  - **Storage and load balancing** – the dispatchable nature of hydro has a utility to the grid/public which is not necessarily captured in the single-project IRR/Hurdle rate calculation.
  - **High proportion of supply chain is UK based** – circa 70-90% of the supply chain value is UK based unlike most other technologies. The assertion on page 38 of the Consultation that "*The deployment of a small additional amount of large-scale hydro is not expected to lead to significant industrial development.*" is simply untrue. Gilbert Gilkes and Gordon manufactures most of the E&M package domestically and needs a strong UK market to maintain and grow an international reputation. Most construction, consultancy, financing, legal services etc are all provided locally with profits re-circulated in local economies. Rentals paid to communities and farms are used to ensure long-term security and are usually re-invested "super-locally" into the land/farm/local community itself.

Other considerations

- In terms of the development process Hydro is very different from other technologies – particularly PV
- Average duration of hydro project development = 3 years (see next slide) vs 3-6 months for PV
- Long duration means project investment slows or stops as FiTs review dates are approached (pre-accreditation will help this)
- Significant investment required with no certainty on tariff (unlike PV)
- Multiple projects now stalled awaiting outcome of FiTs & ROC reviews:
  - Hydro unfairly 'punished' on FiTs due to greed of PV industry
  - Unexpected (and unjustified) reduction of Hydro ROCs – from 1 ROC to 0.5 ROC proposed
- Strong case to 'de-link' PV from other technologies as part of FiTS/ROCs review.
  - PV is very different from Hydro - short-construction duration, short-life (sub-25 years) little-planning requirement, 'gold-rush' mentality, rapid cost-reduction, high level of foreign-ownership of supply-chain)
  - Would allow the 'ring-fencing' of funds to allow non-PV technologies to be rolled-out at a sustainable rate and remain unaffected by the 'boom and bust' nature of PV

Timeline of typical hydro project

- Total duration of a hydro project is rarely less than 2.5 years and normally between 2.5 and 4 years, including:
  - Planning and SEPA/EA consenting process: 1.5 to 2 years
  - Construction: 1-2 years
- Significantly longer than other technologies: wind and solar