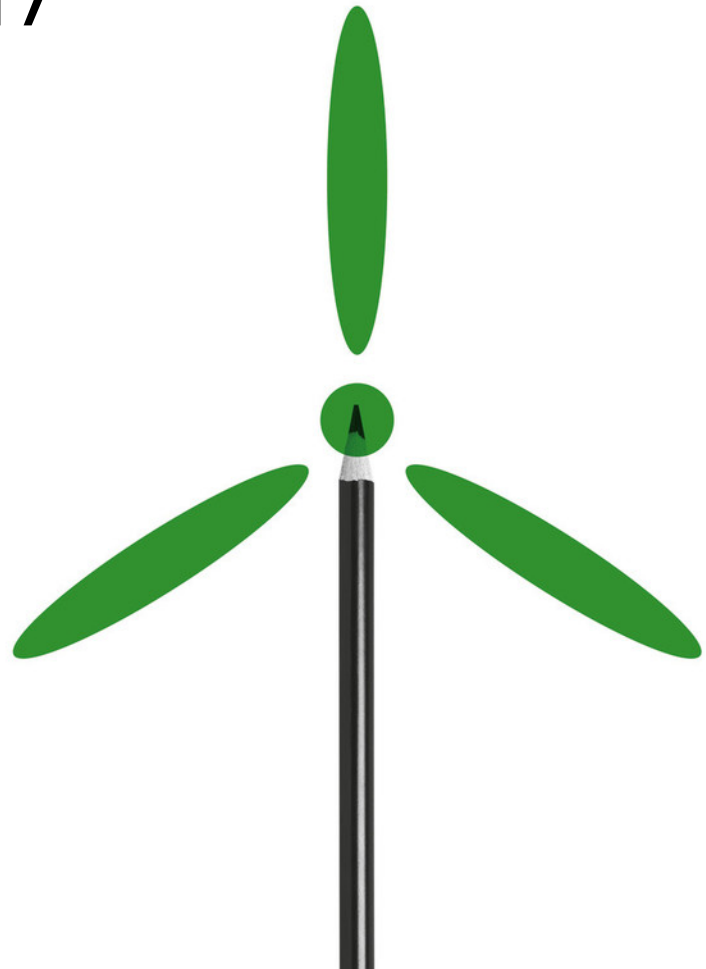


Regulatory framework conditions for new business models of energy suppliers

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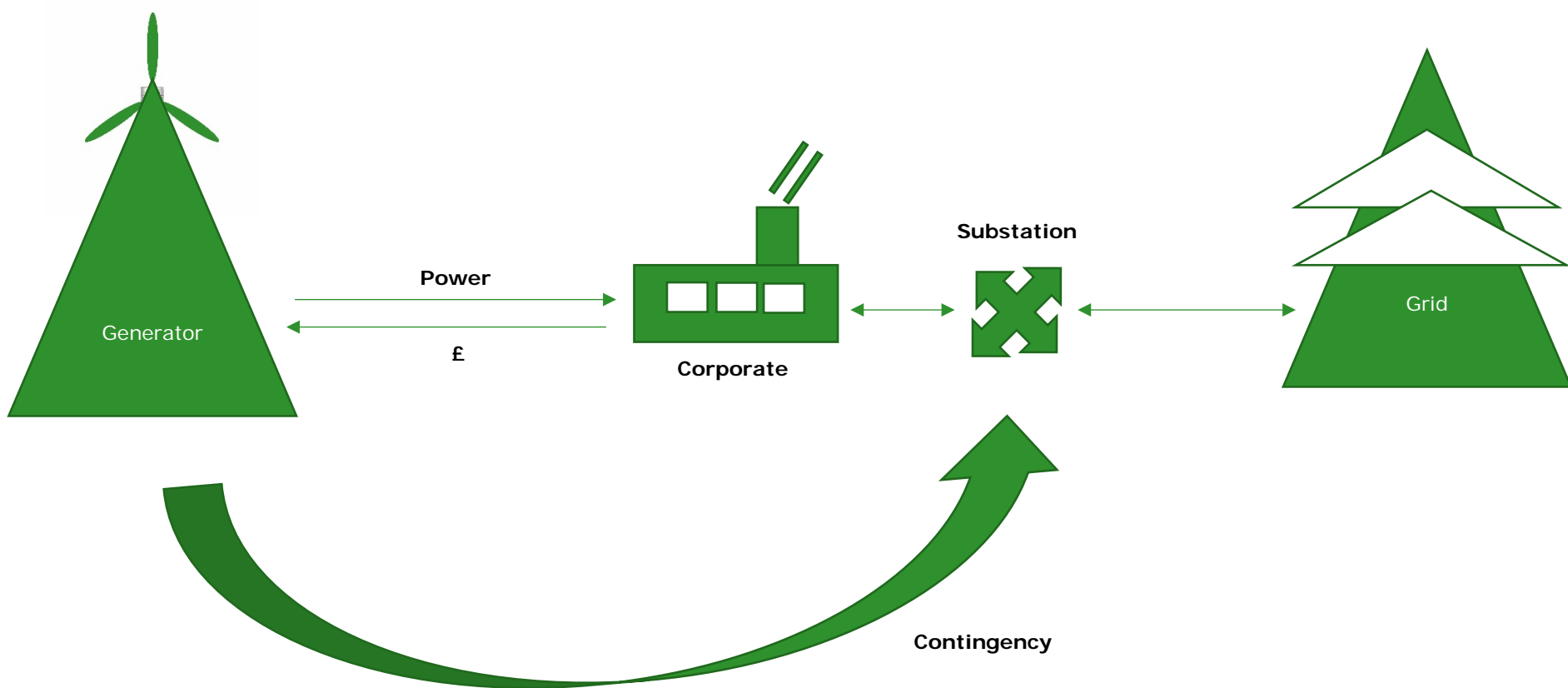
Regulatory conditions for new business models of energy suppliers

- MIT Report: “Business Models for Distributed Energy Resources” 2016
- “... 94% of senior power and utility executives surveyed predict complete transformation of important changes to the power utility model by 2030”
- Historically electricity generation transmission and supply was linear and usually state owned
- Decarbonisation and the rise of renewables
- New electricity is generated at millions of locations with roof top solar, solar parks, windfarms and off shore wind playing an ever increasing role
- In some cases, renewables are not consistent and predictable generators
- Renewables are usually connected to the distribution network and not the transmission network and distribution networks were not designed for generators
- Renewables may cause capacity issues and frequency issues due to their intermittency

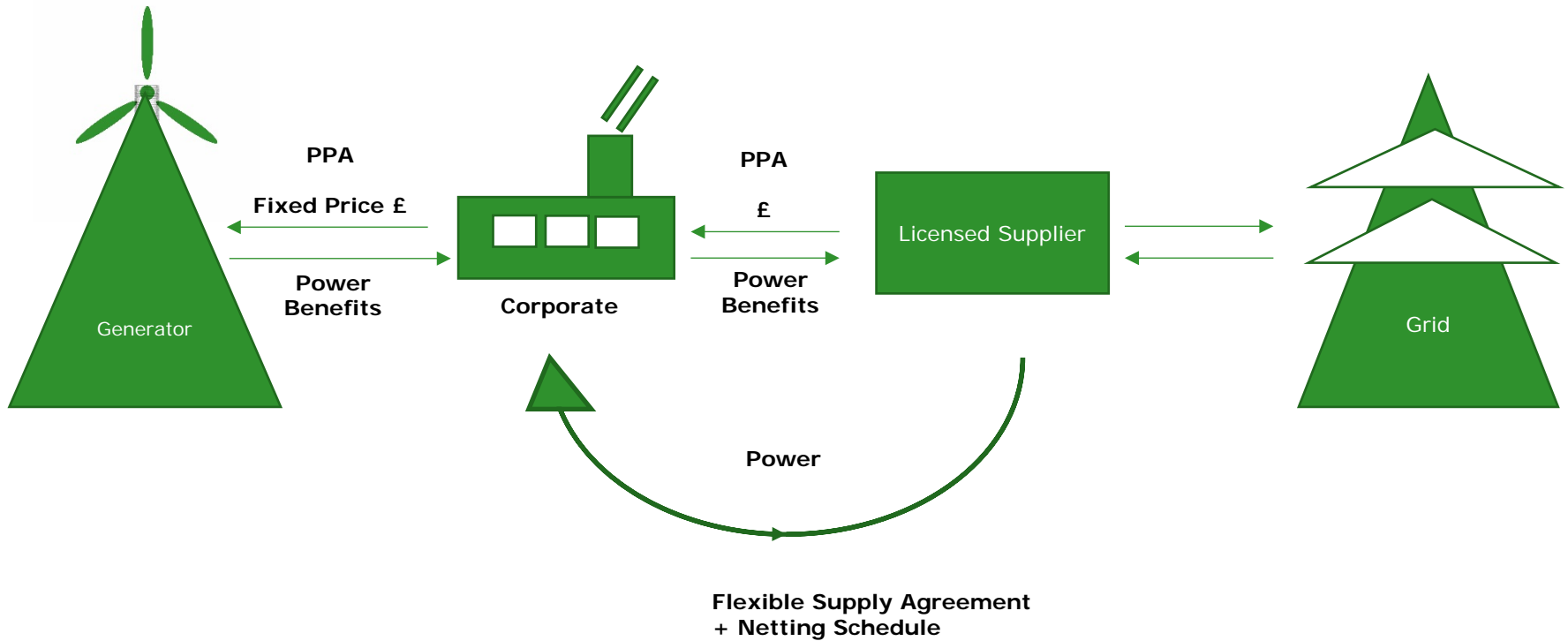
Regulation playing catch up

- Regulation of electricity generation and supply differs widely across jurisdictions
- Developing countries may retain the linear approach and may not allow, for example, private power purchase agreements
- Liberalised free markets such as the UK are developer friendly, facilitate wide ranging market participation and promote competition
- Eversheds Sutherland work across many jurisdictions and deliver best fit solutions and regularly help governments to create sustainable and bankable conditions for the roll out of renewable technologies. An example includes Jordan and Egypt working with IFC

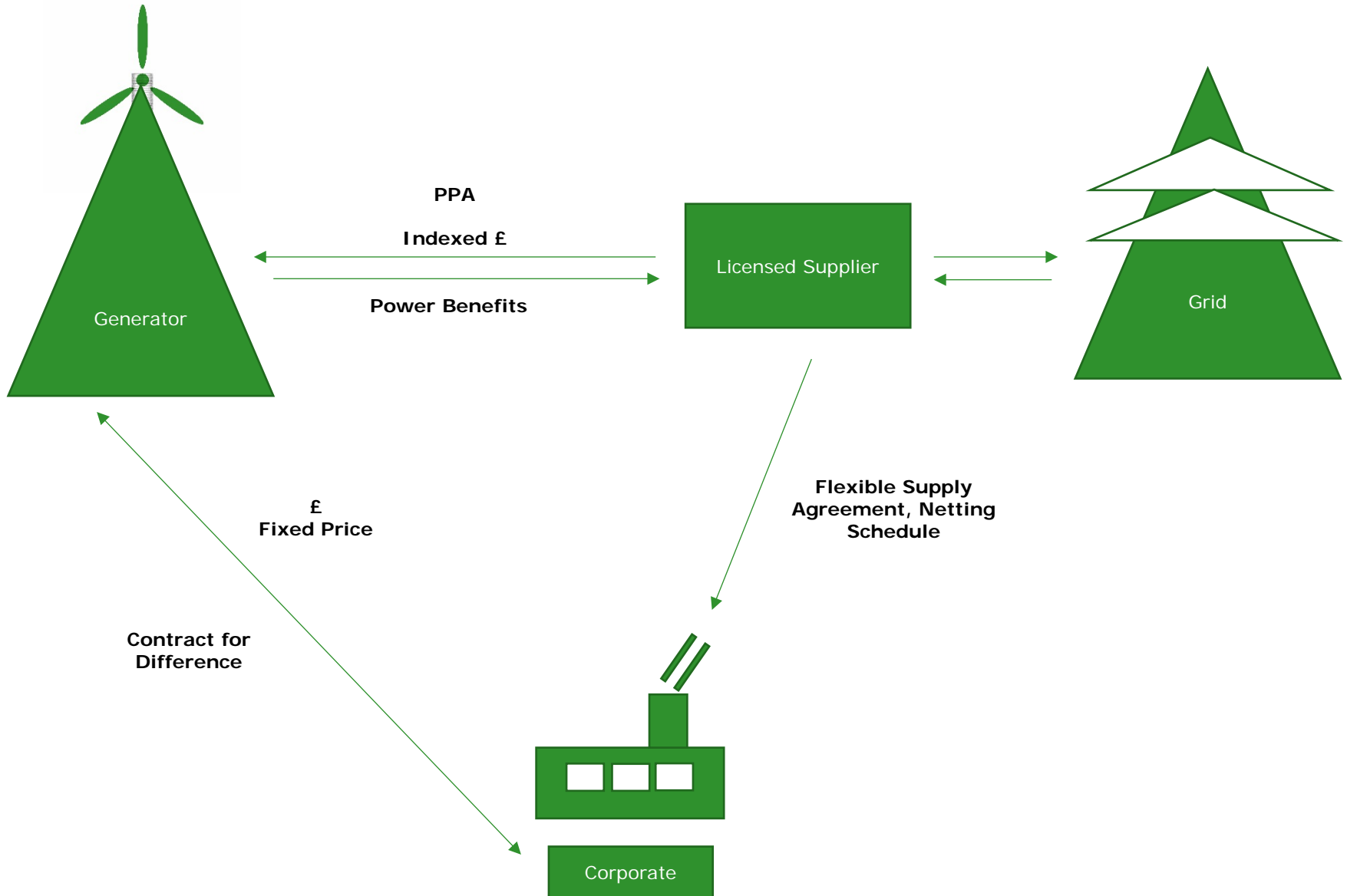
What models are out there – in house generation



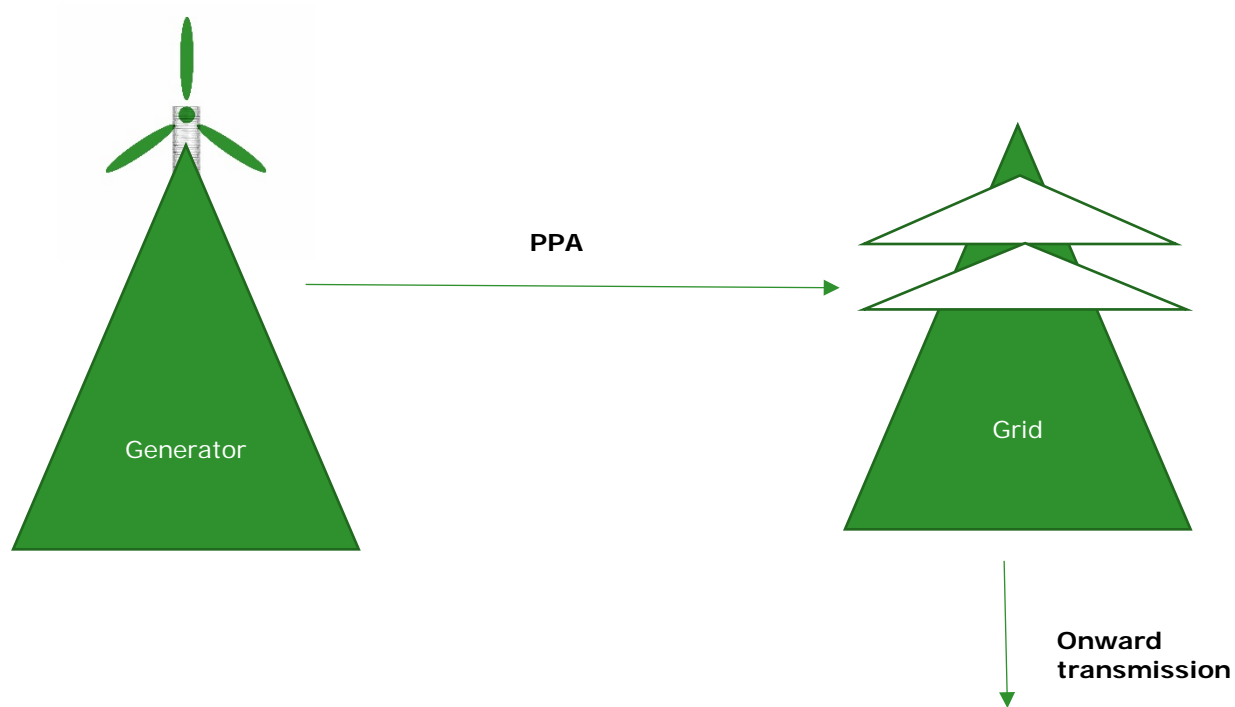
What models are out there - netting



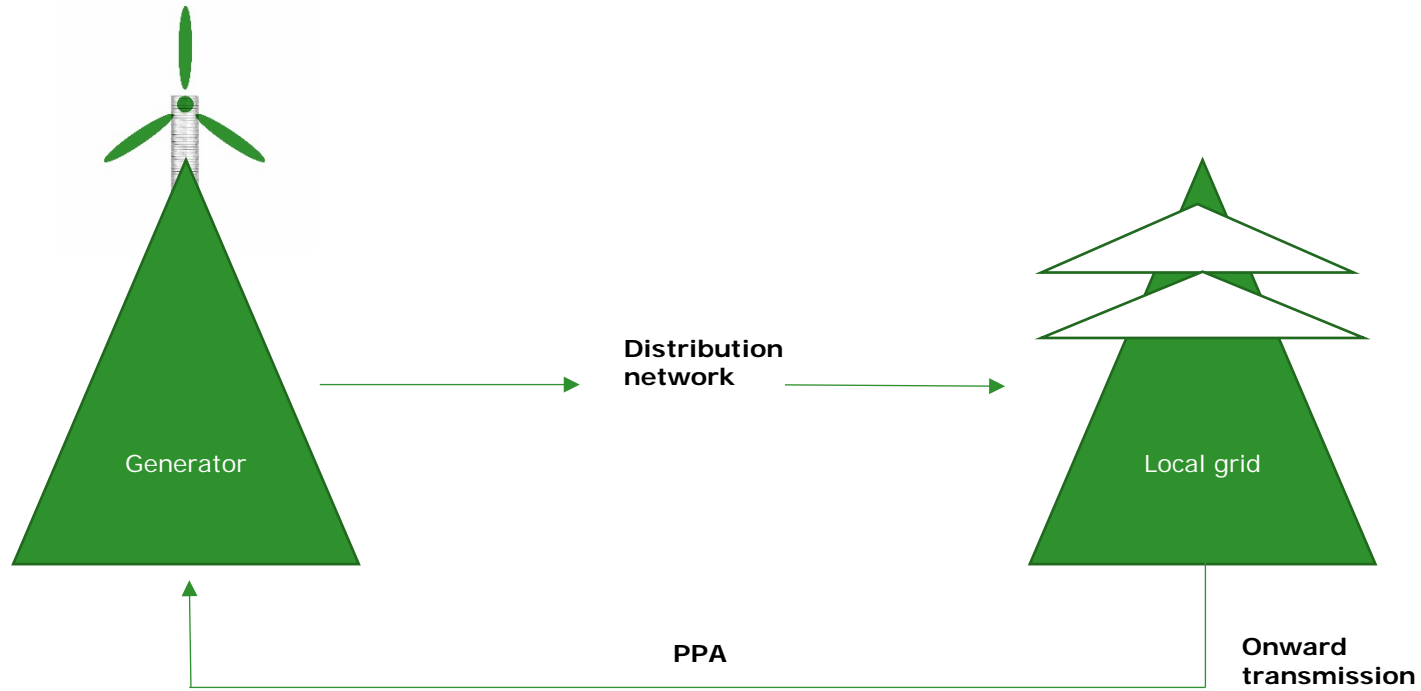
What models are out there - sleeving



What models are out there - utility scale PPA direct to transmission Grid



What models are out there - utility scale PPA direct to distribution network



What are the challenges of low carbon energy

- Many new connections to the grid and the need for reinforcement of the grid
- Most renewables have variable output requiring system operators to balance supply and demand and also frequency on the grid
- Networks can be hindered by out of date or inflexible regulation eg no standard connection agreements or unsuitable short term deals which are not bankable
- Renewables are sited where the resource is best and that may not be close to demand
- Smaller generators tend to connect to local distribution networks at low voltage

These factors can increase the cost of renewables and also slow the roll out of renewables.

What regulatory issues are faced

Grid Connection

- This can be slow to achieve and expensive especially if grid reinforcement is required
- Developers need early visibility of connection availability, cost and timescales to inform their financial model
- Early movers may be disadvantaged by significant grid reinforcement costs
- There may be an inter relation between grid connection and planning/zoning permissions and that inter relationship can sometimes cause problems eg the grid connection is granted on terms which don't match the planning/zoning

Planning/Zoning

- Planning/zoning may be granted by a different body from the grid connection and the priorities of the two may not coincide

Network charges

- Network charges may include:
 - transmission network charges for using the transmission system
 - distribution charges for using the distribution networks
 - balancing charges for balancing grid frequency
 - these charges may depend on geography and perhaps unfairly discriminate against renewables

Further regulatory issues

In countries with high use of renewables and particularly on site renewables the means of recouping the costs of network charges is being reviewed- UK Helm Review

- Charging based on volume may not recoup costs
- Move to charging based on peak load

Storage regulation

- What is storage classified as?
 - generation? hydro storage and compressed air storage does generate but batteries do not
 - anomalies for batteries – they may be charged twice for certain charges such as balancing
 - the licensing regime for a battery as a generator may be disproportionate and a special light touch licence may be preferable
 - check planning, licensing and property rights as a battery may breach any generation cap

Smart grids and digital systems

- The future needs to engage energy consumers in real time
- Aggregators for demand side, electricity supply and frequency support
- Smart meters
- “Internet of things” wifi thermostats reduce heating bills by 6-8% in UK
- Electric cars
- Demand side management
- Integration of storage into supply to smooth renewables and offer frequency control
- Data protection privacy and remote control

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