



CLASP.

Understanding Viability: Financial Rewards and Risks for Renewable Energy Development

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Presentation Overview

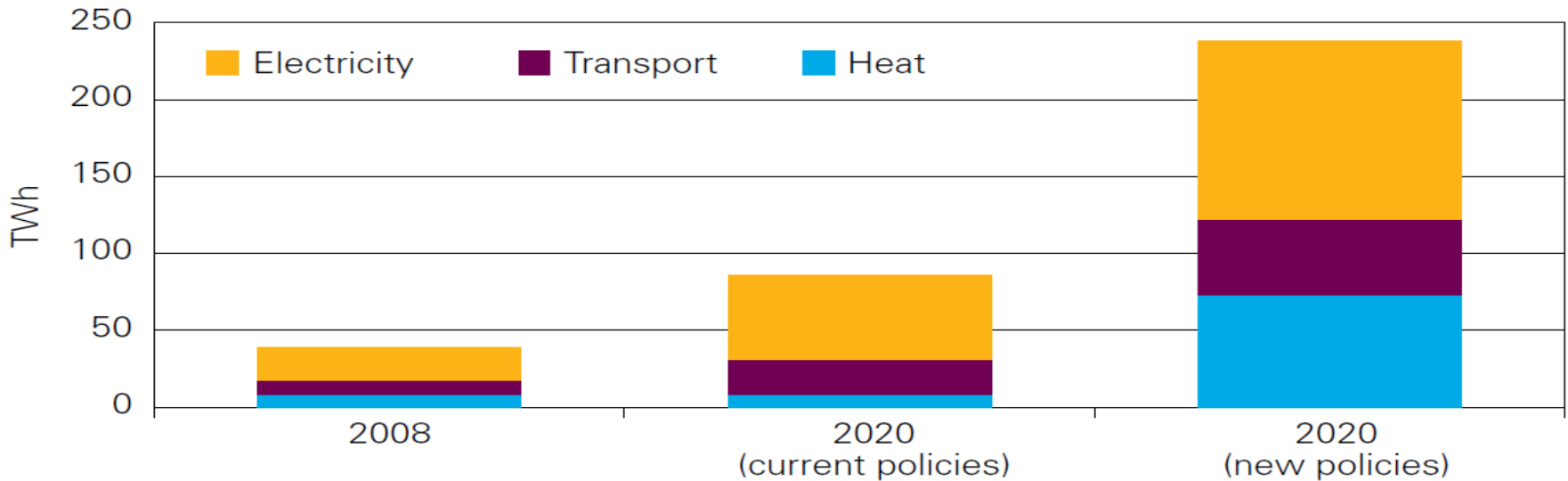
- Review Financial Incentives
- Examine how they are applied
- Examples of Payback and ROI
- Capital Financing Structure
- Risks, Rewards and the Implication of Delays

Drivers

- Climate Change Act 2008
 - *“world’s first long-term legally binding framework to tackle climate change*
 - A legally binding target of 80% cut in greenhouse gas emissions by 2050 and at least 34% by 2020 (1990 base line)
- Energy Act 2008
 - **Renewables Obligation:** to increase the diversity of our electricity mix
 - **Feed-in Tariffs:** Financial support for low-carbon electricity generation projects up to 5 megawatts (MW) - generators receive guaranteed payment
(commenced April 2010)
 - **Renewable Heat Incentive:** establish a financial support programme for renewable heat generated anywhere, from large industrial sites to individual households
(due to commence June 2011)

Renewable Energy Targets

- The UK has made significant unilateral and multilateral commitments to reduce GHGs - RES 2009
- Scale of the challenge: 15% Renewable Energy by 2020
- Where are we in Europe's League Table



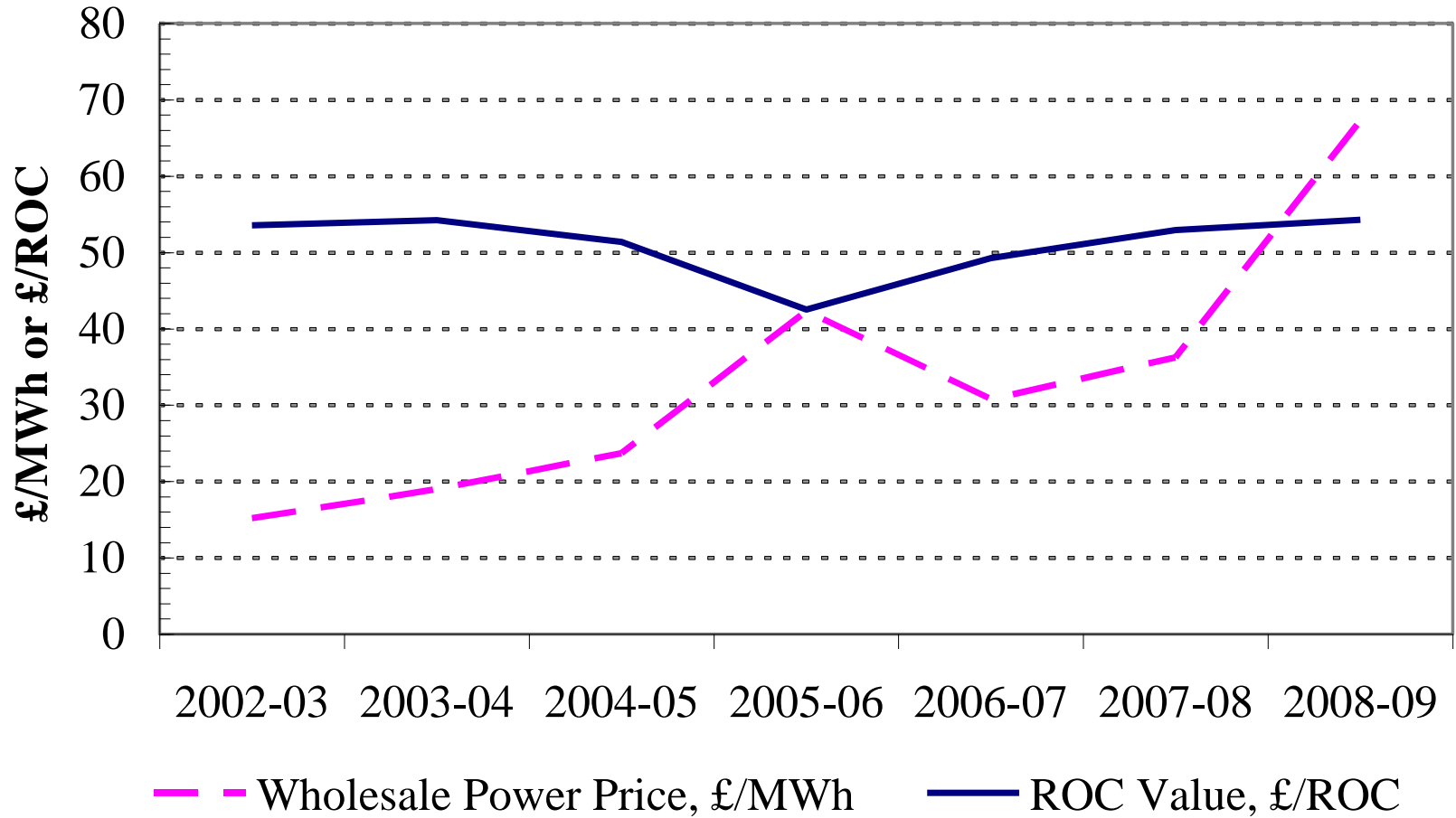
Financial Incentives

- EU report (2008): well-adapted feed in tariff regimes are most efficient and effective support schemes for promoting renewable electricity. (Spain, Germany and Denmark)
- Financial incentives designed to:
 - **Increase decentralised low carbon energy generation** = reduce carbon emissions, diversify energy mix and reduce demand on grid
 - **Reduce unit cost of technology** = economies of scale reduce production costs
 - **Grow low carbon economy** = more business for manufacturers, suppliers and installers

Renewable Obligation Certificates (ROC's)

- ROC's for schemes ≥ 5 MW
- Generators get ROCs per MWh Electricity produced from RE sources
- Obligation on suppliers to present ROCs
- Buyout fund added to recycle price
- Market Driven Mechanism
- Updated to band incentives in 2009 (2002)

Historical ROC Values



Feed in Tariff (FIT)

- Guarantee a price for a fixed period for electricity generated using small-scale low carbon technologies:
 - Wind, Solar Photovoltaics (PV), Hydro, Anaerobic Digestion & non-renewable micro-CHP
- **Generation Tariff:** Payment for every kWh generated (technology specific)
- **Export Tariff:** Extra Payment for every kWh exported to grid (fixed at 3.1p per kWh)
- **Cost Savings:** Additional benefits from avoiding costs of buying in power from the grid
- Designed to give a **5-8% return** on investment
 - * Payments Linked to RPI and last 20/25years (4.8% 2011/12)
 - * Payments Derogated after 3 years

FIT Generation Rates (2011)

Technology	Size	2010/11 Rate (p / Kwh.)	2011/12 Rate (p / kWh)	Lifetime
Anaerobic digestion	≤500kW	11.5	12.1	20
	>500kW	9.0	9.4	20
Hydro	≤15kW	19.9	20.9	20
	>15-100kW	17.8	18.7	20
	>100kW-2MW	11.0	11.5	20
	>2MW - 5MW	4.5	4.7	20
MicroCHP pilot*	≤2kW*	10*	10.5	10
PV	≤4kW (new build**)	36.1	37.8	25
	≤4kW (retrofit**)	41.3	43.3	25
	>4-10kW	36.1	37.8	25
	>10-100kW	31.4	32.9	25
	>100kW-5MW	29.3	30.7	25
	Stand alone system**	29.3	30.7	25
	Wind	≤1.5kW	34.5	36.2
	>1.5-15kW	26.7	28	20
	>15-100kW	24.1	25.3	20
	>100-500kW	18.8	19.7	20
	>500kW-1.5MW	9.4	9.9	20
	>1.5MW-5MW	4.5	4.7	20
Existing microgenerators transferred from RO		9	9.4	Till 2027

FIT - a Worked Example

Assume a 4kW PV array fitted before 2012 to a customer paying 12p/kWh for electricity. The system will generate 3,050Kwh per year of which 500kWh are exported to national grid

- Generation payment = $(3050 \times \text{£}0.433)$ = £1,321
- Value of avoidance costs = $(2550 \times 0.12\text{p})$ = £306
- Value of exports = $(500 \times \text{£}0.031\text{p})$ = £16
- **Total annual income** = **£1,643**
- Typical cost = £16,000
- Payback period ($\text{£}16,000/\text{£}1,643$) = 9.7 years
- ROI ($\text{£}1,643/\text{£}16,000$) = 10.25%
- Income & Savings (25 years) = £41,075
- **Profit** (not factored RPI or energy cost increases) = **£25,075**

Feed in Tariff (FIT) Uptake

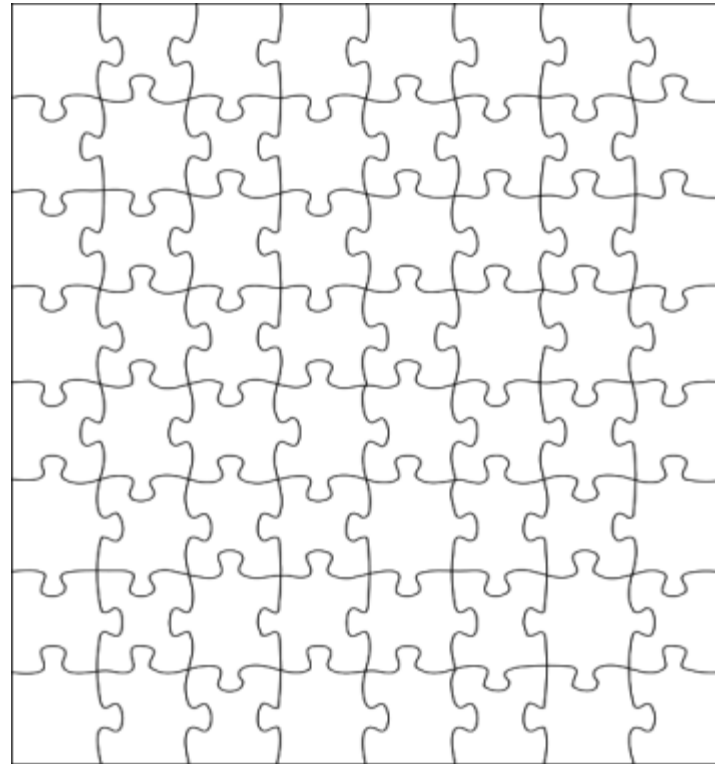
- Ofgem figures show that between April 2010 and August 2010, there were 5040 installations, with:
 - 4969 residential
 - 57 commercial
 - 13 community installations
- Of these, 13 were hydro, 142 wind and 4885 solar PV and the total installed capacity totals 21.9MW
- PV leading! (97% of applications)
- Large PV under severe strain (Consultation)
- Inward investment enquires due to attractiveness of market
- **Installers must be Microgeneration Certification Scheme (MCS) accredited for the consumer to claim FITs**

Bigger Projects

Feature	Small/ Domestic / SME	Commercial Development
Examples Type:	Solar PV/Thermal, Small Turbine.	Large turbines, Solar or Wind Farms , Centralised AD
Potential Impact on Environment:	Low	High
Engineering/ Build:	Certified installers	Construction Programme
Electricity:	Feed through existing system	Grid Connected
Sales of Electricity:	Through Grid	To Market
Costs:	Relatively Low	Relatively High
Financed by:	Equity, or secured lending	Equity + special Project Finance (SPV)

What does a Project Look like?

- Planning/development
- Site/permits & permissions
- Contractual framework
- Lenders approached
- Due diligence
- Initial approval
- Negotiation
- Final approval
- Signing
- Conditions precedent
- Funding
- Ongoing compliance
- Repayment/return

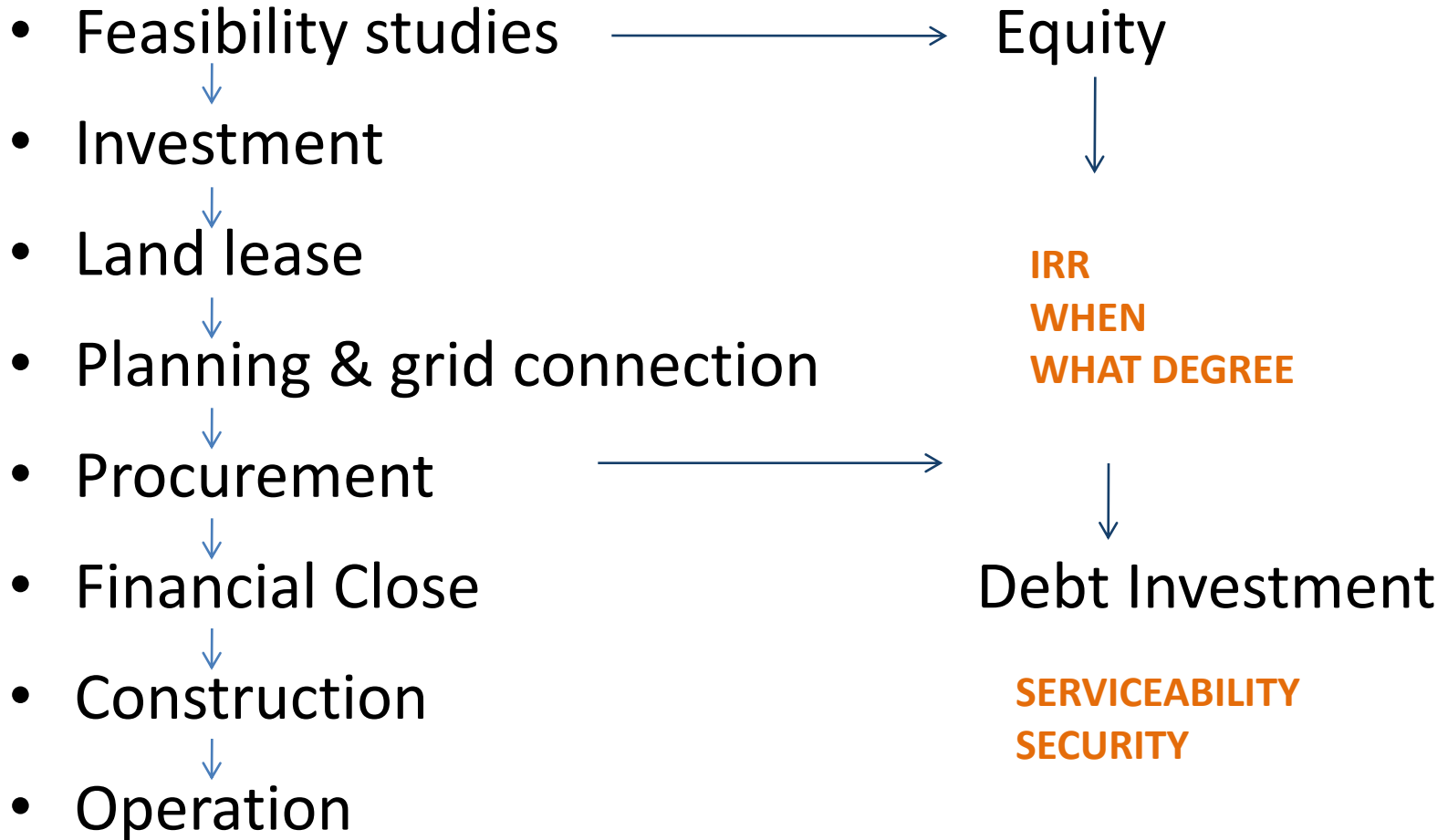


Greater Risk = Different Financing Methods

Features of Project Finance (SPV)

- Tends to be Schemes £1m +
- Investment is secured against project
- Up front equity at risk, (Risk Capital)
- Further finance (Debt) operational risk

Typical Project Finance Methods



Different Lenders

Feature	Equity Lenders	Debt
Market:	Funds, Venture Capitalists	Commercial Banks
Risk:	Risk takers	Risk averse
Entry Point:	Start	Post Planning/Grid
Returns:	12-15%	2-3% above LIBOR
Period:	1-3 years	Typically 7/8
Concerns:	Short term repayment	Full term serviceability

Classic Project Risk

Construction/Completion – construction contracts, sponsor support

Sponsor – Experience/financial

Technology – proven technology?

Insolvency – any of the parties

Offtake – price, market forces

Operational risk – experience, term

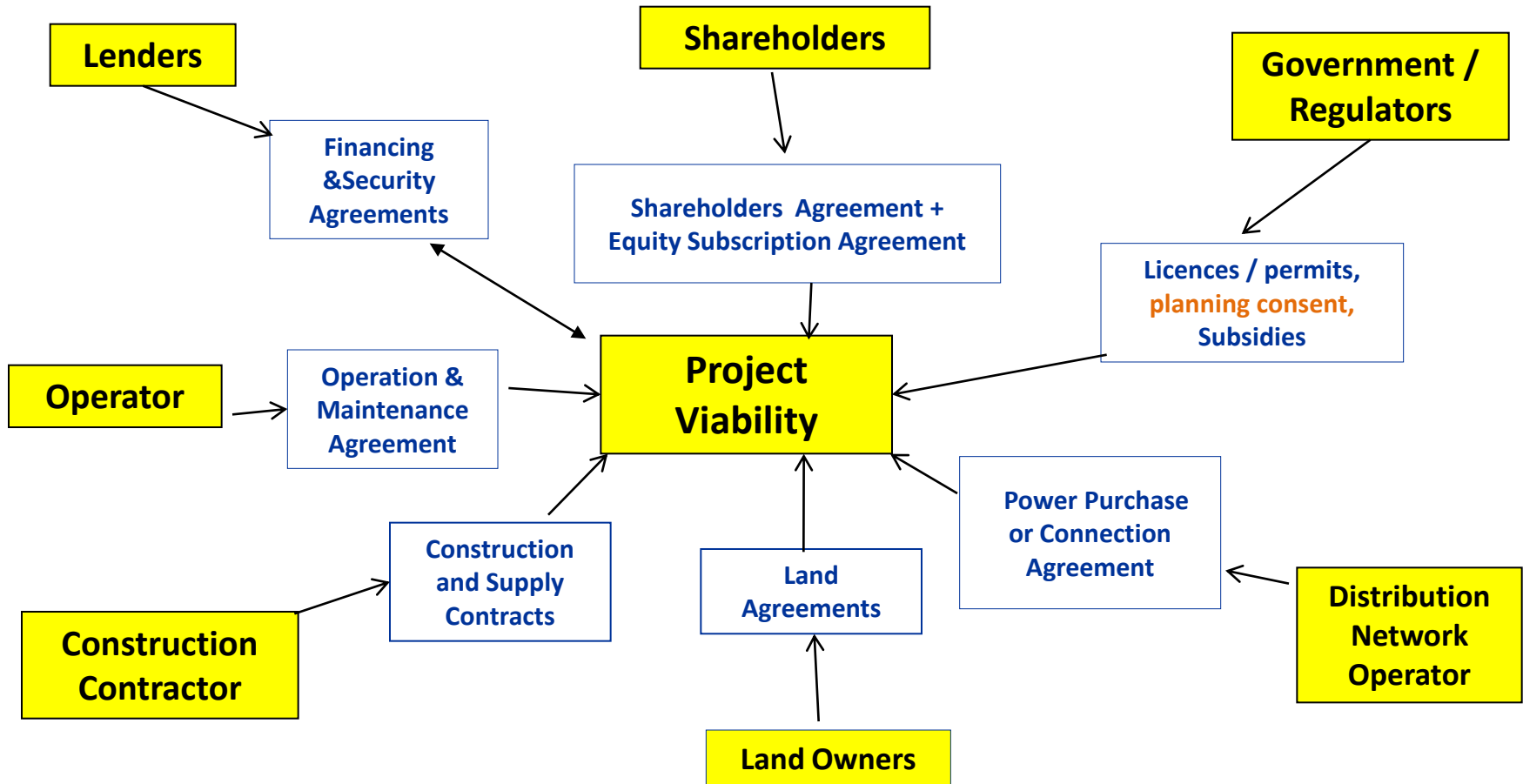
Currency – liabilities in one currency, revenues in another

Force majeure

Political – legislative regime, tax, permits,
planning consent

Legal risk – enforceability, dispute resolution

Project Development Structure



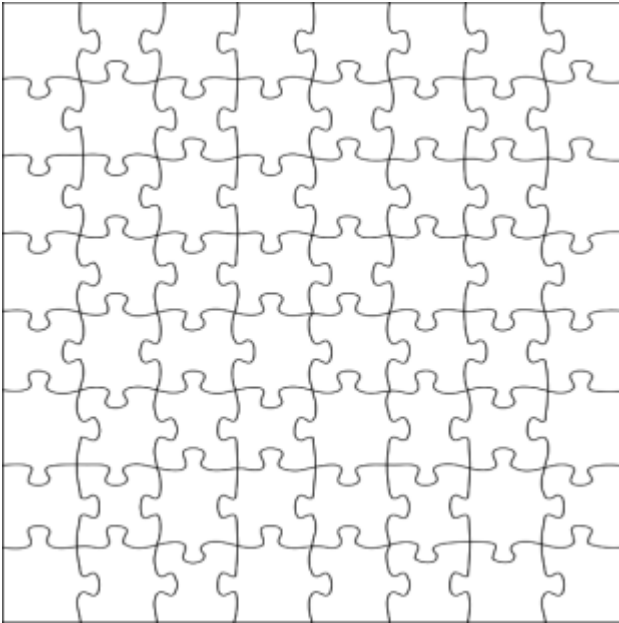
Need all pieces of the puzzle in place

Effects of Risk

- Risk = Potential Delay
- Delay = Delayed income
- Delayed income = Investor uncertainty
- Investors uncertainty = Rebalancing portfolio
- Rebalancing portfolio = Risk to project
- Risk to Project = Potential Cancellation
- Potential Calculation = Less RE Generation

Planning delays will impact on project viability

In practice



OR



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Need to help facilitate projects and appreciate the risks

Questions?