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Disciplines that create value in utility-scale PV project development

International market signals
and lessons from building Italy's largest PV park

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Learning curve effects in utility-scale photovoltaic development

The bottom of the development learning curve

- There are so many unknowns (aside from technology and suppliers)
- Natural questions include:
 - I've got one or more of:
 - Land, Money, Transaction expertise (with other people's money), Real Estate skills, Manufacturing experience, Legacy technology power knowhow ...
 - ... But what do I do next? Where do I start?
 - How much does it cost? – Today? In two years time?
 - How long will it take?
 - Where can I go for (hopefully free) advice?
 - When I get conflicting advice, whom do I trust?
 - Where will the danger come from?
- What do you mean: "It depends ..."?

The bottom of the financing learning curve

- Renewable energy is a really hot topic
 - I want my capital deployed there, somehow
- This is a new emerging sector which is going up for sure
 - So let me relax my investment discipline (just a little bit)
 - Implicitly assuming that the opportunity is large enough to allow for this
 - I don't have time to learn the ground-rules
 - I might miss the best (earliest?) opportunities!
- Solar is just like wind, isn't it?
 - Lots of investors made money out of wind
 - There are a few vague stories of underperforming assets
 - But that won't happen to me – just get me a value for money advisor who works quickly and lets me get my capital deployed fast

Optimistic assumptions through the full development lifecycle

- Development:
 - Processes are standardised, while progress timing and costs are predictable
- Permits are all the same, aren't they?
- Photovoltaic plants are really just commodity items
 - So plant design can easily be subcontracted to outsiders
- Banks want to finance all renewable energy projects
- Building a PV plant looks easy
 - We can trust the construction company to meet the schedule
 - There is no need to monitor progress on site
- The plant will reliably produce the energy that we predicted
- Even if we make a few mistakes along the way
 - There will always be a final buyer anxious to overpay for the asset and give us a healthy profit on exit

Cutting through the clutter in early-stage PV markets

- Everyone thinks that they can develop a PV project
- Typical participants include:
 - Real estate developers
 - Land owners, private or community
 - “Spin-offs” – former financiers, new departments in construction firms
 - Technical experts – architects, engineers, consultants, systems integrators
 - Equipment providers, grid operators
 - Wealthy investors – private groups, entrepreneurial, institutional
 - Influencers – those with access to permit bureaucrats
- All these players can tell a good story and all make extravagant promises – but whom can you trust?

**The critical question in an early-stage PV market:
“What is the value of a promise?”**

Making life easier for your partners

- Developers and financiers are just two perspectives
 - What about your project partners?
- In a win-win situation, your partners also need to succeed
 - Politicians and bureaucrats
 - Interested in backing successful high-profile projects with happy investors
 - Local community
 - Want an opportunity to be engaged in shaping the project and to share locally in the benefits
 - Equipment suppliers and construction partners
 - Desperately want to engage with credible customers who have finance to build
 - Hate wasting time and valuable resources on high maintenance sales prospects with project plans of unknown credibility, or on the high friction costs of dealing with new customers
- Credibility counts in winning and keeping the trust of these partners

**These partners learn - quickly - the true value of a promise
(and all want partners who deliver repeatedly, not just once-off)**

The complexity of successful development

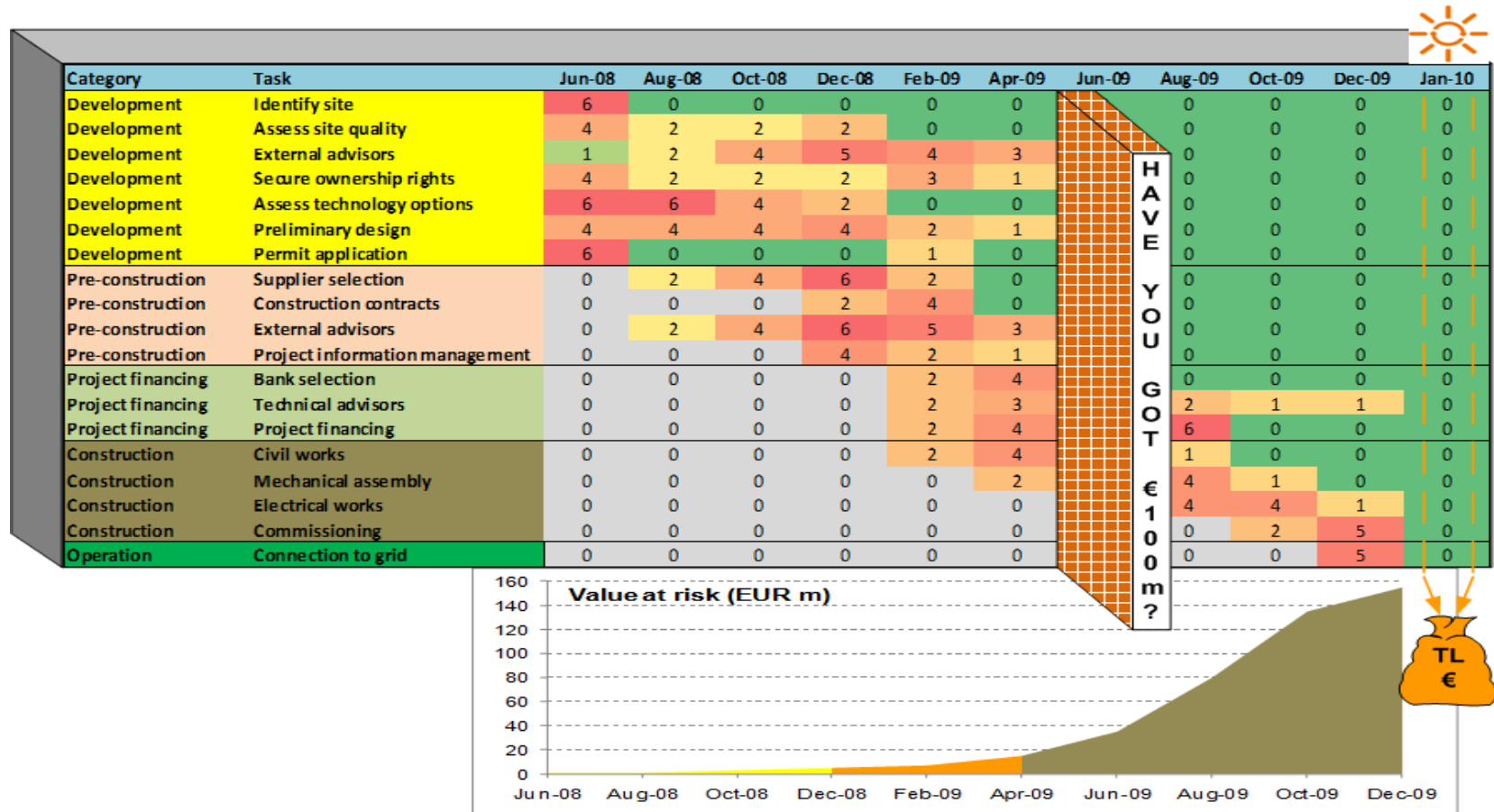
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Utility-scale PV: Defining the space

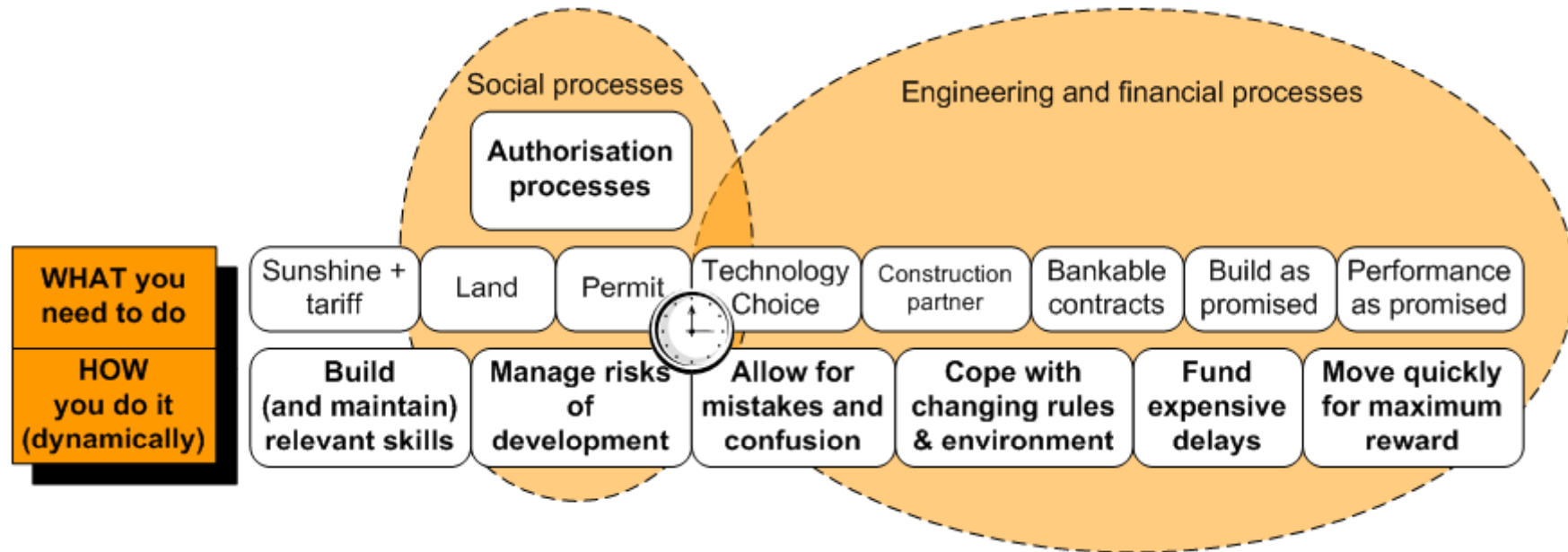
- What is a successful utility-scale PV developer?
 - Builds at least 10 MW in a single location
 - Does it again and again, building professionally and profitably
- There is no map in new and fast-growing sectors like PV
 - Navigation skills improve the chances of success
 - The map will change, sometimes overnight
- Success always looks easy
 - Don't try it on your own – you need wisely-chosen partners
 - Move quickly – this is a time-limited race for success
 - Make accurate decisions (even with less than perfect information)
 - Avoid fatal errors

Another brick in the wall?



Multiple activities: to generate revenues, all bricks in the wall must be removed
 Value at risk rises sharply once construction begins
 Utility-scale projects require €100m+ in financing

Navigate both complexity and diversity under intense time pressure



- Time is the greatest critic of all:
a slow learning curve gets
punished very harshly in PV

Development involves several different types of complexity:
Land rights, project permits and authorisation (social), infrastructure
construction (engineering and finance)

When is quality built in to a PV project?

- Quality emerges from a series of decisions
 - Quality is a process that demands professional answers at the right time
 - We are building long-lived energy infrastructure assets
 - Twenty five years or more of energy production
 - High-quality designs, efficient manufacturing lines, effective quality controls
 - Suppliers with the financial strength to stand behind long-term warranties
 - Partners with the capability to handle the unexpected
 - Professional risk management sufficient to satisfy top-tier bankers
 - Predictable revenues and costs
- Without quality there is disappointment
 - Not just to equity holders, but to community partners

**We are pioneers still early in the rollout of a new technology.
There are no detailed risk maps, but solid commercial and engineering
principles still drive the quality of project execution**

Practical PV project financing

- Project finance is the key to acceptable investment returns
 - This is true across the entire infrastructure sector
- Securing project finance requires formidable discipline
 - Banks run logical and consistent detailed evaluation processes
- Banks are also consistent in what they will not pay for
 - Bureaucratic hurdles, inexperience, bad engineering, project delays
 - Unrealistic project timescales, unsuccessful projects
 - Regulatory uncertainty
 - Project performance risk e.g. Variability in energy generation
 - The cost of this is efficiently transferred to the equity investor
 - Enriching middlemen, proving new technologies, residual risks

What the bank does not pay for, the equity investor has to
Quality is what drives equity returns

Snapshots from international PV markets

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Two different factors have changed the PV industry

- Two distinctively different factors (from the past 18 months)
 - Global economics: Biggest shock for several decades
 - PV industry: Shattering end to the Spanish boom
- Global economics – impact on the PV sector (via project financing)
 - Obliteration of some major project finance teams
 - Lending capacity severely curtailed
 - Risk appetite is slowly returning, focus on proven technology
 - Cost of funding has risen and lending duration has shortened
- This is an utterly changed economic environment
 - Not a normal business cycle recession, balance sheets are bust
 - Consolidation pressure in the solar sector is huge
 - Many formerly strong players will not survive the shakeout in 2010

Snapshot on the Spanish PV market

■ Market time

- **Late 2007/early 2008** – development hurdles are low, property developers and local construction firms speculate on PV, investor appetite is large, finance on easy terms is available and returns are high – landowners demand (and get) high prices for their land almost no matter how good or bad the site is
- **Early 2008** – An end to favourable legislation is announced, creating an artificial time deadline of August 2008. Mayhem ensues – bidding wars for land, permits, construction contracts, premium prices paid for third-tier Chinese modules – investors clamour to get projects finished on time, some using six or more module suppliers in a medium-sized plant

■ SunRay time

- **Mid 2008** – Legal and technical due diligence advisors state that “95% of permits or PV plants have serious flaws and are not free of risks – thus unsaleable to cautious buyers”
- **Mid 2009** – Financing terms are tight, cash-starved sellers are desperate to dump assets, more cautious banks state that a large proportion of PV plants built in 2008 will fail to meet energy yield predictions, several PV plants are repossessed

Snapshot on the Italian PV market

■ Market time

- **Feb. 2007** – After several iterations, Conto Energia legislation proves commercially successful and the volume PV market springs into life
- **International and local developers flock to Italy**, but find it difficult to execute utility-scale PV plants in the anticipated timescale
- **Feb. 2008** - New “fast track” local legislation in Puglia attracts huge attention but reality proves fickle and many projects fail at the execution or financing stages

■ SunRay time

- **Mid 2008** – Speculation on permits gives way to the reality that execution is slow and painful, very few PV plants of greater than 1MW get built, landowners who believed in extravagant promises fail to get their money, prices reset (slowly) to much lower levels
- **Mid 2009** – Virtual famine in project financing, several large-scale projects backed by international investors fail to achieve project financing on attractive terms

The importance of balance in a growing PV market

- The collective aim is to build successful PV plants
- Encouraging entrepreneurs and bankers to risk their capital requires a delicate balancing act
 - There are many moving parts
 - External (beyond control): tariffs, taxes, process transparency, cost of debt, FX rates etc.
 - External (influence is possible): land/equipment costs, technology choices
 - Internal (within direct control): quality control, process speed, teamwork
- The balance can easily be upset
- There is no warning bell that sounds when the balance changes, but wise investors listen and react quickly
 - While it takes much more time for all to hear (and adjust their pricing assumptions accordingly)
- Much later, the market sees the impact on PV plants built or not built

Getting a new PV market off the ground takes consistent support (markets hate uncertainty) as well as adequately attractive tariffs

The Montalto 85MW projects

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Montalto projects – Initial 24MW built during 2009



- Project statistics
 - Land area 80 hectares
 - Power 24MWp
 - 80,000 PV modules
 - Mono-crystalline Silicon technology, mounted on single-axis horizontal trackers
- Construction project:
 - Over 300 workers on site at one time (of which 250 were local)
 - Project completed in 8 months
- Finished plant:
 - Completed on time, on budget
 - Sheep friendly environment

Community benefits

- SunRay's strategy is to spread the benefits that flow from successful development
 - Some benefits are global – e.g. Emissions savings
 - We refer specifically to the benefits that are for the local community, inc.:
 - **Community funds** – financial contributions for the benefit of local residents
 - **Benefits in kind** – SunRay pays for local facility improvements, environmental improvements, school/educational support etc.
 - **Local employment** – During construction and plant operations
- Why do we do this?
 - We believe that sharing the benefits is the right thing to do, when done in an open and transparent manner
 - With community support and trust, we can build a better and larger business

Montalto projects – reaching 85MW in 2010

■ Positioning the Montalto projects

- Permits and authorisations allow for expansion to 85MW
 - Three further projects with construction beginning during Q1 2010
 - Connecting to the same substation, using the same suppliers, benefiting from subcontractors already skilled in the tasks needed
- Ranking the importance of this development:
 - At 24MW, already Italy's largest PV plant
 - At full scale, one of the world's top three PV parks

■ Current status

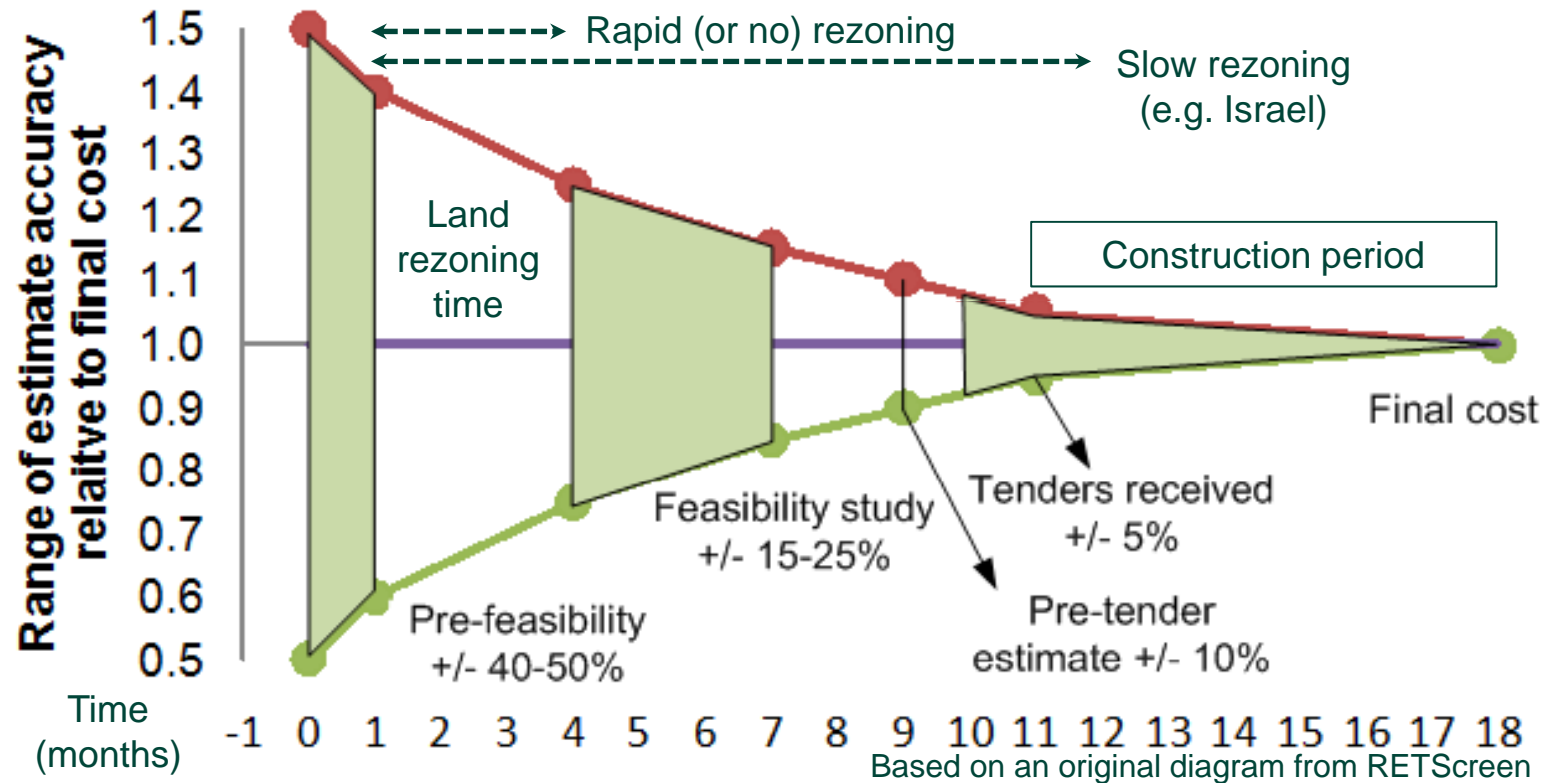
- 24MW connected to the grid and generating electricity
- Finalising finance for 2010 construction schedule

Virtues of size in utility-scale photovoltaics

- Many project development costs are fixed
 - National level: Deep professional understanding of legislation and taxes
 - Regional level: Building relationships to track how business actually works
 - Twenty six different public authorities affect projects in Italy
 - Local level: Building confidence in the local community
 - Banking: Deep contacts with busy and demanding professionals
 - Project feasibility assessment: Gather and process multiple sources of data, using legal, financial and engineering skills
 - Cost of failed projects: Yes, projects do fail but still need to be paid for
- Transaction friction costs are very high
 - EPC contract and equipment supplier negotiations
 - Project-specific legal and financial costs

High fixed costs make this a very volume-sensitive industry
Repeat projects with the same partners are quite attractive

Risk versus time for a renewable energy project



- Estimate accuracy is low and risk is high for early-stage projects
- Upfront costs and lengthy land rezoning time are hugely negative for project returns

Real-life project risks and returns

- For early-stage projects, you need a healthy margin of safety to take on high risk-weighted costs
- Predictions are easier in reverse
 - You will probably encounter the unexpected
- Managing risk levels through the development lifecycle
 - Typical risk levels can be assessed in general terms, even if specific events are unpredictable
 - Risk management comes from sound control practices
 - This requires resources, discipline and the humility to learn from experience

Few developers of utility-scale PV projects have managed to navigate these risks and successfully scaled their business internationally

Summary

- In an early-stage PV market, it is difficult to identify who will be successful
 - Yet this is critical for partners - politicians, local communities and landowners
 - Only successful developers can live up to their promises
- At utility scale, PV project development is difficult
 - It involves complexity at many levels - but quality projects get financed
 - There are many social components, thus it requires careful management to stay close to market signals and keep the process predictable
- Snapshots from international PV markets
 - The PV market is highly unpredictable
 - In Spain and in Italy, many have failed to meet their promises
- SunRay has shown that it can
 - Build a 24MW project (with community support) and deliver on its promises
 - Establish a win-win relationship with partners that results in repeat work together
 - Is willing to take on the tough challenge of building large PV parks in Israel

The value of a promise depends on the credibility of the source
