Deloitte.

Stranded costs, legacy contracts and LT PPAs in competitive markets

May 2022

Agenda

- Need for competitive markets and issue of stranded costs
- Dealing with stranded cost and legacy PPAs
  - International case study – United States
  - International case study – United Kingdom
- Alternatives such as CfD
- Avoidance of stranded costs

Competitive markets and stranded costs

A vibrant wholesale power market aims to offer multiple avenues for power procurement and ensure competition

Objectives of a competitive wholesale power market

1

Providing multiple avenues to market participants

Provide multiple options to sellers / buyers to transact in selling / buying power as per their needs:

2

Productive & Allocative Efficiency

Enables production of output at least cost; Resources allocated to maximize overall benefit

3

Dynamic efficiency

Incentives to make optimal decision of capacity and resource mix

4

Provide sellers an avenue to earn revenues over and above what they can earn through rigid long-term contracts

It is important to consider any expected under-recoveries of LT PPAs when they transition to competitive markets from regulated cost recovery

Transitioning from regulated to competitive markets require identification of unrecoverable costs from legacy contracts which would participate in markets

Generation costs

- Electricity generating firms make different expenditures that are considered sunk or fixed
- Some fixed or sunk costs are typical for a firm operating in a regulated market. These are either approved / imposed by the regulator or incurred as a result of competitive auctions

Reasons for ineffective markets

- Since these costs are fixed or sunk, it is arguable that the power generation firm be allowed to recoup these costs, whatever the market structure is.
- These costs are called as **strandable costs.**

Categories of fixed or sunk costs

		Approved by Regulator / incurred as a result of competitive auctions	
		Yes -> Strandable	*No -> Not strandable*
Recoverable via the market	*Full recovery*	Not stranded	Not stranded
	Partial recovery	Non-recoverable part is **stranded**	Not stranded
	No recovery	**Stranded**	Not stranded

Why competitive markets may lead to stranded costs

Increasing entrants in the market lead to efficient price discovery; may lead to non-recovery of certain costs of legacy contracts

FC

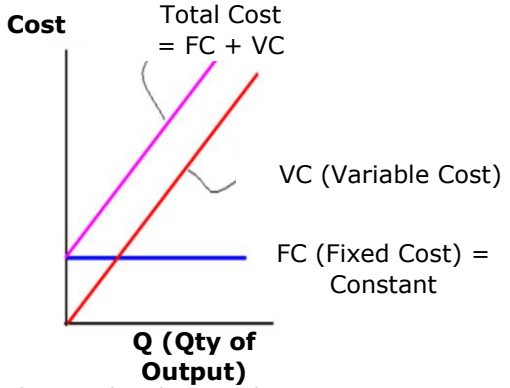
Amount of money a firm has to spend to produce something irrespective of the amount produced.

Total Cost

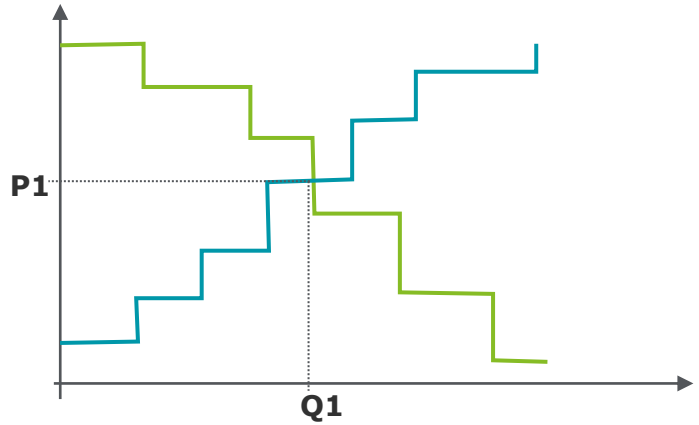
- Total Cost = Fixed Cost + Variable Cost.

VC

- Cost that changes with respect to the quantity produced.

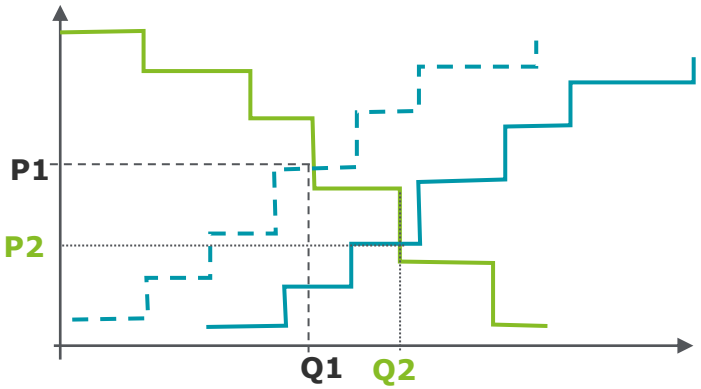


- **Regulated market**



- It is compulsory in the regulated market to meet the market demand
- Price is either approved by regulator or set through competitive auctions
- ***Demand is met at approved rates***

- **Liberalized market**



- More no of low-cost entrants participate
- Supply curve shifts to the right
- Demand is constant and more suppliers are willing to sell in the market
- Supply side competition goes up and hence ***Market price goes down***
- The market price may not cover all of the costs

Difference in prices (P1-P2) represents the loss per unit of output
Legacy generators might be willing to stay in the market as stopping activity may results in bigger losses
If VC < P2 < FC, there would be some stranded costs for incumbent generators

Legacy PPAs need to be given adequate protection to ensure recovery of such stranded costs

Addressing stranded costs need regulatory direction and enforcement.

The aim of such direction is to offer protection to generators to counter the effect of volatility of wholesale prices

Considerations for protection to be given to legacy PPAs

Provide price hedge

- *Provide participants with financial hedges that ensure the financial viability of the participants*
- *This is required to ensure adequate recovery of above-market costs during the transition to full deregulation*

Provide effective signals for new generation

- *Apart from legacy PPAs, new generation should be incentivized*
- *Price floors / caps can be an alternative to ensure appropriate price recovery*
- *However, they may hinder new generation entry*
- *Hedges / financial protection can be used to hedge generator and utility exposure rather than distorting the market signals for new investment*

Structured to be phased out gradually

- *These are temporary arrangements during the transition from regulated to full competitive markets*
- *Such protection needs to be gradually phased out for a complete shift to market-based contracts.*

International case study – United States

Transitioning of long-term contracts to markets – US example

Shift to market-based operations was enabled through grandfathering of legacy PPAs

1978-1990s

- **PURPA act of 1978** created new market entrants viz. **IPPs and QFs**
- 1992 Energy Policy Act - allowed **emergence of non-utility / merchant** generators.
- Emergence of **private generators**

1996

FERC Order No. 888 marked **shift to organized electricity markets**

1998

FERC Order No. 2000 – allowed formation of **Regional Transmission Operators (RTOs)**

ISOs were starting to get organized voluntarily

2001

States devised mechanism to **transit LT PPAs**

California market crisis due to high fluctuations in wholesale prices;

Post 2002

Need was felt for adequacy of generation contracting and price hedging to avoid reliability concerns or over-contracting by utilities

- ***Substantially private owned generation in US due to regulatory provisions***
- ***Transition was undertaken through lengthy re-negotiations and price adders on consumer bills***

- California adopted **Competition Transition Charge** (CTC) to cover above market costs of generation assets
- **Gencos received difference of Total Authorized revenues and revenue received from market**

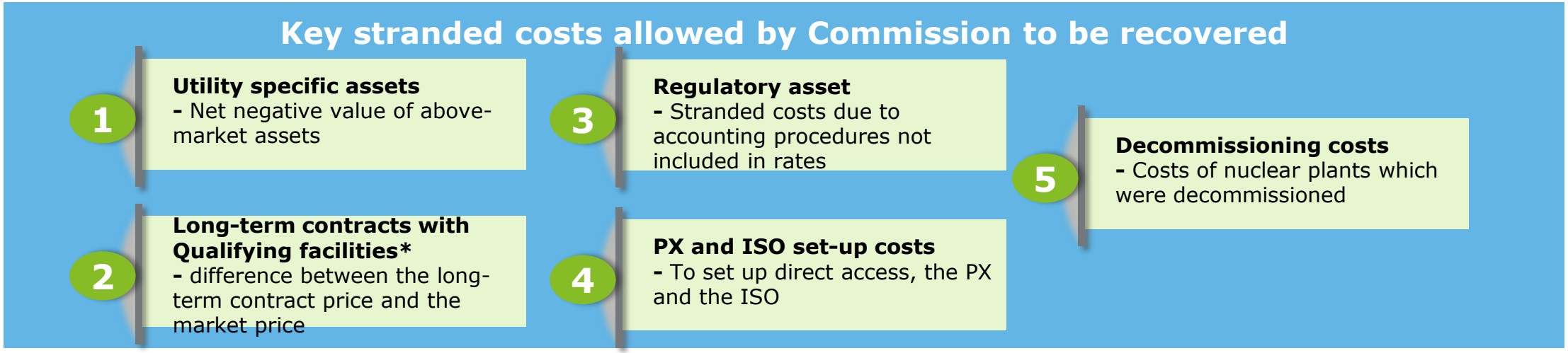
CTC Enacted	Deadline for CTC recovery*
1998	2004

Components of electric charges billed to consumers

Electricity Regulators were mandated by policy frameworks to identify the categories of stranded assets to be recovered

Excerpts from California Assembly Bill 1890

Commission shall identify and determine those costs and categories of costs for generation related assets and obligations, consisting of generation facilities, generation-related regulatory assets, nuclear settlements, and power purchase contracts, including, but not limited to, restructurings, renegotiations or terminations thereof approved by the commission, that were being collected in commission-approved rates on December 20, 1995, and that may become uneconomic as a result of a competitive generation market



Qualifying facilities:

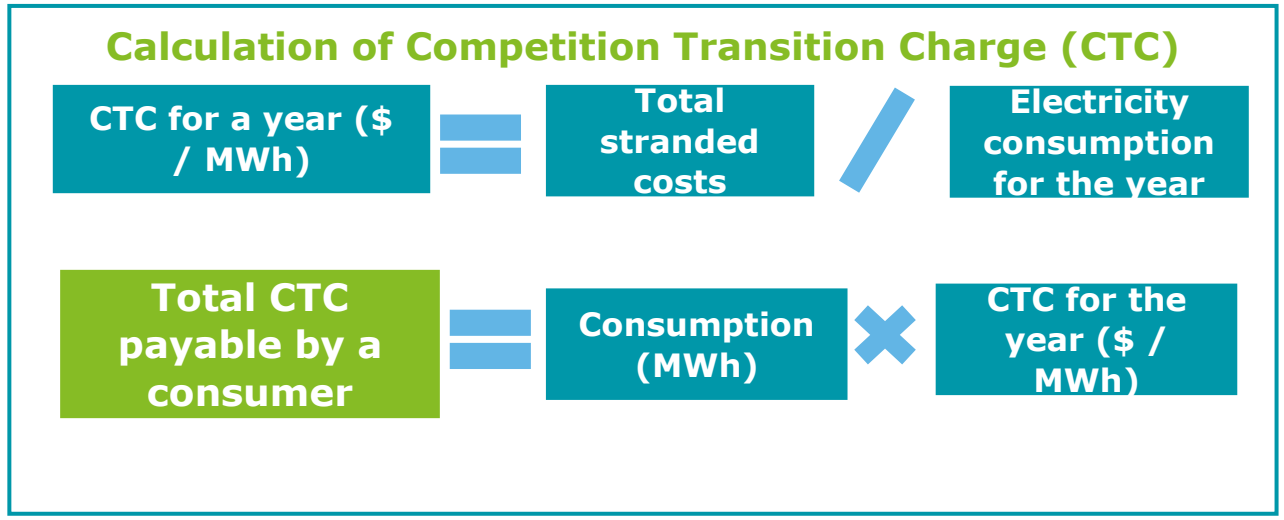
- Certain class of generating facilities receive special rate and regulatory treatment
- Include geothermal, renewable, installations less than a specific size as notified by appropriate Commissions and qualifying cogeneration facilities.
- Could sell energy and capacity to a utility either at the utility's avoided cost or at a negotiated rate.

Overview of Competition Transition Charge (CTC)

Price adders on retail tariffs enabled recovery of stranded costs

Recovery of stranded costs during the transition from regulated environment to market environment was done through levy of adders on consumer bills.

- Retail tariffs were frozen and no rate increase was allowed to ensure full recovery of stranded costs
- Assembly Bill AB 1890 introduced a **pass-through Competition Transition Charge (CTC)**
- Total stranded costs were calculated which were expected to be recovered through electricity consumers
- CTC ($ / MWh) is added as an adder in consumer bills
  - CTC would change each year and the amount paid per month will vary according to electricity consumption.
  - CTC will be adjusted each year to reflect disposition of utility assets and repayment of various accounts. For example, if a utility sells a power plant at a price greater than its book value, the CTC will be reduced.



Estimates for Southern California Edison's CTC & Other Costs (in 1996 Dollars)

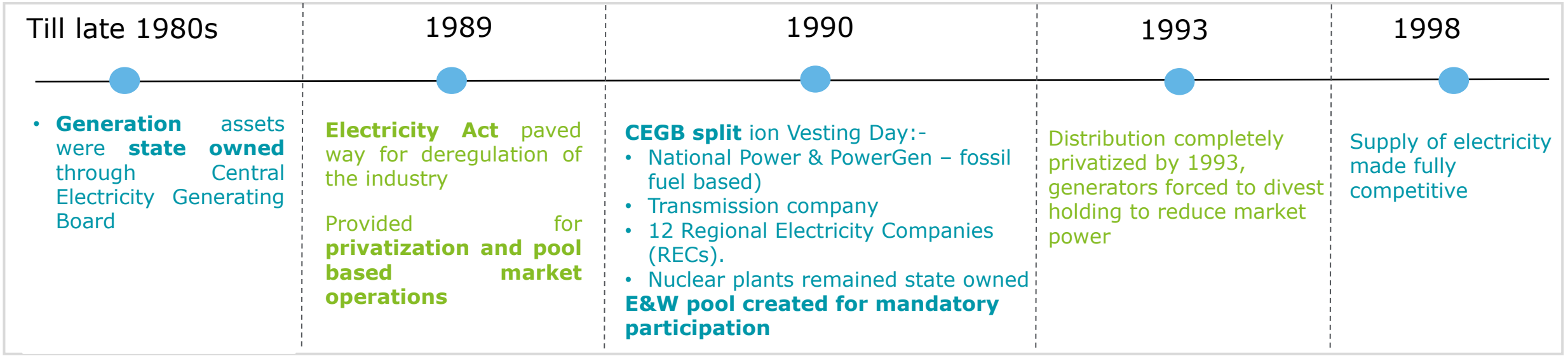
Year	Demand	QF Stranded Costs1	ELECTRIC RATES				CTC Component for Other Stranded Costs4	CTC Revenue for Other Stranded Costs (8)*(2)
			Rate excluding CTC Rate Component2	CTC Component for QF losses (3)/(2)	Rate including CTC for QFs (4)+(5)	Total Electric Rate3		
	(GWh)	($Million)	($/MWh)	($/MWh)	($/MWh)	($/MWh)	($/MWh)	($Million)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1998	99528	$ 1,839.0	77.92	18.48	96.40	111.17	14.77	$ 1,470.3
1999	101220	$ 1,623.6	73.25	16.04	89.29	111.17	21.88	$ 2,214.7
2000	102941	$ 1,423.4	68.97	13.83	82.80	111.17	28.37	$ 2,920.7
2001	104691	$ 1,250.9	65.27	11.95	77.22	111.17	33.95	$ 3,554.4
2002	106470	$ 1,202.4	55.90	11.29	67.19	67.19		
2003	108280	$ 1,178.6	57.21	10.88	68.09	68.09		
2004	110121	$ 1,161.3	58.60	10.55	69.15	69.15		
2005	111993	$ 1,152.6	60.60	10.29	70.89	70.89		
2006	113897	$ 1,082.6	62.16	9.51	71.67	71.67		
2007	115833	$ 1,034.1	63.88	8.93	72.81	72.81		
2008	117803	$ 830.8	65.12	7.05	72.17	72.17		

Illustrative

International case study - UK

Transitioning of long-term contracts to markets – UK example

Vesting contracts enabled protection to generators from spot price volatility



- ***Vertically integrated utilities & all generation assets were state owned prior to liberalization and introduction of WEMs***
- ***Contracts for Differences signed between generators and suppliers provided for hedging of above market costs***

- Generators (PowerGen and National Power) were protected through Vesting CfD contracts with electricity companies.
  - Provided **price hedges** for a fixed period (**7-10 years**) to protect generator margins.
  - Strike price allowed **costs of coal contracts to be passed** onto RECs
  - Ensured that **expected output** of each of the generators was **covered through contracts** with electricity suppliers
  - Ensured **difference payments** to gencos if spot prices were lower

Working of Contracts for Differences

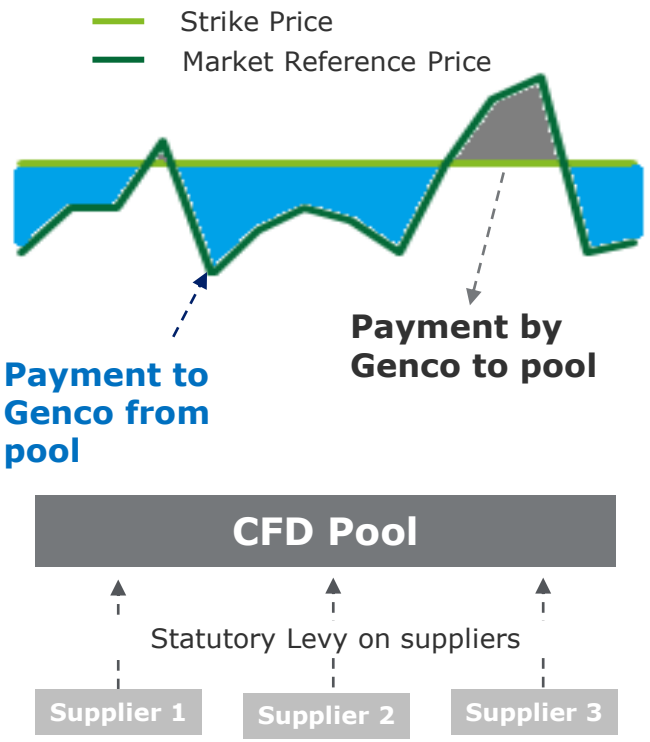
Market based framework for protecting RE from spot price volatility - UK

Contract for Difference (CfD) offers protection from volatility in market prices

Description of Cfd model

- Provides **direct protection** from volatile wholesale prices
- RE power is traded/ settled as usual at market prices
- Fixed "strike price" is determined through competitive auction
- Difference between "**Reference Price**" (average market price) and "**Strike Price**" is paid to/ by the generator from/ into a **CFD pool**
- CFD pool is funded through a **surcharge on tariff**

How framework operates



Stakeholders

LOW CARBON CONTRACTS COMPANY LCCC — Holds auctions and signs 15 yr CFD agreement with generators

EMR SETTLEMENT LIMITED — Settlement of payments by generators and suppliers

Determination of Surcharge

Supplier obligation levy

- CFD levy rate on all suppliers, in relation to their market share based on energy volumes sold

Operational costs levy

- Administrative Expenses of auctions are recovered through separate Operational Costs Levy on suppliers

How can stranded assets be avoided?

A robust market structure with contracting flexibility and integrated resource planning can enable avoidance of stranded costs

- Market structure should enable contracting to transit away from predominantly long term PPAs to a judicious mix of contracts

- Long term contracts are necessary for new generation assets but the term of such contracts have come down in advanced electricity markets
  - In US, long term contracts have come down to 7-10 years
  - Usually, 10%-40% of procurement by utilities from long term
  - Rest is from short term contracts ranging from 3-4 years to a few days forward
- Most international markets offer multiple options to utilities to flexibly adjust their procurement portfolios through offering capacity contracts on a regular basis

- A Resource Adequacy framework is essential to ensure adequate generation capacities are available to reliably serve demand round-the-clock. An Integrated Resource Planning is the first step in determining a Resource Adequacy plan.

- Distribution companies should prepare IRPs on a rolling basis every year. This should include an optimal mix of LT / MT / ST contracts

Thank you