Harvest Fund Project	Version: 01

Alternative Energy Industry Chain Modelling

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Micro-Model Building

- Notation:

Variable	Defination	Acquire Method
c	The overall cost of mine from the upstream industry chain.	
K	The product capacity of fab planning.	
$p(K)$	The price and demand function(usually linear)	
D	Market demand, consists of two part $\overline{D}$ and $\tilde{D}$	
$\overline{D}$	The stable demand in the market.	
$\tilde{D}$	The trendancy symbol of demand moving.	
h	Reputation loss since the lack of supplying.	
s	Reserving value of oversupply inventory.	

- Consider the three-node supply chain for one industry, especially new-energy lottery industry.

$$\prod_{mid} = p \cdot min(D,K) - h(D-K)^+ + s(K-D)^+ - cK$$

$$\prod_{mid} = \int_0^K [p(D) \cdot D + s(K-D)] \cdot f(D)\, dD + \int_K^\infty [p(K) \cdot K - h(D-K)] \cdot f(D) dD - cK$$

- Let the first order of the former equation to 0, thus can obtain that,

$$\frac{\partial}{\partial K} \prod_{mid} = [p(K) \cdot K - sK] \cdot f(K) + sF(K) + SK \cdot f(k) - p(K)K \cdot f(K)$$

$$+ [p^{'}(K) \cdot K + p(K)] \cdot \overline{F(K)} + hK \cdot f(K) + h\overline{F(K)} - hK \cdot f(K) - c$$

$$= [p^{'}(K) \cdot K + p(K)] \cdot \overline{F(K)} + h\overline{F(K)} + sF(K) - c$$

$$= 0$$

- If the price function $p(D)$ maintain stable when the product has rigid market demand, the equation can be simplified to:

$$p\overline{F(K)} + h\overline{F(K)} + sF(K) = c$$

$$F_D(K) = \frac{p+h-c}{p+h-s}$$

$$K = F_D^{-1}(\frac{p+h-c}{p+h-s})$$