
A perspective on Distributed Generation in Municipal Networks

The Revenue Impact of Embedded Solar Generation

64th AMEU Convention

Gallagher Estate, Midrand

October 2014



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- Mitigation Strategies
 - Base/Network charge
 - Time of Use Billing

Why is PV a risk to the municipal electrical business and what we can do about it?



Rooftop PV is coming



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

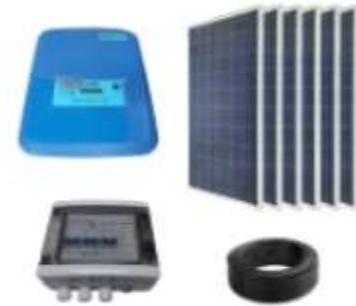
GUIDELINES FOR EMBEDDED GENERATION

Application process to become an
embedded generator in the City of
Cape Town

SEP 15, 2014

Nersa finalising distributed-power, wheeling consultation papers

#138812326103 The National Energy Regulator of South Africa (Nersa) will release a consultation paper in February next year outlining the possible regulatory framework for "distributed power generation" in South Africa, including how "prosumers" could be empowered to feed surplus electricity into the grid. Full-time member for electricity Thembeni Bukule says the aim is to ensure an "orderly introduction" of embedded generation, which Nersa views as inevitable, notwithstanding the prevailing legislative impediments.



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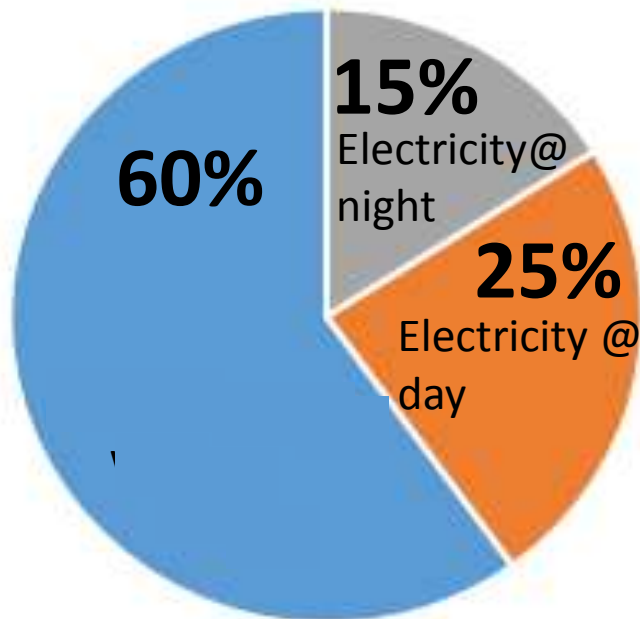


BETTER TOGETHER.



Why is this a threat

Total Municipal Surplus

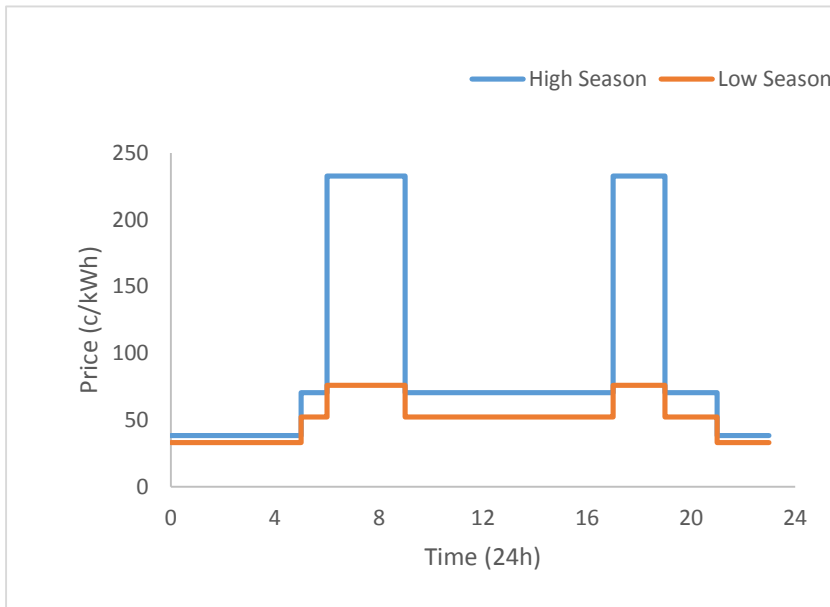


- PV will reduce daytime electricity sales.
- These sales represent 25% of total municipal surplus.
- Surplus is used to cross subsidise essential services.
- Cost of providing an electrical connection customer (network charges) does not change, despite losses.

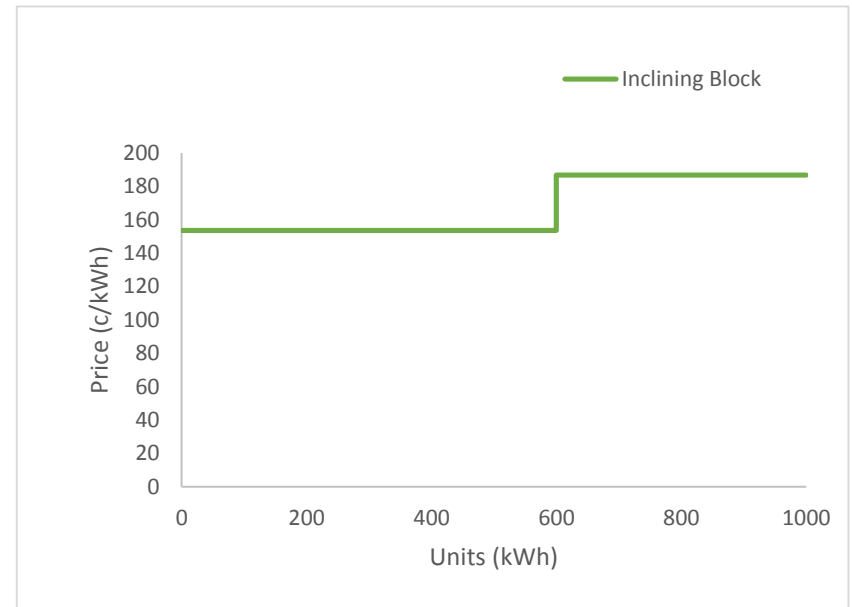
Understanding tariffs

- There is asymmetry in the buying and selling price of electricity

Buy on ToU tariff



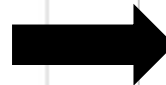
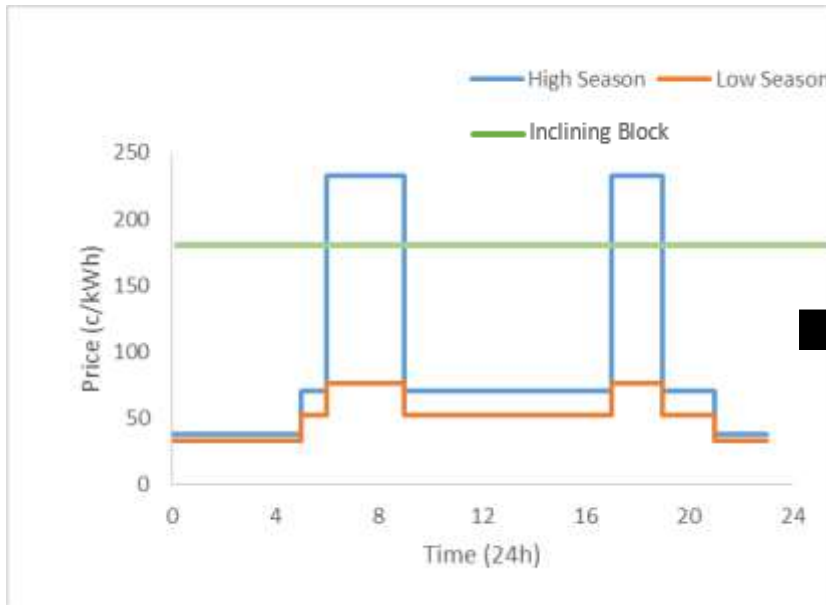
Sell on a Flat tariff



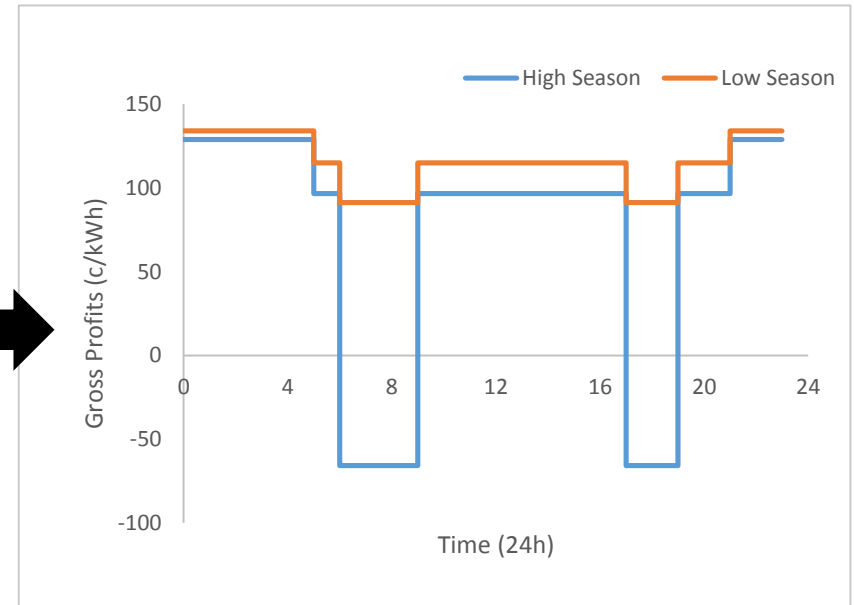
Understanding profits

- Profits vary throughout the day and year. Some sales are even made at a loss

Buying and Selling Tariffs



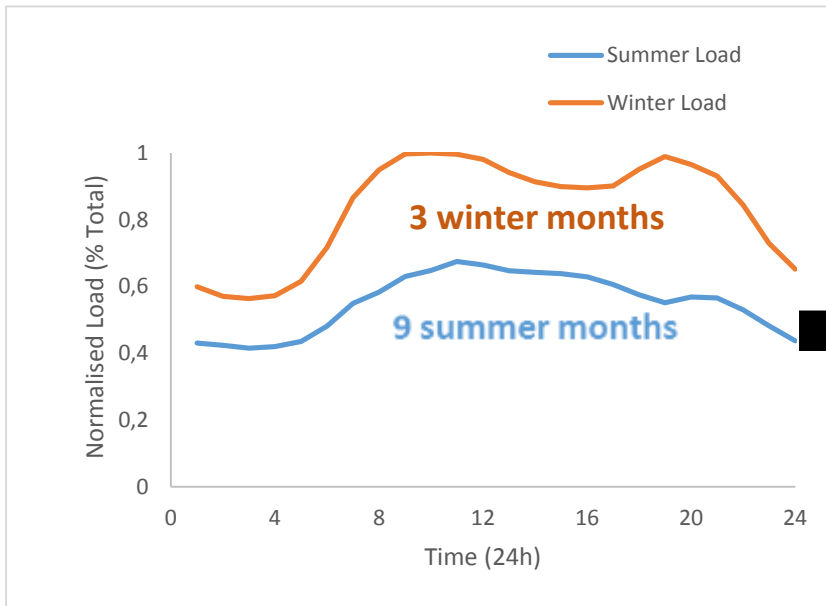
Gross profits realised



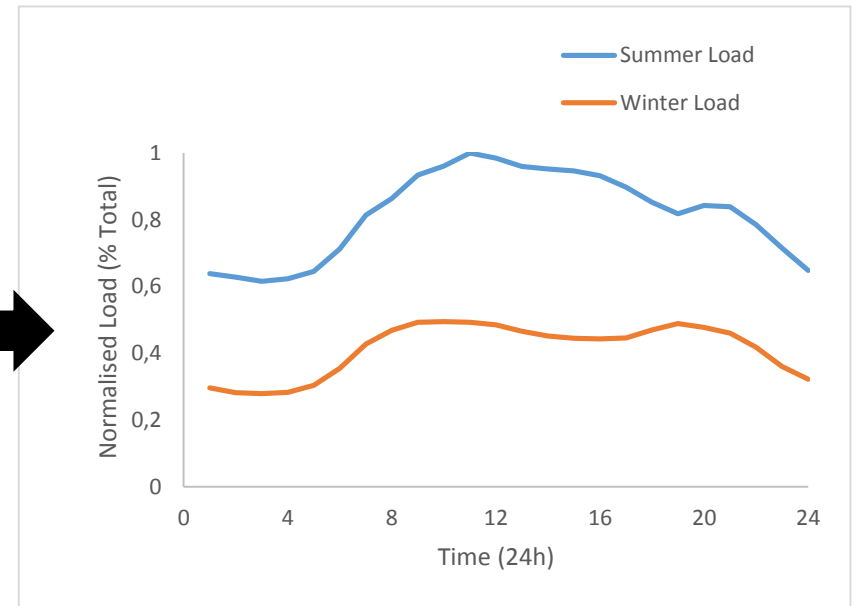
Understanding volume of sales

- Load varies throughout the day and year. This affects the profit profile.

Normalised **Monthly** Load Profile



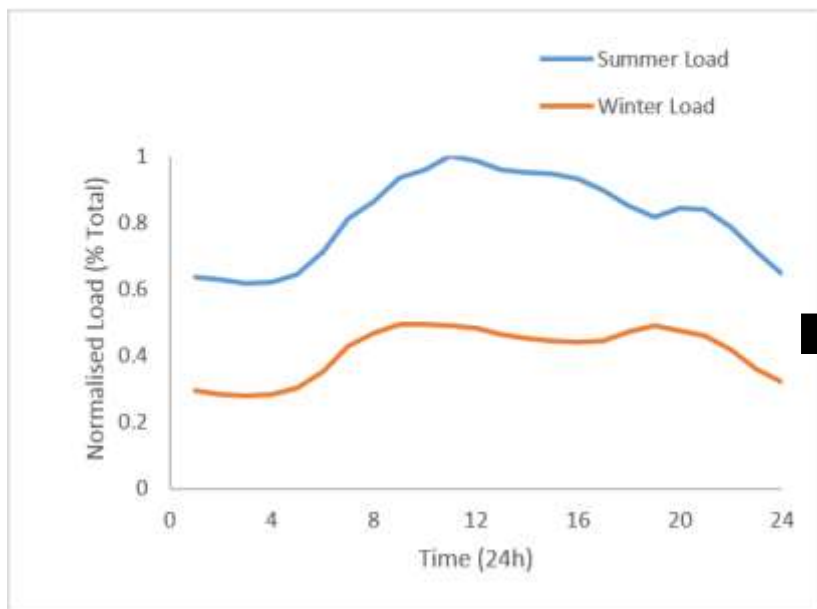
Normalised **Annual** Load Profile



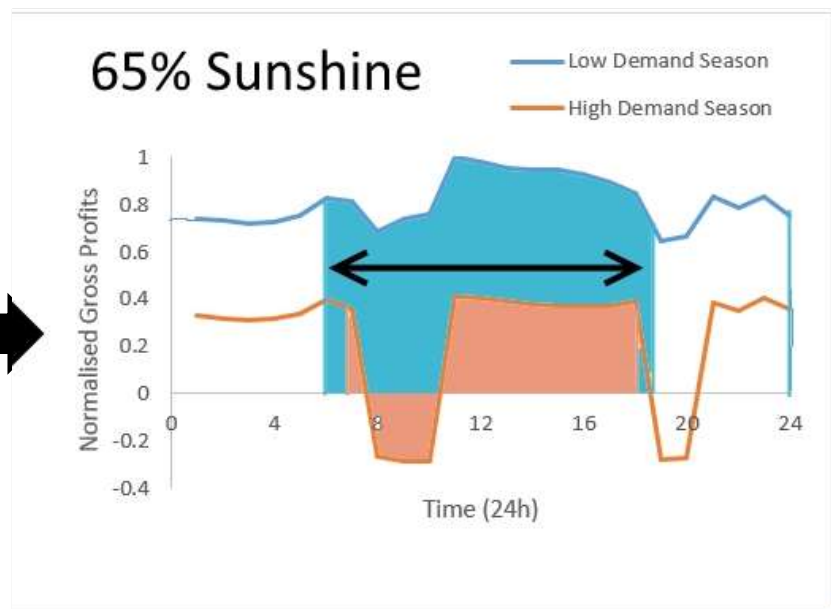
Understanding volume of sales on profits

- Applying the profit margins to the load profile reveals **where** profits are generated.

Normalised Annual Load Profile



Normalised Annual Load Profit Profile



Understanding PV Generation

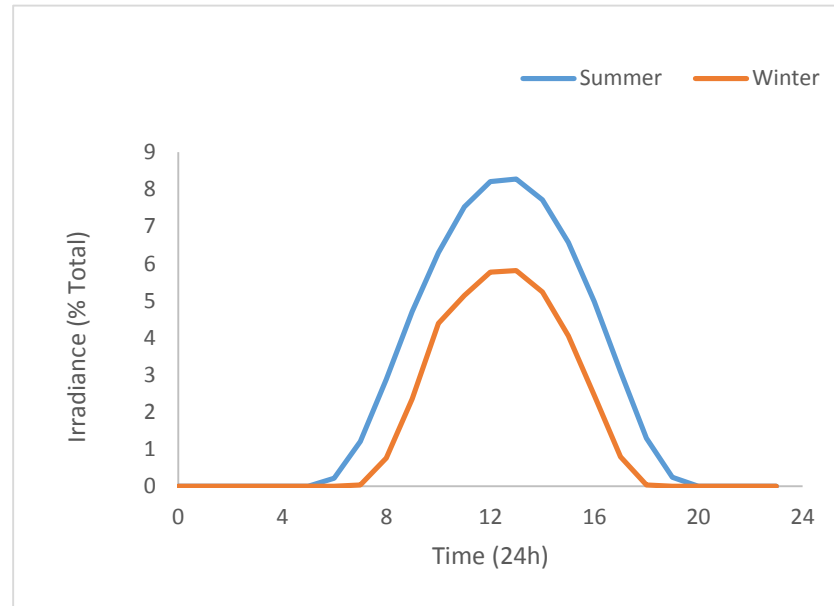


1000w/m²

PV panels 14% efficient

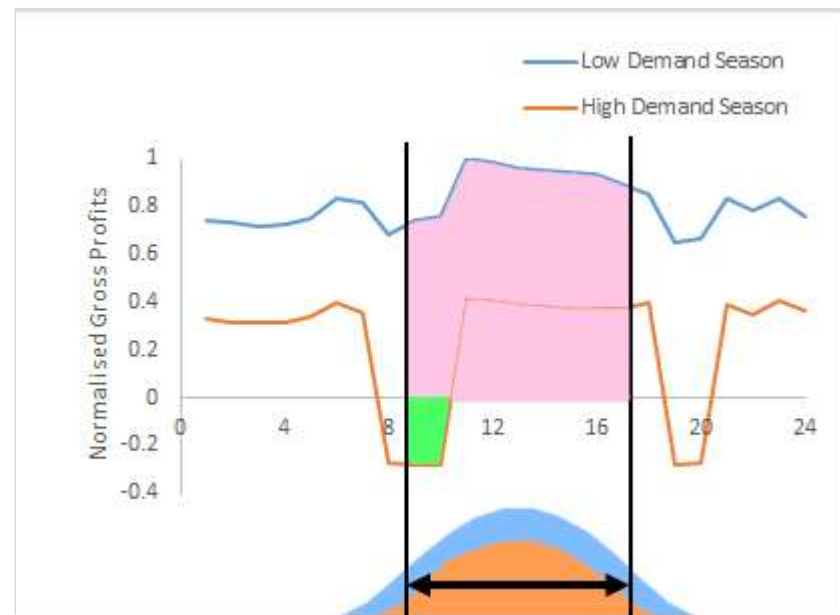
140W/m²

85% of Energy in Summer



PV impacts your most profitable sales

- Takes sales from highest inclining block
- PV most active during summer daytime between 08:00 and 17:00
- This is where a majority of profits are generated



How much will this cost

Example 1: Given the installation of a 1.5 kW peak PV system on a household that uses an average of around 1 000 kWh of electricity a month.

- The municipality stands to lose an average of **270 kWh** per month of sales
- The lost sales occur predominantly during standard time and are equivalent to about **R330** per month of lost gross profits.
- This represents a **25%** decrease in total gross profits earned from this household.



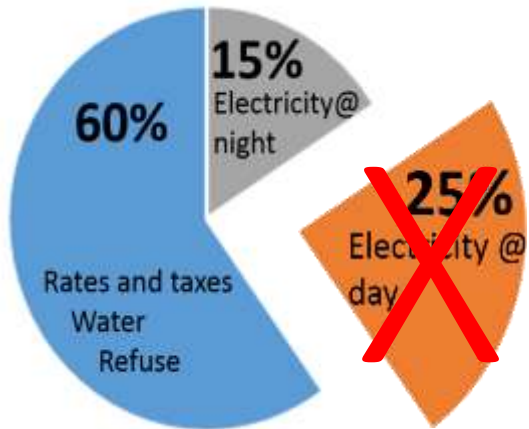
1.5kWp



1000kWh/m



What can be done



Want a fair solution for all

- 1) Base Charge for ALL non-indigent consumers
 - Protect cost of providing service
- 2) Time of use billing
 - Promotes self consumption
 - Reduces peak loads
- 3) Subsidy Options??
 - Paying high prices in REI4P already
 - Solar Geyser program

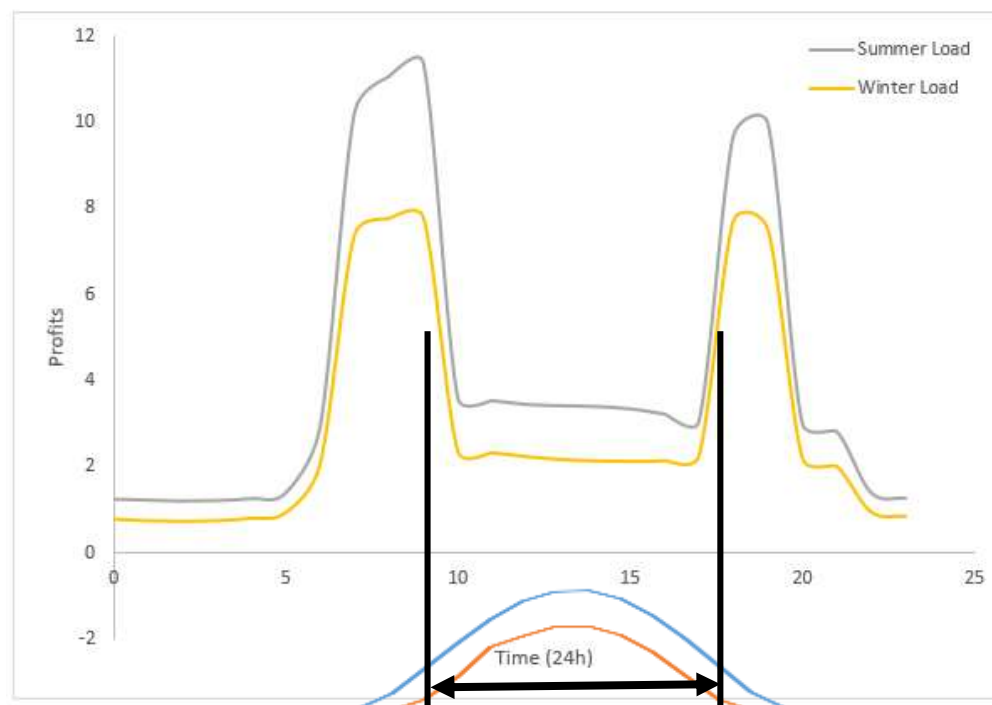


Effect of Time of Use Billing

Looking at example 1 again.

- ToU billing can reduce municipal profit losses to only 11%. Compared to 25% without.
- Can also promote customers shifting load to ensure maximum self consumption.
- This reduces peaks.
Decreasing demand charge

Time of Use



Conclusion

- Widespread PV installations **WILL** impact municipal revenue (for as long as we rely on electricity sales for surplus). There is no way around this. **greencape** is working on a municipal revenue project that aims to redesign the municipal revenue stream.
- The Asymmetrical buying and selling prices of electricity results in a **potentially disproportionate** loss of surplus (when compared to the number of kWh of lost sales).
- A base charge (for all high end consumers) and ToU billing can be used to **reduce the impact** on the municipality while still maintaining a **viable** business case for residents



Questions?

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