

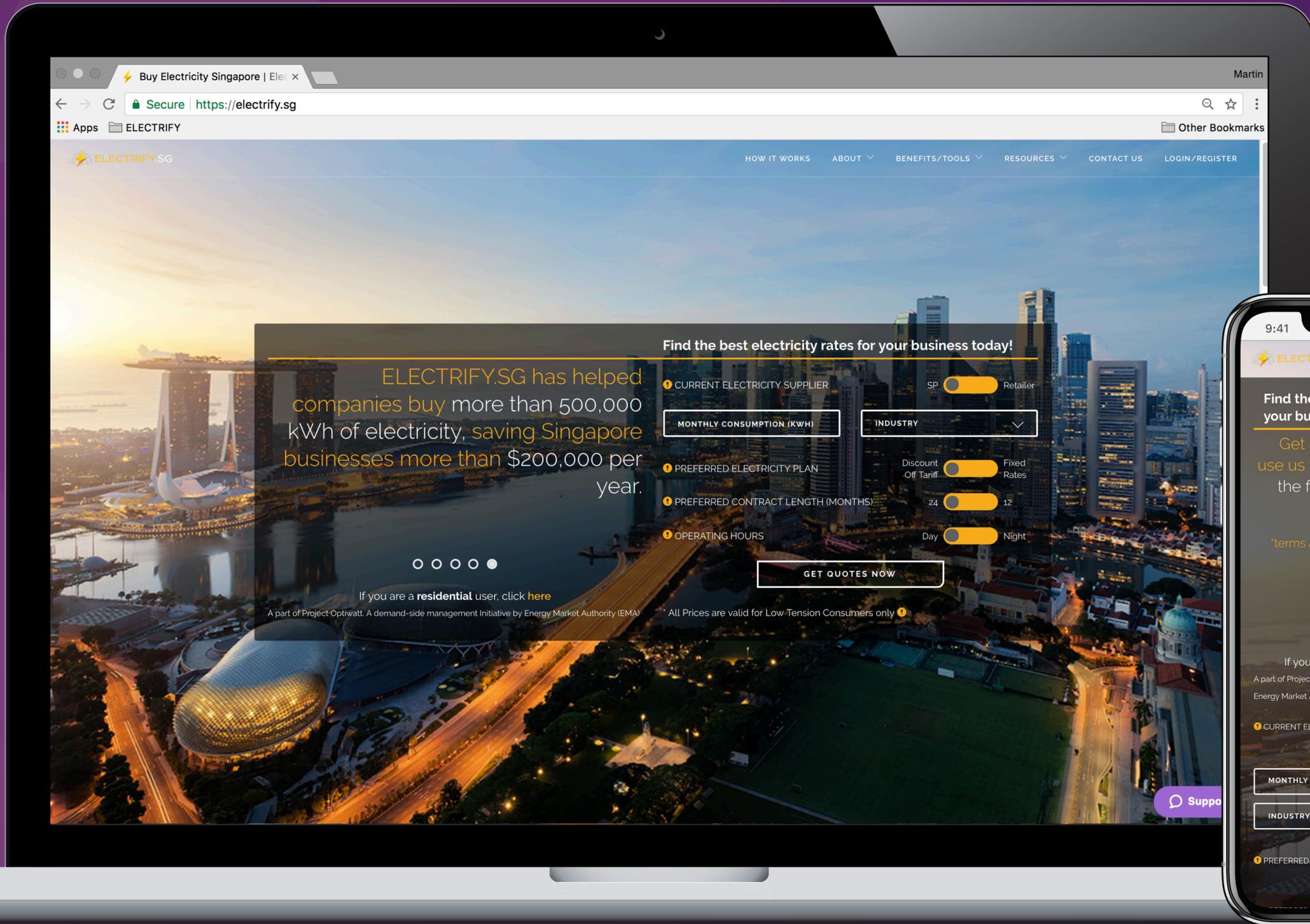


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# FIRST RETAIL ELECTRICITY MARKETPLACE IN SINGAPORE



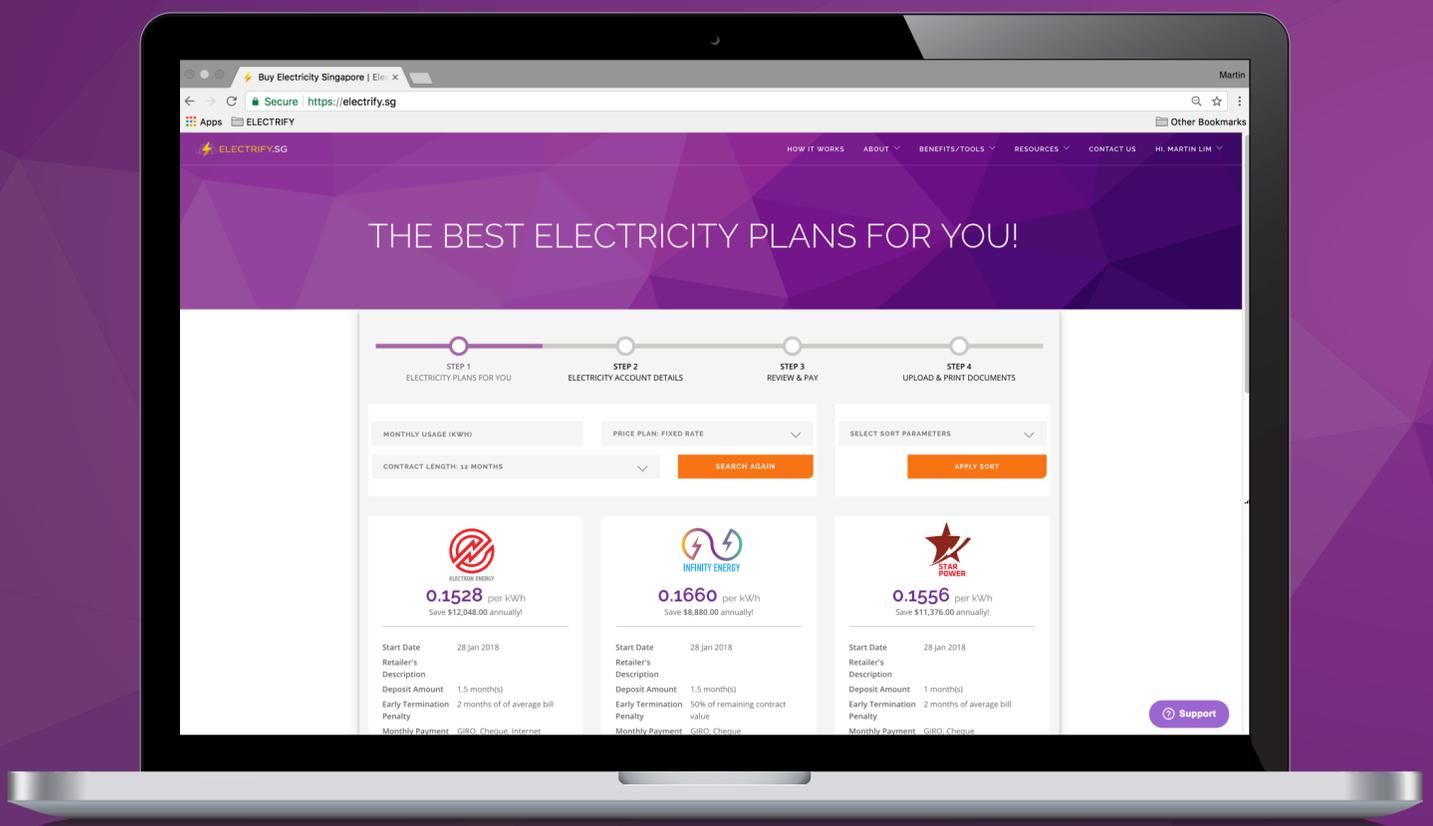
# PLATFORM AND FUNCTIONS

## MARKETPLACE

Retail electricity marketplace

## SYNERGY

P2P and VPP platform for main grid applications





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BACKGROUND ON SINGAPORE



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# BACKGROUND ON SINGAPORE

- ⚡ Gross pool model
- ⚡ Heavily reliant on conventional generation
- ⚡ Limited RE potential - largely rooftop PV
- ⚡ Centralized system
  - High degree of control
  - 88 nodal prices published
- ⚡ Separation of physical and financial flows





# DESCRIPTIVE STATISTICS

- ⚡ 2018 Highest Demand 7,070 MW
- ⚡ 2018 Registered Capacity
  - Generation - 13.5 G
  - Demand response - 7.2 MW
- ⚡ Installed PV (Q2 2018)
  - ⚡ 124.6 MWac, 161.8 MWp

Sources: [1], [2]





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ISSUES IN SINGAPORE



# ISSUES IN SINGAPORE

- ⚡ Oversupplied generation segment depresses prices of energy, regulation and reserve
- ⚡ Current policy for PV is to determine reserve responsibility for all grid-connected PV within Singapore - acceptable for now but will be a problem when PV capacity exceeds contingency reserves





# ISSUES IN SINGAPORE (cont'd)

- ⚡ Low technology and fuel diversity in generation segment leads to low-peak/off-peak spreads
  - Limits arbitrage opportunities for storage systems, peak shifting
- ⚡ Majority of population live in high-rise buildings with limited potential for rooftop PV





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AREAS FOR IMPROVEMENT



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# Areas for improvement

- ⚡ Future-proof regulatory framework that can pre-empt emerging business models and technologies
- ⚡ Ability for solar PV systems to use portfolio effects to socialise costs of balancing/variability
- ⚡ RE market to facilitate and accelerate growth of solar PV
- ⚡ Dynamic grid charges that reflect varying levels of use
- ⚡ Transition to capacity-based models





THANK YOU

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# References

- ⚡ [1] - <https://www.emcsg.com/marketdata/priceinformation>
- ⚡ [2] - [https://www.ema.gov.sg/statistic.aspx?sta\\_sid=20170711hc85chOLVvWp](https://www.ema.gov.sg/statistic.aspx?sta_sid=20170711hc85chOLVvWp)