

Residential Electricity Pricing Offer



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Goals

Understand how an energy supplier **builds** and **prices** a residential electricity offer.

Building and pricing two competitive offers:

- one with energy **directly** bought **to the producer**
- one with energy bought on the **market** with a Guarantee of Origin (GO)

Try to find out if your energy supplier is really the one you want to.

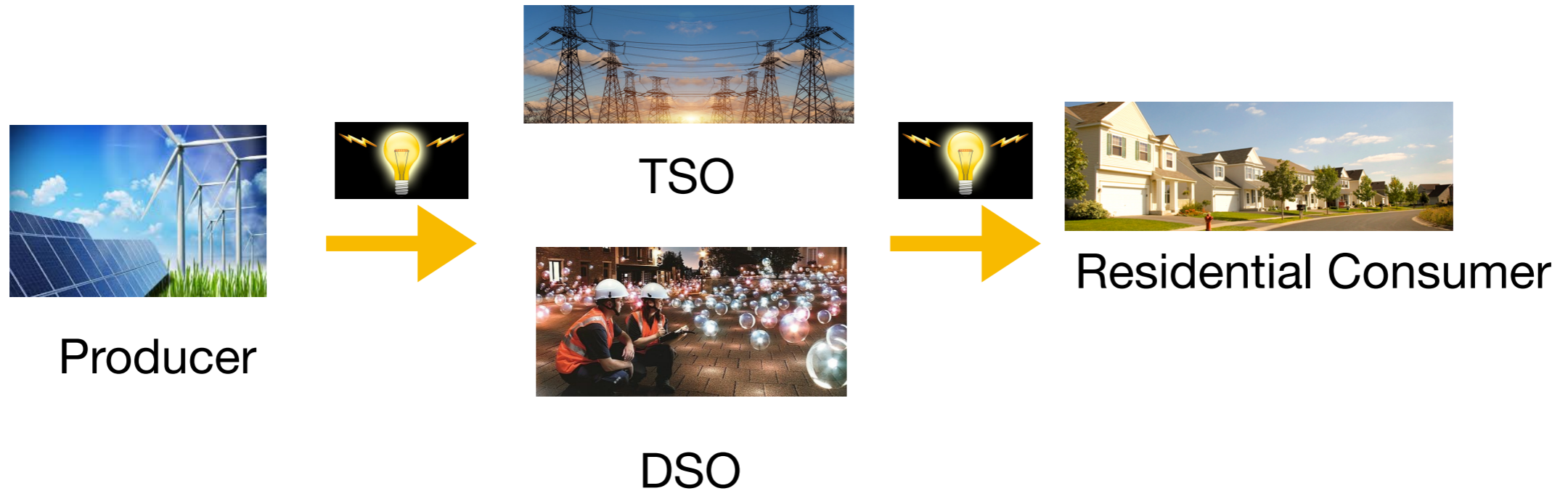
Residential Electricity Pricing Offer

Summary

1. Components of the energy part
2. Pricing the energy part components
 1. Energy part from market
 2. Energy part directly to the producer
 3. Balancing fees
 4. Guarantee of Origin (GO)
 5. Capacity

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3. Components of the energy part



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3. Components of the energy part

Energy part:

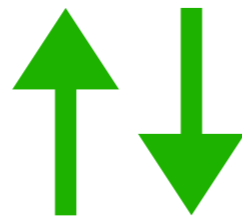
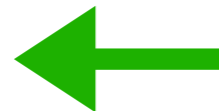
- energy
- balancing fees
- Guarantee of Origin (GO)
- capacity



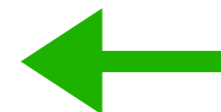
Markets: EEX, EPEXSPOT



Producer



Energy supplier



Residential Consumer

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4. Pricing the energy part components: the energy

Energy part:

- **energy**
- balancing fees
- Guarantee of Origin (GO)
- capacity



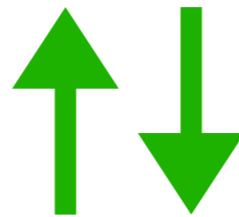
Markets: EEX, EPEXSPOT

EEX:
 Calendars
 Quarters
 Months
 Weeks
 Days

EPEXSPOT:
 Spot
 Intraday



Producer



Energy supplier

- Fixed price
- Indexed price
- Fixed within a threshold then indexed outside

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4. Pricing the energy part components: buying to the market

Minimizing the **risk aversion** by buying futures products on different **horizons**:

- Calendar: Y+1/Y+2/Y+3 -> *to buy 3 years in advance*
- Quarter: Q+1/Q+2/Q+3/Q+4 -> *to buy 12 - 6 months in advance*
- Months: M+1/M+2.../M+12 -> *to buy 3 - 1 months in advance*
- Weeks: W+1/W+2...
- Days: D+1/D+2 ...

T - 3 Y

T - Y

T - 6 M

T - M

T - W

T - D

T

Cal Y+3

Q+1/Q+2/Q+3/Q+4

Day a Head Spot Intraday

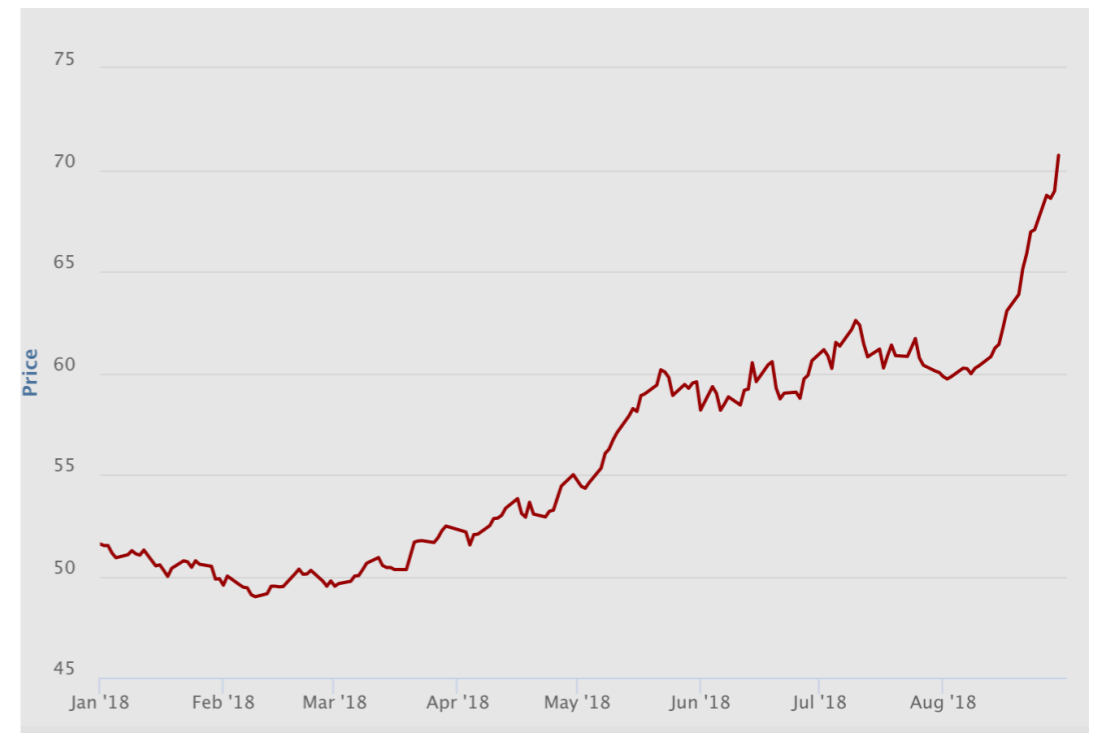
$$Price = P_{cal} + P_Q + P_M + P_W + P_D + P_{Spot}$$

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4. Pricing the energy part components: buying to the market



EEX cal20 historic from 2016-2018



EEX Q1 2019 historic from 2018

T - 3 Y

T - Y

T - 6 M

T - M

T - W

T - D

T

Cal Y+3

Q+1/Q+2/Q+3/Q+4

Day a Head Spot

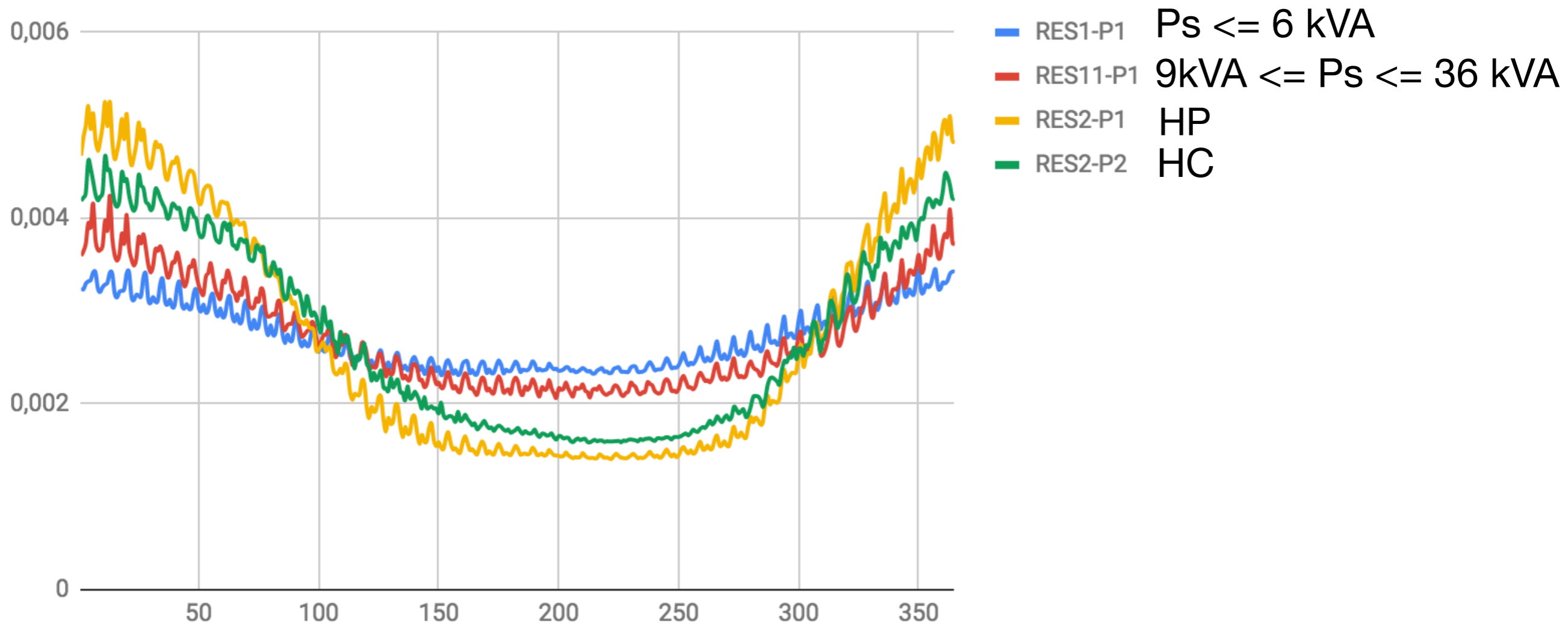
Intraday

$$Price = P_{cal} + P_Q + P_M + P_W + P_D + P_{Spot}$$

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4. Pricing the energy part components: buying to the market

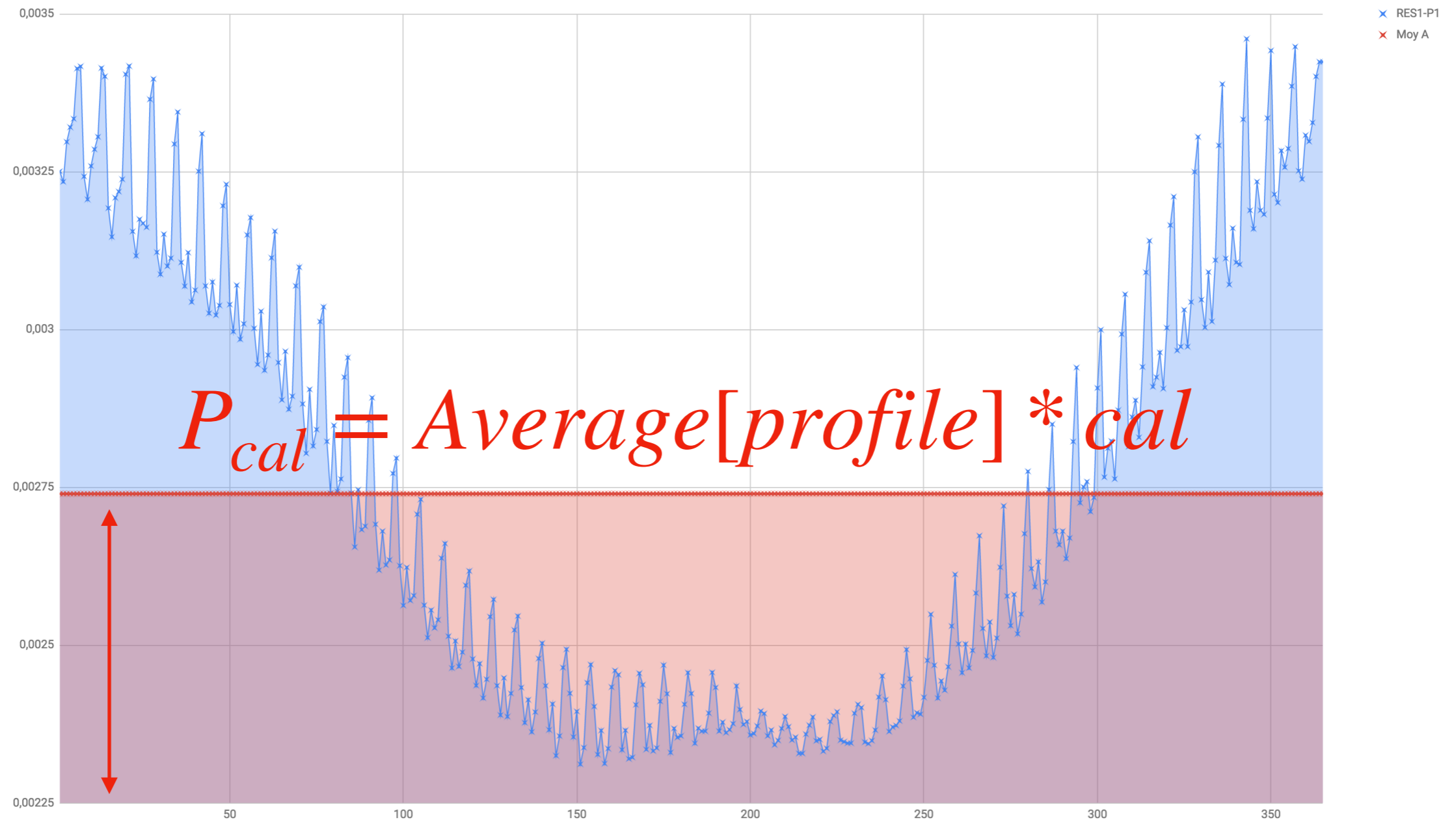
Residential Profiles



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4. Pricing the energy part components: buying to the market

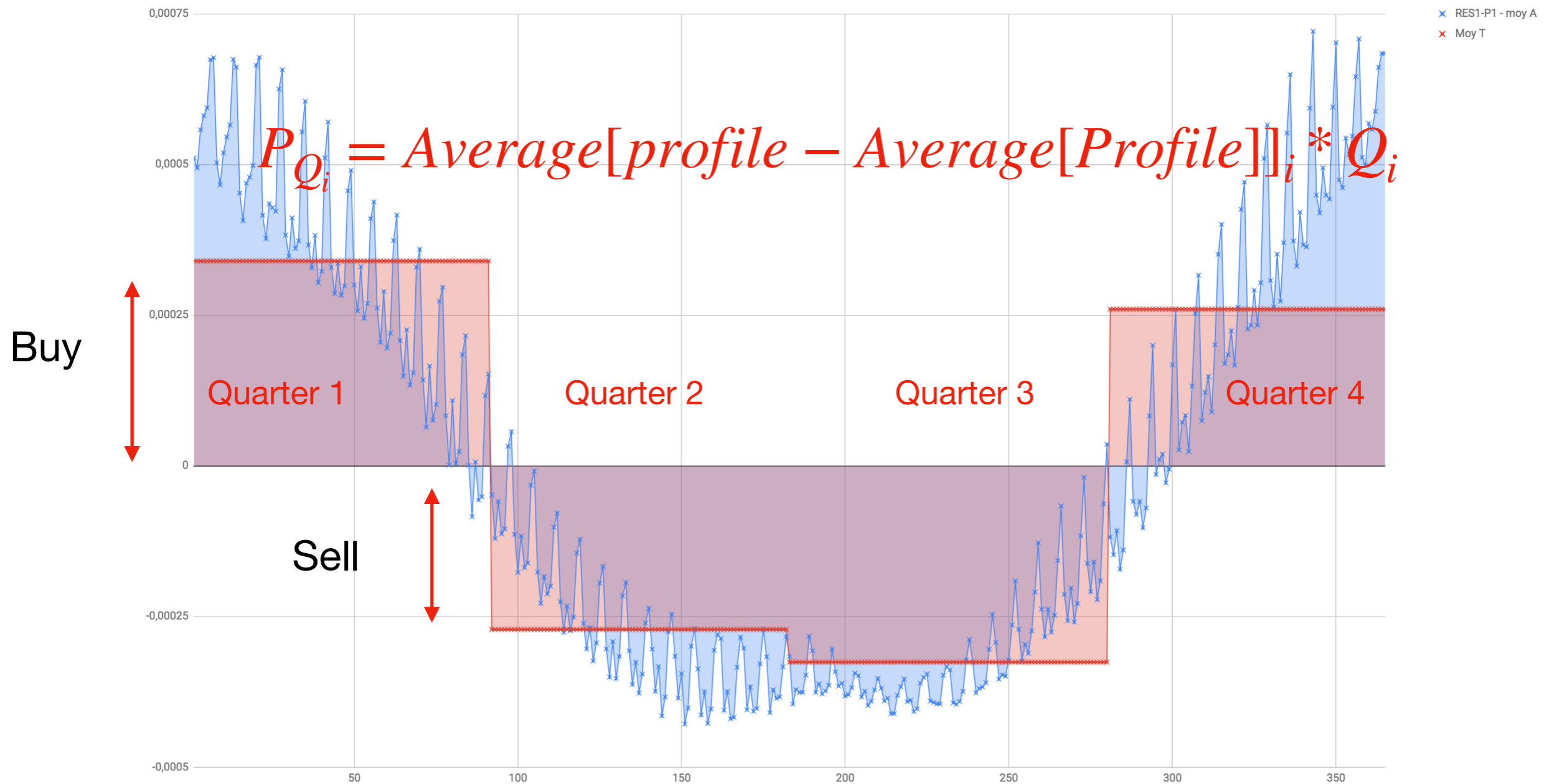
Buying at cal price



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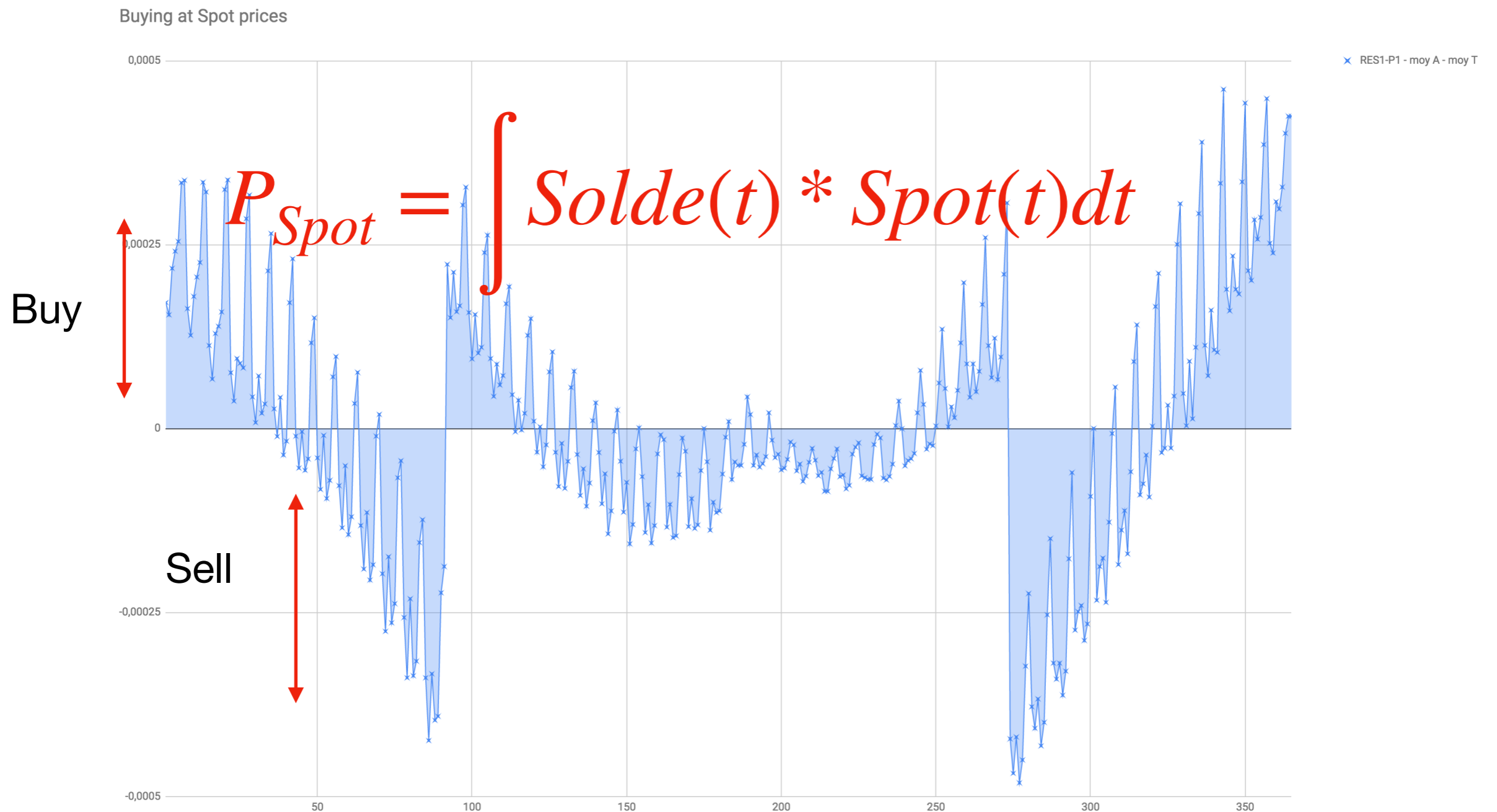
4. Pricing the energy part components: buying to the market

Buying at Q prices



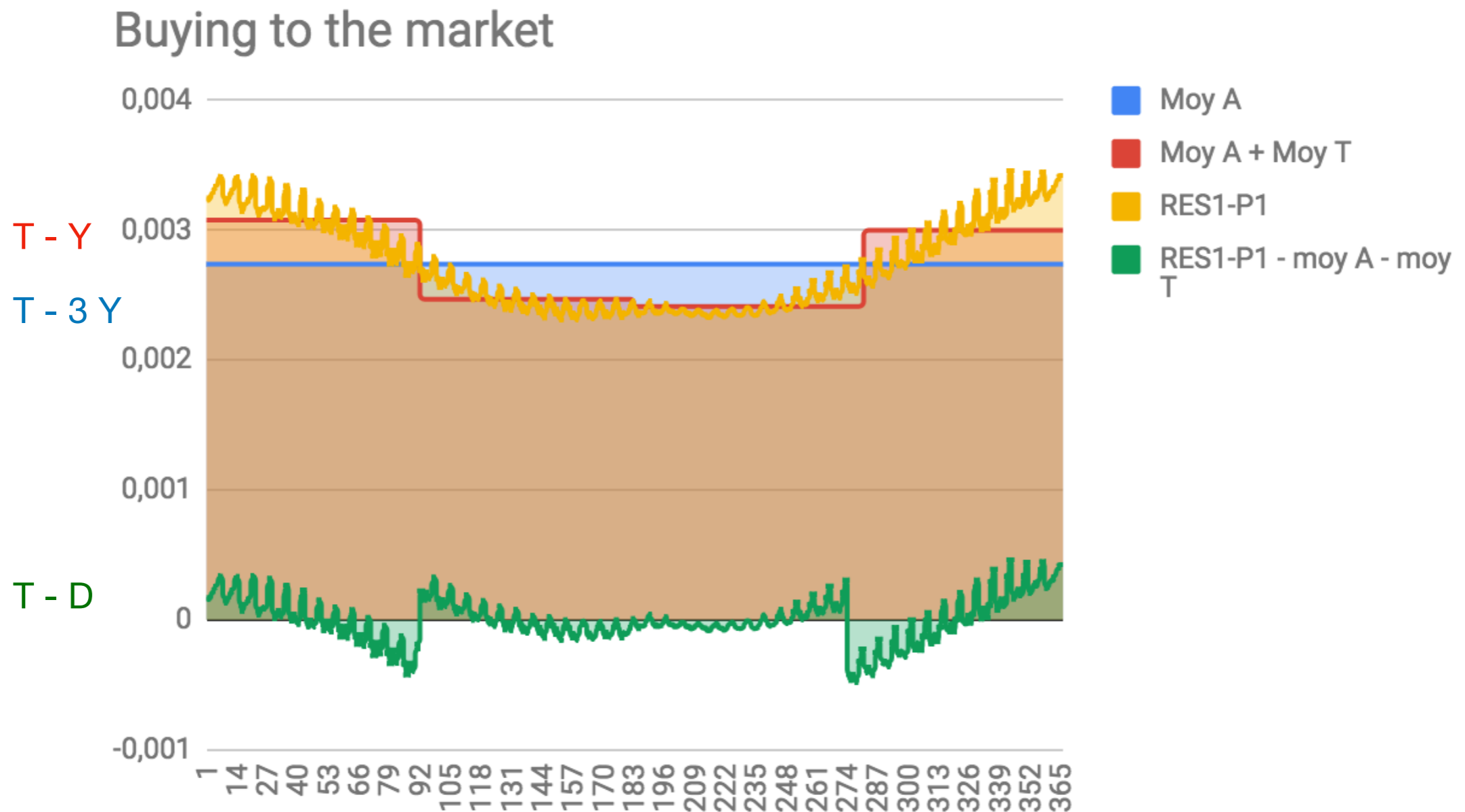
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4. Pricing the energy part components: buying to the market



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4. Pricing the energy part components: buying to the market



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4. Pricing the energy part components: buying to the market

	EEX Settl
Q1 2019	68.95 €
Q2 2019	45.47 €
Q3 2018	46.43 €
Q4 2018	61.42 €
Cal19	55.50 €
Spot recalé en cal & Q	54.93 €

	RES1-P1	RES11-P1	RES2-P1 (HP)	RES2-P2 (HC)
Achat Cal	€55.50	€55.50	€55.50	€55.50
Achat Quarter	1.07 €	1.71 €	3.99 €	3.05 €
Achat Spot recalé en cal & Q	2.47 €	2.30 €	6.04 €	-6.04 €
Frais Bloc	0.00 €	0.00 €	0.00 €	0.00 €
Frais Spot	0.15 €	0.13 €	0.33 €	0.54 €
Prix Achat (euros/MWh)	59.19 €	59.63 €	65.86 €	53.06 €

Frais	(euros/MWh)
Frais blocs au settlement NEB	0
Frais blocs au settlement RE	0
Frais d'équilibrage +/-	0.6

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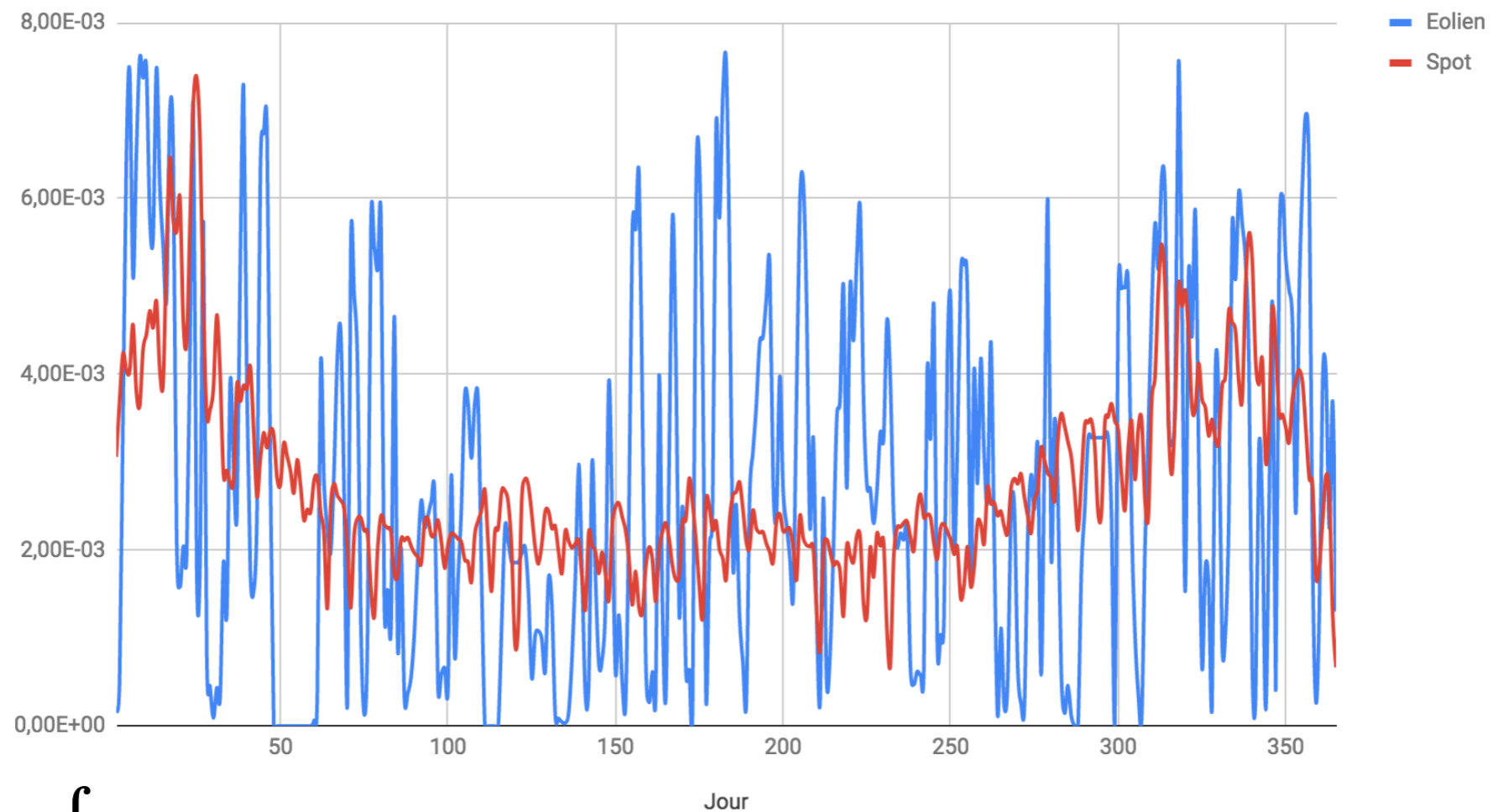
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4. Pricing the energy part components: buying to the producer

Eolien vs Spot



$$Price = \int P(t) * Spot(t)dt \quad 48 \text{ euros / MWh with Spot 2017 on this production}$$

$$Price(t) = Spot(t) - X \quad X = 0.5 \text{ euros / MWh}$$

Price = 48 if $40 < Spot < 48$

Else Price = Spot - X

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4. Pricing the energy part components: the balancing fees

Energy part:

- energy
- **balancing fees**
- Guarantee of Origin (GO)
- capacity

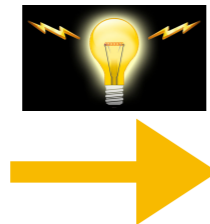


TSO

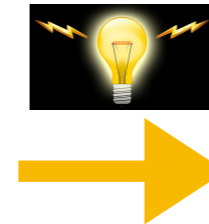
Main grid balancing responsible



Producer



Energy supplier



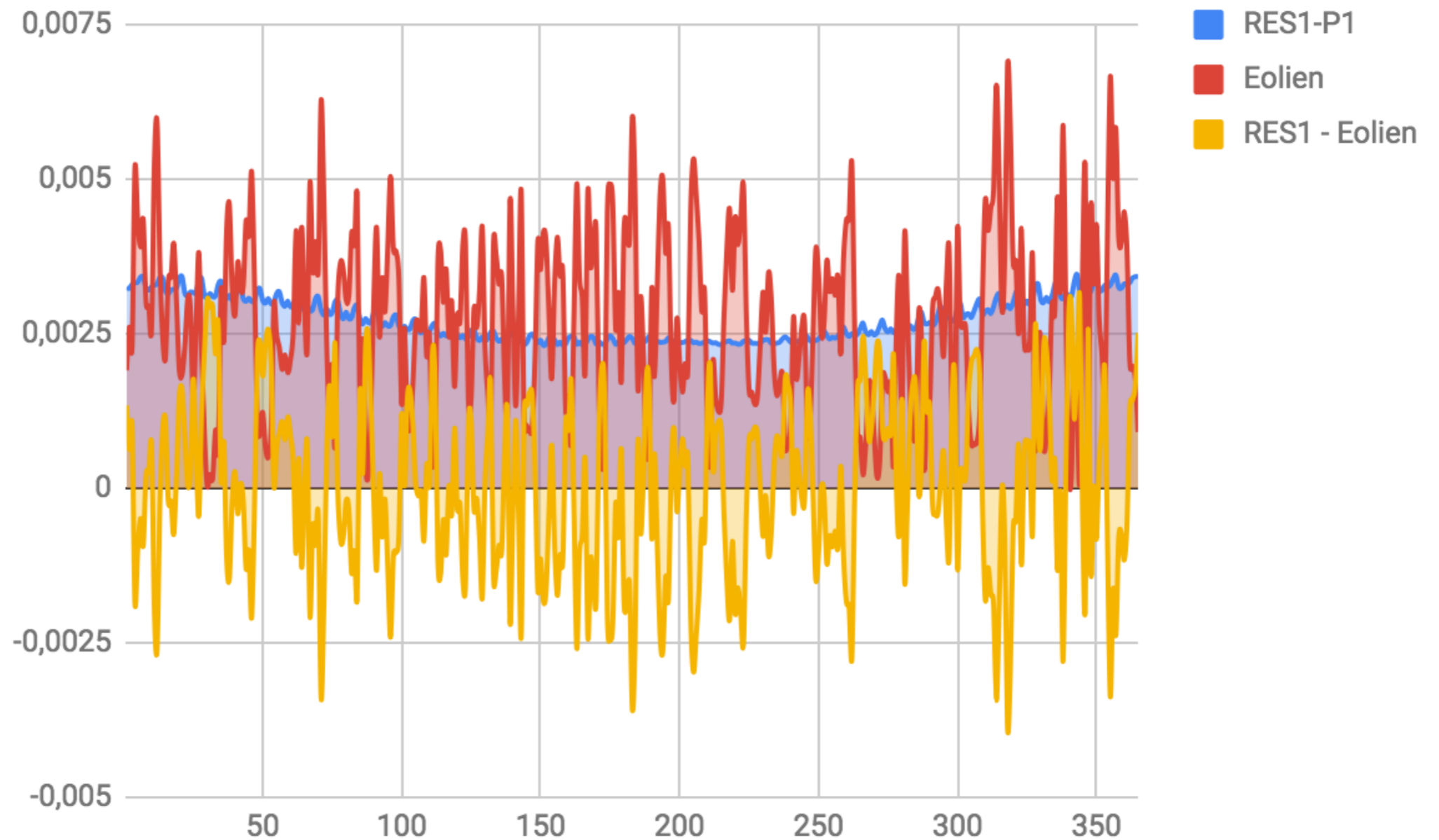
CC: forecast errors for consumption

CP: forecast errors for production

CR: production profile is not equal to consumption profile

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4. Pricing the energy part components: balancing fees CR



$$C_R = \int [RES1(t) - Eolien(t)] * Spot(t) dt \quad C_R \text{ 2017} = 0,24 \text{ euros / MWh}$$

20

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4. Pricing the energy part components: balancing fees CP

The better the forecast is the smaller are Cc & Cp

$$C_P = \int [P(t) - P_p(t)] * [Spot(t) - Ecart(t)] dt$$

$P(t)$: production(t) $[P(t) - P_p(t)] > 0 \rightarrow$ selling at $Ecart_{>0}$

$P_p(t)$: forecast(t) $[P(t) - P_p(t)] < 0 \rightarrow$ buying at $Ecart_{<0}$

if $[Ecart_{>0} > Spot(t)] \rightarrow P_p(t) = 0$ leads to greater profit than $P_p(t) = P(t)$

Wind power: **0, 7** < C_P < **2 euros / MWh**

Hydraulic power: **0, 2** < C_P < **1 euros / MWh**

Solar power: **0, 5** < C_P < **1.5 euros / MWh**

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4. Pricing the energy part components: balancing fees CC

The better the forecast is the smaller are C_c & C_p

$$C_C = \int [C(t) - C_p(t)] * [Ecart(t) - Spot(t)] dt$$

$C(t)$: consumption(t) $[C(t) - C_p(t)] > 0 \rightarrow$ buying at $Ecart_{<0}$

$C_p(t)$: forecast(t) $[C(t) - C_p(t)] < 0 \rightarrow$ selling at $Ecart_{>0}$

if $[Ecart_{<0} < Spot(t)] \rightarrow C_p(t) = 0$ leads to greater profit than $C_p(t) = C(t)$

Residential: $C_C \leq 0.7$ euros / MWh

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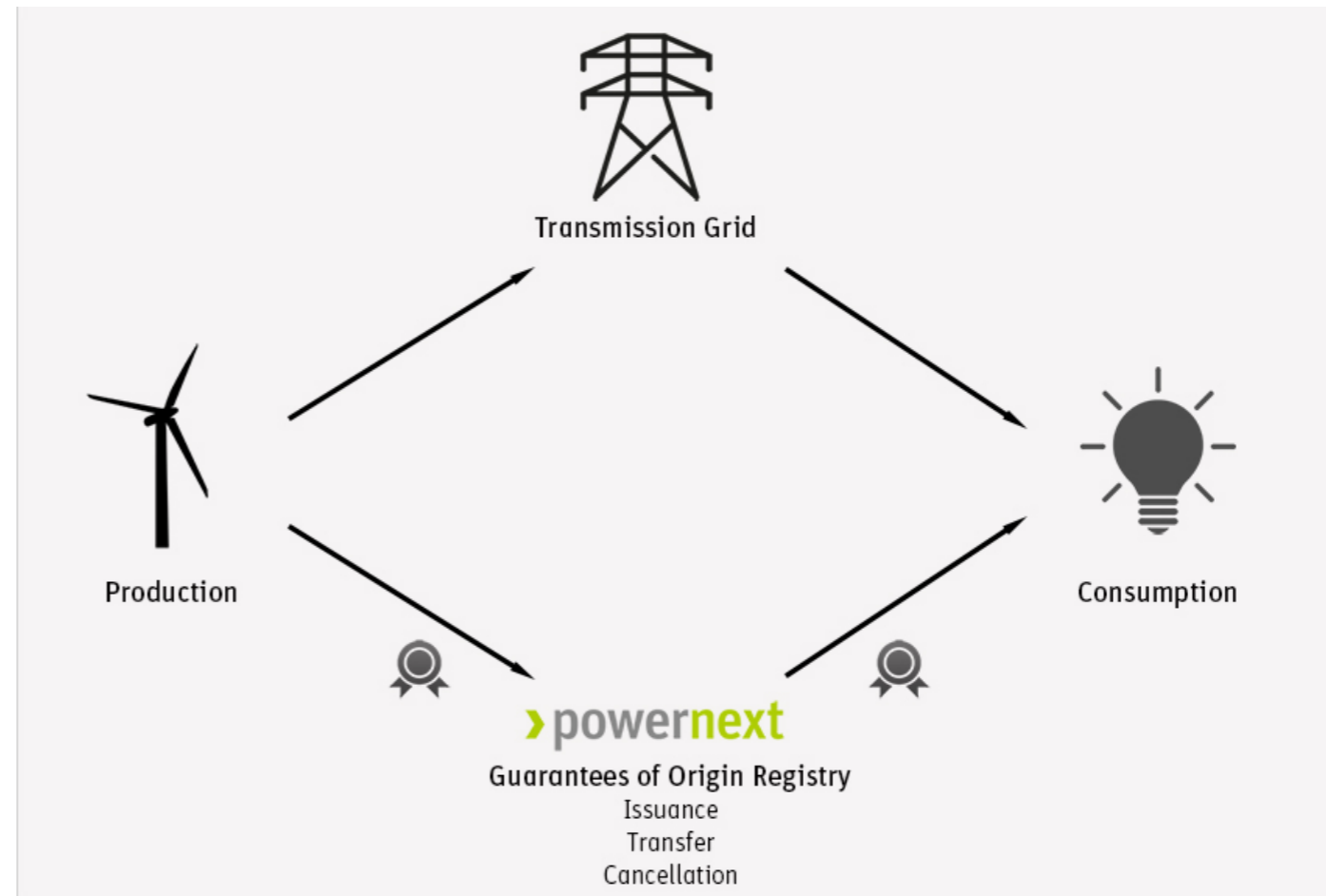
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4. Pricing the energy part components: green certificates

Energy part:

- energy
- balancing fees
- **Guarantee of Origin (GO)**
- capacity



0.5 < Prices < 2 euros / MWh

1 GO = 1 MWh produced

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Summary

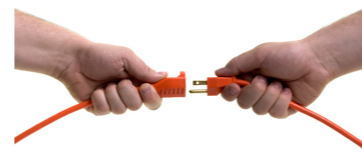
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5. Pricing the energy part components: capacity

Energy part:

- energy
- balancing fees
- green certificates
- **capacity**



Energy supplier

Buy the capacities required for its portfolio.



Producer

Given the generation curve (peaks) the TSO estimate the capacity potential (kW per kW installed) < 1 that can sold on the market.



Residential Consumer

Given the consumption curve (peaks) the TSO estimate the capacity needed for a given portfolio.

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5. Pricing the energy part components: capacity

Energy part:

- energy
- balancing fees
- green certificates
- **capacity**

Capacity Price = 10 000 euros / MW

The screenshot shows a web interface with a progress bar at the top containing three steps: 'Méthode' (Method), 'Données' (Data), and 'Résultats' (Results). The 'Méthode' step is currently active. Below the progress bar, there is a 'Suivant' (Next) button. Underneath, there is a label 'Méthode de calcul' and a dropdown menu showing 'Année 2015'. Below the form, there is a paragraph of text: 'L'outil d'estimation de l'obligation proposé par RTE repose sur des données historiques de consommation. Il effectue un certain nombre de simplifications. L'obligation est calculée avec un coefficient de sécurité de 0,93. Trois années d'historique complet sont proposées : 2015, 2016 et 2017. Le format des fichiers d'entrée est en téléchargement depuis l'interface. Un [guide d'utilisation](#) est à votre disposition ci-dessous. Ce site est optimisé pour Firefox.'

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Conclusion

Energy part (1/3 of the total electricity bill):

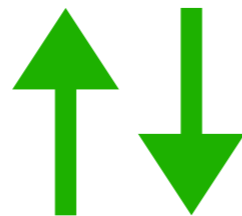
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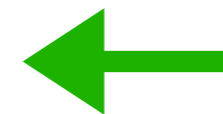
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Producer



Energy supplier



Residential Consumer