

“Smart grids or smart solutions?”

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Dubrovnik, September 2013

Answer:

Smart grids are part of smart solutions

But what is the basic question???

The problem is:

Large shares of intermittent renewables:

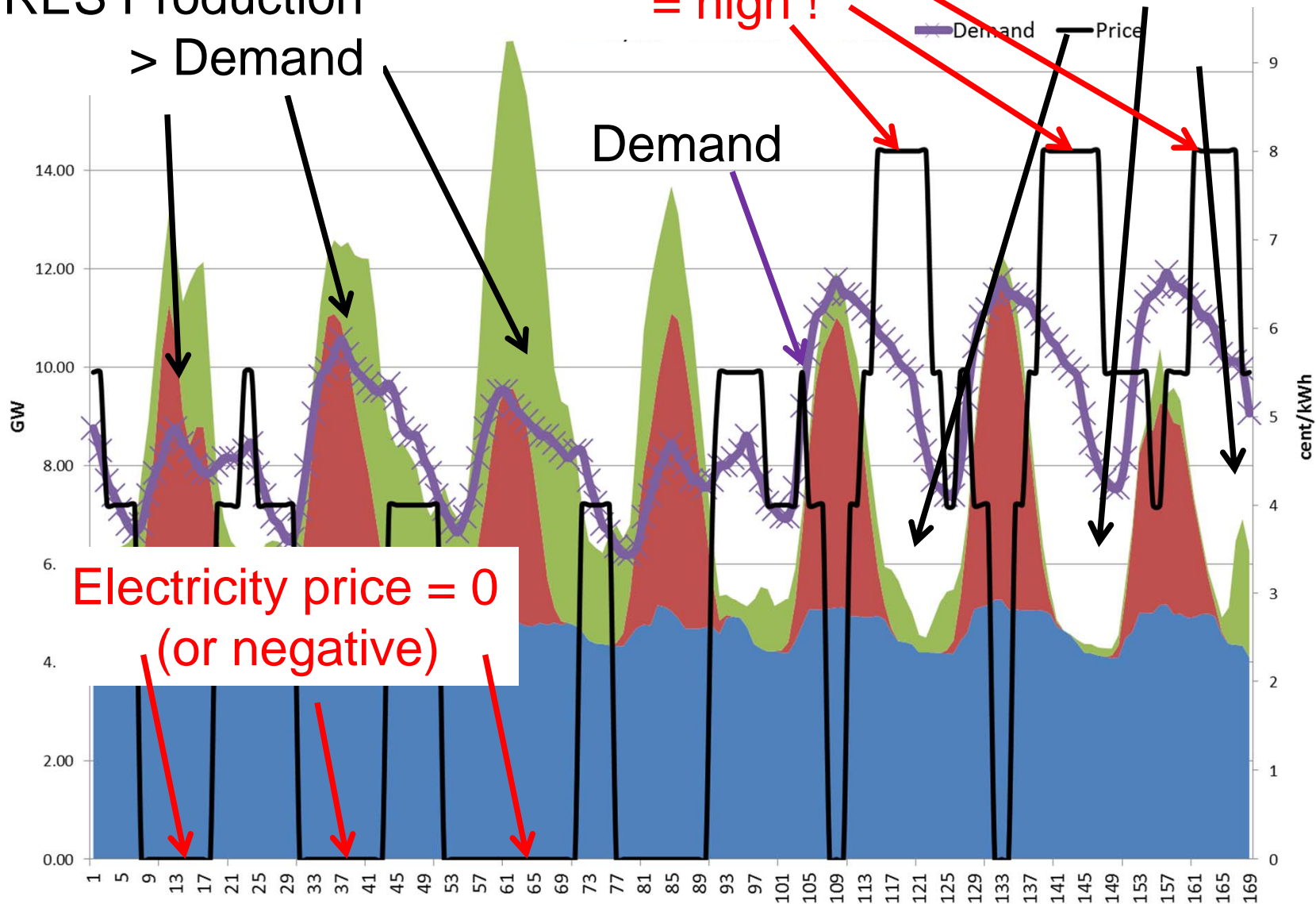
How to ensure supply security in times of low production from renewables?

Supply and Demand

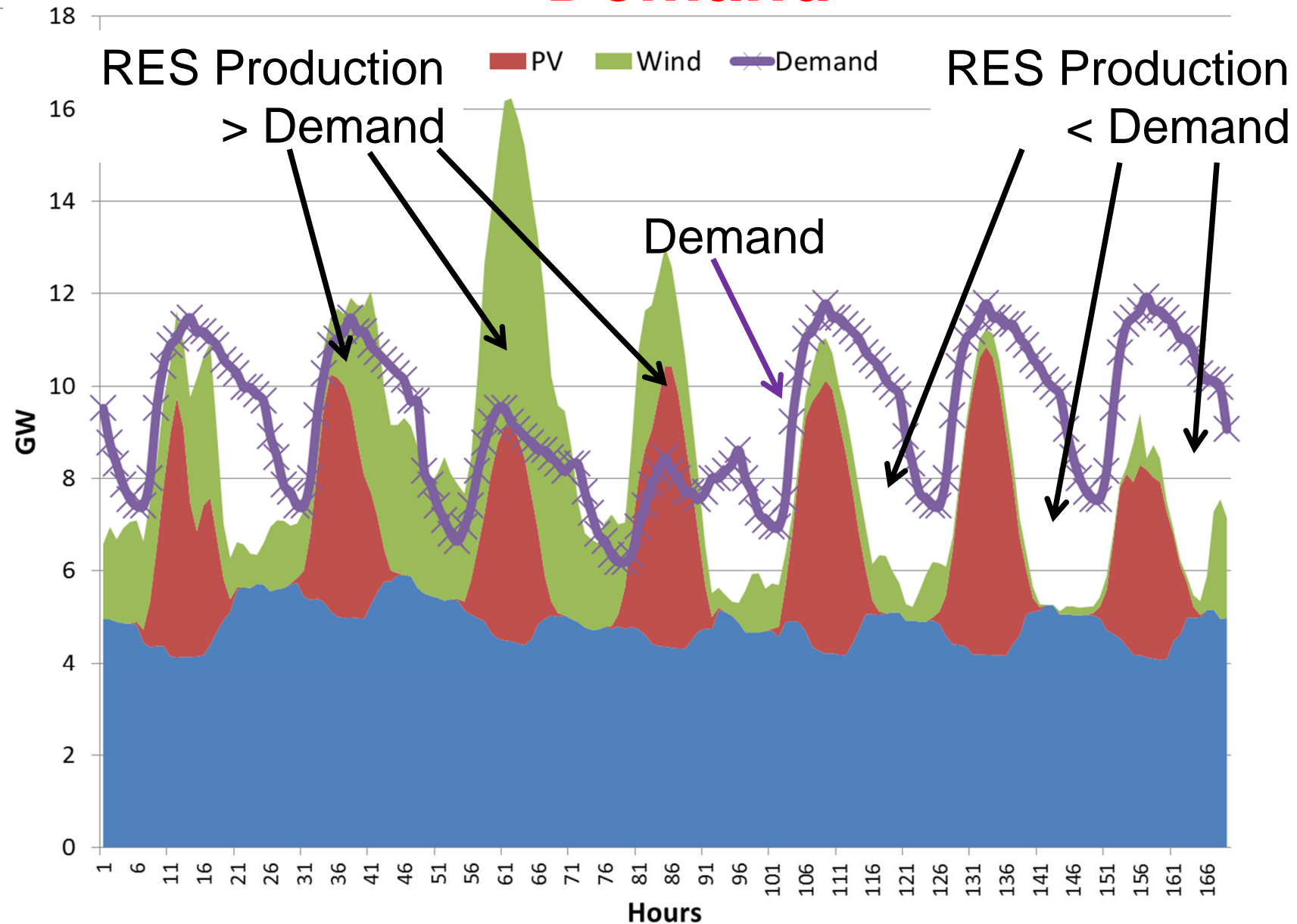
RES Production
> Demand

Electricity price
= high !

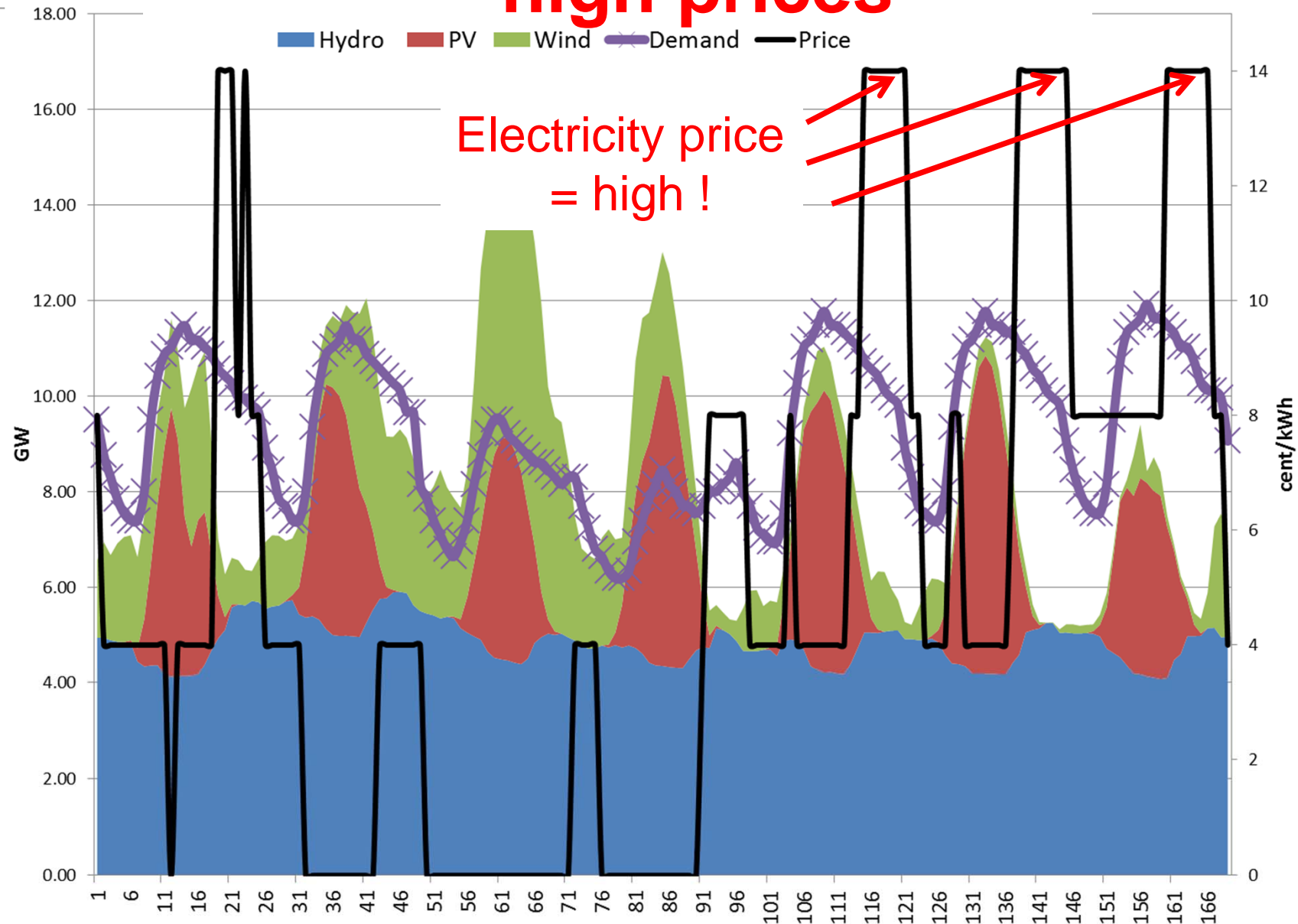
RES Production
< Demand



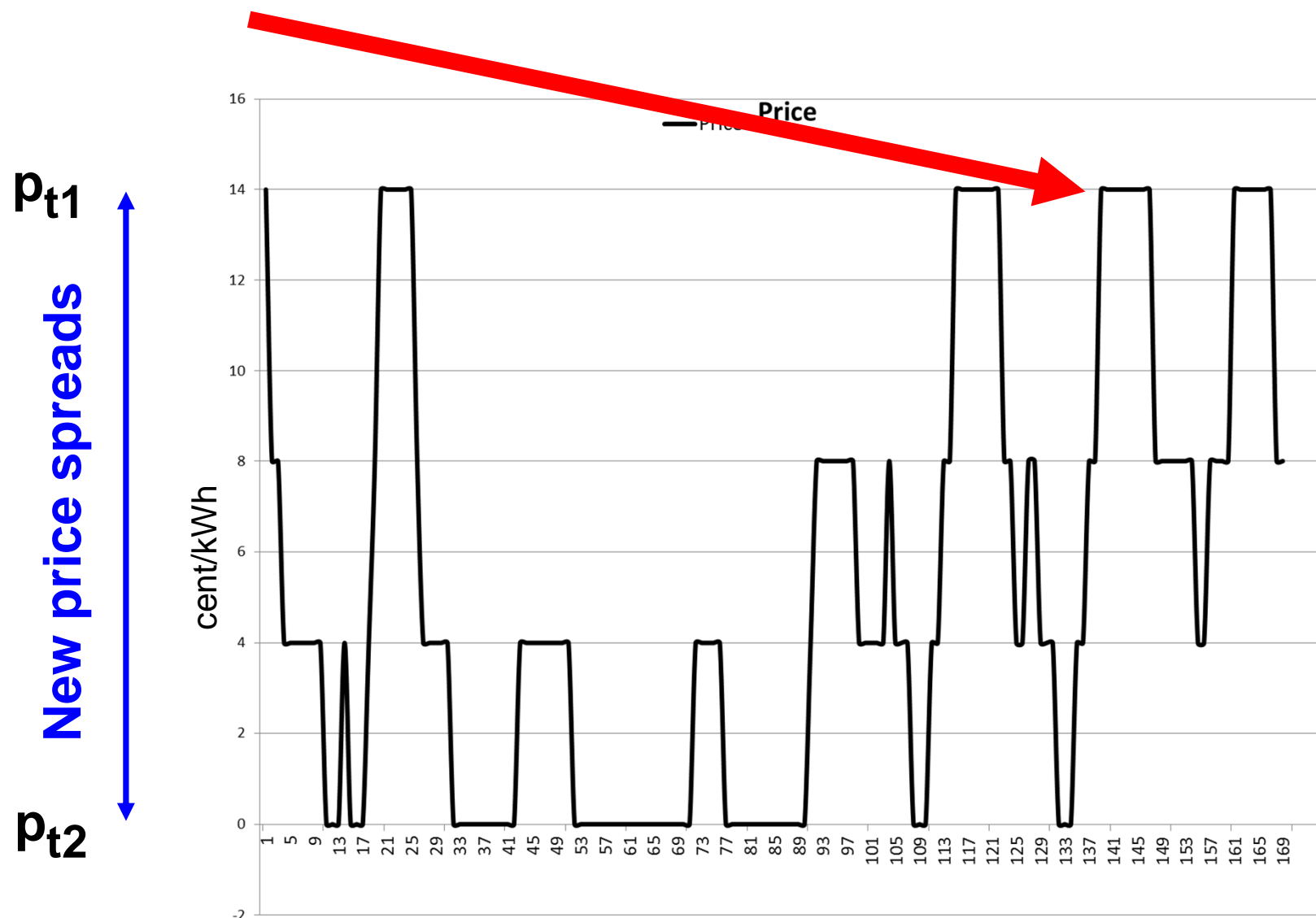
Example: Supply and Demand



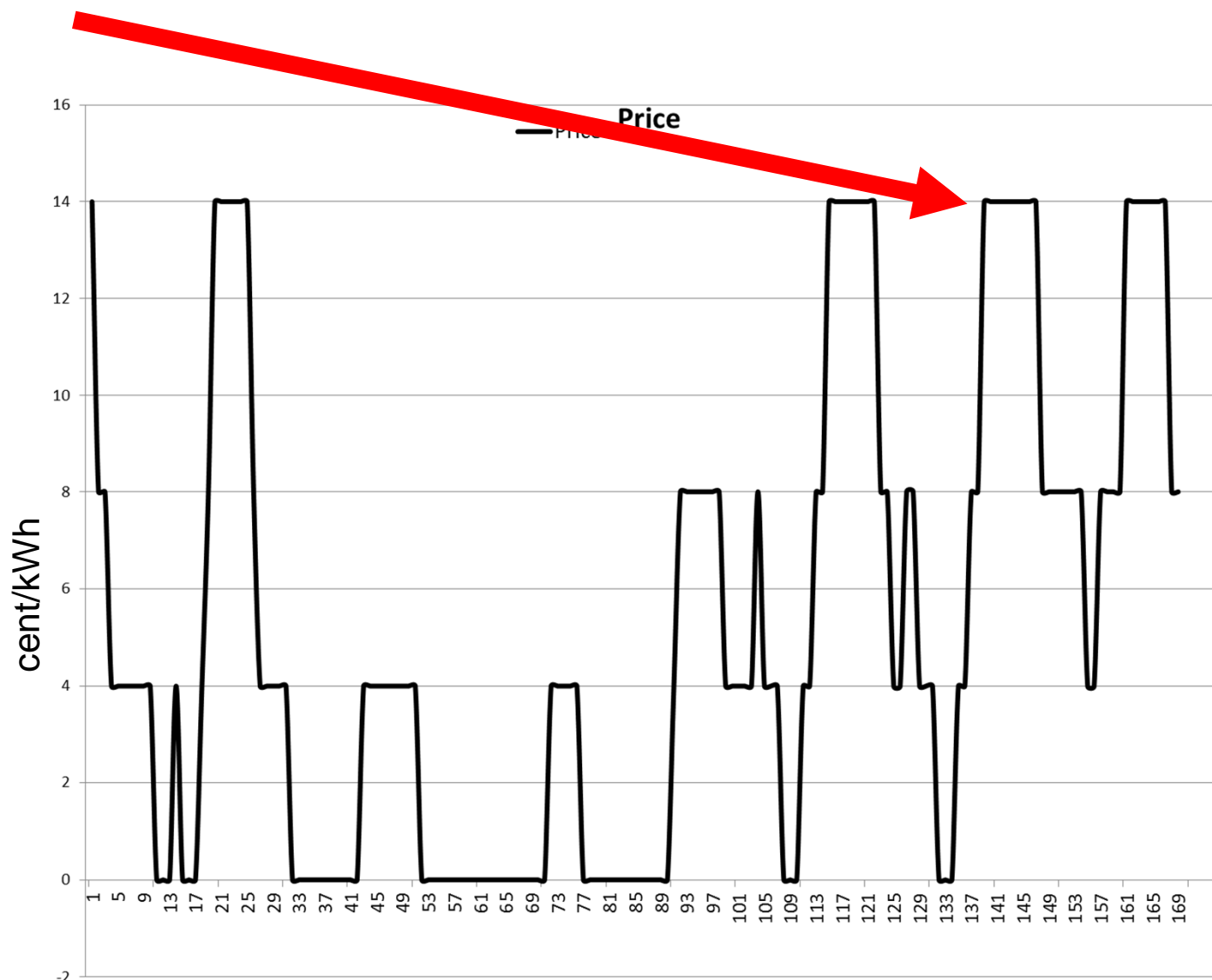
Solution 1: Temporarily high prices



ARE THESE PRICES TOO HIGH?



ARE THESE PRICES TOO HIGH?

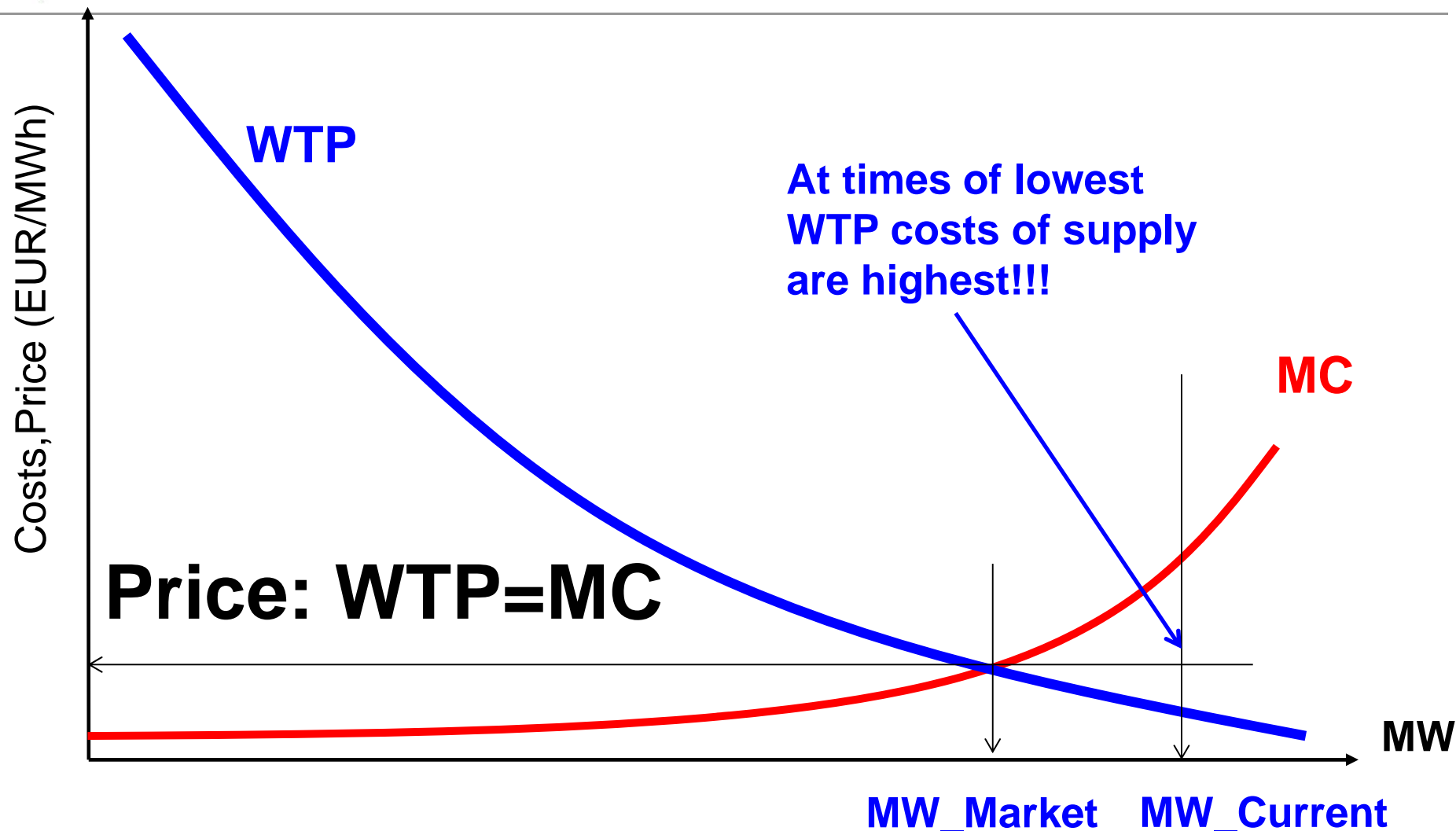


Historical (anachronistic) definition:

At every point-of-time every demand has to be met regardless of the costs!

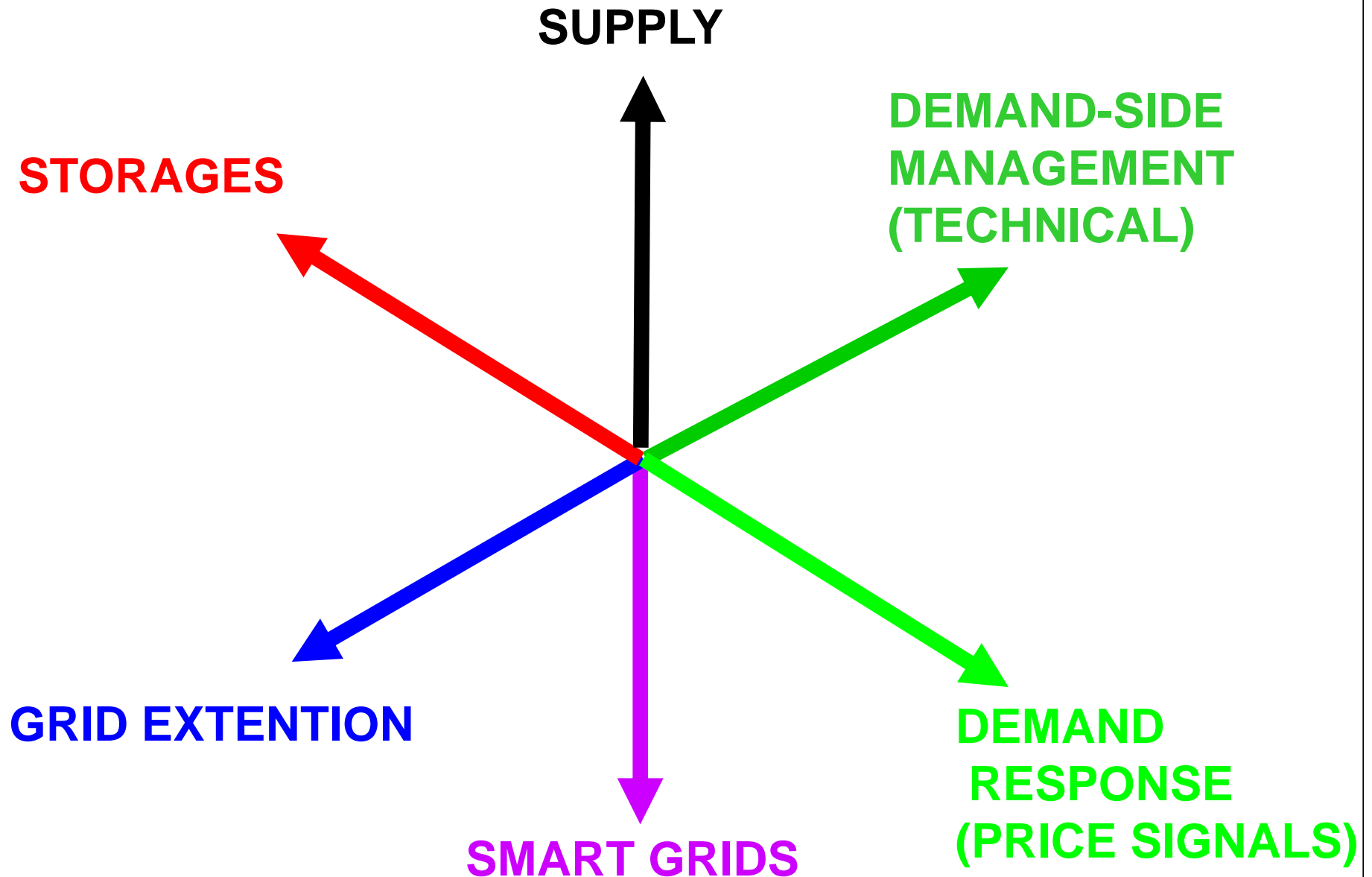
At every point-of-time every demand has to be met regardless of the costs!

A MARKET DESIGN



In a real market: equilibrium of supply options, grid options and demand options

DIMENSIONS OF ELECTRICITY MARKETS



Conditions from (smart) economic point-of-view:

In the equilibrium the marginal costs (MC) of all options must be equal

$$MC_{\text{Gen}} = MC_{\text{Sto}} = MC_{\text{Grid}} = MC_{\text{DSM}}$$

$$P_t = MC = WTP$$

... and customers must be willing-to-pay for it!

CONCLUSIONS

- The still applied concept of supply security is **anachronistic**
- Currently, **the demand-side** is completely neglected (it has never been really developed)!
- most important now for achieving **smart solutions:**

exhaust the **full potential** of the creativity of **all market participants** especially demand-side!