

Weather & Energy PROGnoses

WEPROG

A view on
<<Forecasting Trials>>

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inclusive physical uncertainties from Ensembles



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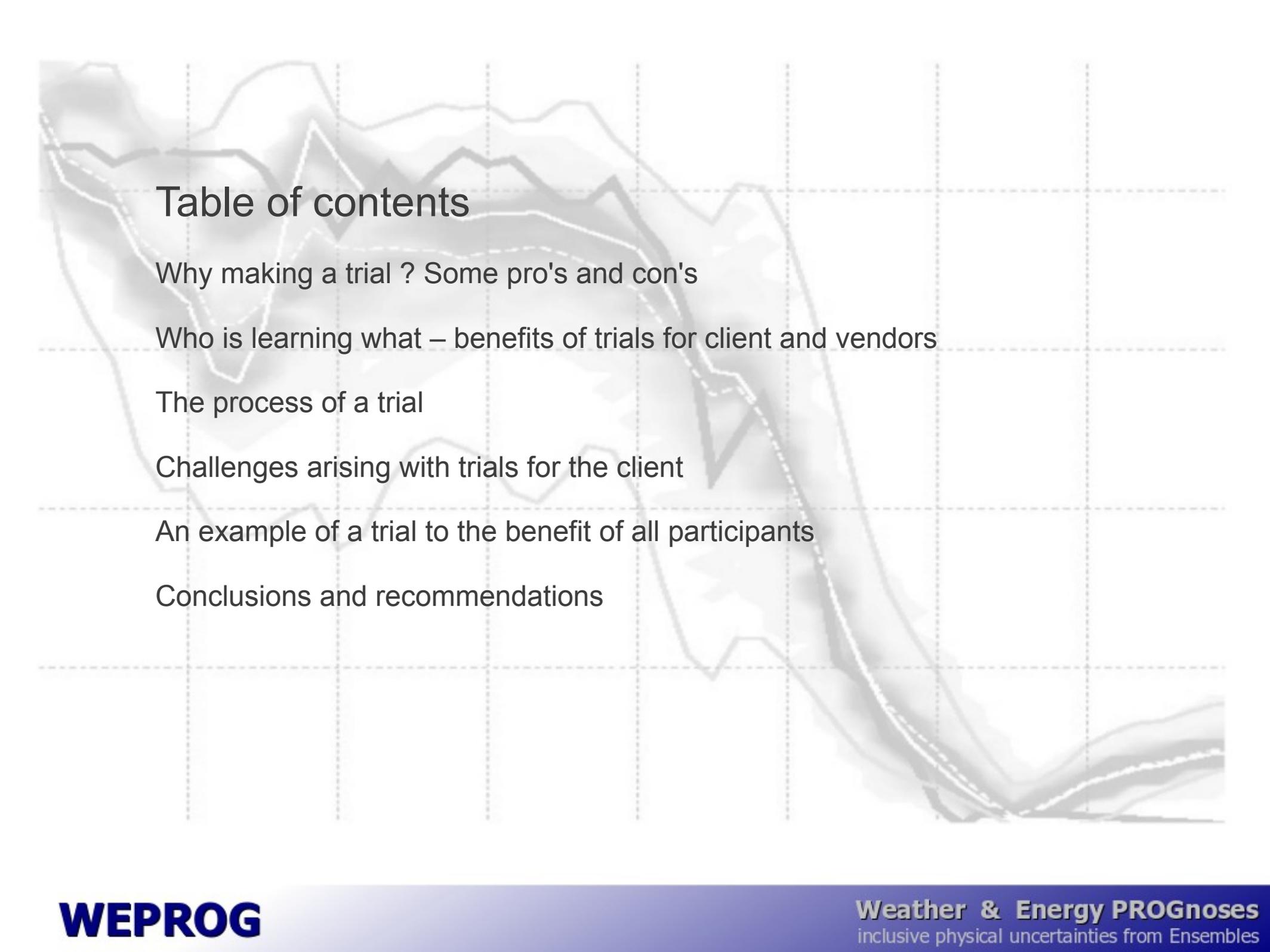


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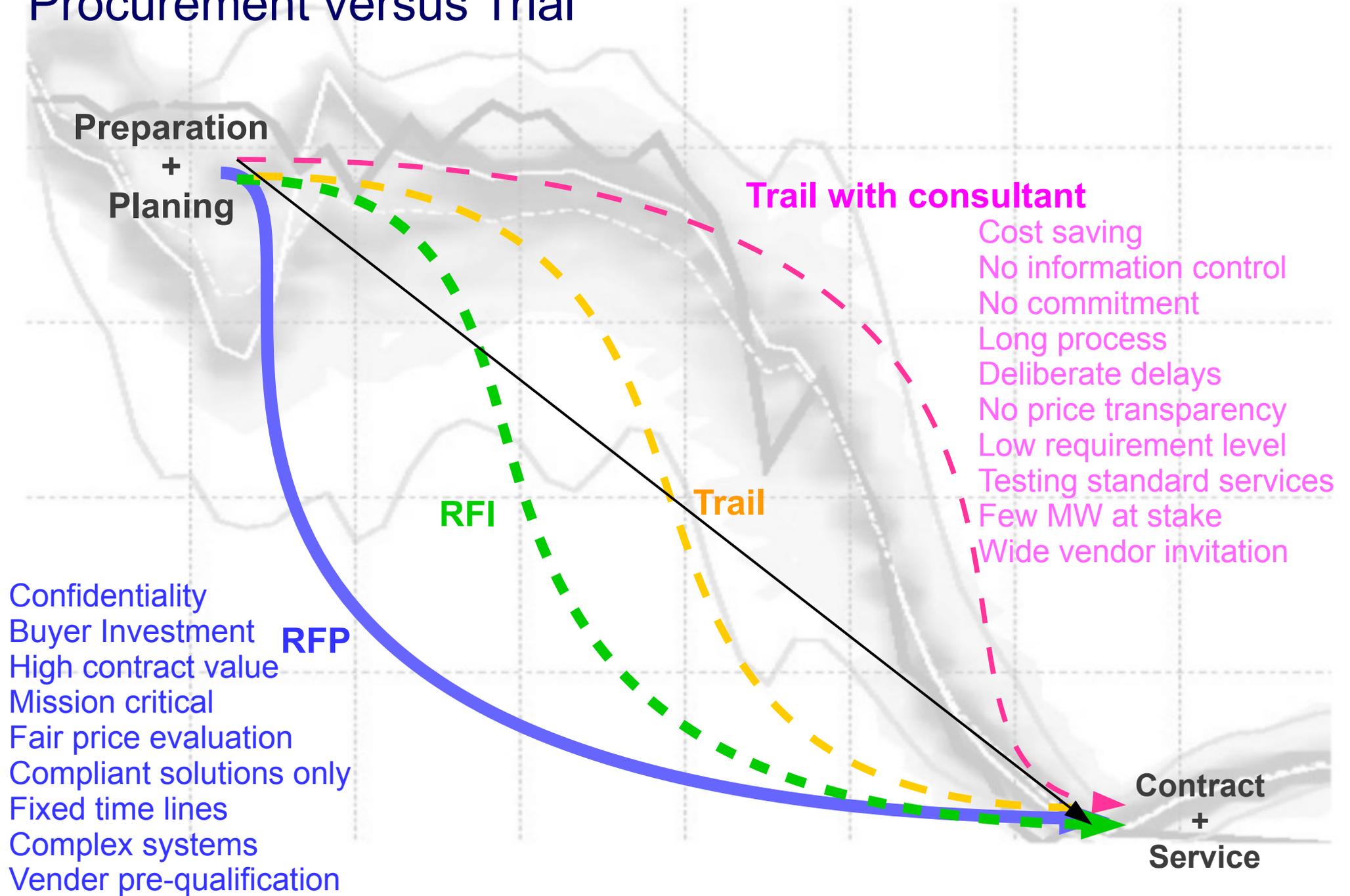
We need forecasts of our variable generation...

...should we follow the current industry standard and carry out a trial with as many forecasters as possible to be safe when reporting to management ?

...should we do our own scoping and define our challenges, requirements, goals and future prospects and run a RFP ?



Procurement versus Trial



Does a trial give the buyer any useful answers ?

For how long can we expect a vendor performance evaluation to be valid ?

Can test results be extrapolated to a full scale implementation ?

Can decisions really be taken from a trial, where vendors are not paid for their work ?

Low contract value → poor service level → contract often funds next trial!

Vendors only incentive to enter low value contracts is to get market shares

High market share → stakeholder decisions get correlated → low value

Why carry out Forecast Trials

Benefits for the Client/Buyer

- Gaining experience of receiving forecasts
- Internal processes can be developed with real data
- Staff gets trained along the way
- Insights from analysis

Benefits for a forecaster vendor new to the market

- Gaining experience in delivering forecasts
- Gaining experience of competitor's quality of forecasts
- Data to further develop methodologies
- Possibility to show skills without references
- Insights from evaluation

Looks like a win-win situation ?

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From the experienced forecaster's perspective

Trial culture → Competitive bidding → Selection of cheapest allocation of resources by buyer → contract or knowhow transfer?

The objective for participation:

act as a “teacher” or confuse, drag out time, control and mislead

What the forecaster considers before investing in a trial

How consistent was the documents/invitation produced by the buyer ?

Has there been made a plan at the buyer ?

Has the buyer allocated the required resources ?

Has the buyer qualified staff to evaluate what is better ?

Has the buyer really control over own data to conduct a test ?

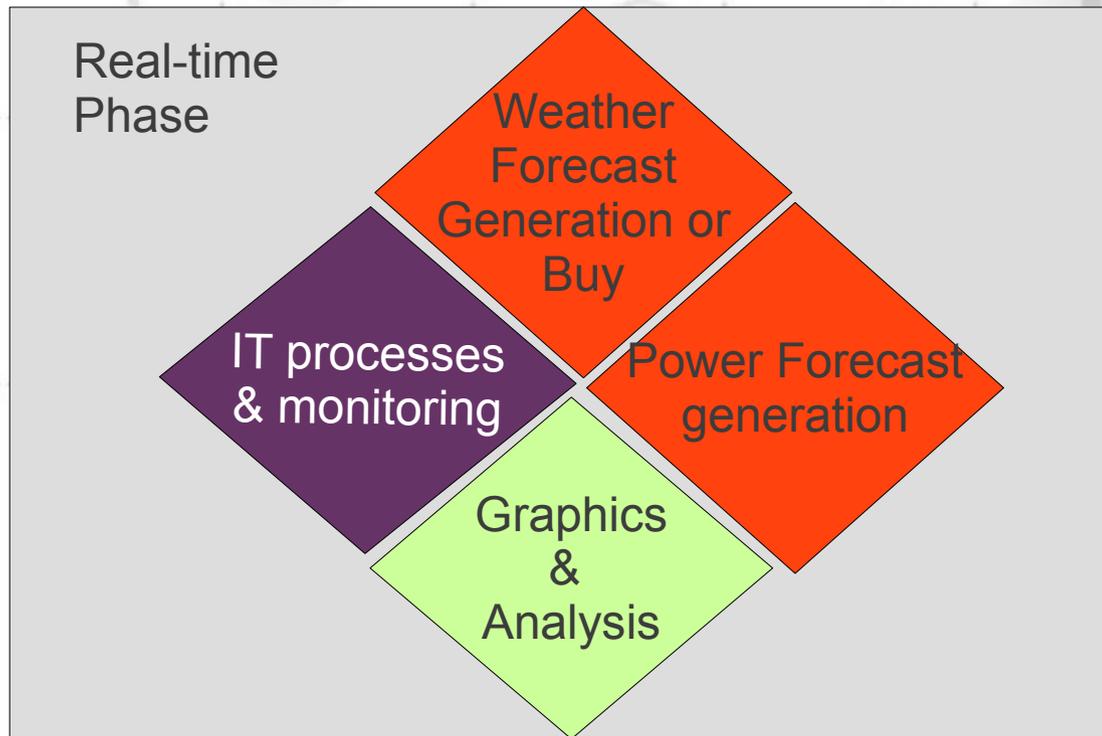
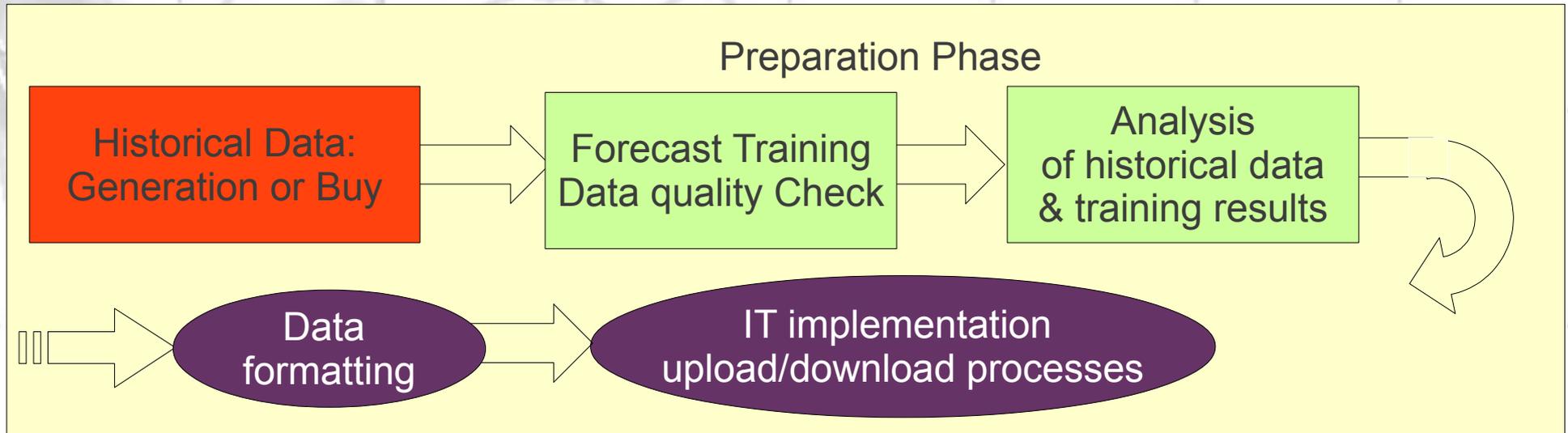
How long time does each decision step take at the buyer ?

Are vendors with modest experience invited for lowest possible price ?

Does the scope mainly seem to be "technology transfer" ?

The vendor must always for *economic reasons* evaluate, if the trial project is likely to lead to a contract for anybody

The process of a forecast trial for a forecaster vendor

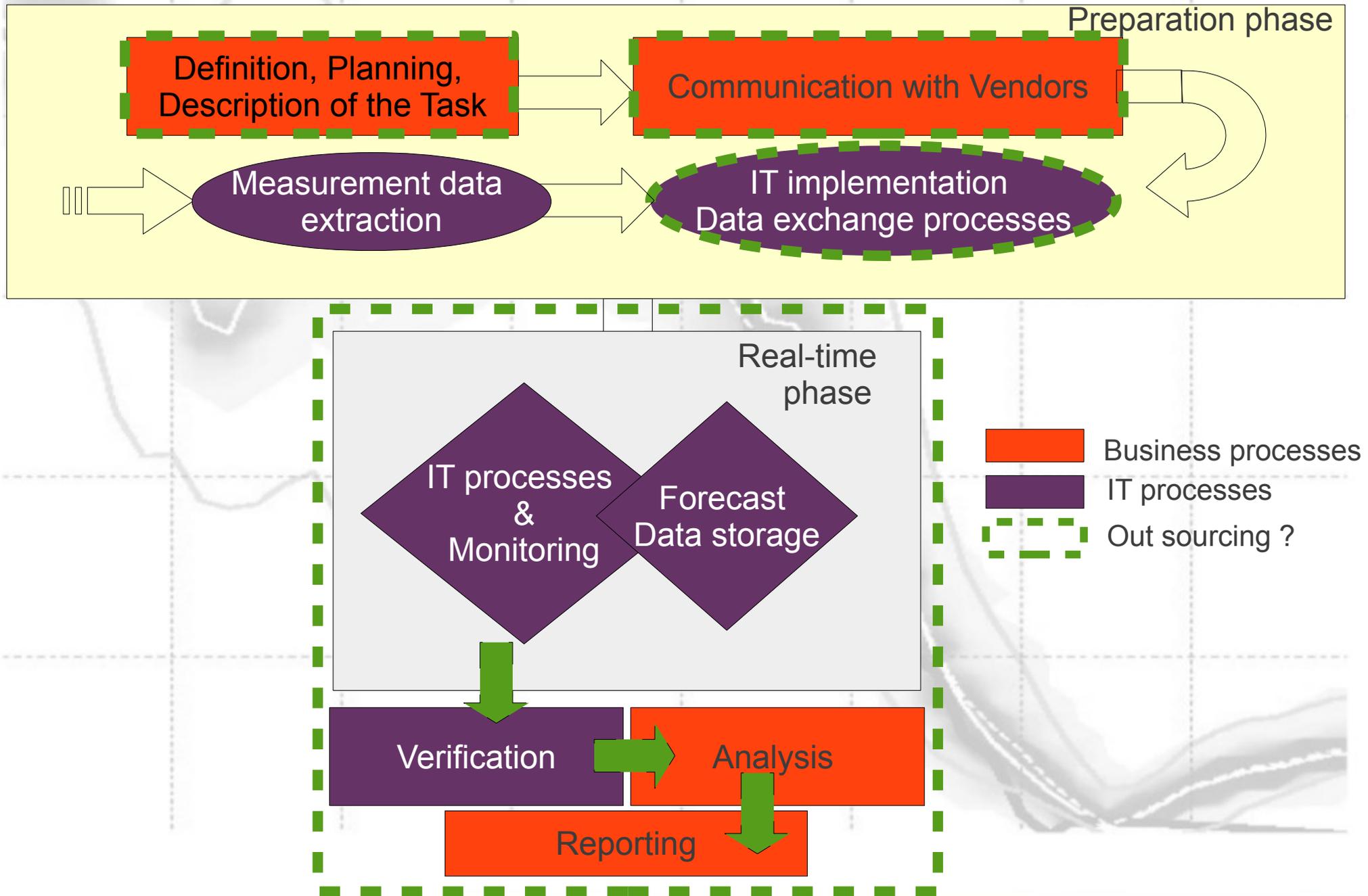


- Known / Direct costs
- resources/man hours
- Unknown costs

Unknown costs allocation factors

- What is the contract potential
- Financial situation
- Growth Ambitions
- The likelihood of winning

Process for the Client/Buyer with Trial Consultant



Illustrative fictive example of the dangers of “low-cost” Trials

UPS wishes a **new fleet of cars for delivery and pick up** and wish to **improve the environmental profile** of the company.

A “no cost reimbursement” trial could look like this:

- 4 different vendors participate
- parameters to be measured on are
 1. how fast can the cars travel various distances
 2. price of the car
 3. fuel consumption

vendor	car type	20mi	50mi	100mi	Fuel	price	Result [3 x distance 2 x fuel price]
A	citycar	1	1	3	1	1	8
B	van	3	3	2	2	2	14
C	sportscar	2	2	1	3	3	14
D	transporter	4	4	4	4	4	24

There is a clear winner – but is it also the best choice ?

....1 transporter can deliver 10 times as much as a city car...

- many more city cars than transporters required
- more staff to drive the cars and higher fuel costs

==> UPS forgot to evaluate the logistic optimization potential!...

A cost-reflective trial answering “burning” questions

<http://www.aeso.ca/gridoperations/13825.html>



Wind Power Forecasting Pilot Project

Length: 2 years

RFP: Oct. 2006

Forecast Trial: 1 year (May 2007-May 2008)

Final Reports: August 2008

5+8 Participants:

3 forecast vendors

1 vendor for quantitative analysis

1 vendor for data collection

Industry Steering Group (8)

Funding: ca. 1mioC\$*

3 Funding parties/authorities

...remember
AESO's power
cap in 2006
... ?

17 Questions were Posed by the Working Group

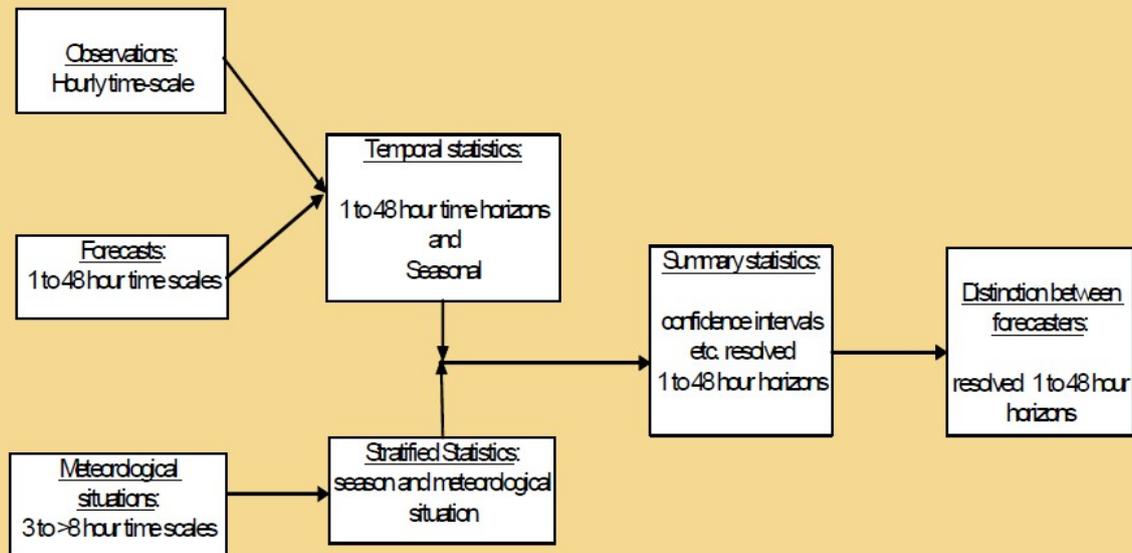
- (1) What is the accuracy of the Forecasts at the different forecast horizons studied (T=1 hour to T=48 hours)?
- (2) What is the accuracy of the Forecasts at different hours of the day and seasons of the year?
- (3) What is the accuracy of the forecasted Meteorological
- (4) Data before running through the Power Conversion models?
- (5) What is the accuracy of the Power Conversion?
- (6) What is the Potential co-variance from given data samples?
- (7) What is the accuracy of the Forecast at different wind speeds or different points of a Wind Power Facility's power curve?
- (8) What is the relative comparison between Forecasts?
- (9) Which is the region with the least amount of error?
- (10) Which forecaster forecasts best in that region and why?
- (11) What is the effect of spatial smoothing on forecast error?
- (12) How well do the forecasts predict fast ramp up and ramp down times, event analysis (CSI)?
- (13) What is the Impact on data availability?
- (14) Are there times (day/month/weather pattern) when there is more uncertainty in the forecasts than other times?
- (15) What is the relationship between the spread of the min/max and the forecast error?
- (16) What is the general accuracy of the Forecasts?
- (17) What is the correlation factor between all three forecasts? Is this related to the forecast error?

...covering concern and needs of stake holders, AESO and the market participants...

Source of Questions: published material from ORTECH (Online <http://www.aeso.ca/downloads/ORTEC.pdf>)

Quantitative Analysis by ORTECH

ORTECH's process flow for the quantitative analysis



Independent party did quantitative analysis for:

- client (AESO)
- steering group (8)

Thorough analysis of:

Meteorological data

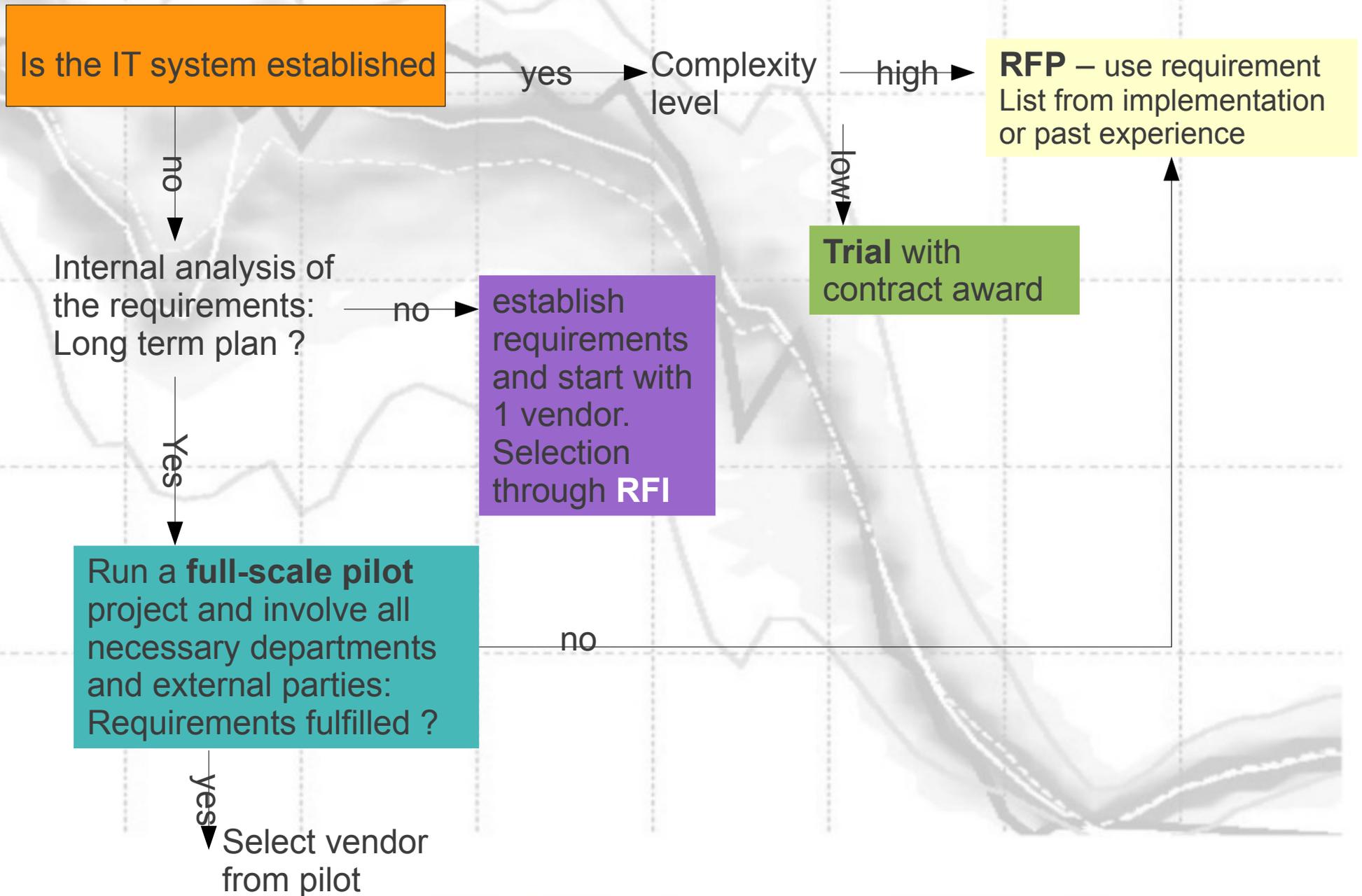
- quality
- reliability
- calibration

Power Data

Forecast data

- different time horizons
- different methodologies
- different parameters
- seasonal effects
- extreme events
- requirements for different applications at client

A rough guideline to find the right methodology



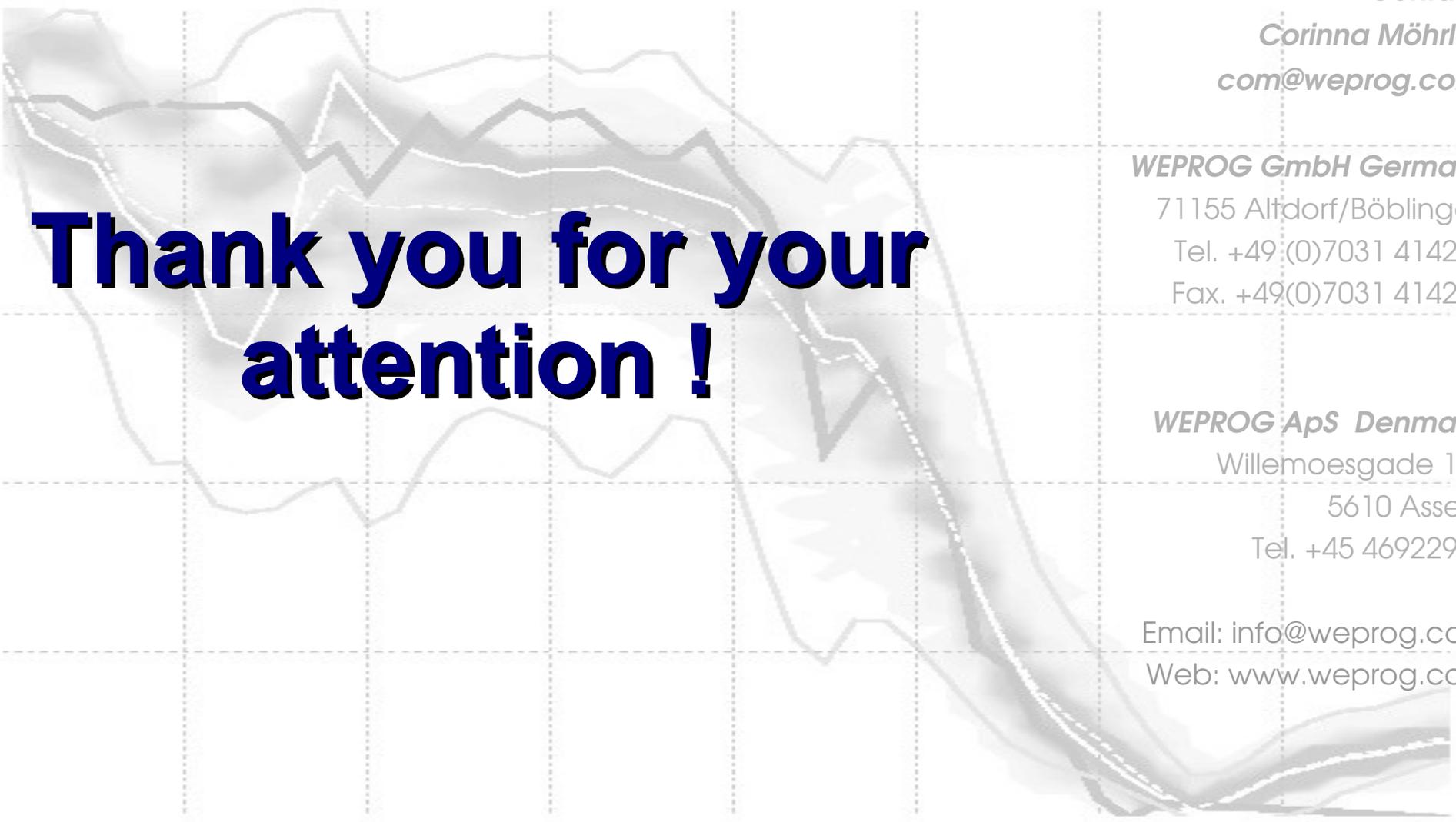
A last note...

The market is not in balance at the moment:

- **Forecast vendors must invest to participate in most trials**
- **Only vendors rejecting no-cost trials can invest in development**

The long-term result of this evolution will be:

- **Forecasting improvement will stall**
- **Missing development of new tools to meet targets**
- **Lower energy efficiency and higher costs for energy**
- **Lower life quality, because energy is vital for today's life quality**



**Thank you for your
attention !**

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