

The logo for europia, featuring the word "europia" in a bold, lowercase, yellow sans-serif font. The text is set against a dark blue square background with rounded corners.

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CEPS Benchmarking

8th July 2009

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A decorative horizontal bar at the bottom of the slide, composed of several colored segments: blue, cyan, yellow, green, purple, and red.

- Benchmarking may only be seen as “transitional” for the EU ETS before a move to auctioning, but:
 - Could be a longish transition.
 - It may be an essential tool to link to other schemes, via sectoral crediting mechanisms.
- We have a lot to learn so use all available experience:
 - For example, Refining has 25 years of voluntary, global benchmarking experience.
 - **It has been used to drive performance improvement: a complement to price signals.**
- The goal is improvement in carbon efficiency, so be pragmatic and flexible in application of the EU ETS Directive:
 - To get as many sectors as possible with realistic systems.
 - If product benchmarking really not feasible, then some other equitable system to drive improvement

Some lessons from 25 years of Refining benchmarking

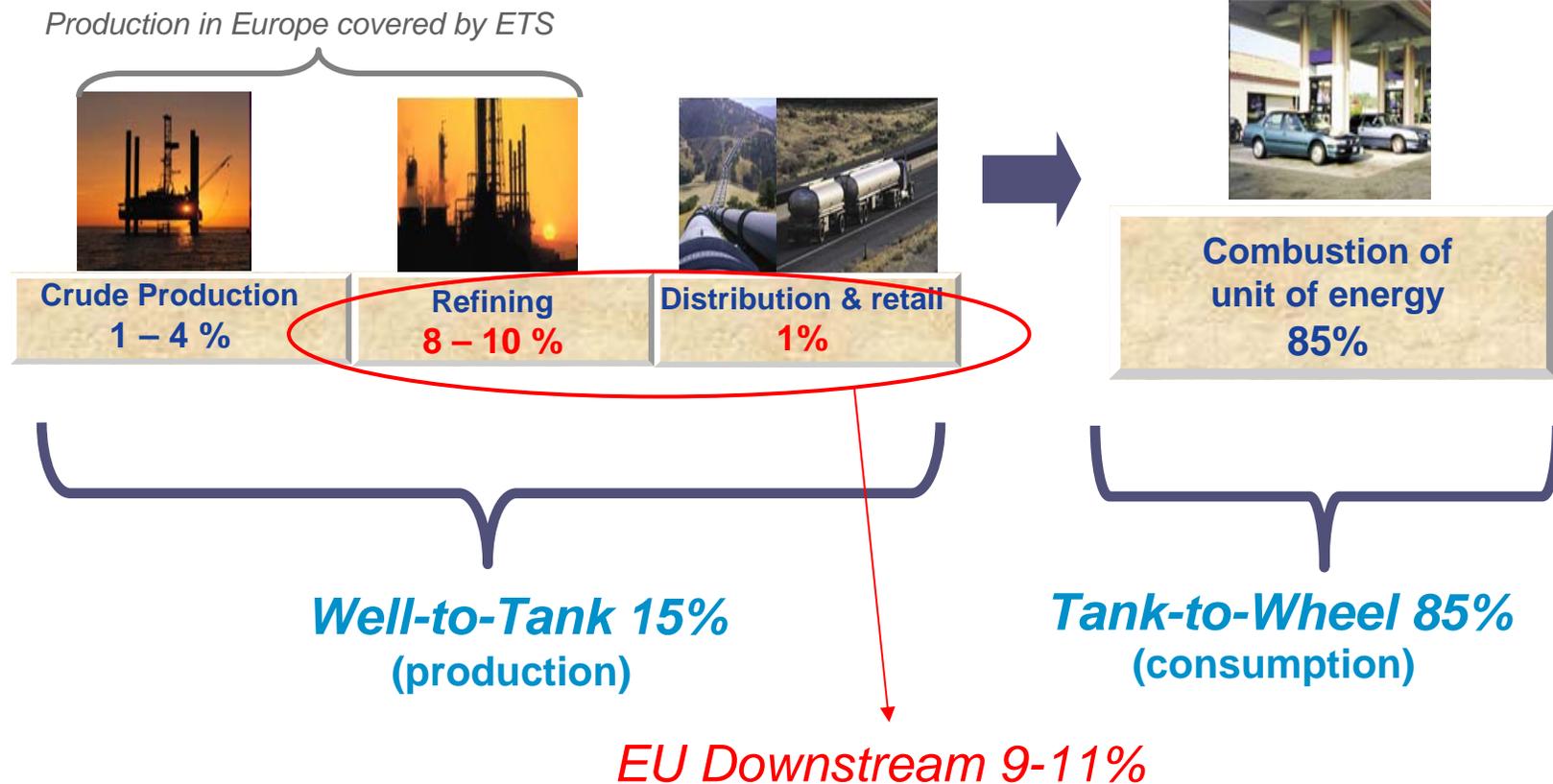
- It takes time to develop confidence in the benchmarking output:
 - Tough to get the comparisons right first time.
 - Data consistency and integrity, eliminate gaming – Solomon has worked at these issues.
 - Without confidence that a benchmark “ranking” reflects real performance, it will not drive behaviour change.
 - Solomon based benchmarks have for many become part of “normal business”:
 - Many Refineries have built their Solomon competitive positioning into their internal measurement processes..
 - Business decisions are based on this....investment, organisation etc
 - “You get what you measure”
- ⇒ What started as a “ranking tool” has become for many an important driver for change.

A benchmark “ranking” thus *complements* the normal price signal?

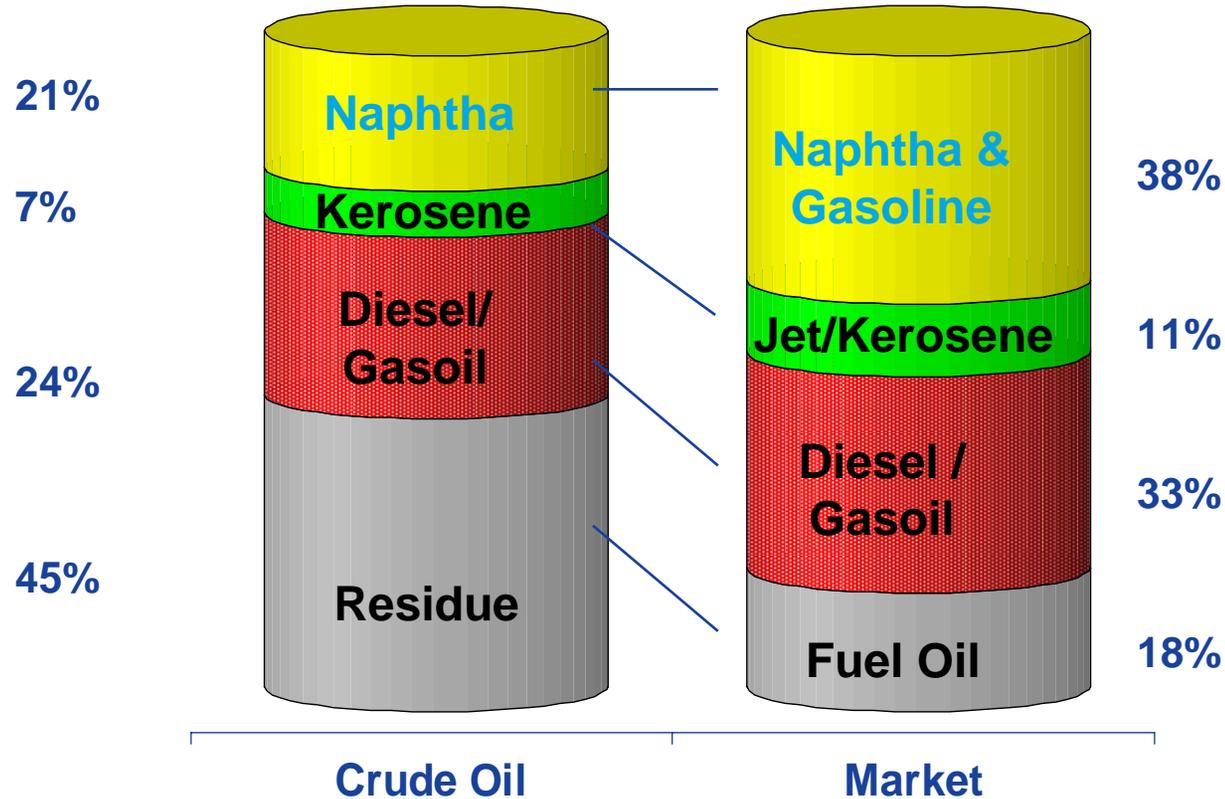
- All EU Refiners get very similar price signals:
 - Refined products are global commodities, so refinery energy *prices* are also very similar
 - Industry energy efficiency has improved, though individual refinery energy *costs* vary significantly.
- Some Refiners also use their “competitive ranking” to drive improvement:
 - What are my absolute energy costs? Of course important.
 - But, also what is my ranking vs. competition?
- Not a perfect reaction :
 - McKinsey highlighted some of the reasons, such as difficulties to build awareness, balance conflicting demands on resources etc
 - Some of the changes require major capital, long planning, often extended shutdowns.
 - Even then, some changes are just not feasible or economically viable.
- But even on a voluntary basis a benchmark ranking can enhance the “simple” price signal to incentivise improvement.

The fossil fuels challenge: Well to wheels CO2

FOSSIL FUELS

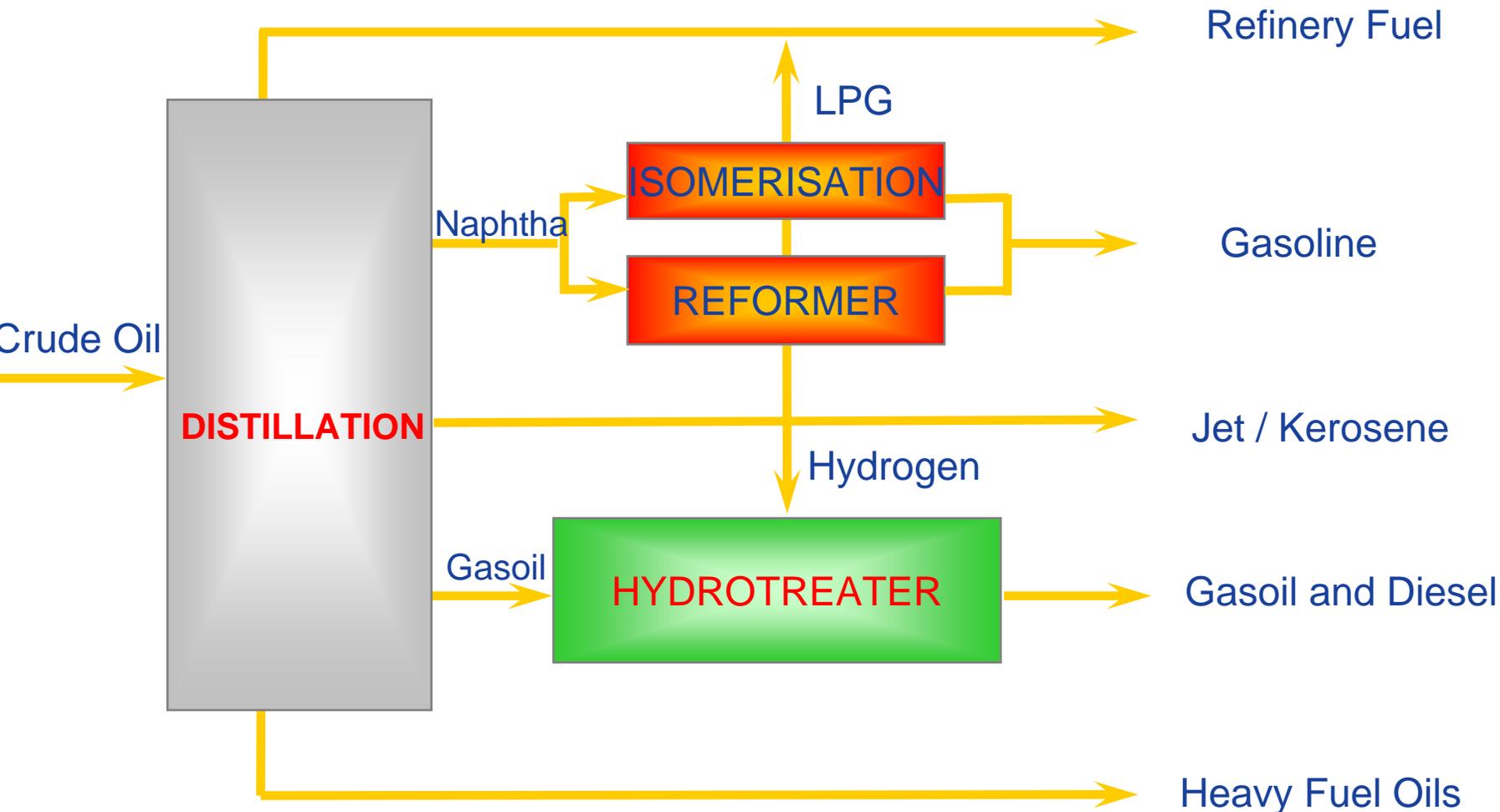


Refineries need to convert some residue to light products in order to keep markets supplied

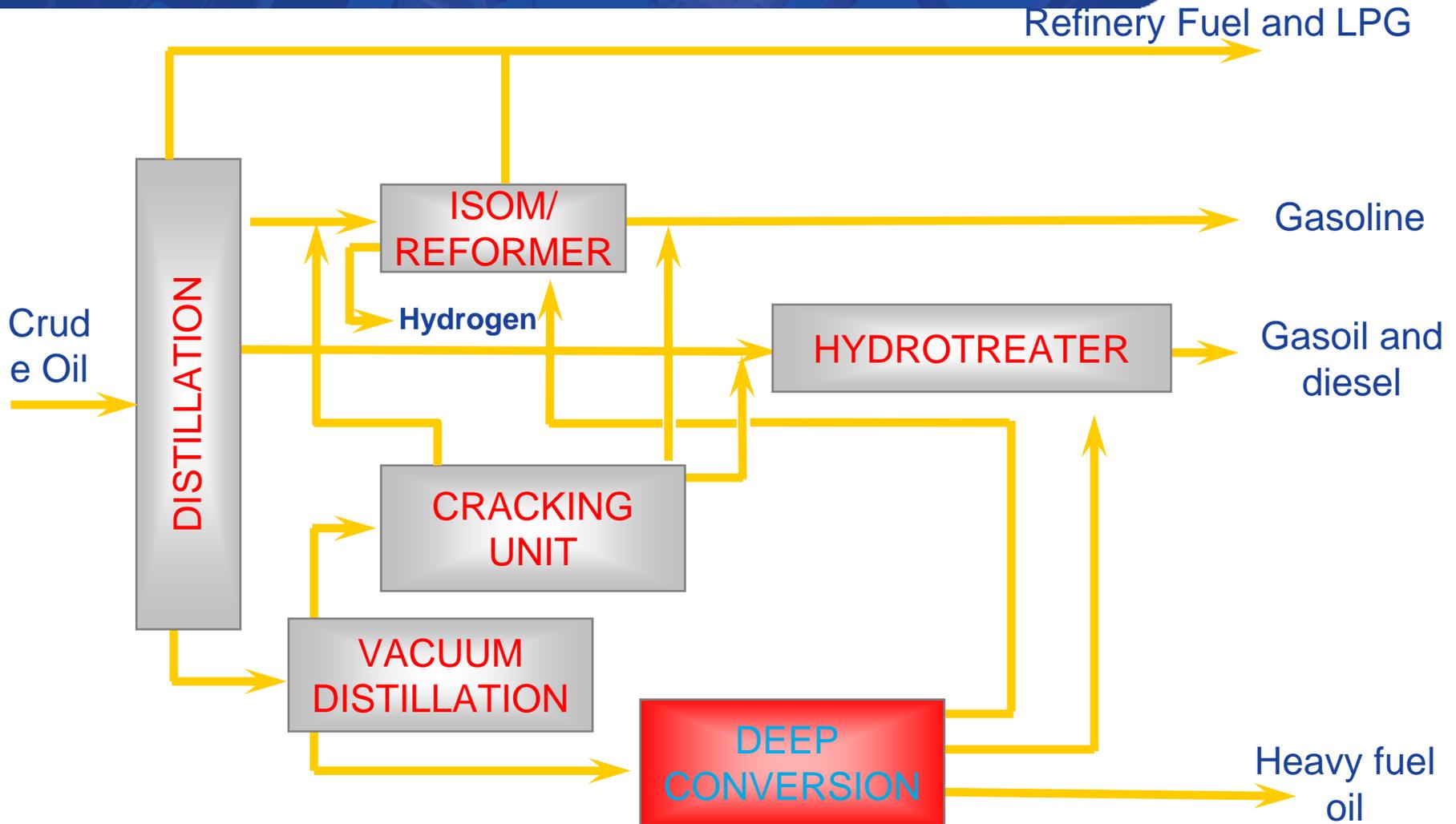


- The average yield obtained from crude oil distillation does not match the proportion of products demanded by the market
- To rectify this refiners use different combinations of conversion and treating processes to produce more lighter products from residue

The “hydroskimming” refinery upgrades naphtha to gasoline and gasoil to diesel and heating oil



Deep conversion refineries also convert vacuum residue



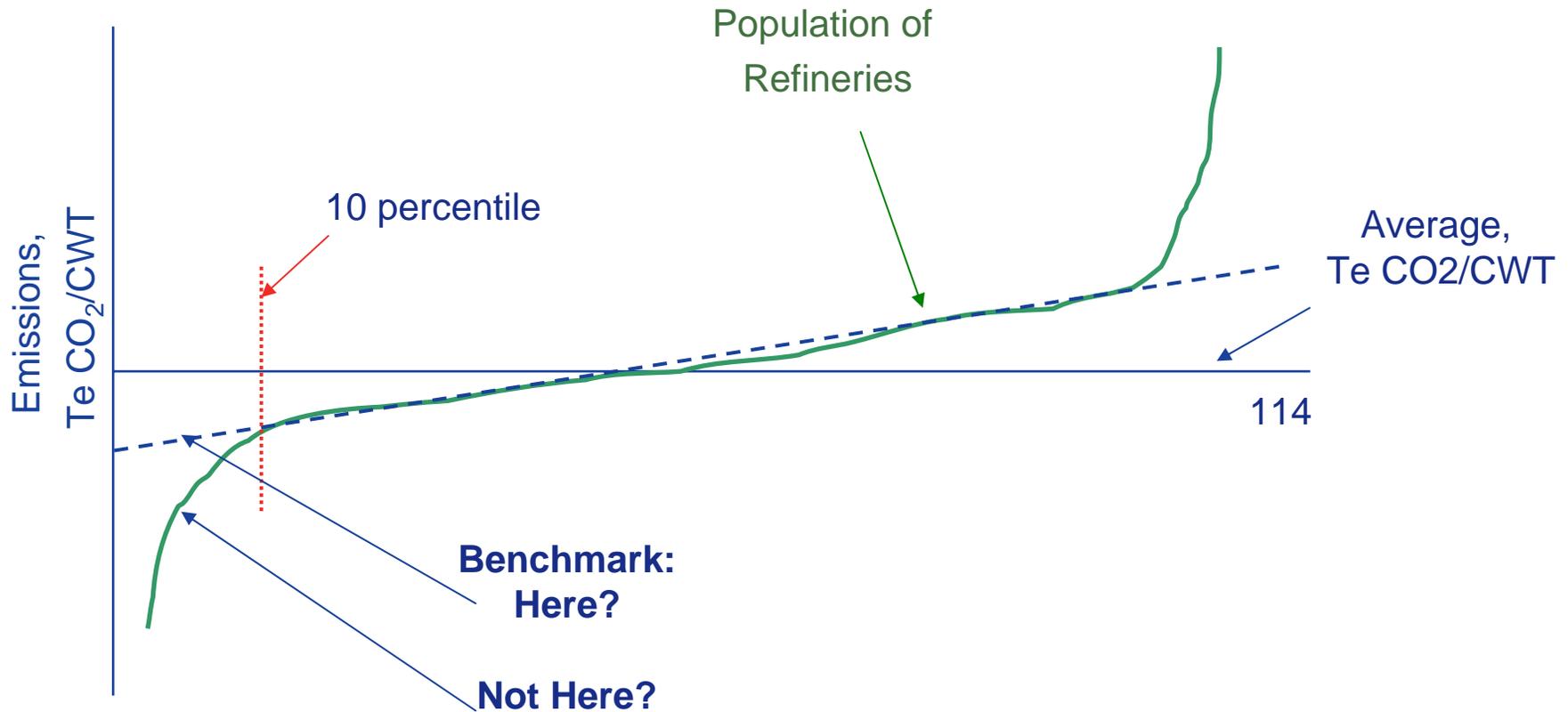
How to compare ~110 EU Refineries, size from 2-20MT, varied product outputs

- Refining is a complex “co production” process: simple crude or product based benchmarks do not adequately represent it.
- Solomon CWT or “complexity weighted tonne” represents the total “production” of a particular Refinery.
 - Although varied, some common product classes: LPG, naphtha, gasoline, kerosene, diesel/gasoil and heavy fuels.
- “CWT” will characterise Refineries of different sizes and complexity as a simple means of comparing the emissions from all the different Refineries.

One parameter to characterise EU refining

- **A single, common “production” parameter CWT for all sites is a major achievement:**
 - Reviewed and endorsed by Concawe.
 - All EU Refineries included.
 - Applicable to all EU Refineries, across 27 EU Countries.
 - Takes into account the product mix produced by each Refinery.
 - Reduces competitive distortion and complexity of using several parameters.
- **Ecofys May 19th draft report on the Refinery Sector concludes:**
 - “that the approach is suited to compare different refineries”
 - “is flexible enough to come to a benchmarking methodology in line with the Directive”
- **The same parameter can be used for New Entrants**

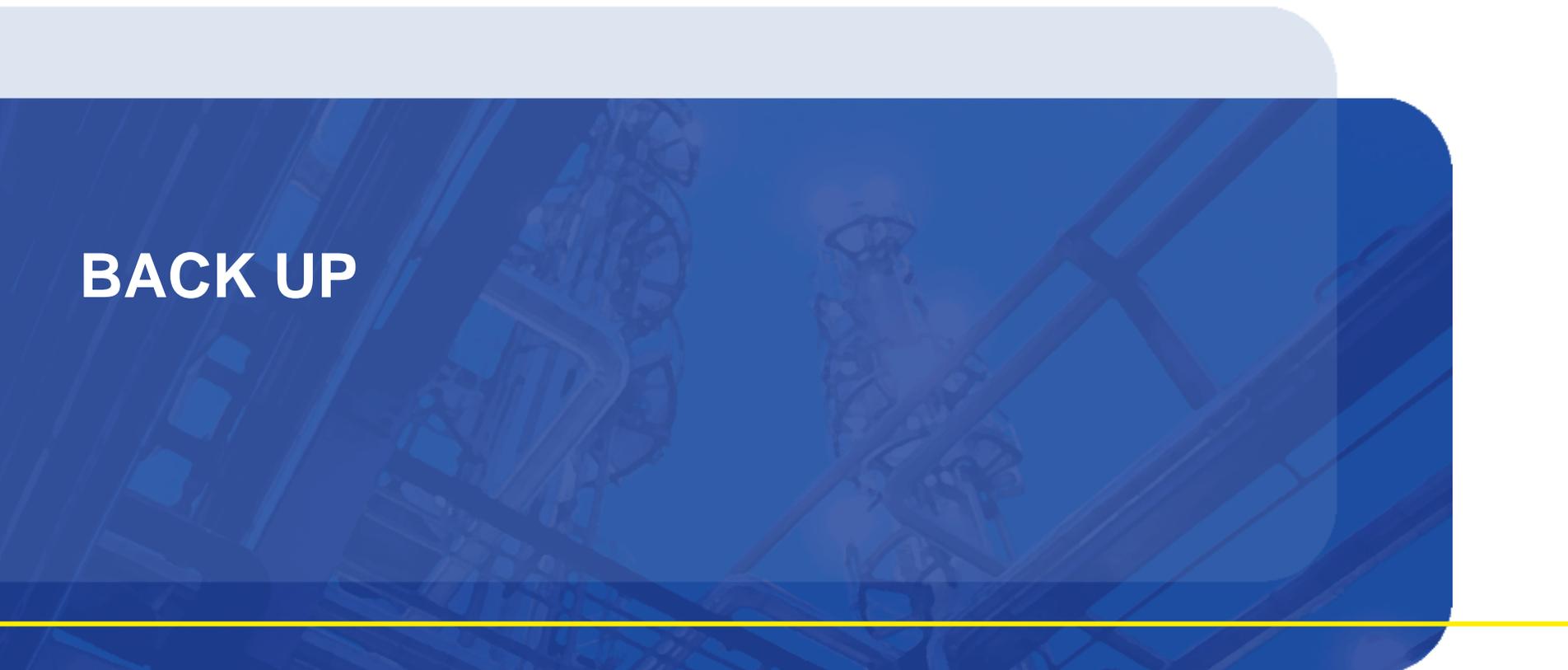
How to derive the average of the best 10%: excluding the outliers by regression?



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BACK UP



■ Competitive impacts:

- Benchmarking must target real performance and not distort competition in a sector.
- Concawe-Solomon approach has this as a key success factor.

■ Encourage greater reductions?

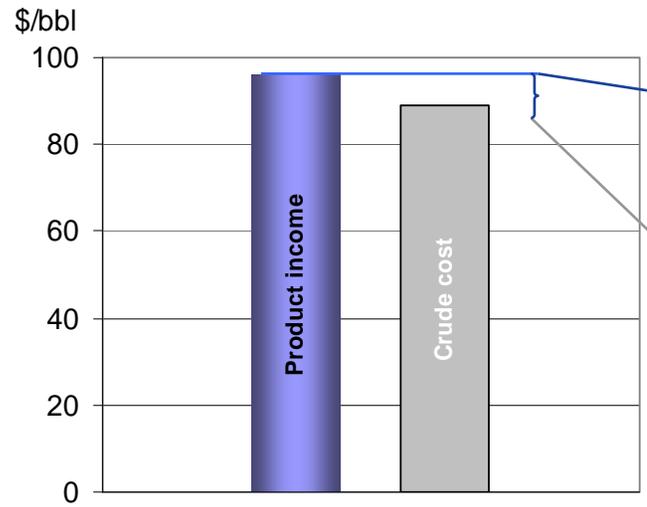
- There is still a carbon value even for those better than benchmark.
- But an over aggressive benchmark will severely penalise some installations and not necessarily incentivise others.

■ Verification:

- Looking for perfection or just obvious signs of problems?
- Once off, ex ante exercise – encourage sector involvement to “self police”
- Pragmatic, work with Csion and MSs.

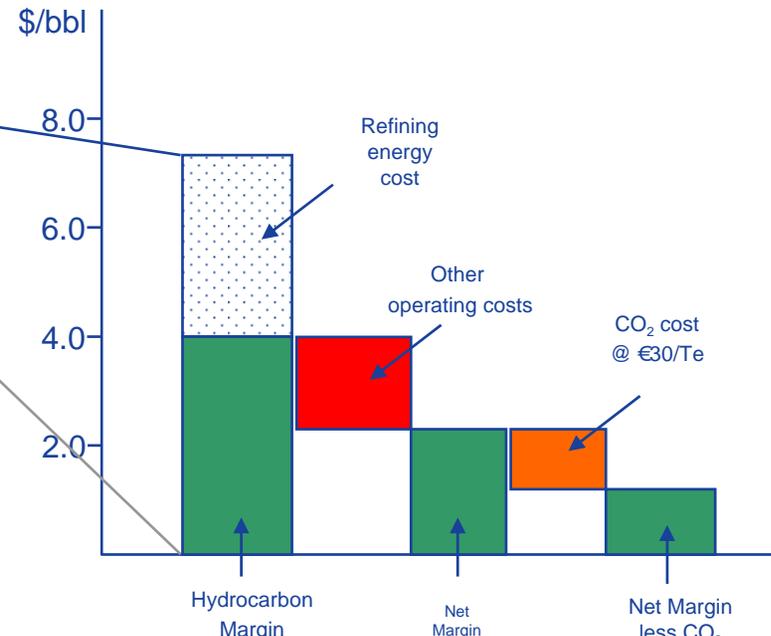
Refining is an energy intensive industry: Energy is its biggest cost: 60% of operating cost

Crude cost and Income from products



Sources:
 - Price: Platts
 - Typical refinery yield: Concawe

Refinery operating cost 2007

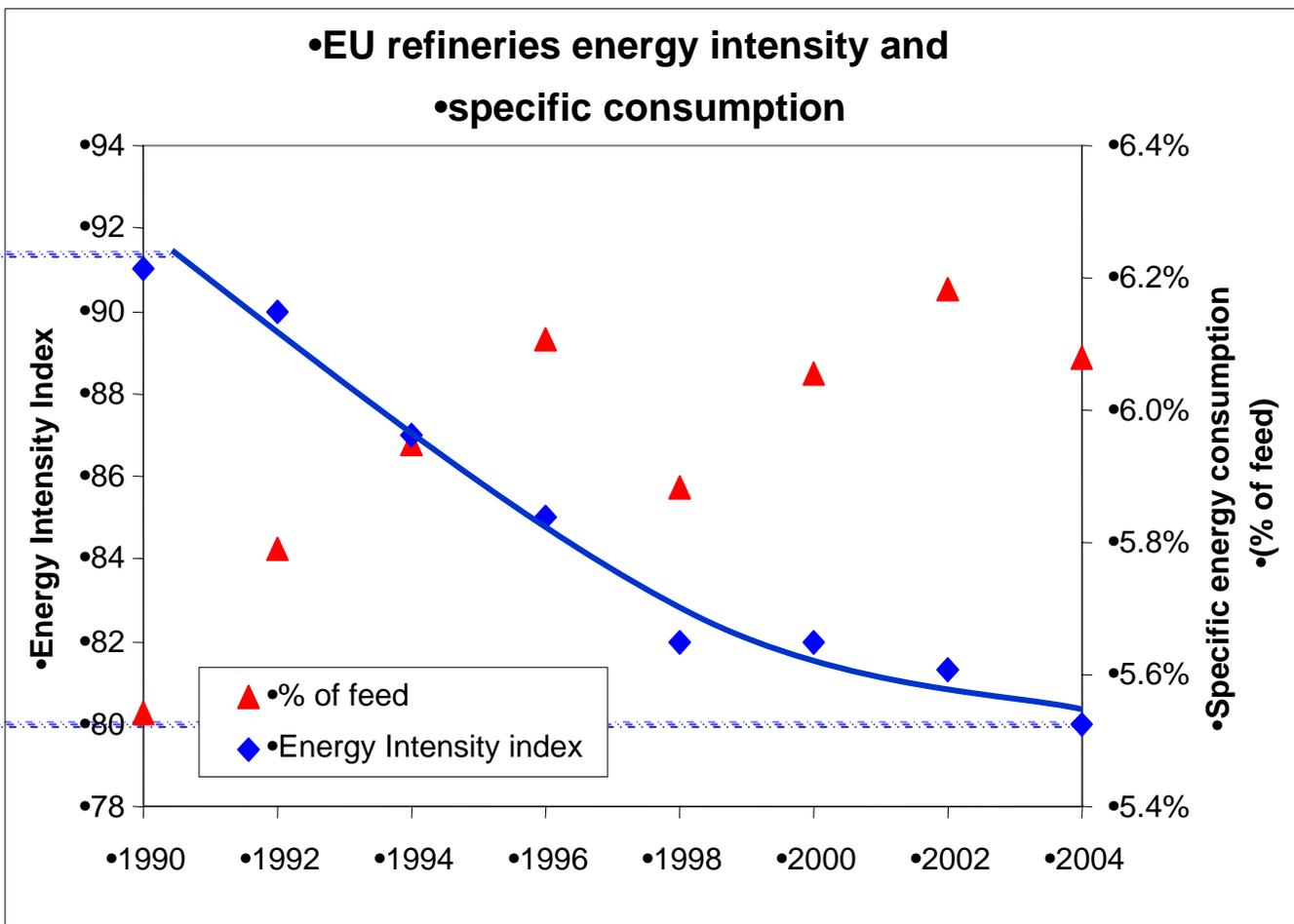


Sources:
 - Operating cost: Concawe

Improvements in energy efficiency do not match the increased energy required for more complex refineries

•EU refineries energy intensity and
•specific consumption

-13 %



•Source: Solomon Associates



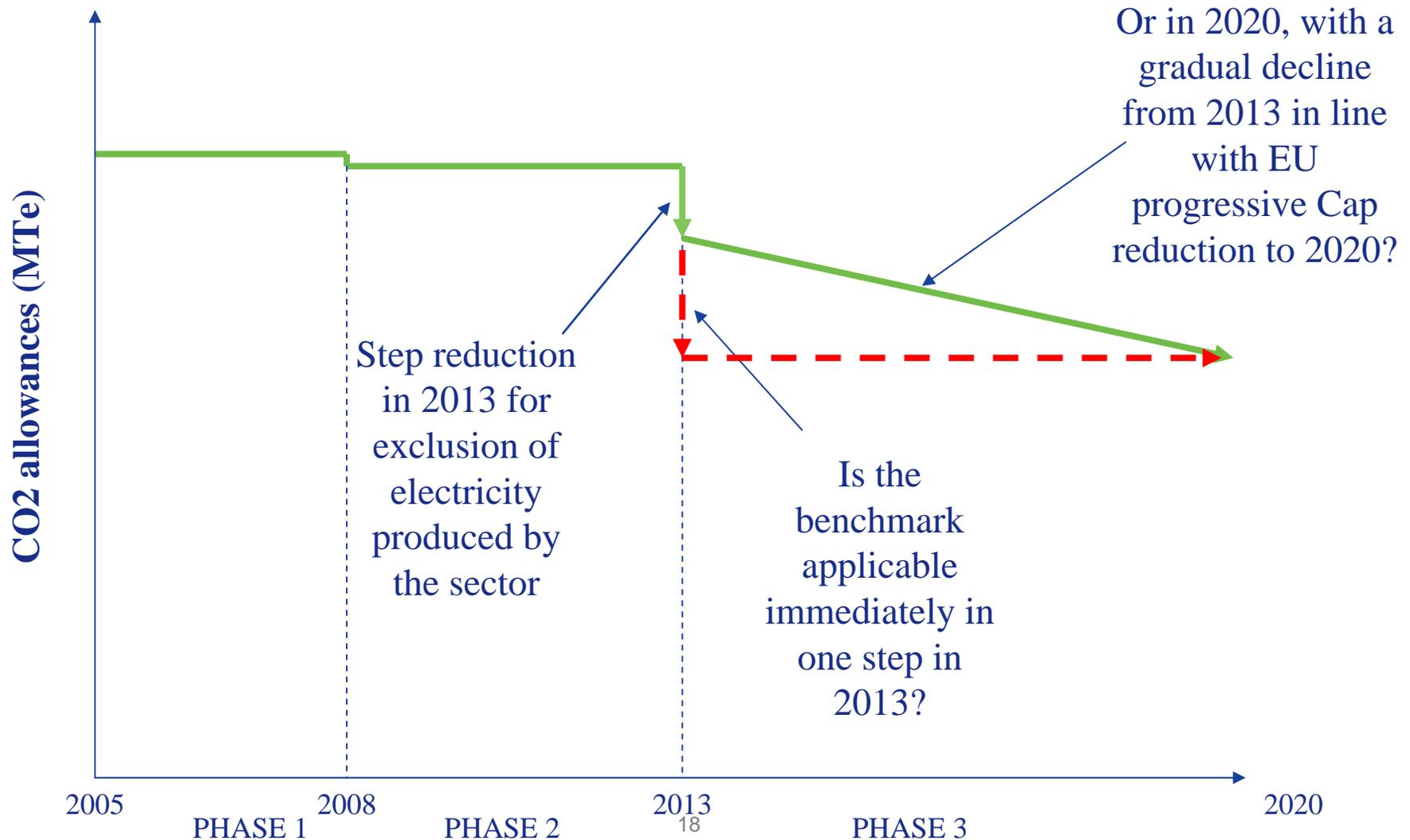
Recommended ground-rules for benchmarking as part of EU ETS

- **Do not damage competitiveness of EU versus other regions:**
 - Whilst still stimulating emissions reductions.
- **Equitable treatment of all sectors “exposed to significant risk”**
 - Directive does not differentiate between exposed sectors.
 - Sector benchmarks should require similar effort.
- **Equitable treatment of all installations within a sector:**
 - Financial stakes are high.
 - Must not distort competition within a sector.
 - Allows differentiation between installations on CO2 efficiency – rewards early movers.
- **Be sufficiently transparent to:**
 - Allow someone with reasonable technical knowledge (but not necessarily sector specific) to understand.
- **Be applicable in practice:**
 - Fit for purpose for the sector concerned: one size will not fit all.
 - “Ex ante” benchmarks based on single reference period to give predictability for business decisions.
 - Be verifiable.

What are the specific factors to consider when characterising Refining?

- Refining is a “co production” process:
 - Typical production includes LPG, naphtha, gasoline, kerosene, diesel/gasoil and fuel oil.
 - Yields of each product vary between refineries, but not possible to produce just one or two products.
 - Not possible to allocate CO₂ by product.
- Broad range of size and degree of upgrading:
 - EU refineries range from 2 to 20 MTe per year in production.
 - Although almost all Refineries start with Crude Distillation, each individual refinery has a different combination of units and technology to produce its own final product mix.
- A Refinery total energy use and therefore emissions are not simply the “sum of the parts”:
 - Combining or heat integrating units optimises energy use and reduces emissions.
 - Energy typically represents over 50% of Refining cost, so most sites have made major steps in this optimisation.
- The methodology should ideally reflect these factors:
 - Characterise emissions from all Refineries with multi product mixes.

Setting the “benchmark” for an EII sector: when should it apply?

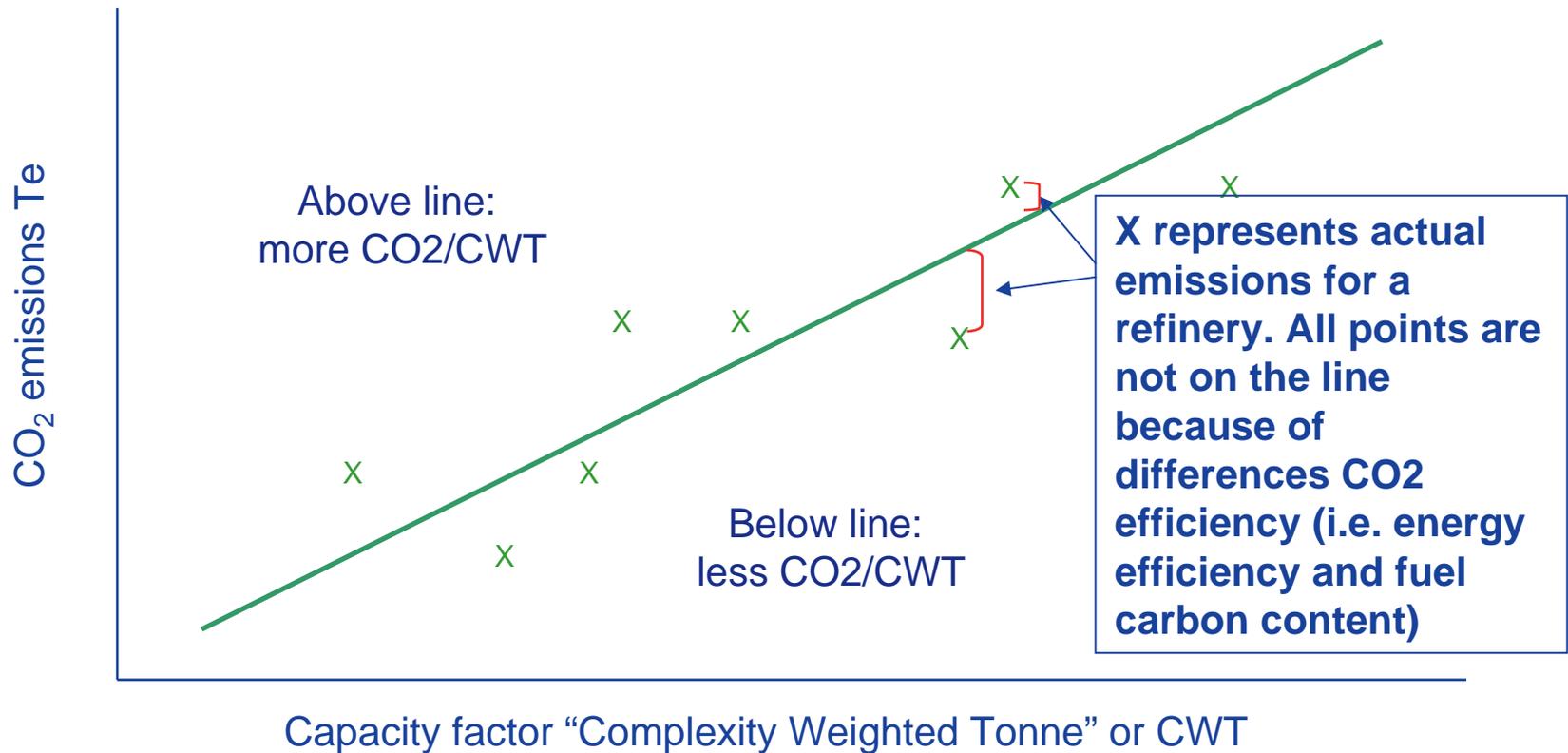


Complexity Weighted Tonne, or CWT: the essential elements

“CWT” is a relatively simple way of characterising the CO₂ emissions from Refineries of different sizes and complexity:

- A list of generic process units is defined, applicable to all Refineries.
- Each process unit is assigned an emission factor representative of its propensity to emit CO₂ relative to crude distillation at standard energy efficiency and fuel emission factors
- A standard process emissions term is added where relevant. E.g. FCC, hydrogen production, coker.
- For each process unit the emission factor is multiplied by its throughput and these are totalled up.
- An allowance is added for off-sites e.g. tankage, jetty facilities
- The final metric is corrected to account for the import and export of energy, in particular power and steam.

A single throughput parameter which compares Refineries' CO2 efficiency.



- **The parameter works well for the entire population of EU Refining:**
 - Refineries of all sizes and complexity appear well distributed along the curve(*)
⇒ **One single parameter can be used**
- **Difference between actual performance of a Refinery and the correlation is due to energy efficiency or fuel carbon content:**
 - If corrected for actual CO2 efficiency (energy efficiency and fuel carbon content) Refinery CO2 emissions correlate closely with CWT (>99%)
 - Has been tested using Solomon extensive energy and fuel database.
 - There is a wide range of actual CO2 emissions per CWT in the EU population.
⇒ **Will provide differential incentive and incentivise emissions reductions.**
- **The methodology can be used for New Entrants:**
 - A CWT allowance can be defined for a plant expansion under the New Entrant provisions.
⇒ **One single coherent system.**

(*) to be confirmed finally when all data available