SOLOMON

Energy Efficiency: More Crucial than Ever

November, 2020

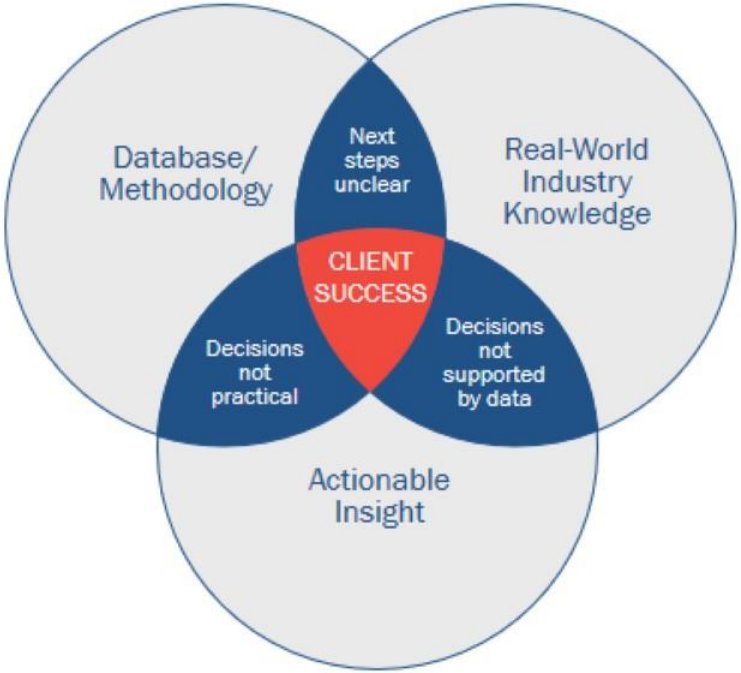
Case for Change

Stakeholders are demanding reductions in Carbon Emissions

- Policy makers and consumers demanding change
- Major Oil Companies announce Net Zero Carbon Targets
  - Detailed ambitions vary but the intent is clear
  - Reducing energy consumption is the largest lever for reducing carbon emissions
- Reducing demand for fossil transportation fuels means refineries in Europe face tough competition to stay in business
  - Refineries need to be as cost efficient as possible

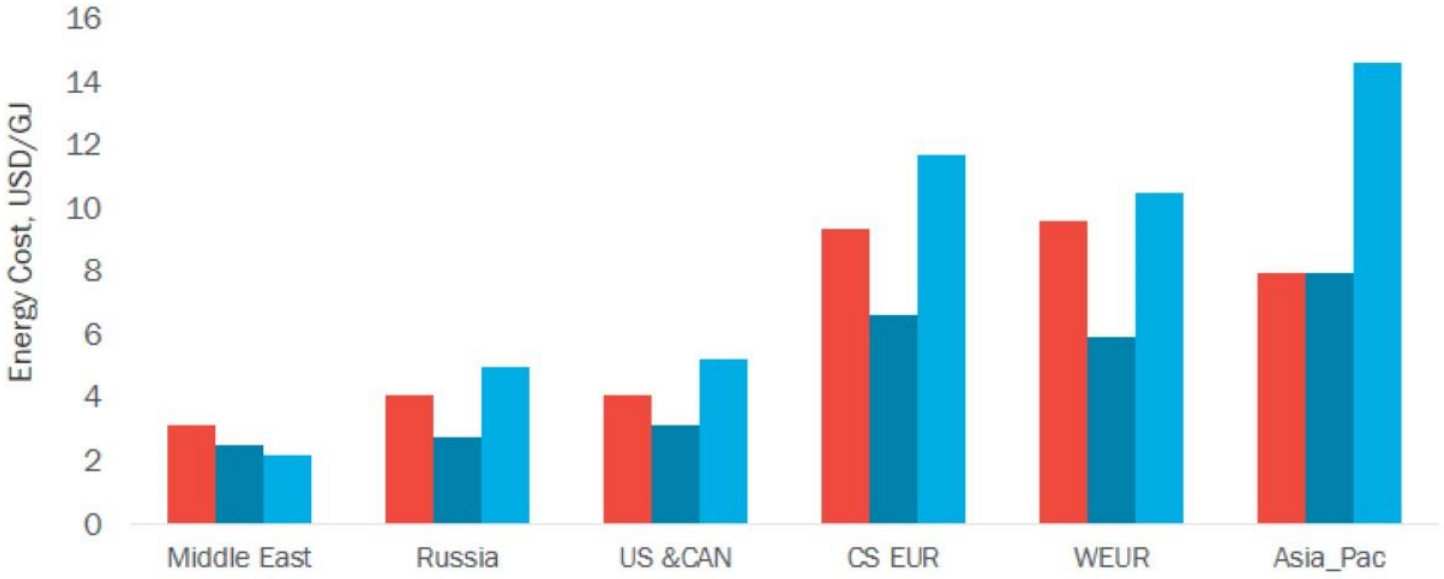
What should you be doing?

Solomon's Credentials



Worldwide Energy Costs

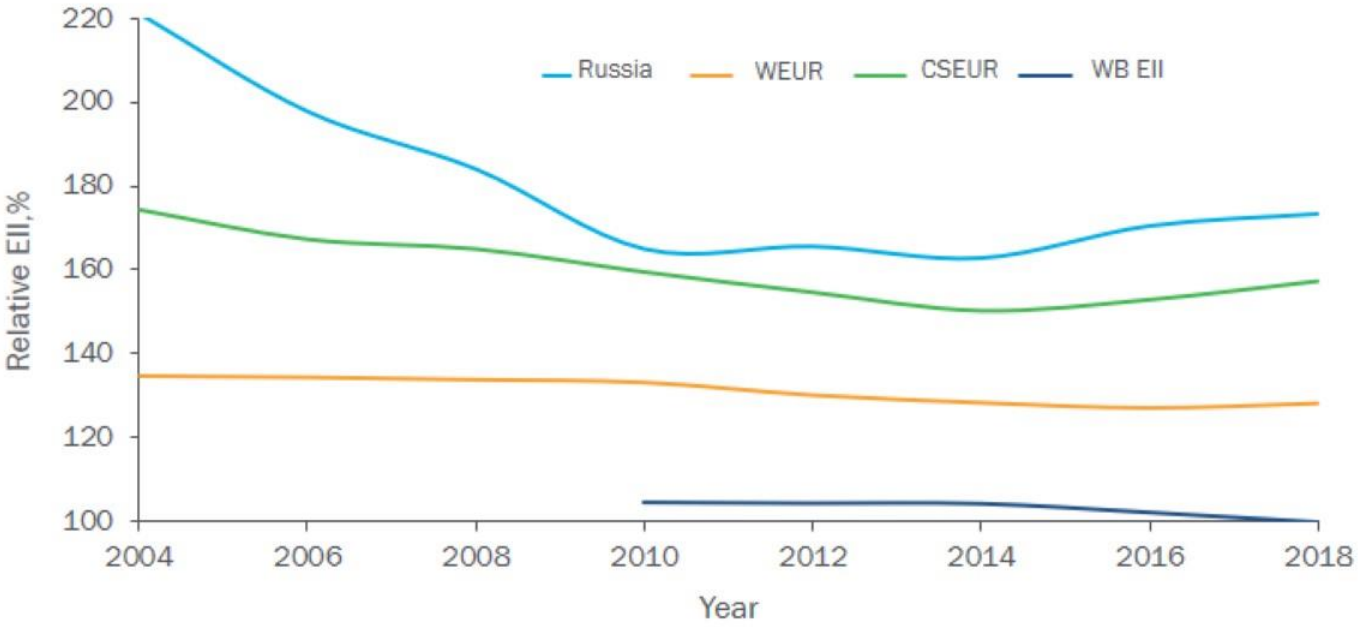
2014 – 2018 Worldwide Fuels Study – By Region



Energy costs in Europe remain high

Relative Energy Efficiency Trend 2004–2018

European Regions relative to World Best EII Refineries

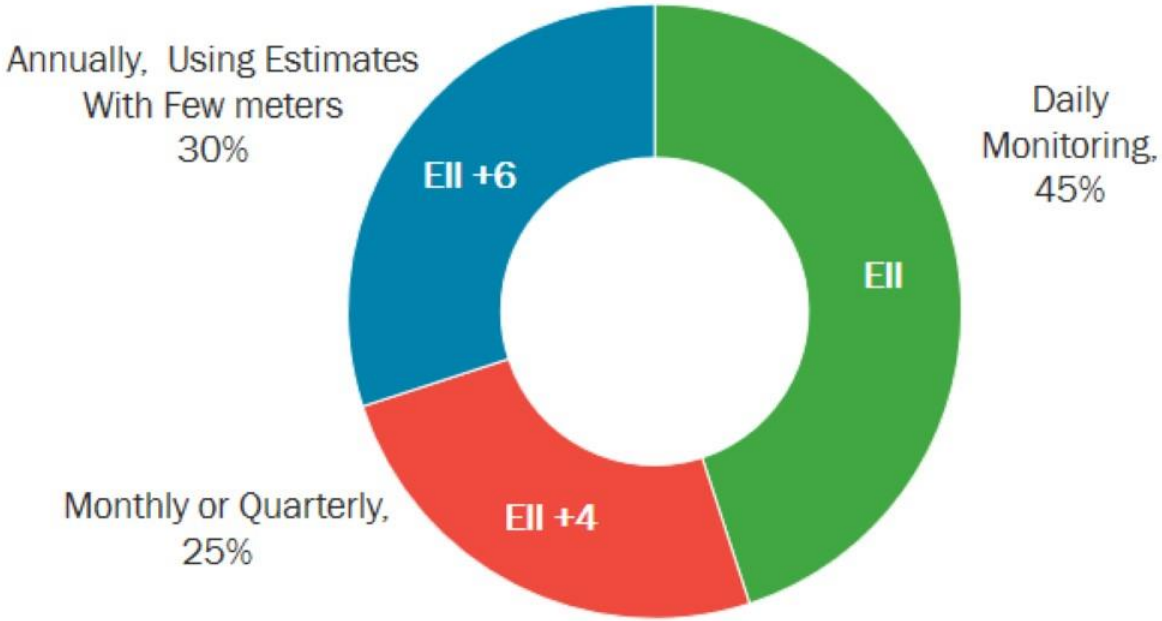


Large gaps remain to World Best Energy Performers

Relative EII = Average EII for Region/ WB EII (2018)* 100.

Frequent Unit-Level Monitoring Leads to Reduced EII

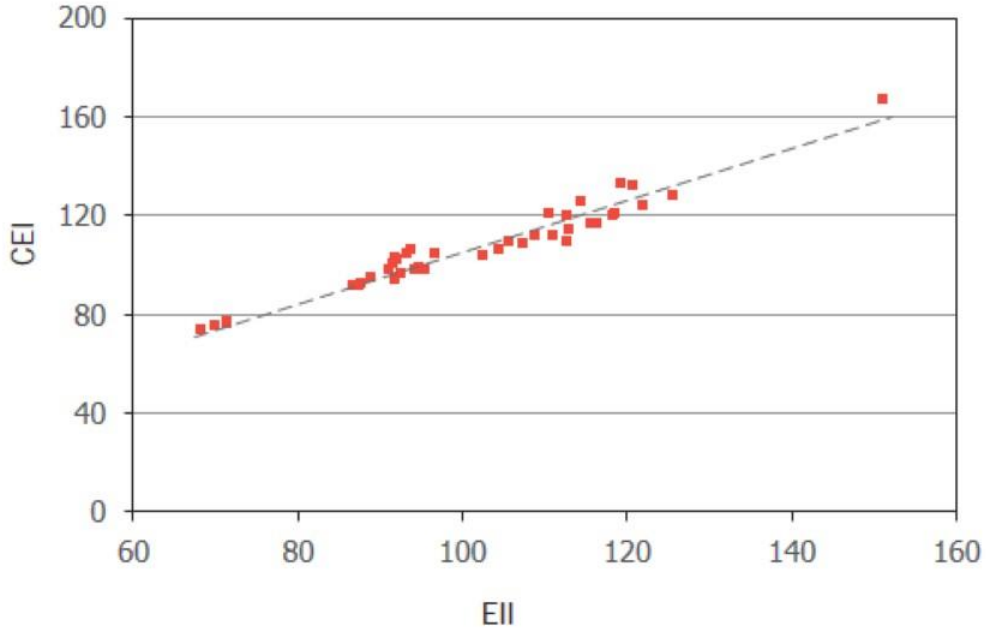
2018 Europe Study



Energy Efficiency linked to Carbon Intensity

Carbon Emissions add to incentive to reduce Energy consumption

- Carbon Intensity is impacted by non-energy consumption variables
  - Such as hydrogen plants, FCC plants, carbon capture
  - Fuel-type
  - Making it more representative of actual GHG emissions.
- Carbon Intensity is strongly influenced by Energy Efficiency
  - Energy Efficiency is easier to track and monitor.



Relative Carbon Efficiency Index Trend 2010–2018

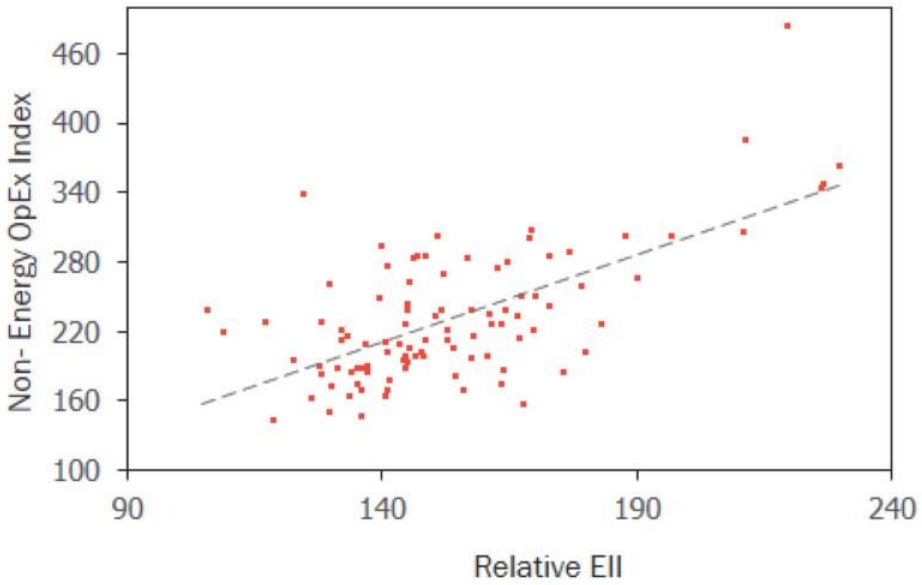
European Regions relative to World Best EII Refineries

Reducing Energy Consumption key to reducing Carbon Intensity in Refineries

Relative CEI = Average CEI for Region/ WB CEI (2018)* 100.

Energy Efficiency Impacts Non-Energy OpEx

- Energy Costs are a significant portion of overall OpEx
- Improving Energy Efficiency also reduces Non-Energy Operating Costs
- Why?
  - Reducing utilities,
  - Reduces maintenance cost
  - Reduces work hours



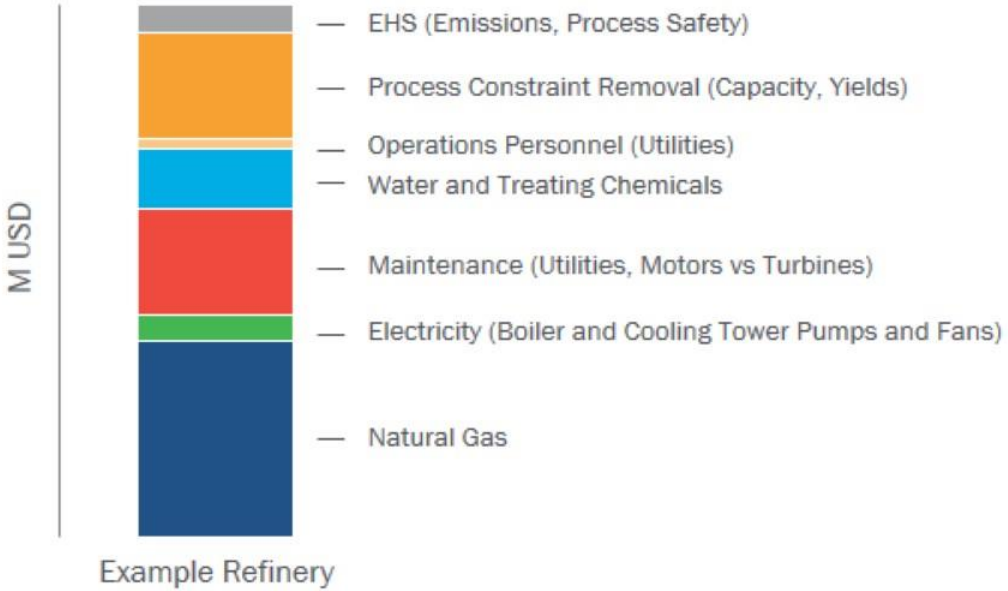
Relative EII = Relative Energy Intensity Index

Integrate Energy Efficiency into Maintenance and Business Planning

- Robust Asset Lifecycle Management is critical
  - Sites have equipment end-of-life knowledge, yet it's often dispersed
  - Long lead times to optimize new equipment
  - Replacing turbines with motors requires adequate electrical infrastructure/planning
- Drive investment timing using the site maintenance plan to drive investment timing
  - Replace equipment rather than repair – labour is expensive, increases TA durations
  - Avoid adding new work fronts – optimize scope instead
- Consider all the economic drivers
  - Uncertain values (EHS, Public Sector) are NOT zero
  - Total opportunity value is much larger than the sum of the parts

Value of Improving Energy Efficiency

More Than You Think



- World's Best EII Refineries have an EII of 60–70
- Any energy consumption above this minimum becomes waste heat
- Ultimately this waste heat is rejected to air, directly or via cooling water
- Reducing EII will have a large impact on the size of the Utility systems

Increased earnings due to energy savings can be twice the fuel savings

M USD (million United States dollars)

Key Takeaways

- Energy efficiency is linked to carbon intensity and energy improvements can contribute to achieving carbon emissions goals.
- Energy efficiency projects can deliver savings well beyond energy alone.
- Regular monitoring of energy consumption at a unit level is a best practice and one that is proven to produce lower EII
- Look at energy efficiency holistically and strategically. Understand the economics and ALL benefits of a large EII improvement – to World's Best for example. Decide how far to go and define the economics for that target.
- Use your maintenance plan as THE plan to drive investment timing.

Time is of the essence.
Energy efficiency in our industry is more crucial than ever.

Can you afford not to invest in Energy Efficiency today?

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