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Acetic Acid Europe Variable Margin Analytics Methodology

ICIS
Independent Commodity Intelligence Services

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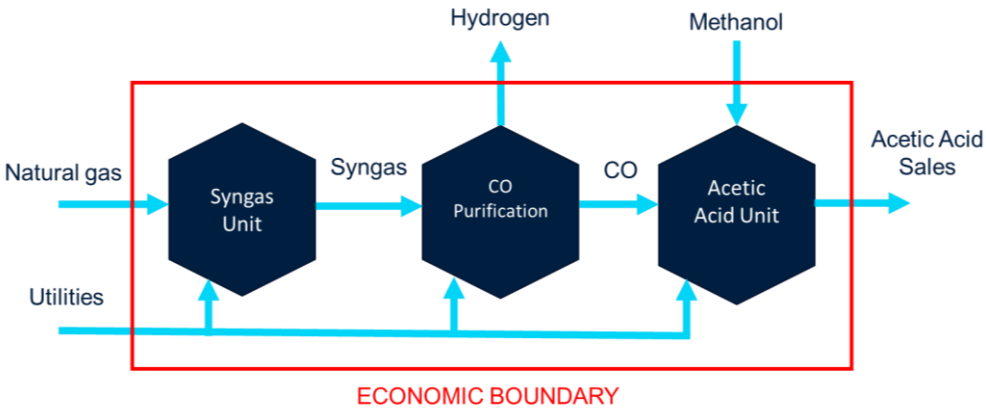
THE BUSINESS MODEL

Both a fully integrated and standalone acetic acid plant have been modelled by ICIS. In Europe, the largest producers most closely represent the standalone model.

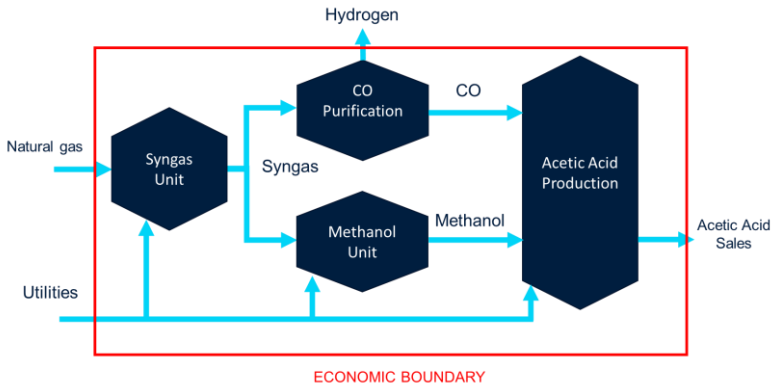
Standalone model

Methanol and carbon monoxide are fed into an acetic acid production unit to produce acetic acid for sale. Methanol is purchased, whereas it has been assumed that the acetic acid producer has a syngas production unit and cryogenic separator to produce purified carbon monoxide. Syngas is produced via reformation of natural gas, which is supplied by pipeline. Hydrogen co-product produced from CO purification is assumed to be recovered for its heating, the value of which is compromise between the regional natural gas and fuel oil heating value.
A simplified illustration of material flows is as follows:



Fully integrated model

The fully integrated model is like the standalone model above, except it has been assumed that methanol is also produced on site via the syngas unit.
A simplified illustration of material flows is as follows:



THE MARGIN CALCULATION

- The margin measure provides an assessment of the ex-works cash margin obtained for the product over raw material costs, credit for selling co-products and key variable manufacturing costs, including power and steam, chemicals and catalysts. This measure can also be termed as a variable margin, contribution or benefit.
- This margin measure provides simple signals on the direction of business margins as dictated by the environment, thus informing market positioning by sellers, buyers and traders.
- ICIS does not model beyond raw material costs, credit for selling co-products and key variable manufacturing costs. Further analysis would cease to be generic to the industry and would be highly specific to individual business operations, their site structure, location, ownership and financial structures. Such detail would not fairly reflect or be applicable in a wider industry context. It may also be more subjective, open to fair challenges and not feasible to reference in commercial discussions.
- ICIS models plant operations for a series of 'representative' plants around the world. These representative plants have no flexibility with respect to feedstock or process configuration and ICIS assumes the plants to be purchasing inputs and selling outputs at constant prices.
- As the process model is generic and not based on any individual operation, the contribution measure is indicative. Instead of absolute value terms, it is most valuable as an index and in step-change terms.
- ICIS plant manufacturing and feedstock yield assumptions incorporate data from Intratec (www.intratec.us), an independent provider of chemical production cost reports.
- Ex-works product price assessments link to ICIS pricing quotations for large-volume commodity products, with netbacks assessed using the ICIS petrochemicals logistics model. To estimate representative transport costs, the ICIS logistics model considers a network with nodes at individual production sites connected by streets and ports linking each continent. The logistics model incorporates shipping data from Xeneta (www.xeneta.com), and duties data from SimplyDuty (www.simplyduty.com).

The calculation below shows how ICIS derives the standalone acetic acid margin for Europe. The example is based on spot sales prices, is denominated in US dollars per tonne, and uses average prices for the year 2018.

Standalone Acetic Acid margin ($/tonne AA)

AA spot price		923
AA product value		923
Co-product sales		122
Total income		**1045**
Purchase feedstock		390
Utilities		95
Variable costs		**485**
Acetic Acid margin	1045 – 485	**= 560**

MODEL YIELD PATTERN AND CALCULATION

Plant manufacturing data relates to the variable cost components of the unit operation. Yield pattern data relates to the overall material balance of the unit. For example, for 1 tonne of acetic acid produced, a unit will use approximately 15-20 mmBTU of natural gas and 0.5-0.6 tonne of methanol. In addition to the 1 tonne of acetic acid produced, the unit will produce around 0.1 tonnes of hydrogen.

- Natural gas is the dominant feedstock for Acetic Acid production in Europe.
- Acetic Acid margins are calculated for two different production processes in Europe:
    - Fully integrated up to raw feedstock (natural gas)
    - Standalone acetic acid and carbon monoxide production unit with purchased methanol

  This analysis demonstrates business volatility and the influence of price floors (as an uneconomic margin generally forces supply reductions).

ASSESSMENT INPUTS

The following pricing inputs are used to generate the full content of the ICIS Weekly Margin – Acetic Acid Europe report.

NORTHWEST EUROPE

- Acetic Acid in North West Europe, Spot FD NWE (EUR/tonne, WEEKLY)
- Acetic Acid in North West Europe, Contract FD NWE (EUR/tonne, MONTHLY)

- Methanol in North West Europe, Spot FOB R'dam (EUR/tonne, WEEKLY)
- Methanol in North West Europe, Contract FOB R'dam (EUR/tonne, MONTHLY)
- Natural Gas in North West Europe, Spot DEL (EUR/tonne)

The methodology associated with each individual ICIS pricing quotation referenced above is available on the ICIS Compliance and Methodology website.

In addition to the listed ICIS pricing inputs, the model also takes into account logistics costs (calculated through the ICIS logistics model), and utility costs.

A key objective of the calculation process is to provide a weekly summary that strongly aligns to the reported market price positions on the date of release.

Where inputs are unavailable for individual weeks, e.g. due to public holidays, prior-week data is carried forward to the current week. This is for the specific purpose of populating the model and preventing model inconsistency. This form of data interpolation infers some limited data points that may not be market derived, and customers should be aware of this assumption.

As the majority of petrochemical trades are in US dollars, all data used in the ICIS Margin – Acetic Acid Europe model are denominated in USD unless specifically stated otherwise.

Acetic Acid Europe WEBPAGE

Filter data on the website using the following criteria.

- **Area**: Acetic acid variable margins are generated only for North West Europe
- **Process type**: Select from standalone acetic acid or fully integrated production
- **Price terms**: Variable margins are generated for both spot and contract prices
- **Frequency**: Viewable at weekly, monthly, quarterly, or yearly granularity.
- **Currency**: Allows conversion from displayed currency to currency of choice.
- **Unit**: Allows conversion from displayed unit to unit of choice in data download only.

Variable margins data are available online from January 2014 onwards. One year of trailing data shows as default.

The website deploys the following data, all per tonne of acetic acid.

- **Main product value, ex-works**: the estimated acetic acid netback value for the producer, taking into account the ICIS assessed price, shipping costs, handling costs and applicable duties.
- **Co-product credits**: the revenues from the other products generated in a process, also ex-works. This data is also available broken down into co-product types.
- **Feedstock and utility costs**: or total variable input costs for a process. This data is also available broken down into the component feedstock costs and utility costs.

Calculated outputs are:

- **Variable cost** = [Feedstock and utility costs] – [Co-product credits]
- **Variable margin** = [Main product value] + [Co-product credits] – [Feedstock and utility costs]

A selected variable margin (i.e. a margin for a specific location, process and price term) is comparable with margins of different process technologies in the same region, and with margins using the same technology in different regions. Subscribers can review margin performance by week, month, quarterly and per annum. Subscribers can view the flows of different products, in terms of their volume and value, into and out of the representative production unit used to calculate the ethylene variable margin.

PUBLICATION FREQUENCY

The ICIS Weekly Margin – Acetic Acid Europe model is based on the latest data at the close of business in Europe on Friday and released to customers on the following Monday, along with written commentaries, subject to schedule planning. When the Monday is a public holiday in the UK, commentaries will be made available the following day. ICIS does not publish an update on some public holidays. Holiday dates and days of publication may be subject to revision.

The new margins feature allows users to select data for the period they are most interested in from January 2014 onwards. Key margins data includes the calculated margins, feedstock and utility costs and the assessed ex-works values for co-product credits and acetic acid on a weekly basis. Combined with relevant price history

series, also available via ICIS dashboard, this allows subscribers to manipulate ICIS data more easily than was previously possible.

From late September 2015, ICIS made available its margin series for download in Excel format. Each week subscribers were able to download the latest 12 months' of weekly data for the calculated margins, the feedstock costs and, where applicable, the co-product credit values. These historic reports will remain available in their current location until further notice.