



argusmedia.com

ARGUS CHLOR-ALKALI OUTLOOK REFERENCE AND MODELLING GUIDE

Contents:

Overview	2
Publication and timing	2
Fundamental analysis	2
Forecast prices	2
Redactions	2
Additional data	2
The ECU cost model	2
Model parameters and assumptions	3
Five-year outlook	4
Change process	4
Corrections to outlook	4
Ethics and compliance	4

LAST UPDATED: JUNE 2022

The most up-to-date Argus Chlor-Alkali Outlook Reference and Modelling Guide is available on www.argusmedia.com

Overview

Argus publishes a monthly 24-month price outlook for chlor-alkali products for the main global regions: North America, northwest Europe, northeast Asia and China. Argus will additionally publish a longer-term five-year price outlook once a year in June.

Argus price forecasts are based on a combination of cost and margin modelling and fundamental analysis by our market experts. No specific weighting is given to these elements.

Publication and timing

Argus Outlook data is published in a monthly PDF format, via the Argus Direct online platform and are available through various Argus data feeds. A downloadable spreadsheet containing the key price outlook is also available via Argus Direct.

Publication is on the second Wednesday of the month.

Fundamental analysis

Our market experts will analyse any factors they consider relevant to providing a credible forecast. These may include but are not limited to: analysis of Argus' ECU modelling, current market prices, supply and demand outlook, capacity changes, known maintenance, trade flows and anticipated trade flows.

Forecast prices

Forecasts are published for the following products and basis:

- Caustic soda fob US Gulf coast export
- Caustic soda domestic contract northwest Europe
- Caustic soda fob northeast Asia export
- Caustic soda China domestic

Redactions

To avoid influencing active contract negotiations, forecasts for monthly or quarterly contracts that are under active negotiation at the time of publication will be redacted from publication.

For northwest Europe this means the forecast of the nearest quarterly contract price will only be published in the second month of the preceding quarter (i.e. a forecast for the second quarter will be published in February, but not in March or April).

Additional data

In addition to caustic soda price forecasts, Argus publishes underlying modelled values for ECU cash cost, for each of the key regions, North America, northwest Europe, northeast Asia and

China.

The ECU cost model

Argus calculates and publishes Electrochemical Unit (ECU) cash-cost forecasts in each major production region.

Cash cost: The sum of variable costs and fixed costs, where:

Variable costs: Feedstock costs (electricity + salt, less a credit for hydrogen) + catalyst costs + utilities (steam)

Fixed costs: Labour costs + capex costs

Capex costs: The sum of inside battery line (ISBL) costs and outside battery line (OSBL) costs.

- ISBL (USD mn): inside battery line costs — assessed per million tonnes of capacity in the US and adjusted to other regions and for the assumed capacity of the plant, includes an inflation adjustment
- OSBL (USD mn): outside battery line costs — assessed per million tonnes of capacity in the US and adjusted to other regions and for the assumed capacity of the plant, includes an inflation adjustment

Variable costs: the sum of the following components

Variable costs: the Argus price outlook for feedstocks (as outlined below) * the cost of that feedstock (USD/t) required to produce a unit of ECU in the Argus model.

- Salt cost (USD/t of ECU) = Salt price (USD/t) * Operating rate (%) * Salt consumption (t/t of ECU)
- Electricity cost (USD/t of ECU) = Electricity price (USD/kWh) * Operating rate (%) * Electricity consumption (kWh/t of ECU)
- Catalysts and chemicals: the costs of chemicals and catalysts required to produce a unit of ECU in the Argus model
- Utilities: the sum of the following components.
 - Steam: Argus steam price outlook (as outlined above) * the amount of steam required to produce 1 unit of ECU in the Argus model
 - Steam cost (USD/t of ECU) = Steam price (USD/t) * Operating rate (%) * Steam consumption (t/t of ECU)
 - Steam costs are calculated by fuel, dependent on the region.
 - Fuel: the Argus price outlook of the fuel price (as outlined below) * the number of tonnes of fuel (coal or natural gas) required to produce 1 unit of ECU in the Argus model

Co-products: the sum of the following components

- Hydrogen credit: the Argus assessment of the fuel price (as outlined above) * the amount of fuel produced as a result of producing 1 unit of ECU in the Argus model (2.5 mmBtu/t of ECU)

Fixed costs: the sum of the following components

- Labourer salary: the cost of employing an assumed number of labourers at an assessed annual salary divided by the ECU capacity of the facility
- Foreperson salary: the cost of employing an assumed number of forepersons at an assessed annual salary divided by the ECU capacity of the facility
- Supervisor salary: the cost of employing an assumed number of supervisors at an assessed annual salary divided by the ECU capacity of the facility
- Maintenance: a percentage based on the Argus model of the ISBL costs described above divided by the ECU capacity of the facility
- Overheads: a percentage based on the Argus model of the labour and maintenance costs described above
- Insurance and tax: a percentage based on the Argus model of the capex costs described above divided by the

ECU capacity of the facility

Model parameters and assumption

Electrochemical Unit; a unit of measure reflecting the chlor alkali process outputs of 1 tone of chlorine, 1.1 tons of 100pc caustic soda and 0.03 tons of hydrogen.

Capacity

Assumed to be 399,000t/yr for US diaphragm process, 399,000t/yr for US membrane process, 225,000t/yr for northwest Europe membrane process and 1.040mn t/yr northeast Asia membrane process

Five-year outlook

Where the described model parameters and assumptions are unavailable for the whole five-year forecast period, Argus will make an internal forecast for the balance of the period.

Region/input	Source type	Source
North America		
Natural Gas	Henry Hub Natural Gas Future (Nymex future prices)	Argus internal
Electricity	Calculated from Henry Hub Nymex future prices	Argus internal
Salt	Argus forecast	Argus internal
Hydrogen	Calculated from natural gas	Argus internal
Steam	Calculated from natural gas	Argus Internal
Northwest Europe		
Electricity	Argus German OTC forward market assessments	Argus European Electricity
Salt	Argus forecast	Argus internal
Hydrogen	Calculated from natural gas	Argus internal
Natural gas	Argus Natural Gas TTF forecast	Argus European Gas and LNG Outlook
Steam	Calculated from natural gas	Argus Internal
Northeast Asia		
Electricity	Calculated from coal	Argus Internal
Coal	South China cfr forecast	Argus Seaborne Coal Outlook
Natural Gas	Argus LNG Northeast Asia des forecast	Argus Internal
Salt	Argus forecast	Argus internal
Hydrogen	Calculated from natural gas	Argus internal
Natural Gas	Argus LNG Northeast Asia des forecast	Argus internal
Steam	Calculated from coal prices	Argus Internal
China		
Coal	South China cfr forecast	Argus Seaborne Coal Outlook
Electricity	Calculated from coal prices	Argus Internal
Salt	Argus forecast	Argus internal
Hydrogen	Calculated from natural gas	Argus internal
Natural Gas	Argus LNG Northeast Asia des forecast	Argus internal
Steam	Calculated from coal prices	Argus Internal

Change process

Argus welcomes feedback on its reference and modelling approach and will continuously engage informally with clients and the wider industry on best practices. At its discretion, Argus may undertake a formal consultation on changes. Argus commits to communicating any changes in the reference and modelling approach in the first publication after it has been made.

Corrections to outlook

On occasion Argus may publish corrections after the publication date. We will correct errors that arise from clerical mistakes, calculation errors, or a misapplication of our stated modelling approach. If an Argus price assessment or other input to the model is corrected, the model will be re-run and corrected values distributed to subscribers. Argus will never adjust its price forecasts and modelled numbers after publication because of new information

or a change of opinion.

Ethics and compliance

Argus operates according to the best practices in the publishing field, and maintains thorough compliance procedures throughout the firm. We want to be seen as a preferred provider by our sub-scribers, who are held to equally high standards, while at the same time maintaining our editorial integrity and independence. Argus has a strict ethics policy that applies to all staff. The policy can be found on our website at www.argusmedia.com. Included in this policy are restrictions against staff trading in any energy commodity or energy related stocks, and guidelines for accepting gifts.

Argus also has strict policies regarding central archiving of email and instant messenger communication, maintenance and archiving of notes, and archiving of spreadsheets used in the forecasting process.