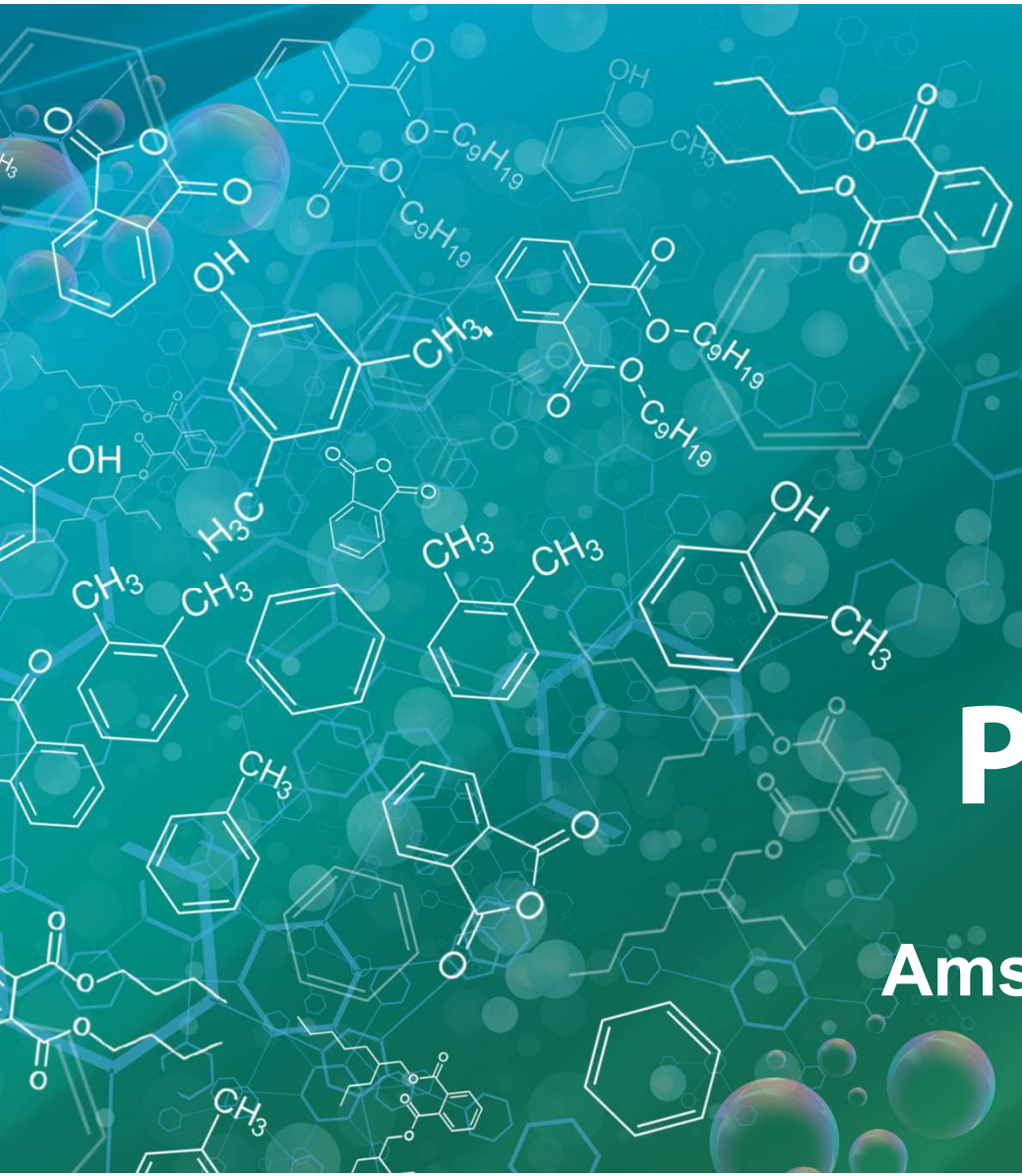

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# DEZA HYBRID PITCH PROJECT

## ITA Conference

## Amsterdam, 27th October 2025

# About DEZA, a.s.

DEZA, a.s. is one of the leading companies in the processing of coal tar and crude benzene. With over 130 years of tradition, our company focuses on the producing basic organic substances for further chemical use. We are one of the largest employers in the region. Our production ranks among the largest of the chemical companies in the Agrofert Group and we are one of the largest companies in Europe with this production program.


# AGROFERT Group

Agrofert is a Czech holding company specialising in agriculture, food and chemical industry. The company was founded in 1993 and has since become one of the largest companies in the Czech Republic. In addition, it owns several major companies in various industries.

# HISTORY

**1892**

**Establishment** of the **Julius Rütgers** tar distillation plant in Ostrava.

**1905**

**Complex processing of tar and benzene from coking plants of the Ostrava-Karviná Basin.**

**1945**

**Nationalization** of the Julius Rütgers Limited Partnership.

**1950**

Renaming to **Urxovy závody.**

**1960**

**Construction of a new plant in Valašské Meziříčí.**

**1990**

Independent **joint stock company DEZA, a.s.**

**1996**

**Production at the Ostrava plant has been stopped.**

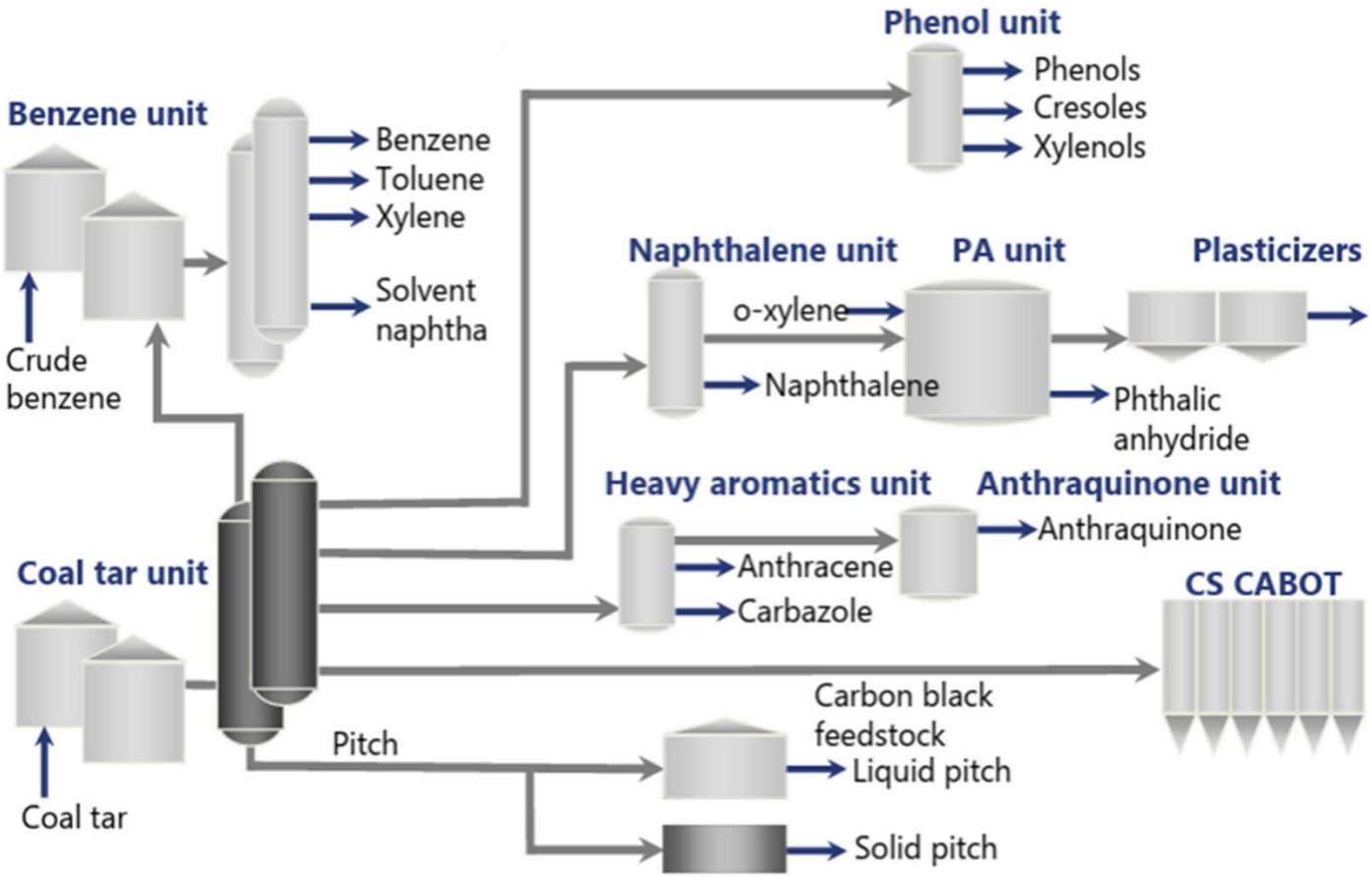
**1999**

**Incorporation into the Agrofert group**





# DEZA PRODUCTION SCHEME




## Basic terms

- **The hybrid pitch** means basically a mixture of coal tar pitch and petroleum pitch.
- Hybrid pitch is produced by mixing coal tar pitch with petroleum pitch or by mixing feedstocks upstream the processing.
- **Alternative raw materials** (feedstock) to coal tar mean heavy aromatic oils on crude oil basis. Biobased alternatives or waste pyrolysis oils are not considered.
- Presented circumstances and trends are especially valid for **central Europe region**. The situation in other parts of the world may differ.
- The general intention of Deza is the use of hybrid pitch for the production of **anodes for aluminium smelting and graphite electrodes**.
- Insoluble particles QI, TI are basically bearers of binder properties of the pitch and high coking yield.

# HYBRID PITCH

## Petroleum pitch

- Distillation residue from heavy aromatic oils on crude oil basis
- Low QI and TI content.
- Lower 24PAH content
- Low „binding“ ability
- Lower carbon yield
- Lower content of heavy metals.

## Coal tar pitch

- Coal Tar distillation residue
- Hi content of QI and TI
- Higher content of 24PAH
- High „binding“ ability
- Higher carbon yield
- Higher content of heavy metals.

## Hybrid pitch

- Combination of useful properties suitable for the desired application.
- Limitation of negative effects.

# HYBRID PITCH UPGRADING

- 20% - 30% of petroleum pitch in hybrid pitch is generally accepted by anode and graphite producers.
- Quality of petroleum pitch has to be adjusted to increase its proportion.

Thermal treatment

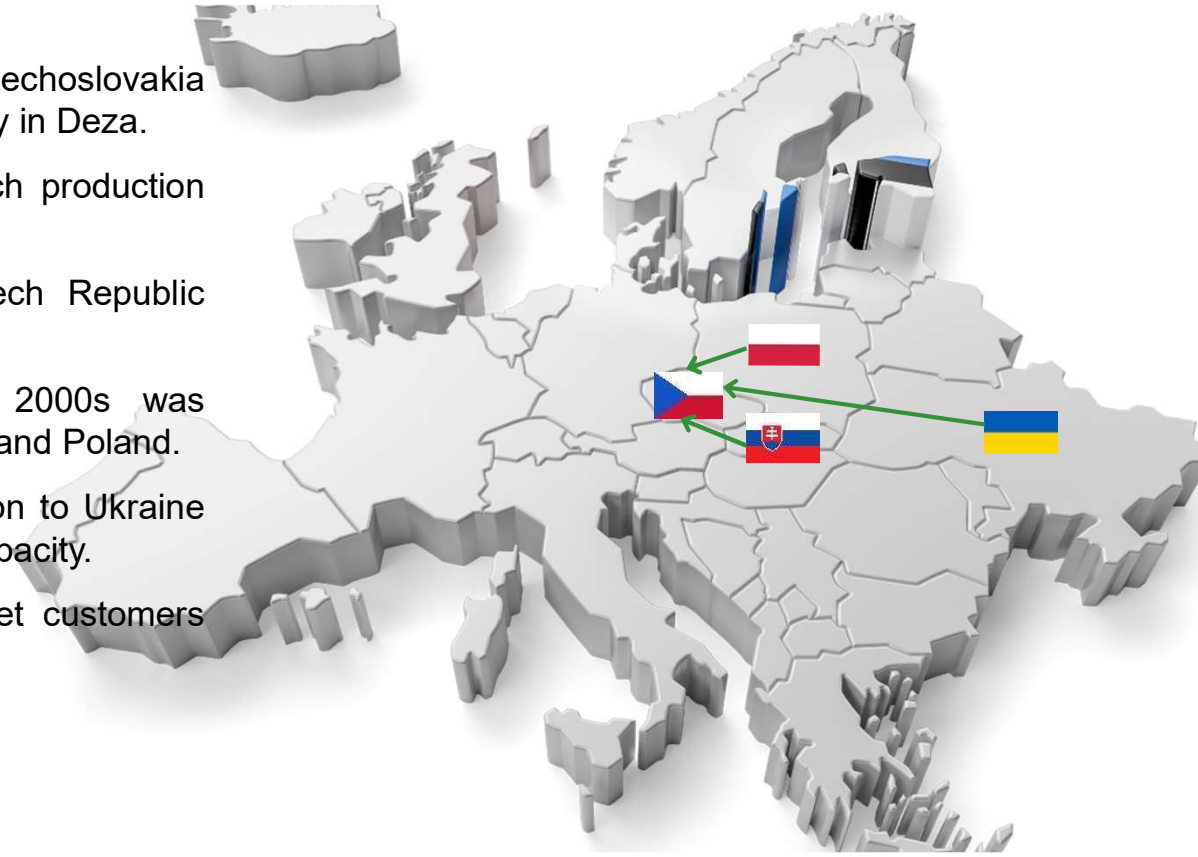
1. To increase the content of TI in petroleum pitch.
2. To increase the coking value of petroleum pitch.
3. To increase the yield of other valuable aromatic compounds such as naphthalene, wash oil, etc.

# PETROLEUM PITCH HISTORY

- Technologies to upgrade heavy oils quality have been known from refineries for decades.
- In the 1960s, some refineries in the US developed the petroleum binder pitch production.
- In the late 1980s and 1990s, coke ovens closure in the US led to the „second age“ in the production of petroleum binder pitch.
- With the Green Deal policy, environmental regulations, and the coke ovens closure, a „new age“ in the production of petroleum binder pitch is currently unfolding in Europe.
- The coal tar distillation facilities and crude oil refineries are usually not in strong partnership in Europe.

# DEZA BACKGROUND

- In the 1970s, 1980s, cokemaking capacity in Czechoslovakia was fully covered by the coal tar distillation capacity in Deza.
- With limited export to western countries, the pitch production capacity exceeded the market size before 1990.
- In the 1990s, cokemaking capacity in the Czech Republic began to decline. The pitch market has expanded.
- The closure of coke ovens in the 1990s and the 2000s was fully compensated by imports mainly from Ukraine and Poland.
- The Green Deal strategy and the Russian invasion to Ukraine further accelerated the decrease in cokemaking capacity.
- Hybrid binder pitch can be the way how to meet customers requirements while decreasing imports of coal tar.

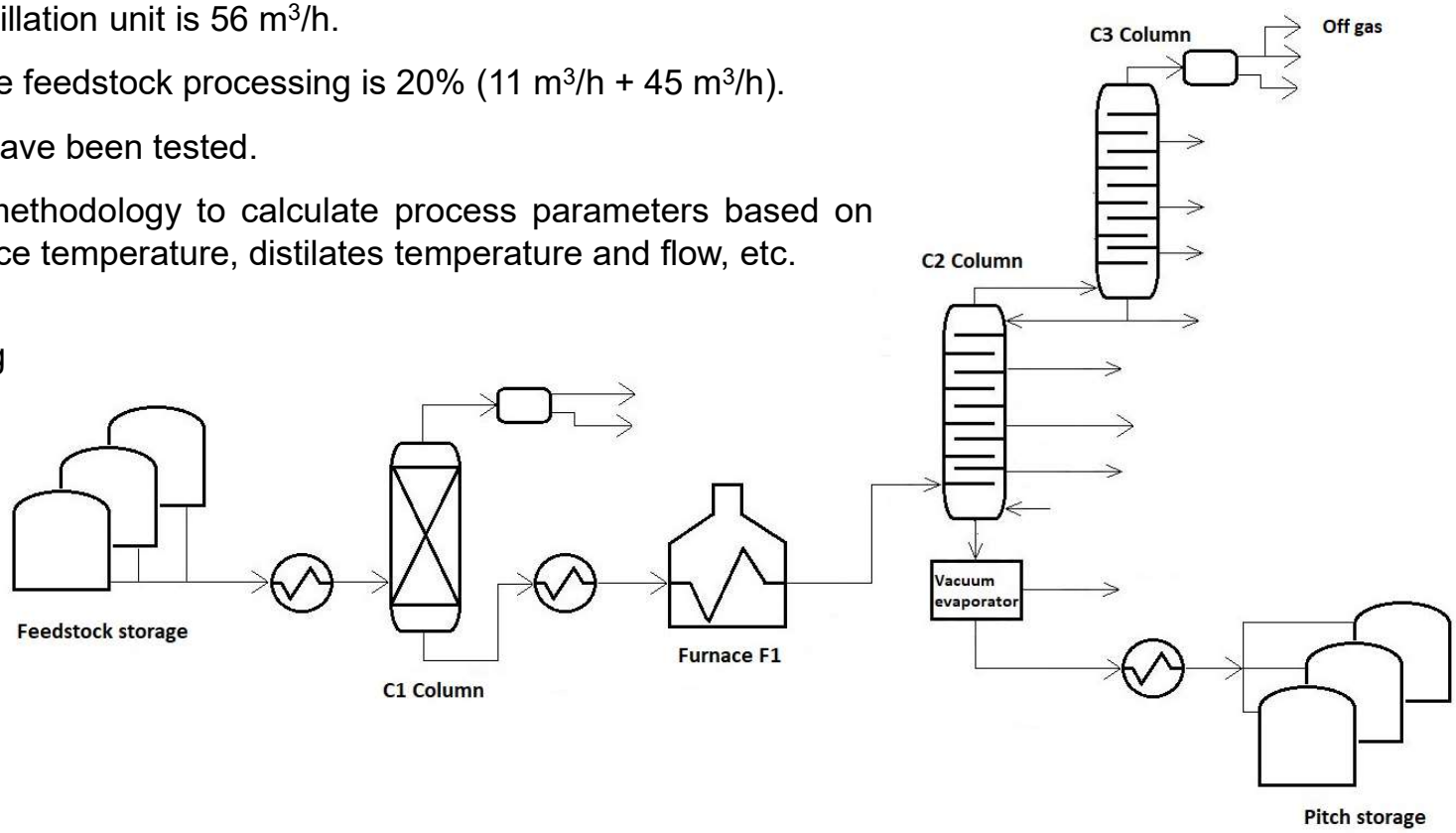


# ALTERNATIVE FEEDSTOCK AVAILABILITY

- High aromatic heavy petroleum feedstock typically comes from steam cracking or FCC.
- Heavy aromatic residues are low-value products for refineries and steam crackers.
- Refineries have improved their process to reduce the amount of aromatic residues (catalyst, feedstock, process parameters, etc.).
- Heavy aromatic oils are typically used for carbon black production, for heat generation or as a marine fuel component.
- Hybrid pitch production may be an attractive alternative to heat generation for refineries.

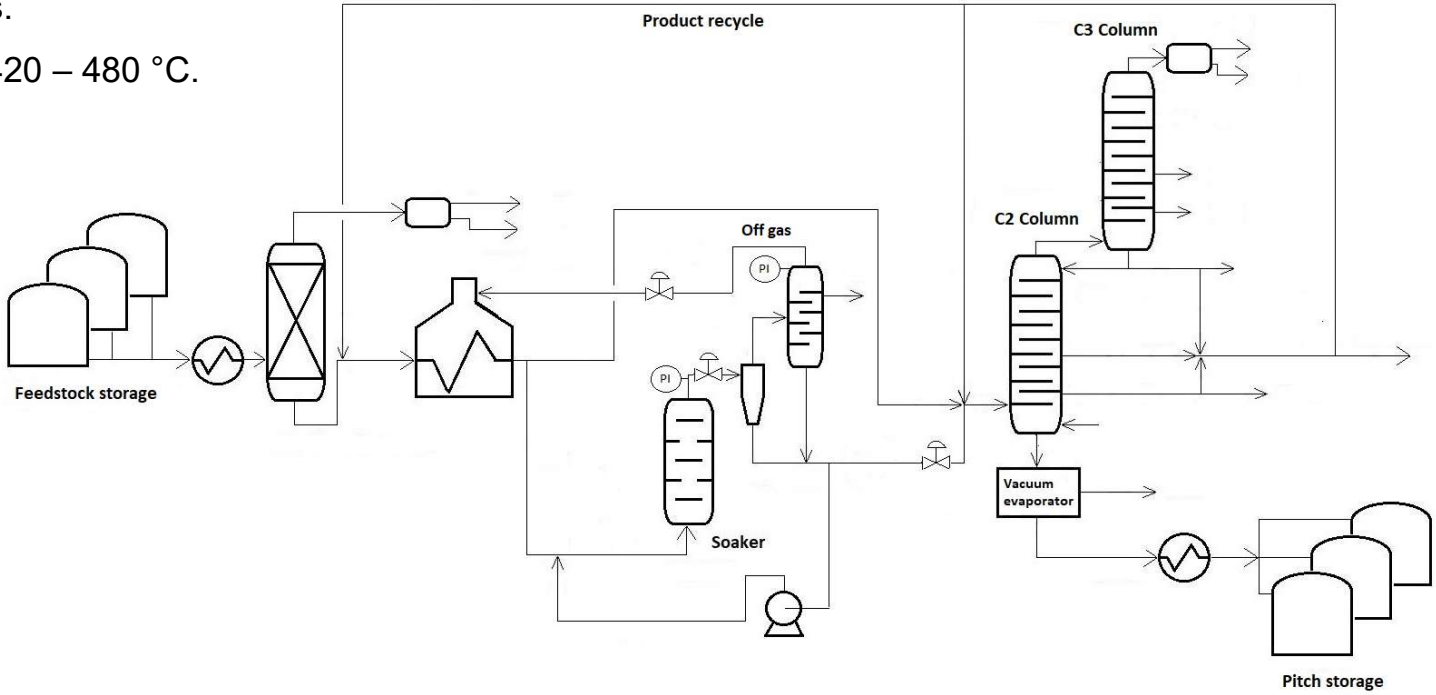
# DEZA HYBRID PITCH PRODUCTION

- Petroleum feedstock injection is fully integrated in existing coal tar flash distillation plant.
- Nominal capacity of coal tar distillation unit is 56 $m^3/h$.
- The target capacity of alternative feedstock processing is 20% (11 $m^3/h$ + 45 $m^3/h$).
- Various alternative feedstocks have been tested.
- Deza has developed its own methodology to calculate process parameters based on laboratory results such as furnace temperature, distilates temperature and flow, etc.
- The main bottlenekcs for alternative feedstock processing are acceptable pitch quality and the off gas amount.



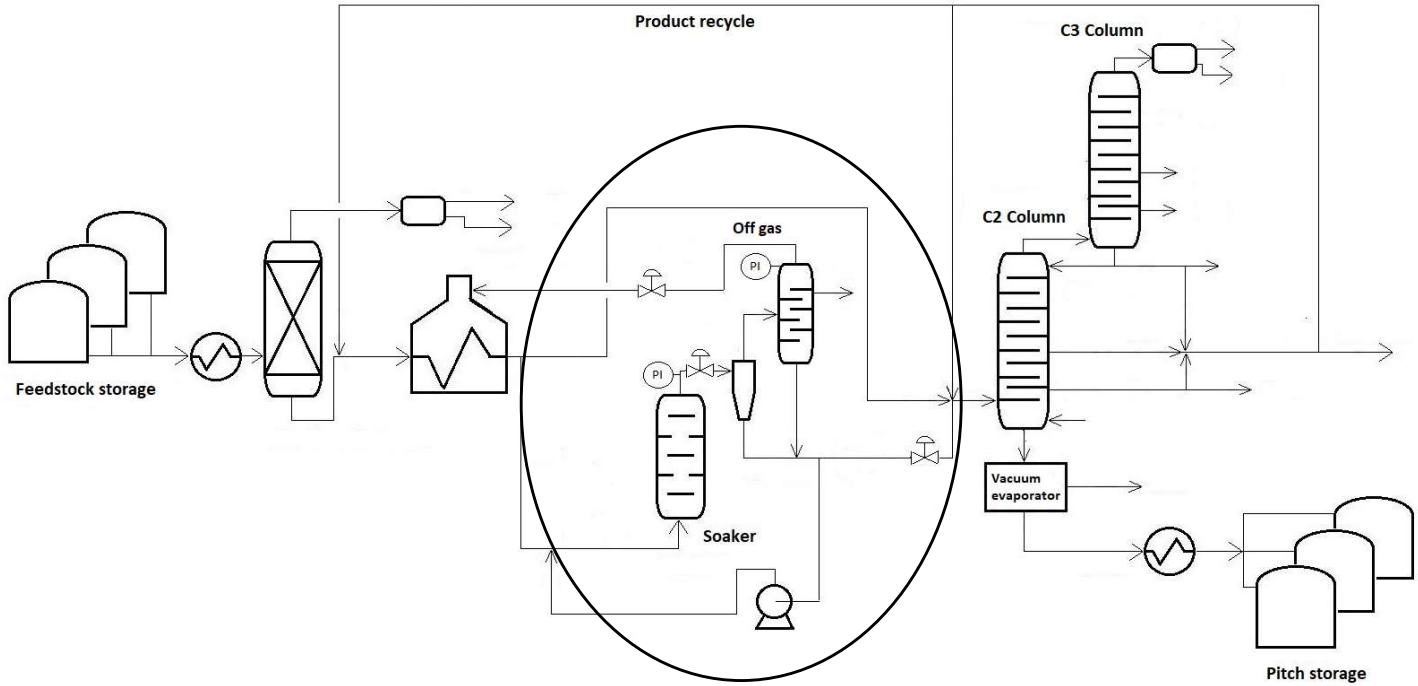
# THERMAL TREATMENT UNIT PROJECT

- Thermal treatment unit will be integrated in existing distillation plant.
- The name „Soaker“ reactor is used by Shell company for its Visbreaker unit.
- Thermal treatment is necessary to increase the TI and carbon yield in alternative feedstock to produce hybrid pitch with higher content of alternatives.
- The furnace temperature will be 420 – 480 °C.
- The residence time in the soaker reactor will vary between 20 min and 1h by product recycle.
- Temperature and residence time will be adjusted according to the type of alternative feedstock, TI in the pitch and the desired yield of key products.



# BASIC RESEARCH RESULTS

- The thermal treatment unit will generate enough tail gas for heating all process furnaces.
- Thermal treatment is feasible also for coal tar or any coal tar distillates (CBF, creosote).
- Low value products can be recycled.
- The „Soaker“ revamp of the distillation unit can increase the petroleum content in hybrid pitch to desired level.



# PROCESS LIMITATIONS

- In the continuous thermal cracking step of aromatic feedstock, the prevention of fouling is crucial.
- The higher soaking temperature and residence time, the higher the fouling risk.
- The most risky parts are furnace soaker and bottom of the downstream fractionator.
- The fouling occurs on the place where the material flow decreases under the limit and the temperature is high enough for coking reaction – „frozen river effect“
- The detail design of the equipment must be carried out based on CFD analysis.
- The utilization of the gas generated during the heat treatment step is not permitted without the desulphurization.

# SUMMARY

- Deza company has integrated the hybrid pitch production into the distillation unit in response to the demand from European customers.
- The „Soaker“ revamp of existing distillation unit is challenging.
- The availability of alternatives may change in the future (EUA price, marine fuel demand, EU regulations, etc.)
- Deza needs to find a strong partner for detailed development of the new process.
- Current low demand and low price of pitch does not support the project implementation.
- The future of heavy industry in EU remains uncertain.

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# THANK YOU FOR ATTENTION