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## Subject: Abstract MVR based Solvent Recovery systems

The European Green Deal is the European Union's overarching objective to become the first climateneutral continent by 2050. The EU aims to reduce greenhouse gas emissions by 55 % by 2030 compared to 1990 levels. European companies shall become world leaders in clean products and technologies. Besides these ambitious goals, actual global crises and escalating fossil fuel prices threaten the process industry. Those facts will radically transform the pulp, biorefinery & fiber industry and relevant production processes.

There is a need to rethink established production processes across all industries, becoming more sustainable and environmentally friendly. Using mechanical vapor recompression (MVR) systems based could help companies reduce their CO<sub>2</sub> footprint and become more sustainable using green and renewable energy.

MVR systems are based on an open heat pump principle and are used for various evaporation and distillation tasks, especially within the pulp, biorefinery and fiber industry. It is an energy recovery process for reusing low-pressure waste steam. Typically vapor streams increase the temperature of the latent heat by using compressor units for being reused as a heating medium. The recompression requires only minimum energy compared to raising an equivalent amount of steam in a boiler. Depending on the process conditions, MVR systems require either no or only very little supply of live steam and cooling during continuous operation.

As a specialist in evaporation technology, GIG Karasek supplies state-of-the-art thermal separation plants worldwide, from main equipment supply up to turnkey installations. In the Fiber and pulp industry, GIG Karasek is one of the world's leading plant suppliers and process developers for solvent recovery applications.

For the recovery and concentration of solvents (e.g. NMMO, ionic solvents, etc.) from a spinning bath in Fiber Plants a brand-new patented process concept has been developed based on MVR Technology. Usually, the Solvent Recovery has been realized by Multiple Effect Evaporation Plants until now which can handle quite high Boiling Point Rises of the Liquor such as NMMO/Water or Ionic Solvent/Water Solutions. Due to an advanced process concept and improvements in MVR Compressor Technologies, it is now possible to use a pure MVR system for reaching final concentration and handling highest Boiling Point Rises by Iowest thermal stress. As Evaporation Plants are one of the major steam & cooling water consumers in all plants, high OPEX and CAPEX costs could be saved, especially if the sites are not integrated in a pulp mill which is mostly the case. As gas boilers are the common steam generators in such plants, the new MVR System could be of special interest as live steam demand could be reduced about ~97%. Furthermore, the dependency

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on gas supply could be reduced as investments in gas boilers could be dramatically reduced or even cancelled. Instead, renewable electrical energy could be used which will contribute to a greener future.

Advantages of the brand-new MVR Solvent Recovery System are:

- Reduction in overall CAPEX costs of Fiber and Pulp Plants
- Providing an ideal solution for a carbon neutral production
- Reduction in dependency on natural gas supply
- Significantly lower cooling water demand
- Reuse of low-pressure steam possible
- Lowest solvent losses
- Reduction in OPEX
- Little fouling

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