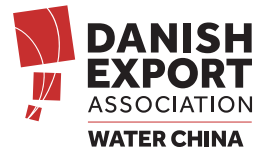


## 中丹水技术交流会概要 – 饮用水和污水处理

### Compendium for Sino-Danish workshop on Drinking Water and Wastewater Treatment



EMBASSY OF DENMARK  
The Trade Council



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# 欢迎辞

## Welcome



Ilse Korsvang

中丹友谊源远流长。丹麦是1949年新中国成立后最早承认中华人民共和国的西方国家之一，自1950年我们建立外交关系，如今一起经过了72周年。

长期以来，环保领域的合作一直是中丹之间的重点领域，两国政府已经签署多个框架合作协议。出于世界的需求以及发展行业的巨大潜力，丹麦和中国环境部之间签署的合作协议已将水行业列为高度优先领域之一。上述协议建议的合作形式之一就是由企业参加的联合举办的研讨会，我很高兴贵司接受了我们的邀请来一起举办研讨会。

中国作为全球第二大经济体，计划将其经济转型为绿色增长，我们高度赞赏中国制定的2030和2060年实现减少二氧化碳排放的目标，这跟丹麦的目标是一致的。如果能与您和中国水务单位一起合作来实现这些目标，我们将感到非常高兴。

在该文件中，我们收集并介绍了一些丹麦的最佳实践经验和知识。我们非常希望，这些研讨会可以成为和您一起在中国发展新的解决方案的起点，并共同创造令人瞩目的成果，从而造福于环境

The friendship between China and Denmark has a long history. Denmark was one of the first Western countries which recognized the People's Republic of China just after its foundation in 1949, and we have had diplomatic relationships since 1950, thereby, just passing our 72's anniversary together.

Cooperation in the field of environmental protection has long been a focus area between China and Denmark, and many framework agreements have been signed at state level. The cooperation agreement signed between the environment ministries of Denmark and China has put the water sector as one of the high priority areas due to the World's need and the huge potential in developing the sector. One of the cooperation forms recommended by the above agreement is jointly organized workshops attended by the enterprises, and I am very glad that your company has accepted our invitation to jointly organized workshops.

We follow with great interest China's plan as the second largest world economy to transfer its economy to green growth, and we highly appreciate the goals of CO2 reduction addressed for 2030 and 2060, which are in line with those of Denmark. It would be our pleasure if we could co-operate with you and the Chinese water sector to reach such goals.

In this folder, we are presenting some of all the best practices and knowledge collected in Denmark. It is our great hope that these workshops may be the starting point of developing new solutions and impressive results together at plants in China for the benefit of the environment.



Lixia Duan



Jingquan Lu



Angela Zhang



Lars Eskild Jensen

# 丹麦出口 – 水技术中国 会员企业

## Danish Export - Water China Members





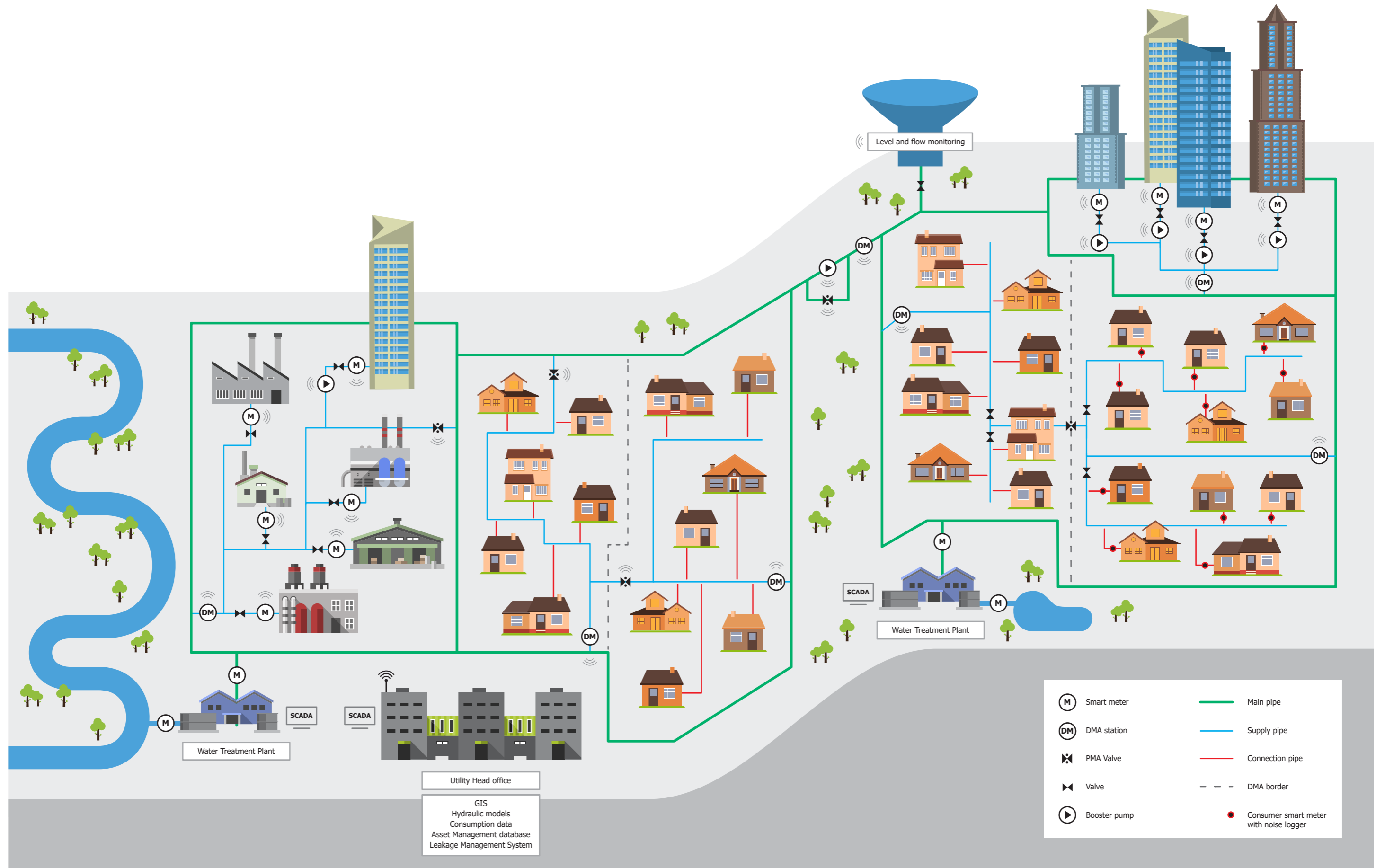
Next / 请继续关注...

丹麦供水系统

Water Supply System



# Water Supply System, Denmark





20-25%

- 全球输水管网的漏损率有20-25%  
- of all distributed water globally is lost or never invoiced.

7-8%

· 丹麦自来水公司的非收益水只有7-8%

Danish water utilities have a national NRW average of just 7-8 percent.



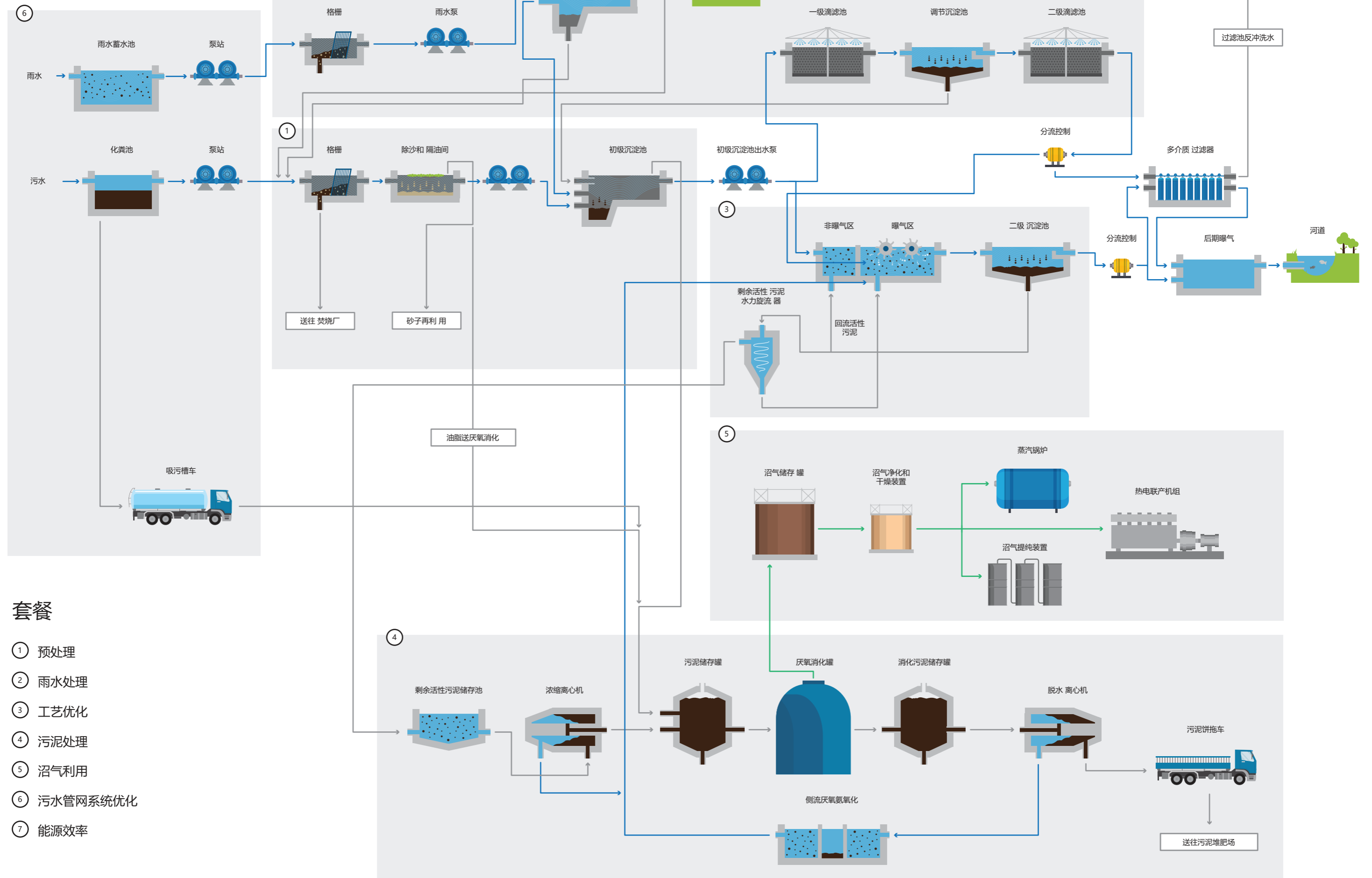


Next / 请继续关注...

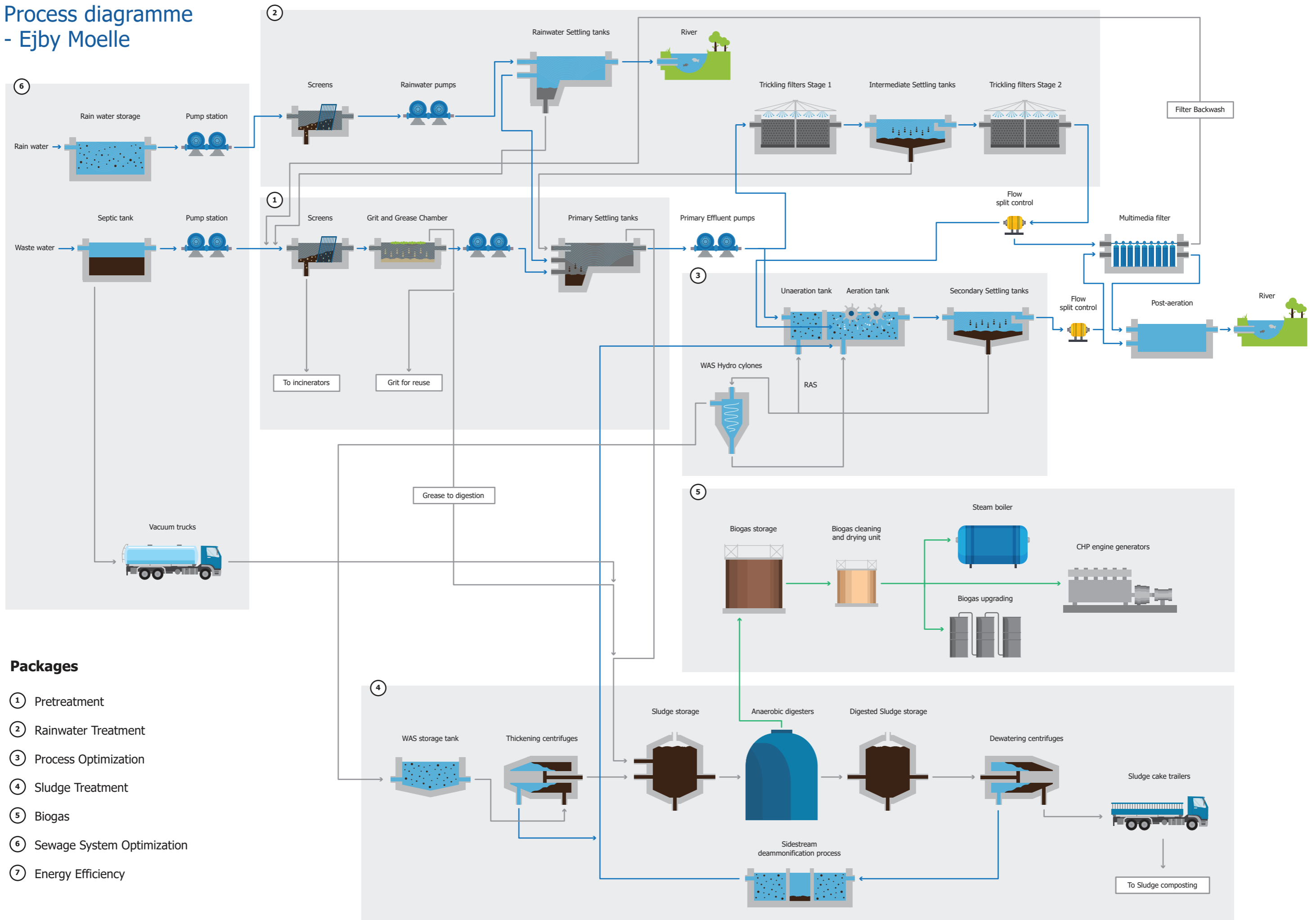
# 污水处理厂-- 介绍

## WWTP-introduction

# 艾比米勒污水厂 工艺流程图



# Process diagramme - Ejby Moelle

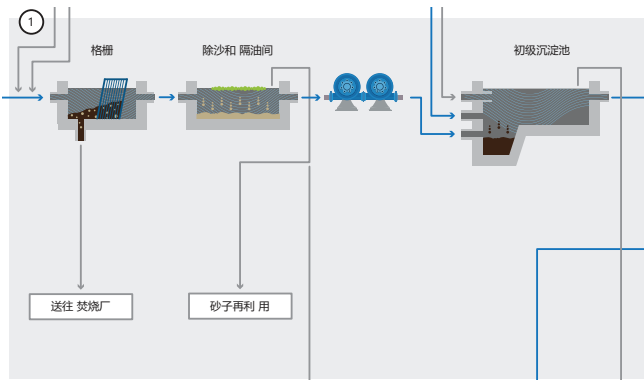


## Packages

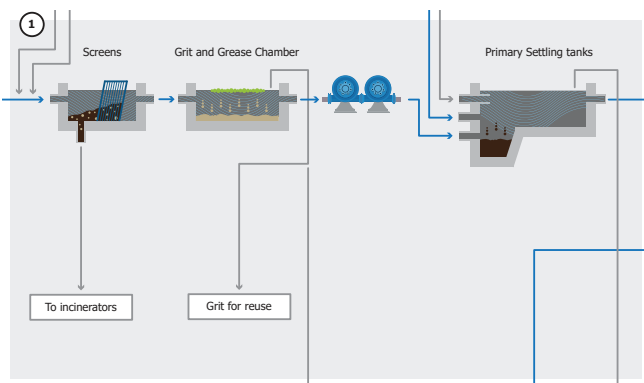
- ① Pretreatment
- ② Rainwater Treatment
- ③ Process Optimization
- ④ Sludge Treatment
- ⑤ Biogas
- ⑥ Sewage System Optimization
- ⑦ Energy Efficiency

# 技术包1 - 预处理

## Package 1 - Pretreatment



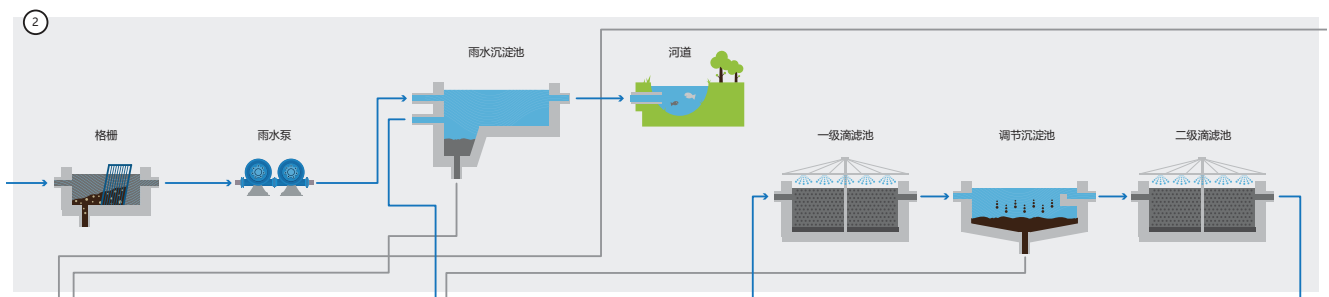
对来水进行预处理，是为了捕获来水中的有机质并去除沙土。在生化池之前除去油脂和固态有机物质能够减少生化池的有机负荷，这将大幅减少曝气的能耗。同时，所捕获的有机质用于能源生产。通过去除沙土，可以提高生化池中活性污泥的活性，增加生化池的有效容积，减少最终需要处置的污泥的发生量。分选出来的砂粒可以用于道路建设等。



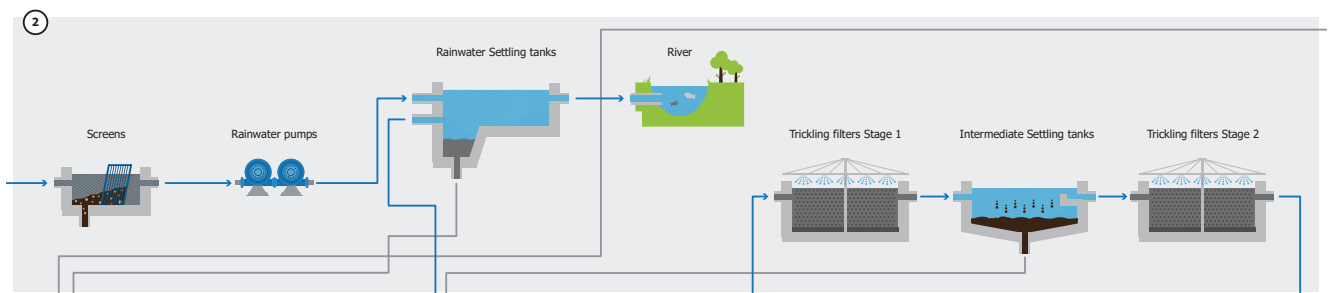
Pre-treatment of the incoming wastewater is to harvest the organic material and to remove the sand. If the grease/oil and the solid organic material are removed before the biological tank, the organic load to the biological tank will be reduced. This means that less energy will be needed for aeration, and at the same time the harvested organic matter can be used for energy production. By removing the sand, the activity of the activated sludge in the biological tank will be increased, and the amount of final sludge for disposal will be reduced. The sand can be re-used, for example, for road construction.

## 技术包2 - 雨水处理

# Package 2 - Rainwater Treatment



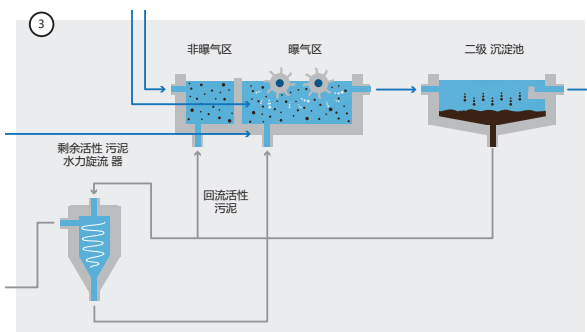
采用分流制收集和输送城区内的雨水和污水，是一种理想的方式。降雨初期，雨水会将地表的沙尘及各种污染物冲刷到排水系统。这部分雨水应加以处理。雨水经过格栅和初步沉淀后，由两级滴滤池处理，其中一级滴滤池主要去除COD，二级滴滤池主要去除NH<sub>4</sub><sup>+</sup>和NO<sub>3</sub><sup>-</sup>。这样的工艺设置并不复杂，仅需要把雨水抽至滤池顶部，然后从滤料中布洒下来。因此，这是一种经济有效的雨水处理方法。



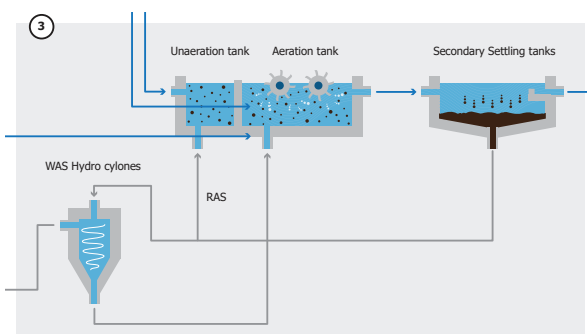
Ideally, rainwater and wastewater should be collected and transported separately in the urban area. When it starts to rain, the rainwater in the beginning period will rush out dust, sand and different pollutants on the surface of the ground into the drainage system. This fraction of rainwater should be treated. After screening and primary sedimentation, the rainwater is treated by the two-stage trickling filter tanks, of which the first tank removes COD while the second one removes NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup>. Such process setup is not sophisticated. Rainwater is pumped and spread from the top of the tanks. So, this is an economic and efficient way of treating rainwater.

# 技术包3 - 工艺优化

## Package 3 - Process Optimization



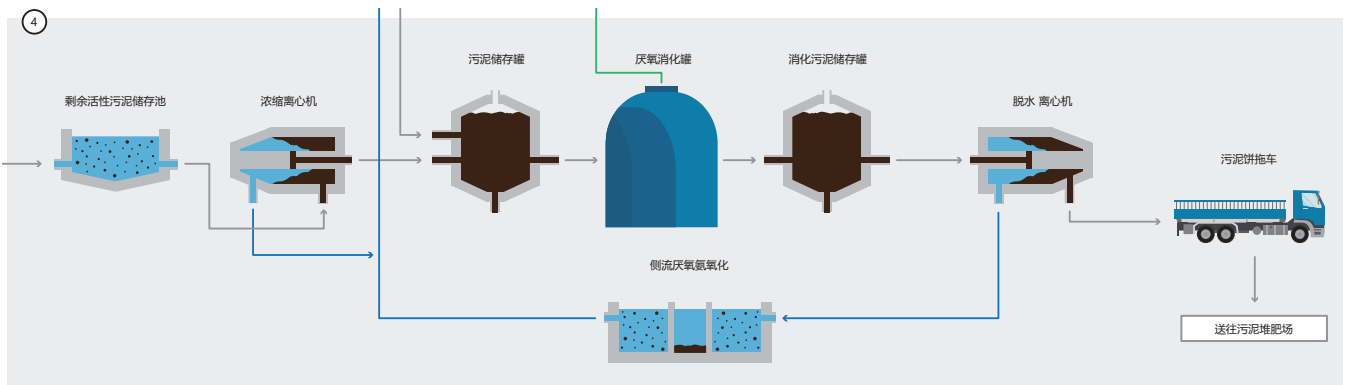
如果通过在线检测和控制来监控生物过程，则在线数据（例如 $\text{NH}_4^+$ ， $\text{NO}_3^-$ ， $\text{N}_2\text{O}$ ，COD和氧化还原浓度）将用于对曝气、缺氧和厌氧阶段的精确控制。这样的操作将减少曝气能耗，最重要的是，它可以更有效地去除有机物、氮和磷，从而确保高质量的出水。优化流程后，污水厂将减少对人工操作的依赖。通过双重过程控制软件和来自设备PLC接口的预警，可以提前排除自控系统的故障。



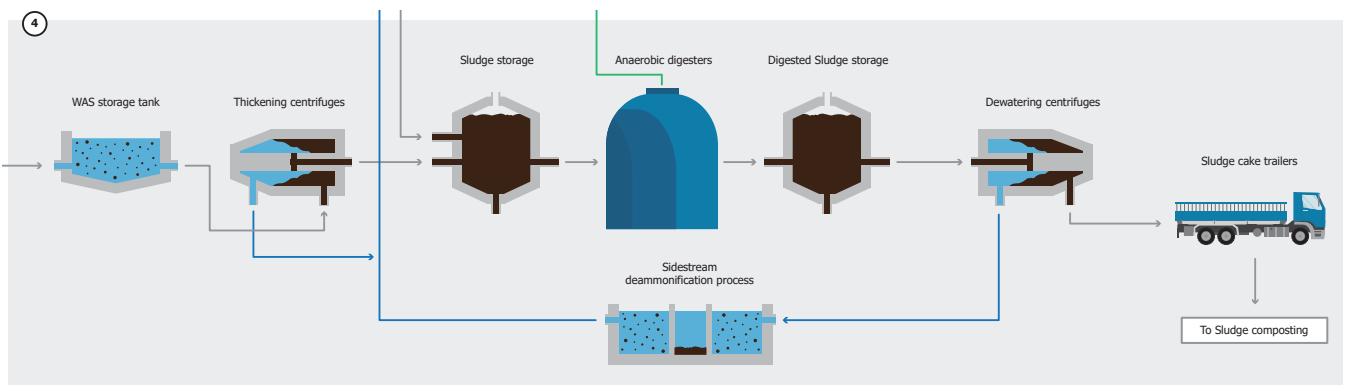
If the biological process is monitored by on-line measurement and control, the online data such concentrations of  $\text{NH}_4^+$ ,  $\text{NO}_3^-$ ,  $\text{N}_2\text{O}$ , COD and Redox will be used for accurate aeration and for precise operation of the stages of anoxic and anaerobic. Such operation will reduce the energy for aeration, and most importantly it gives a more efficient removal of organic matter, nitrogen, P, and thus ensures a high quality of treated water. After the process is optimized, less persons will be needed to work at the plant. Failure of automation will be avoided by the double-controlling process software and by the warnings from the interface of PLC of the equipment.

# 技术包4 - 污泥处理

## Package 4 - Sludge Treatment



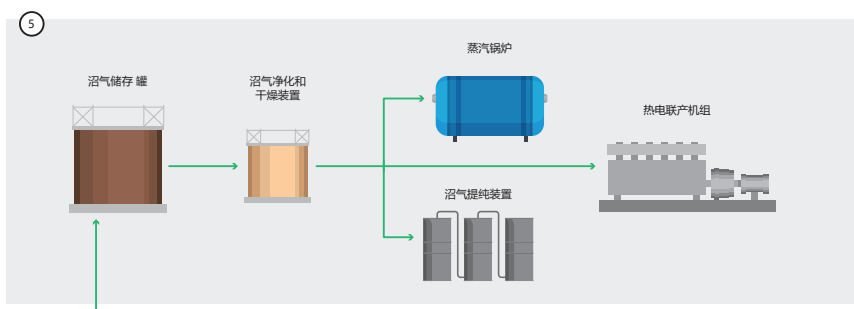
通过厌氧消化，污泥中的大部分有机物（50-70%）将分解为沼气用以产生能源，病原体被杀灭，N，P，K等养分会释放到已经稳定化的消化产物中去。经过脱水，消化产物可用作肥料，滤液将通过厌氧氨氧化工艺进行处理，以去除NH<sub>4</sub><sup>+</sup>和NO<sub>3</sub><sup>-</sup>污染物。厌氧消化是一种可持续的污泥处理方法，不仅可以减少污泥对环境的影响，而且可以从污泥中回收资源。



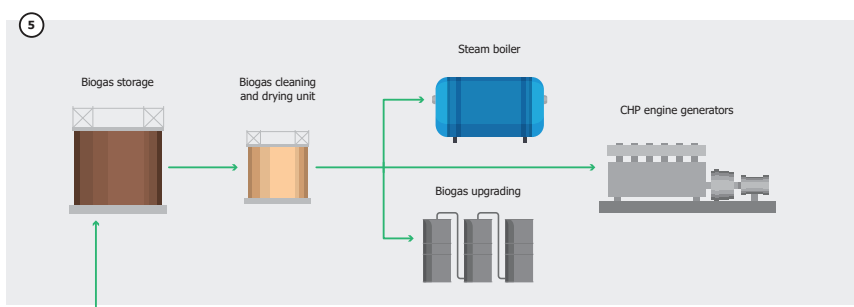
By anaerobic digestion, a large fraction (50-70%) of the organic material in the sludge will be decomposed into biogas for energy production, pathogens are killed, and nutrients such as N, P, K and etc. are released into the stabilized digestate. After dewatering, the digestate can be use as fertilizer, and the rejected water will be treated by the process of anammox to remove the pollutants of NH<sub>4</sub><sup>+</sup> and NO<sub>3</sub><sup>-</sup>. Anaerobic digestion is a sustainable treatment method, which can not only minimize environmental impact, but also recover resources from the sludge.

# 技术包5 - 沼气

## Package 5 - Biogas



沼气来自污泥中的有机物质，因此它是二氧化碳中性的。来自消化池的沼气中含有水分和H<sub>2</sub>S。因此，必须对其加以净化，以免腐蚀设备和污染环境。净化后的沼气可用作锅炉或热电联产机组的燃料。随着技术的不断进步和成本的降低，如今越来越多的沼气被提纯为生物天然气，提供给公共燃气网，或用作交通燃料。

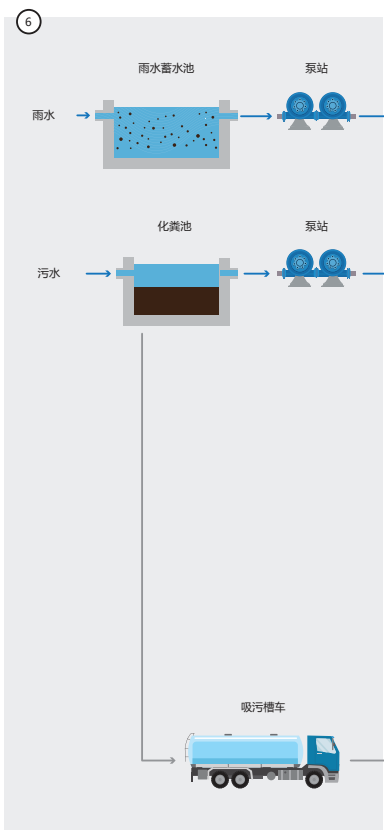


Biogas is from the organic material of the sludge, so it is CO<sub>2</sub>-neutral. Biogas from the digestion tank contains moisture and H<sub>2</sub>S. So, biogas must be cleaned in order to avoid corrosion to the equipment and pollution to the environment. After cleaning, biogas can be used as fuel for boilers to produce heat or for combined heat and power production. With continuous technology improvement reduction of operation cost, nowadays, more and more biogas is upgraded to CH<sub>4</sub> gas and supplied to the public gas grid, or used as fuel for transportation.

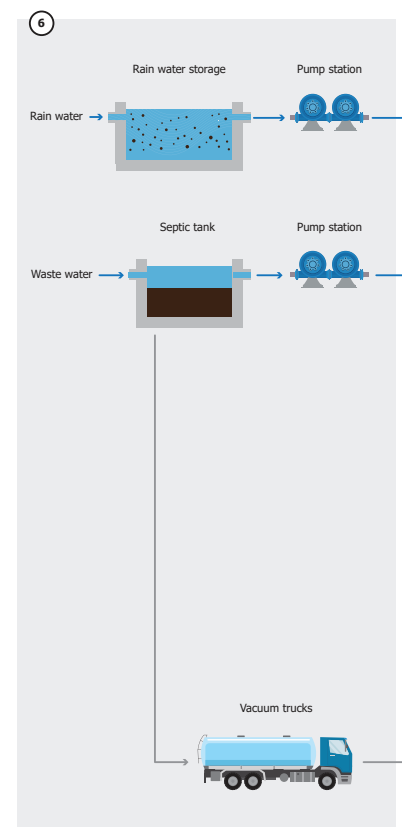


# 技术包6 - 污水处理系统优化

## Package 6 - Sewage System Optimization



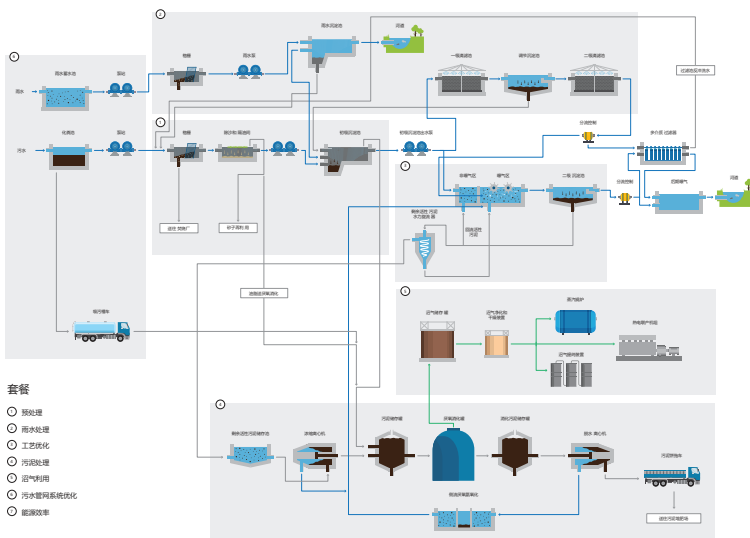
污水处理厂的任务是有效的处理其服务区内的污水。只有尽可能有效地将污水及其中的污染物有效收集和运输到污水处理厂，污水处理厂才能发挥其全部功能。因此，功能完备的污水管网系统是必不可少一部分。首先，应将雨水和污水分开，以避免污水溢出，并且还应防止沙尘被雨水冲入污水中。同时，必须维护和优化污水管网以确保其功能。如果有有机物在化粪池中滞留或沉积在管道中的时间过长，有机物将在其中降解，会产生有气味的有害气体（例如H<sub>2</sub>S）和温室气体（例如CH<sub>4</sub>和N<sub>2</sub>O）。同时，污水处理厂进水的化学需氧量将很低。这不利于磷和氮的去除，并且在这种情况下，污水处理厂无法实现能量中和或资源回收。因此，有必要定期清理化粪池并疏通管道，以确保污水中的有机物在污水处理厂中得到处理。



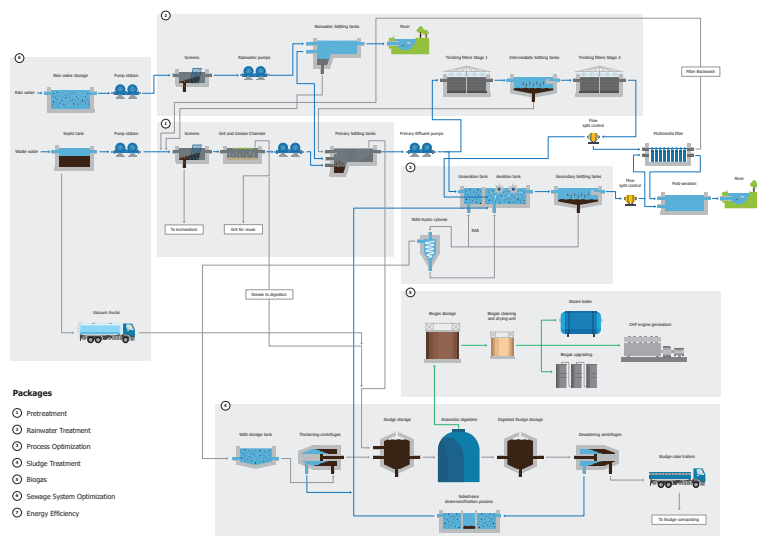
The mission of the WWTP is to effectively treat the sewage within its service area. Only with effective collection and transportation of the sewage and the pollutants in it to the WWTP as much as possible, can the WWTP play its full function. Therefore, a functioning sewage network system is an indispensable part. First of all, rainwater and sewage should be separated to avoid overflow of sewage, and also to prevent sand and dust from being washed by rainwater into the sewage. At the same time, the sewage pipe network needs to be maintained and optimized to ensure its function. If the organic matter is retained in the septic tank or deposits in the pipeline for a too long period, the organic matter will be degraded in it, producing odorous and harmful gases such as H<sub>2</sub>S, and greenhouse gases such as CH<sub>4</sub> and N<sub>2</sub>O. At the same time, the COD in the influent of the WWTP will be low. This is not conducive for phosphorus and nitrogen removal, and in such condition, the sewage plants cannot achieve energy neutralization or resource recovery. Therefore, it is necessary to clean regularly the septic tank and dredge the pipeline to ensure the organic matter in the sewage is transported and treated in the WWTP.

# 技术包7 - 能源效率

## Package 7 - Energy Efficiency



为了提高污水处理厂的能源效率，要进行必要的能源审核。通过能源审核，可以确定过程中能耗最高的单元或工艺阶段。有多种方法可以提高污水处理厂的能源效率。用高质量和高能效的设备来替代现有设备有可能是当务之急。其次，工艺优化，尤其是通过在线监测和控制来优化生物池的运行非常重要，因为曝气和回流活性污泥一般是污水处理厂能耗最大的部分。此外，安装热回收设备从消化池的出料中回收热量，且使用有效的隔热材料会减少热能的损失。



In order to increase the energy efficiency of a WWTP, conducting an energy audit is necessary. Through energy audit, the most energy-consuming units or sections of the process will be identified. There are different ways to increase the energy efficiency for a WWTP. Renewing the existing equipment with high quality and high energy efficient equipment is of the first priority. Secondly, process optimization, especially optimize the operation of the biological tank by online monitoring and control is of great importance, as aeration and recycling activated sludge accounts the largest fraction of the total energy consumption of the WWTP. Besides, installation of heat recovery equipment to harvest heat from the effluent of the digestion tank, and use of effective insulation material will reduce loss of heat energy.



**180%**

能源产出的污水处理厂

Energy generating wastewater treatment plants

**50%**

减少污泥中50%的干物质含量

Reduction of dry matter content in sludge

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会员介绍 / Member introduction

# 会员公司和技术包

## Members and packages Drinking water

您可以在下面找到每个会员公司的产品所关注的重点

Below you can find the main product focuses for each member.

公司 / Company	技术包 / Package	资产管理 Asset management	运行 Operation	用户用水数据 Data on pressure and flow	消耗数据 Data on consumption	自来水水质 Tap water quality	地理信息系统、SCADA和资产管理 GIS, SCADA, Asset Management
丹佛斯自动控制管理 Danfoss		●	●	●		●	
埃维柯阀门 AVK Valves		●	●	●		●	
格兰富水泵（上海）有限公司 Grundfos		●	●	●	●	●	●
EWA Sensor		●	●	●			

# 会员公司和技术包

## Members and packages Wastewater

您可以在下面找到每个会员公司的产品所关注的重点

Below you can find the main product focuses for each member.

公司 / Company	技术包 /Package	管线 Pipeline	预处理 Pretreatment	雨水处理 Rain water treatment	工艺优化 Process optimization	污泥处理 Sludge treatment	沼气 Biogas	排水系统优化 Sewage system optimization	能源效率 Energy efficiency
丹佛斯自动控制管理 Danfoss		●	●	●	●	●	●	●	●
埃维柯阀门 AVK Valves		●	●	●	●	●	●	●	●
Unisense Environment A/S					●				●
格兰富水泵（上海）有限公司 Grundfos		●	●	●	●	●		●	●
MUTAG A/S					●				●
EWA Sensor			●	●	●	●	●	●	●



## 丹佛斯（上海）投资有限公司

上海市宜山路900号科技大楼C楼18层



### 综合简介

丹佛斯是一家拥有超过28000名员工，业务遍及100多个国家的跨国公司。丹佛斯中国员工超过了5000人。丹佛斯是水 and 污水行业全球最大的变频器供应商，所有工厂符合来自汽车行业最严格生产质量标准。50年来，丹佛斯已成为电机调速控制的全球领导者。我们拥有全球最大变频器装机量，包括VLT®和VACON®系列产品，并具备几十年来在各行业积累的丰富应用经验

### 产品及服务

丹佛斯可以为水和污水行业提供多种变频器产品，其中核心产品是为水工业专门研发的AQUA系列变频器。VLT® AQUA变频器将专业的应用知识和强大的变频技术结合起来，使得水司的运营比以往更加简单高效，同时节省相当可观的安装和运行成本。

- 基于严苛环境下的持久耐用，丹佛斯VLT® AQUA变频器可以为世界各地的水处理设施提供免维护运营。
- 坚实的硬件设计和优化的软件功能可以确保最大程度的能源节约，并帮助客户实现高水平的持续和经济的运营管理。
- 独特的散热管理和谐波抑制等功能可以改善安装效率，节省安装成本
- 基于边缘计算的CBM功能（电机工况检测）和泵清洗功能将进一步提高系统运行可靠性。

### 案例

重新思考水 | 丹佛斯

<https://www.danfoss.com/en/about-danfoss/insights-for-tomorrow/energy-and-water/>

来自污水处理的电能 | 丹佛斯

<https://www.danfoss.com/en/service-and-support/case-studies/dds/generating-surplus-power-from-wastewater-treatment/>

VLT® AQUA Drive 变频器覆盖整个海水淡化厂 | Danfoss

<https://www.danfoss.com/zh-cn/service-and-support/case-studies/dds/vlt-aqua-drives-cover-entire-desalination-plant/>

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[www.danfoss.com/zh-cn](http://www.danfoss.com/zh-cn)

## Danfoss (Shanghai) Investment Co. Ltd.

18th Floor, Block C Hi-Tech Building 900 Yi Shan Road  
200233 Shanghai, China



### General presentation

Danfoss is a global company with more than 28.000 people represented in more than 100 countries. Danfoss has 5000 employees in China. Danfoss is the global largest supplier of VSD's (Variable Speed Drives) to the Water & Wastewater industry. All factories are complying with the strict quality demand from the automotive industry.

For 50 years, Danfoss Drives has been a global leader in the variable speed control of electric motors. We have the world's largest installed base of variable speed drives comprising VLT® and VACON® AC drives and can draw on decades of passion and experience within a wide range of industries.

### Products and services

Danfoss offer a wide range of VSD's (Variable Speed Drives) to the Water & Wastewater industry, with the range of water dedicated VSD name AQUA drive as the core product

The VLT® AQUA Drive combines deep application know-how with powerful drives technology to make your water operation easier and more efficient than ever, while saving you considerable installation and running costs.

- Built to last and withstand even the harshest conditions, the VLT® AQUA Drive offers trouble-free operation of any type of water facility anywhere in the world.
- The combination of solid design and sophisticated software-based solutions ensure considerable energy savings and help you achieve masterclass sustainable and economic water management.
- A lot of functionality will help cutting installation savings as well as unique heat management and harmonic mitigation will improve installed efficiency if the total VSD installation.
- Edge computed CBM (Condition based Monitoring) will together with integrated derating improve uptime

### Cases

Rethinking the water sector | Danfoss

<https://www.danfoss.com/en/about-danfoss/insights-for-tomorrow/energy-and-water/>

Generating surplus power from wastewater treatment | Danfoss

<https://www.danfoss.com/en/service-and-support/case-studies/dds/generating-surplus-power-from-wastewater-treatment/>

VLT® AQUA Drive 变频器覆盖整个海水淡化厂 | Danfoss

<https://www.danfoss.com/zh-cn/service-and-support/case-studies/dds/vlt-aqua-drives-cover-entire-desalination-plant/>

### Contact

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[www.danfoss.com/en](http://www.danfoss.com/en)



## 综合简介

AVK集团始于1941年，是一家由100多个公司组成的私营工业集团。AVK的核心业务是开发和生产阀门、消火栓和管配件，产品主要应用在供水、污水处理、燃气管网和消防领域。此外，AVK也为各个工业领域和先进制造提供产品和解决方案，并建立了强大的品牌。AVK的产品基于主要的国际标准来设计，并被销往世界各地。与AVK集团的合作代表了客户对品质、功能、可靠性和长久使用寿命的期望。

## 产品及服务

AVK在中国现已形成闸阀、蝶阀、止回阀、空气阀、控制阀、消火栓、管件等多条产品线，同时拥有德国GSK/DVGW，英国WRAS，美国NSF等多项权威证书，产品不仅在大陆港澳台销售，更是借助集团遍布全球的销售网络销往世界各地。另外，公司还通过了BSI的ISO9001、ISO14001、ISO45001三大体系认证，并通过大力推进精益生产，持续改进，不断为客户提供负担得起的高品质产品。

为满足客户的期望，我公司坚持五项基本原则：品质、创新、可靠、可持续发展以及客户服务。但我们的目标远不止此，我们要超越客户的需求和期望，从而走得更远。

## 案例

匠心制造，洞见长远

AVK阀门自投入使用直至三厂迁建新厂，历时17年仍可正常运行

<https://www.avkchina.com/zh-cn/news/product-innovation/17-year-stable-operation>

高品质、实用、易操作的阀门是所有供配水系统的支柱

<https://www.avkchina.com/zh-cn/news/product-innovation/2020-qiantao-lake>

助力河钢集团工业循环水零排放

<https://www.avkchina.com/zh-cn/news/product-innovation/hbis>

## 联系

严荣

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## AVK Valves (Shanghai) Co. Ltd.

Room 301, New Bund Oriental Plaza 1, No.512 West Haiyang Road, Pudong New Area  
Shanghai 200126 P.R. China



### General presentation

The AVK Group was founded in 1941 as a privately-owned industrial group currently comprising +100 companies worldwide. We develop and produce valves, hydrants and accessories for water and gas distribution, sewage treatment and fire protection. Furthermore, AVK has built up strong brands supplying products and solutions for various industrial sectors and within advanced manufacturing. Our products are designed to meet international standards and are sold worldwide. When dealing with the AVK Group expect quality, reliability, functionality and long lifetime in service.

### Products and services

AVK in China has formed many product lines, such as gate valve, butterfly valve, check valve, air valve, control valve, fire hydrant, pipe fitting, etc. AVK has many authoritative certificates, such as German GSK / DVGW, British WRAS, American NSF, etc. Various products are not only sold in Great China, Macao and Taiwan, but also sold all over the world with the help of the group's global sales network. AVK has also obtained the three system certification of BSI, namely ISO9001, ISO14001 and ISO145001, and continuously provided customers with affordable high-quality products by vigorously promoting lean production and continuous improvement.

Doing business with AVK is getting a share of our know-how, expertise and dedication. And as a global leader, it is our obligation to keep pushing the boundaries of what the market can expect. In our business, five cornerstones must be in place in order to meet customer expectations: quality, reliability, innovation, sustainability and customer service. But we need to go further than that. We go further to exceed our customers' needs and expectations.

### Cases

17-year stable operation has created good reputation and customer loyalty  
<https://www.avkchina.com/en/news/product-innovation/17-year-stable-operation>

High quality, functional and operational valves are the backbone in any water distribution system  
<https://www.avkchina.com/en/news/product-innovation/2020-qiandao-lake>

AVK helps HBIS Group to achieve zero discharge of industrial circulating water  
<https://www.avkchina.com/en/news/product-innovation/hbis>

### Contact

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[www.avkchina.com/en](http://www.avkchina.com/en)



### 综合简介

Mutag A/S 位于丹麦日德兰半岛南部的埃斯比约市，隶属于丹麦 Lynddahl集团。该公司致力于污水处理生化工艺的可持续高新技术的研发。凭借 20 多年的经验，Mutag A/S 现已成为生态水和污水净化生物介质的领先制造商之一

### 产品及服务

2008年，Mutag A/S开发了Mutag BioChip™产品。这是一种应用于 MBBR/IFAS的高性能生物膜载体，具有材料品质卓越、表面结构和微孔系统科技含量高许多优点。

使用 Mutag BioChip™，客户可以受益于以下优势：

1. 最佳的去污性能
2. 操作简单
3. 系统占地面积小，搅拌要求低，能源消耗低
4. 现有污水厂易于升级或改造，安装成本低
5. 新建污水厂投资成本低
6. 高品位的材质
7. 材料寿命长，无磨损

Mutag BioChip™ 可以用于市政污水和工业污水的反硝化、硝化、COD 去除和厌氧氨氧化等生物处理工艺。

### 案例

<https://mutag.de/cases/erkelenz-germany/>

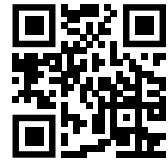
<https://mutag.de/cases/perlen-papier-switzerland/>

### 联系

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## MUTAG A/S

Ørstedsvej 40  
DK-6760 Ribe Denmark



### General presentation

Mutag A/S is located in the City of Esbjerg in the South of Jutland, Denmark. The company is part of Lynddahl Group, working with biological, sustainable, and high-technology water treatment processes. Building on more than 20 years of experience, Mutag A/S has now become one of the leading manufacturers of Bio Media for biological water and wastewater purification.

### Products and services

In 2008, Mutage A/S developed its product of Mutag BioChip™, which is a high-performance biofilm carrier for MBBR/IFAS applications. The outstanding quality of the material as well as the high-tech structure of the surface and the fine pore system, are only a few of the many benefits that the customers can gain from this media.

With the usage of the Mutag BioChip™, the customer can benefit from the following savings and advantages:

1. Best possible removal performance
2. Simple operation
3. Small footprint systems and low mixing requirements, low energy cost
4. Easy upgrading or retrofitting of existing plants, low installations costs
5. Low investment costs in case of building a new WWTP
6. High grade quality
7. Long life material, no abrasion & wear

The Mutag BioChip™ is used in the biological treatment processes of denitrification, nitrification, COD removal, ANAMMOX and etc., in the treatment of both municipal and industrial wastewater.

### Cases

<https://mutag.de/cases/erkelenz-germany/>

<https://mutag.de/cases/perlen-papier-switzerland/>

### Contact

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## 格兰富水泵（上海）有限公司

上海市闵行区苏虹路33号虹桥天地3号楼10层



### 综合简介

丹麦格兰富集团是一家全球性的水泵及水技术解决方案提供商，成立于1945年。2022年集团净营业额达333亿丹麦克朗，在全球各地拥有全职员工超过20,000人，年产量超过1600万台水泵装置。自成立至今的77年中，格兰富始终致力于水泵相关的技术、产品，为应对世界水资源和气候挑战提供开创性解决方案，提高人们的生活品质。

1995年，格兰富正式进入中国市场，目前在全国18个城市设有办公室，拥有2家生产工厂和1个研发中心，员工1800多名。2021年起，格兰富围绕四类全球客户细分市场——商业建筑、民用建筑、工业和市政水务领域设置销售、市场、技术和运营，并加大对创新和数字化的投入，应对不断变化的市场需求。

### 产品及服务

格兰富市政水务是全系列智能水泵和系统供应商，产品广泛应用于各种供水和污水处理领域。我们力求对泵送方案进行优化，为客户提供最佳可靠性和资源利用效率。我们的方案均采用久经测试的先进技术，多年积累的丰富专业知识保障了产品的高品质。我们提供的专业方案和技术适用于原水取水、饮用水处理、水资源配送、污水输送、防洪、污水处理等应用领域。

### 案例

智能投加，助力传统水厂高效升级 | Grundfos

<https://www.grundfos.cn/about-us/cases/Digital-dosing-helps-waterworks-upgrade>

智慧化二次供水，打造宜居现代化的用水体验 | Grundfos

<https://www.grundfos.cn/about-us/cases/Water-supplier-system-helps-on-comfortable-community>

智慧加持高校供水，百年黄师告别用水难题 | Grundfos

<https://www.grundfos.cn/about-us/cases/Huanggang-University-SPS-helps-to-supply-water>

改善污水收集，打造更宜居的乡村环境 | Grundfos

<https://www.grundfos.cn/about-us/cases/How-to-build-a-beautiful-countryside-and-wastewater>



### 联系

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[www.grundfos.cn](http://www.grundfos.cn)

## Grundfos Pumps (Shanghai ) Co., Ltd.

10F, No.33, Building 3, Suhong Rd,  
201106 Shanghai China



### General presentation

Grundfos, a global provider of water pumps and water technology solutions, was founded in 1945. As of 2022, the group's net revenue reached 33.3 billion Danish kroner, with over 20,000 employees worldwide and an annual output of over 16 million water pump devices. Over the past 77 years, Grundfos has been committed to water pump-related technology and products, providing pioneering solutions to address global water resources and climate challenges, and improving people's quality of life.

In 1995, Grundfos officially entered the Chinese market, currently operating offices in 18 cities nationwide, with 2 production factories and 1 research and development center, employing over 1800 staff members. Since 2021, Grundfos has segmented its global customers into four categories: commercial buildings, residential buildings, industrial and municipal water, and set up sales, marketing, technology, and operations to respond to constantly changing market demands, while increasing investment in innovation and digitization.

### Products and services

Grundfos Water Utility is a full-line supplier of intelligent water pumps and systems, with products widely used in various water supply and wastewater applications. We strive to optimize pumping solutions and provide customers with the best reliability and resource utilization efficiency. Our solutions all use advanced technology that has been tested over the years, and the rich professional knowledge accumulated over many years ensures the high quality of our products. Our professional solutions and technologies are suitable for application areas such as raw water intake, drinking water treatment, water distribution, wastewater transport, flood control, wastewater treatment, etc.

### Cases

<https://www.grundfos.cn/about-us/cases/Digital-dosing-helps-waterworks-upgrade>

<https://www.grundfos.cn/about-us/cases/Water-supplier-system-helps-on-comfortable-community>

<https://www.grundfos.cn/about-us/cases/Huanggang-University-SPS-helps-to-supply-water>

<https://www.grundfos.cn/about-us/cases/How-to-build-a-beautiful-countryside-and-wastewater>



### Contact

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[www.grundfos.com](http://www.grundfos.com)

## EWA Sensors ApS

Bakkeborgdalen 40  
DK-8600 Silkeborg Denmark



### General presentation

EWA Sensors: EWA Sensors是一家专门开发嵌入式状态监测传感器的技术公司。该公司在信号处理和算法设计方面拥有最高水平的状态监测知识、应用知识和经验。EWA Sensors传感器建立在对旋转机械状态监测和诊断的知识和最佳实践之上，其产品已经通过了国际三个权威认证机构Mobius Institute、Technical Associates of Charlotte 和 Vibration Institute的 ISO认证。

### Products and services

EWA Sensors 的核心竞争力在于强大、稳健和可靠的传感器监控电路以及基于信号处理的最智能算法设计。在城市的供水和排水领域，EWA Sensors的传感器可以通过监测泵、搅拌器和鼓风机等设备的传动部件的震动、转数、滑动速度、温度和运行时间等，评估设备的运行状况并对故障发出预警，是实现自来水厂、污水处理厂和供排水管网智慧化管控的重要感知元器件。

### Cases

<https://ewasensors.com/partners>

### Contact

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[www.ewasensors.com](http://www.ewasensors.com)

## EWA Sensors ApS

Bakkeborgdalen 40  
DK-8600 Silkeborg Denmark



## General presentation

EWA Sensors is a Danish company, established in 2020.

The company core capabilities are within advanced sensor technologies, signal analyses and Early Warning Analytics (EWA), creating smart and advanced sensors for predicting failures on rotating machines.

Early Warning Analytics is based on combined sensor technologies (e.g. vibration and magnetic field), in several dimensions (x-, y-, z-dimension) and knowledge about fault signatures in time and frequency domains. This creates strong and robust parameters.

The sensor analytics creates parameters for machine faults, but also process and operation parameters.

EWA Sensors has four patents pending, all focusing on EWA Sensors core value – parameter algorithms.

The EWA sensor will be commercialized in 2023-Q2

## Products and services

The EWA sensor is a smart condition monitoring sensor, for rotating machinery. It is addressing both submerged and dry installed machines, and it can be used on new or retrofit machines.

Key sensor values are:

- Working on-the-edge, as all processing and analytics takes place in the sensor itself
- Real-time and continuously data, updated every second.
- All parameter outputs are concluded and evaluated outputs, using green-yellow-red stamps for each parameter
- Data available on a fieldbus (Modbus RS485-RTU), to be integrated in customers own control or cloud solution
- Generic; no data needs to be tapped into the sensor.

## Cases

<https://www.linkedin.com/pulse/ewa-sensor-condition-monitoring-solution-short-technical-munk>

<https://ewasensors.com/partners>

## Contact

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[www.ewasensors.com](http://www.ewasensors.com)

## Unisense Environment A/S

Langdyssen 5  
DK-8200 Aarhus N, Denmark



### 综合简介

Unisense Environment公司开发和销售工业用传感器技术。我们希望污水处理厂能够无缝监测和管控其一氧化二氮 (N<sub>2</sub>O) 的排放。N<sub>2</sub>O 是一种温室气体，其影响强度是 CO<sub>2</sub> 的 273 倍，在污水处理厂气候足迹中，占非常大的一部分。为了解决这个问题，我们早在2014 年就推出了世界上第一个也是唯一一个工业 N<sub>2</sub>O 污水传感器。该传感器提供实时在线的 N<sub>2</sub>O 监测，并能够集成到污水厂的控制系统中。当污水处理运行人员能够监测到N<sub>2</sub>O的排放时，他们可以采取更有效的行动来减少其污水厂的气候足迹。

我们致力于向客户提供高质量的解决方案，以满足客户需求，并帮助他们实现其可持续发展目标。

### 产品及服务

#### N<sub>2</sub>O 污水系统

使用 N<sub>2</sub>O 污水系统，您将获得一个有价值的工具来探究那些导致 N<sub>2</sub>O 形成和排放的生物过程。N<sub>2</sub>O 污水传感器将全天候为您提供实时数据。这就使您能够直接监测和控制污水处理厂的 N<sub>2</sub>O 排放。

#### 运行操作

将 N<sub>2</sub>O 污水传感器直接放置在活性污泥中，就可以测量在硝化和反硝化过程中产生的一氧化二氮。凭借其内置的温度传感器，凭借其内置的温度传感器，N<sub>2</sub>O 污水传感器提供标准化数据，可用于实时计算排放量，同时检查减排措施的效率。

#### 传输至 SCADA 或 PLC

来自 N<sub>2</sub>O 污水传感器的信息，通过 4-20 mA 信号从 N<sub>2</sub>O 污水控制器传输到 SCADA 或 PLC 系统。您也可以直接登录 N<sub>2</sub>O 污水控制器，将之前的数据信息下载到 U 盘上。

### 案例

National N<sub>2</sub>O mapping and reduction of N<sub>2</sub>O-emission:

<https://unisense-environment.com/applications/reduction-of-n2o-emission-through-advanced-online-control/>

A Tool for Carbon Dosage Control:

<https://unisense-environment.com/applications/a-tool-for-carbon-dosage-control/>

Direct Effect of Activated Sludge Concentration on N<sub>2</sub>O Emission and CO<sub>2</sub>-equivalents at Full-scale:

<https://unisense-environment.com/applications/direct-effect-of-activated-sludge-concentration/>

### 联系 / Contact

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## Unisense Environment A/S

Langdyssen 5  
DK-8200 Aarhus N, Denmark



### General presentation

Unisense Environment develops and markets sensor technology for industrial applications. We want to make it possible for wastewater treatment plants to seamlessly measure and manage their nitrous oxide (N<sub>2</sub>O) emissions. N<sub>2</sub>O is a greenhouse gas that is 273 times as potent as CO<sub>2</sub>, and it makes up a substantial part of wastewater treatment plants' climate footprint.

To address this issue, we launched the world's first and only industrial N<sub>2</sub>O Wastewater Sensor in 2014. This sensor provides real-time, online N<sub>2</sub>O measurements that are integrated into the plant's control system. When wastewater treatment operators can monitor their emissions, they can take more effective actions to reduce their plant's climate footprint.

We are committed to providing high-quality solutions that meet our customers' needs and help them achieve their sustainability goals.

### Products and services

**N<sub>2</sub>O Wastewater System:** With the N<sub>2</sub>O Wastewater System, you get a valuable tool to understand the biological processes that lead to N<sub>2</sub>O formation and emission. The N<sub>2</sub>O Wastewater Sensor will provide you with real-time data around the clock. This makes it possible for you to directly monitor and control the N<sub>2</sub>O emission from your wastewater treatment plant.

#### Operation:

You place the N<sub>2</sub>O Wastewater Sensor directly in the activated sludge where it measures the production of nitrous oxide in both nitrification and denitrification processes. With its built-in temperature sensor, the N<sub>2</sub>O Wastewater Sensor delivers normalized data that can be used to calculate the emission in real time and at the same time check the efficiency of mitigation actions.

**Transmit to SCADA or PLC:** The signal from the N<sub>2</sub>O Wastewater Sensor is transmitted via a 4-20 mA signal from the N<sub>2</sub>O Wastewater Controller to a SCADA or PLC system. You can also log directly on the N<sub>2</sub>O Wastewater Controller for later downloading on a USB-stick.

### Cases

National N<sub>2</sub>O mapping and reduction of N<sub>2</sub>O-emission:

<https://unisense-environment.com/applications/reduction-of-n2o-emission-through-advanced-online-control/>

A Tool for Carbon Dosage Control:

<https://unisense-environment.com/applications/a-tool-for-carbon-dosage-control/>

Direct Effect of Activated Sludge Concentration on N<sub>2</sub>O Emission and CO<sub>2</sub>-equivalents at Full-scale:

<https://unisense-environment.com/applications/direct-effect-of-activated-sludge-concentration/>

### Contact

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[www.unisense-environment.com](http://www.unisense-environment.com)

# 减少城市供水漏损

水务公司如何实现高效用水  
满足未来的用水需求

## 本白皮书内容

降低供水产销差的成功途径  
从整体规划到成功实施

克服障碍并获得收益  
阻碍供水产销差降低的常见障碍分析  
以及如何取得长远效益

支持降低供水产销差的框架条件  
唤起公众的水价值意识并制定政策目标



# Think Denmark

绿色转型白皮书

## 开启 废水资源的 潜力空间

将废水视为一项宝贵资源  
用于保护人类与生态系统

### 本白皮书内容

将污水处理厂  
作为能源回收设施  
迈向能源平衡的水循环

让污水转废为宝  
从废水回收中获益

集中化对比分散化解决方案  
确保最具成本效益的  
废水基建设计

成功的工业废水  
处理方法  
处理工业废水  
应从源头抓起



**DWF**  
Danish Water Forum

**State of Green**  
绿色国度 - 参与未来 · 联手丹麦

## Supported by:



**MINISTRY OF FOREIGN AFFAIRS  
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