



社團法人

台灣小水力綠能產業聯盟

Taiwan SHP Industries Alliance

立案證號：台內團字第1100021423號 法登證號：110 證社字第000060號



建立小水力產業鏈 促成台灣第三大再生能源

# TURBINES AND HYDRO-ELECTRIC ENGINEERING

## 小水力發電案例介紹



Taiwan National Small Hydropower Forum on November 08-09, 2024



wasserkraft





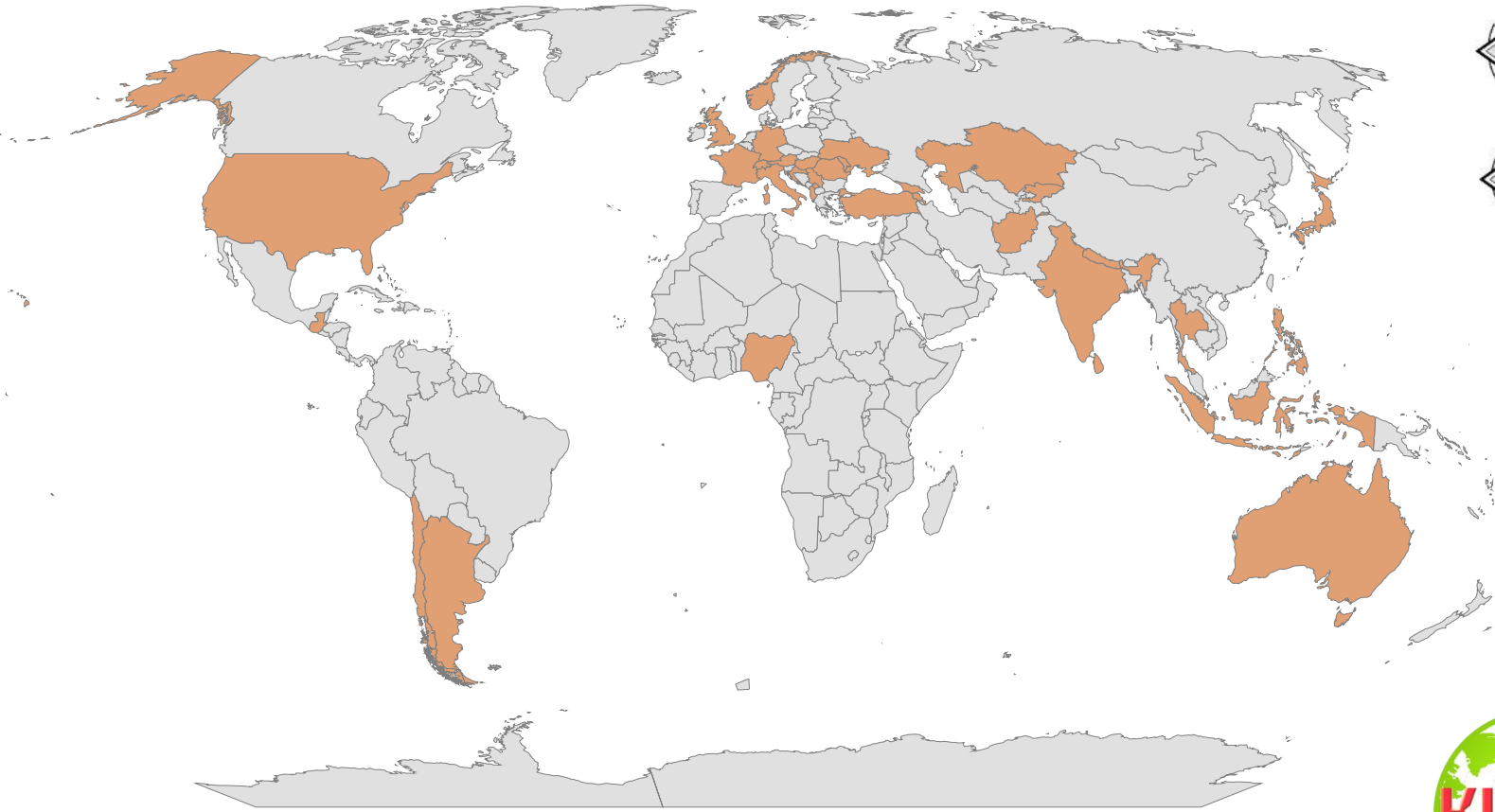
# Company Data

Capacity: approx. 30-35 projects/year  
Subsidiary's: 5 (分公司:吉爾吉斯、土耳其、美國、阿根廷、日本)  
Staff: ~ 75 employees  
Export quota: > 80%  
Experience: > 40 years  
> 350 projects  
> 300 MW  
Own & Share of 5 HPP 擁有5個小水電站





# Active Countries – Status 2024





# Ownership



**Christoph WAGNER**  
CEO

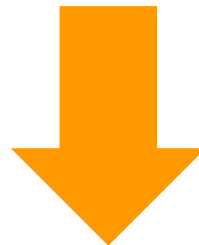
- President of Austrian Small Hydropower Association
- Owner of 7 Small HPPs
- Owner of design office „WWT Wasserkraft“

**Ing. Josef & Ing. Lukas WÖGERBAUER**

- 40 years experience in design and project management

**Ing. Günther SCHARRER, MBA**  
CCO

- 20 years experience in design, project management and sales



**wasserkraft**





# Product portfolio

- Kaplan Turbines
- Francis Turbines
- Pelton Turbines
- Hydraulic Power Units & Lubrication Units
- Control Systems & SCADA
- Hydraulic Steel Components
- PowerGate

軸流式渦輪機  
法蘭西斯式水輪機  
佩爾頓式水輪機  
液壓動力裝置及潤滑裝置  
控制系統和 SCADA  
液壓鋼件  
閘門發電一體





# Kaplan Turbines

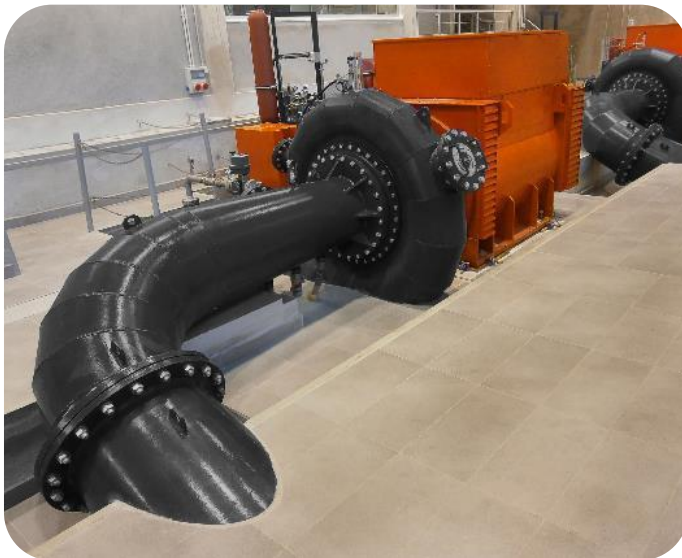
Runner ø: up to 2,600 mm  
Power: up to 5,000 kW  
Net head: up to 30 m  
Type: Kaplan - Semi spiral  
Kaplan - Spiral  
Kaplan - Bulb  
Kaplan - Tubular





# Francis Turbines

Runner ø: up to 1,400 mm  
Power: up to 10,000 kW  
Net head: up to 200 m  
Type: Francis – horizontal  
Francis - vertical





# Pelton Turbines

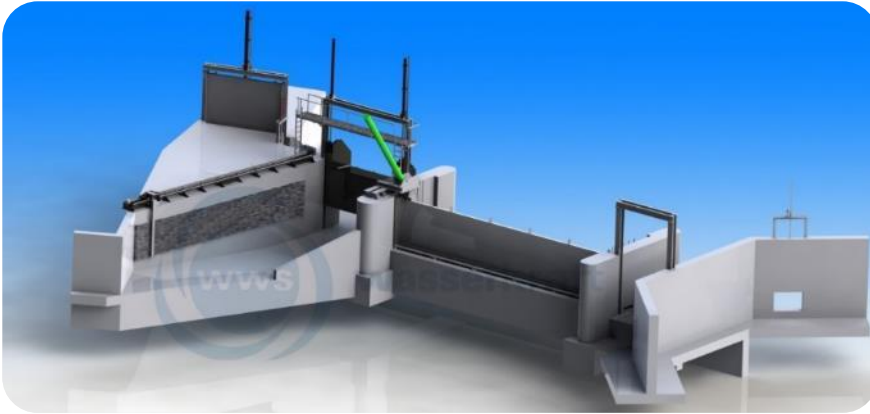
Runner ø: up to 1,400 mm  
Power: up to 10,000 kW  
Net head: up to 1,000 m  
Type: Pelton – horizontal  
Pelton – vertical  
1-6 Jets





# Hydraulic Steel Components

*designed & manufactured by WWS*



# Automatic Trash Rack Cleaning Machines

*designed & manufactured by WWS*





# WWS PowerGate

自動緊湊型微水力系統

- POWERGATE: automatic compact micro-hydro system
- POWERGATE: very low applications 2m, 非常低的應用2m
- POWERGATE: Field of application: Irrigation canals, Dams, Fish farms, Diversions, Reservoirs

應用領域：灌溉渠道、水壩、養魚場、引水道、水庫

- POWERGATE: is developed, designed and manufactured by WWS Wasserkraft in AUSTRIA

由奧地利 WWS Wasserkraft 開發、設計和製造



# WWS PowerGate Specifications

„Revolutionizing the idea in standardizing micro hydro equipment“

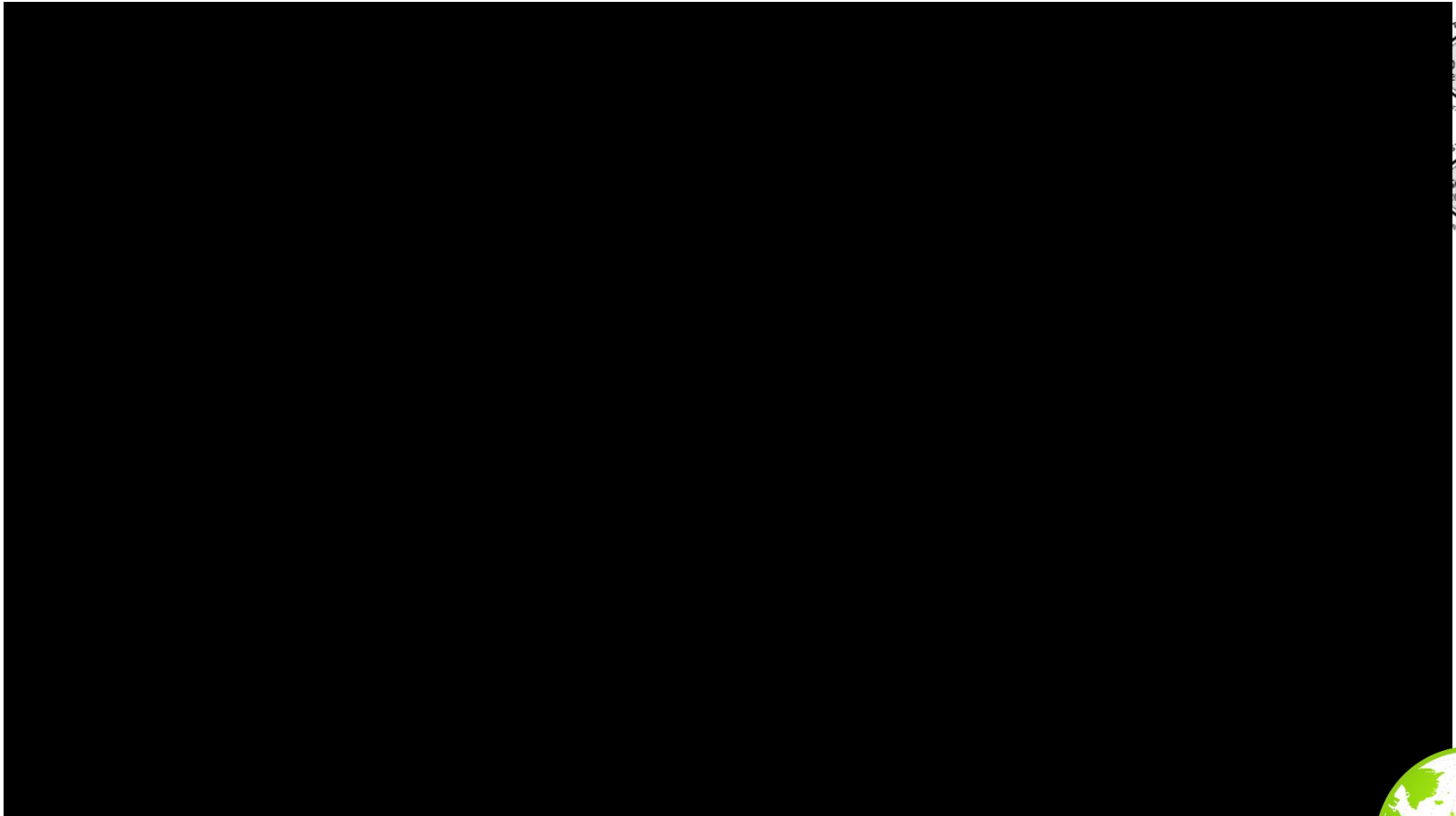


## Specifications: POWERGATE

Turbine Type	Kaplan Pit Turbine
Net Head	2 – 10m
Flow Rate	1 – 5 m <sup>3</sup> /s
Power Output	30 – 200kW
Runner Diameter	500 – 1,200mm
Generator	380-440V; 50/60Hz
Turbine Efficiency	~90%
Lead Time	6 – 8 months



# POWERGATE



# POWERGATE





# POWERGATE - Advantages

- High efficiency 高效率
- Less civil costs (almost nothing in existing structures) 土木工程成本更低（現有結構中幾乎沒有成本）
- Compact project design 緊湊的專案設計安裝
- Quick and easy installation (Plug and play) 快速簡單安裝（即插即用）
- Stabilizing effect on grid in rural areas 對鄉村地區電網的穩定作用
- Negligible impact on environment and ecology 對環境和生態的影響可以忽略
- Easier procurement (hydrology study, geological report, land purchase, ...) 採購更容易（水文研究、地質報告、土地購買...）



# Where to install Small Hydro Power

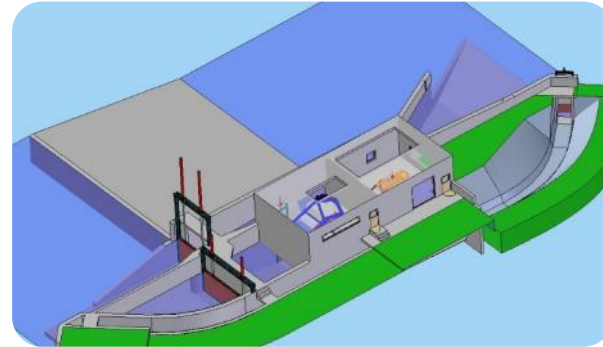
- Rivers
  - Run-of-Rivers





# Eckhart - Austria

- Kaplan-Semispiral-Turbine
- Runner  $\varnothing = 2,000$  mm
- $H_n = 3$  m
- $Q = 15$  m<sup>3</sup>/s
- $P_n = 408$  kW



# Where to install Small Hydro Power

- Rivers
  - Run-of-Rivers
  - diversion power plant



# Gallata - Albania

- Pelton Turbine 6 - nozzles
- Runner  $\varnothing 830\text{mm}$
- $H_n = 110\text{m}$
- $Q = 1.80 \text{ m}^3/\text{s}$
- $P = 1,748 \text{ kW}$



# Where to install Small Hydro Power

- Rivers
  - Run-of-Rivers
  - diversion power plant
  - Dam – or Dam transition



# Curnera - Switzerland

- Francis-Turbine
- Runner  $\varnothing = 700$  mm
- $H_n = 75$ m,
- $Q_1 = 5$ m<sup>3</sup>/s,
- $P_1 = 2,500$  kW,



# Where to install Small Hydro Power

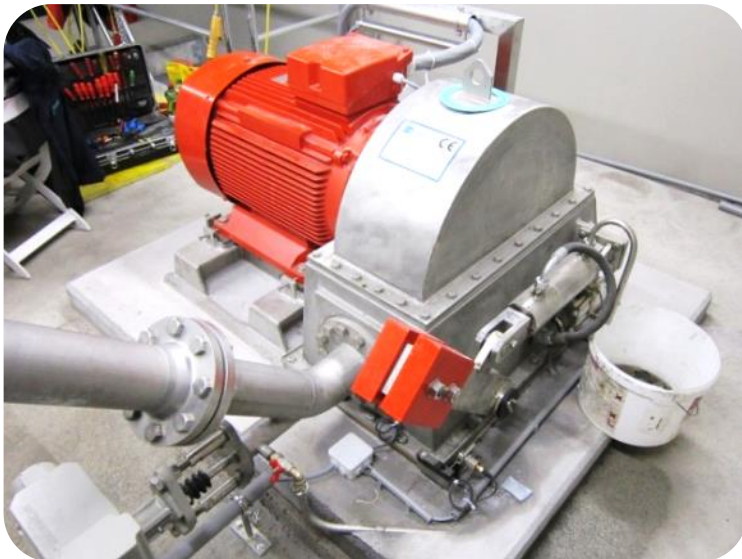
- Rivers
  - Run-of-Rivers
  - diversion power plant
  - Dam – or Dam transition
- Process water
  - Drinking water





## Schruns (drinking water)- Austria

- Pelton-Turbine
- Runner  $\varnothing = 425$  mm
- $H_n = 258$ m
- $Q = 40$  l/s
- $P_n = 92$  kW



# Where to install Small Hydro Power

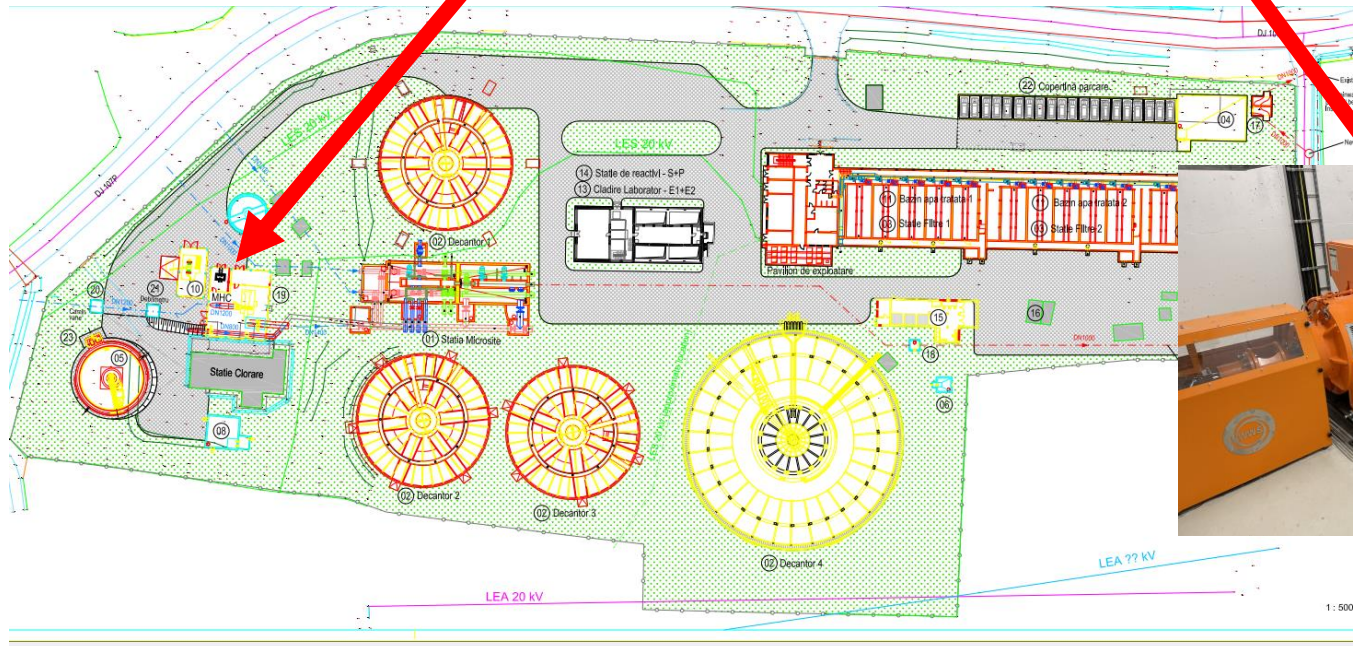
- Rivers
  - Run-of-Rivers
  - diversion power plant
  - Dam – or Dam transition
- Process water
  - Drinking water
  - Sewage water





# KW Gilau - Romania Water treatment plant

- Kaplan-Spiral-Turbine
- Runner  $\varnothing = 800$  mm
- $H_n = 18.7$ m,
- $Q_1 = 2.0$ m<sup>3</sup>/s,
- $P_1 = 300$  kW,



# Where to install Small Hydro Power

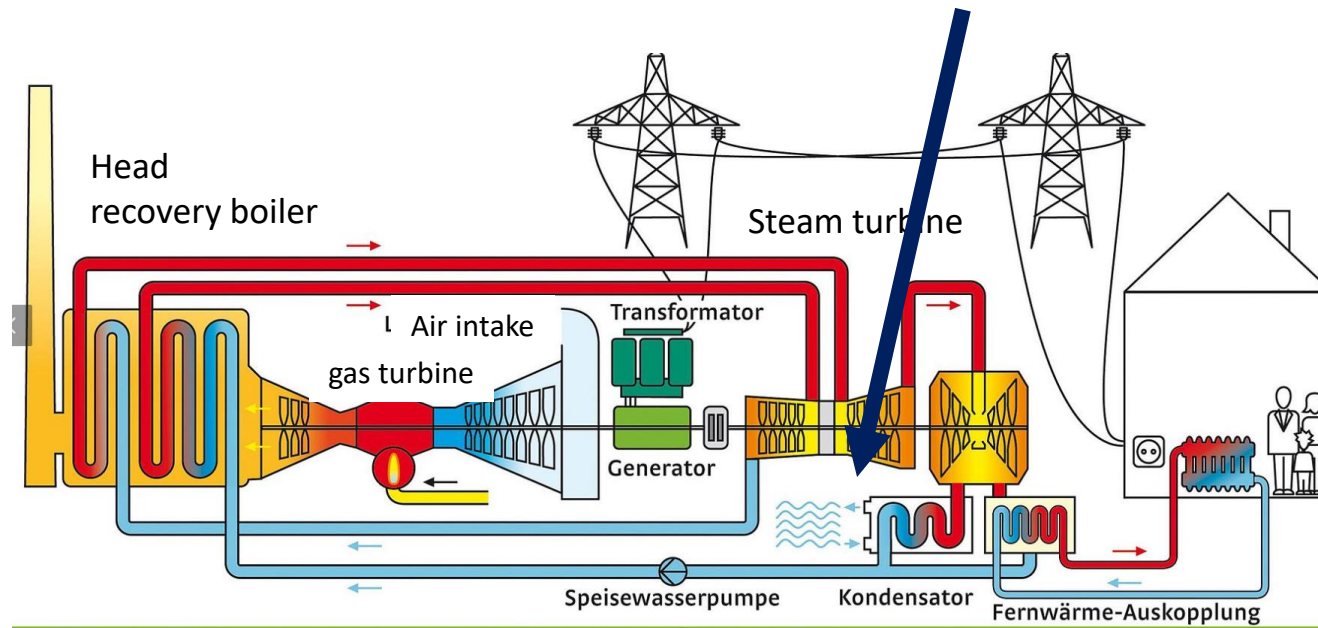
- Rivers
  - Run-of-Rivers
  - diversion power plant
  - Dam – or Dam transition
- Process water
  - Drinking water
  - Sewage water
  - Cooling Water



# Düsseldorf - Germany

(cooling water from a 1100 MW gas power plant)

- Kaplan-Turbine
- Runner  $\varnothing = 2 \times 1,400 \text{ mm}$
- $H_n = 6.5\text{m}$ ,
- $Q_1 = 8.5\text{m}^3/\text{s}$ ,
- $P_1 = 2 \times 496 \text{ kW}$ ,



# Where to install Small Hydro Power

- Rivers
  - Run-of-Rivers
  - diversion power plant
  - Dam – or Dam transition
- Process water
  - Drinking water
  - Sewage water
  - Cooling Water
  - Irrigation channels or water supply





# HPP DTB,SL6, SL7, SL8, TSU - Argentina

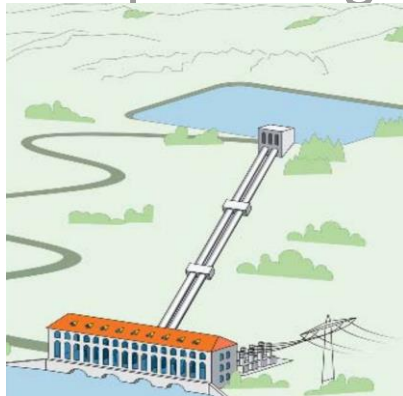
- 6 Kaplan-Semispiral-Turbines
- Runner from  $\varnothing 1700 - 2,400\text{mm}$
- $H_n$  from 5 to 6.5m
- $Q$  from 13 to 25  $\text{m}^3/\text{s}$
- $P$  total 6,240 kW





# Where to install Small Hydro Power

- Rivers 河
  - Run-of-Rivers 徑流
  - diversion power plant 引水發電廠
  - Dam – or Dam transition 水壩——或水壩過渡
- Process water 製程用水
  - Drinking water 飲用水
  - Sewage water 污水
  - Cooling Water 冷卻水
  - Irrigation channels or water supply 灌溉渠道或供水
  - also other medium (oil) 還有其他介質（油）
- Pump Storage 抽蓄發電



# HIGH QUALITY TURBINES

## MADE IN AUSTRIA

### ... Thank you for your attention!



## KIMAX

節能綠能產品 / 流體控制設備

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- 柏狄儀表



- 水泵/風機/轉動設備節能
- 流體管道餘壓驅動&發電
- 空調、空壓系統節能
- 永磁直驅馬達
- 綠能: 小水力發電、海洋能、風力發電
- EMS: 能源管理與監控系統
- 冷卻水循環系統節能與節水和創能

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