



Addressing the World's thirst: solutions for lowering costs and improving quality

Membrane barriers for removal of organics, micropollutants
and overall salinity in drinking water

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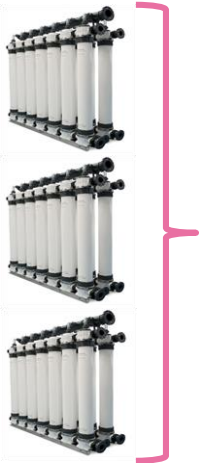
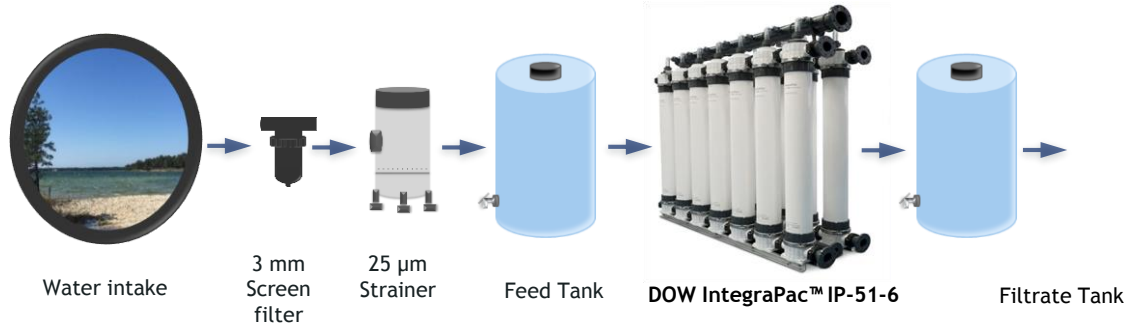
The first UF-NF Nordic installation for drinking water applications using solar cells as partial energy source

Where is Fårösund DWTP?



- **Plant location:** Fårösund (Gotland), Sweden
- **OEM:** Björks Rostfria AB
- **Market Segment:** Municipal
- **Application:** Drinking Water
- **Feed Water Source:** Lake Bästeträsk
- **Start Up Date:** May 2015
- **Total capacity:** 720 m³/day of net permeate
- **Solar cells** as partial source of energy
- **Filtration Technologies:** DOW™ Ultrafiltration and Nanofiltration

Process Description



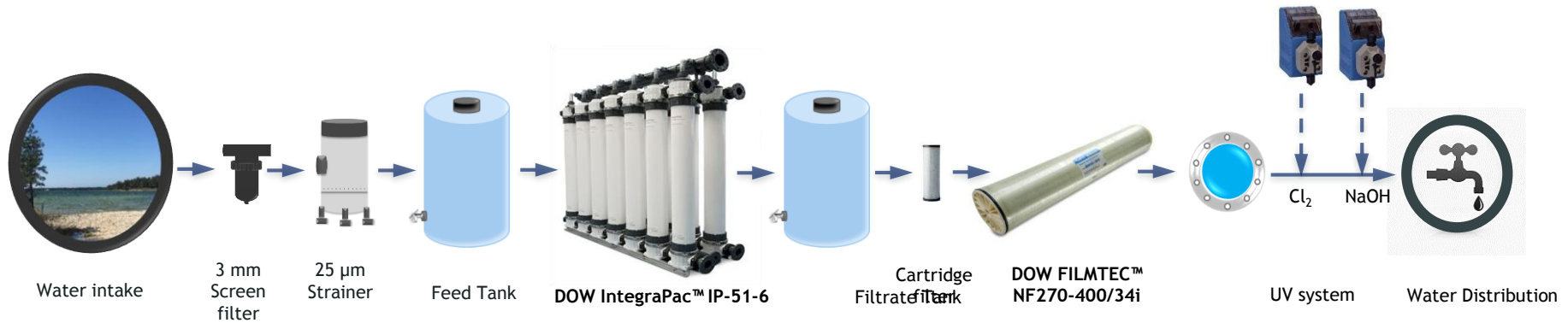
UF Design Conditions	
Filtration Flux (LMH)	60
Backwash frequency (min)	60
Air Scour (min)	120
Chemical Enhanced Backwash:	
Oxidant: 250 mg/L NaOCl 10% (hours)	12
Acid: 550 mg/L HCl 35% (hours)	72



3 DOW IntegraPac™ UF IPD-51-6 (18 modules in total).

The UF system has a maximum feed flow limit of 42 m³/h.

Process Description



3 lines with 20 DOW FILMTEC™ NF270-400/34i elements
NF Design conditions: Flux 13.5 LMH, 75% recovery



Operational Performance



Raw Water

pH	8.4	Alk. (mg/L HCO ₃ ⁻)	120
Cond. (µS/cm)	270	Na ⁺ (mg/L)	3.7
TOC (mg/L)	10.9	Ca ²⁺ (mg/L)	34
Turbidity (NTU)	9.2	Mg ²⁺ (mg/L)	4.6
TSS (mg/L)	28.9	SO ₄ ²⁻ (mg/L)	5.9
TVSS (mg/L)	3.6	Mn (mg/L)	<0.02
COD (mg/L)	11.3	Fe (mg/L)	0.054



Water After Ultrafiltration

TOC (mg/L)	9.0
Turbidity (NTU)	<0.05
TSS (mg/L)	0.5
TVSS (mg/L)	0.5
COD (mg/L)	6.90
Mn (mg/L)	<0.02
Fe (mg/L)	<0.02



Water After Nanofiltration

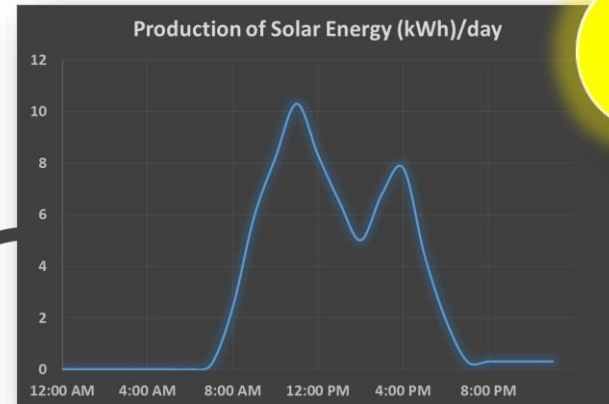
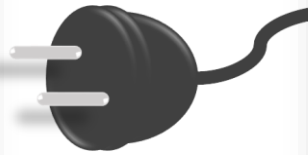
pH	8.4
Cond. (µS/cm)	270
Alk. (mg/L HCO ₃ ⁻)	100
Na ⁺ (mg/L)	3.7
Ca ²⁺ (mg/L)	26
Mg ²⁺ (mg/L)	2.6
SO ₄ ²⁻ (mg/L)	0.1



Product Water Requirements (SLV FS 2001:30)

pH max.	8.6
Turbidity (NTU)	< 0.2
Alkalinity (mg/L HCO ₃ ⁻)	> 80
COD (mg/L)	< 1
Ca ²⁺ (mg/L)	> 25
Mg ²⁺ (mg/L)	> 2

Energy Savings



135 m² of solar panels on the roof of the WTP

UF-NF energy consumption	1.07 kWh/m ³
Energy produced by solar cells	0.30 kWh/m ³

30% non renewable energy saved

Estimated cost of energy	0.1 \$/kWh
Estimated water production	246,375 m ³ /year

\$7,400/year saved



**Thank
You**

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