



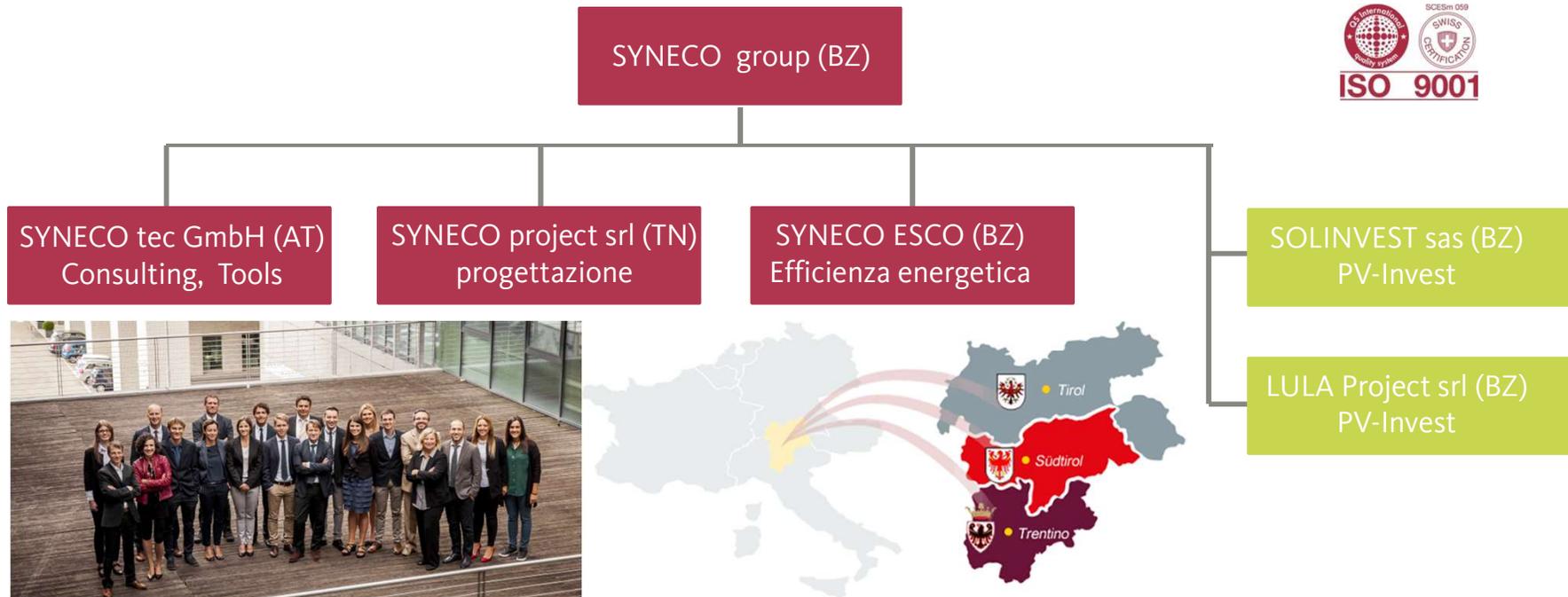
Strass (Tirolo) impianto a bilancio energetico in pareggio

24/05/2017

Martin Sulser

IL NOSTRO TEAM

- SYNECO è un' azienda di consulenza per la promozione dello sviluppo sostenibile nei settori dell' **energia** e dell' **ambiente**
- TEAM interdisciplinare di 20 persone



REFERENZE ED ESPERIENZE - REGIONALI/INTERNAZIONALI



Regione	Impianto	AE _{COD}	kWh el.
Tirol	Strass i Z.	140.774	3.302.054
Tirol	Zirl	37.864	1.197.353
Tirol	Schwaz	40.068	1.228.982
Tirol	Innsbruck	272.494	6.975.734
Alto Adige	Passiria	9.647	375.885
Alto Adige	Glorenza	16.267	710.158
Alto Adige	Bassa V.Isarco	23.126	716.098
Alto Adige	Media Venosta	25.607	1.062.026
Alto Adige	Wasserfeld	27.711	934.521
Alto Adige	Bassa Pusteria	27.958	1.125.364
Alto Adige	Bressanone	49.448	1.935.427
Alto Adige	Termeno	73.238	2.013.766
Alto Adige	Bronzolo	93.566	3.424.066
Alto Adige	Tobl	102.787	5.109.114
Alto Adige	Merano	158.219	6.992.657
Alto Adige	Bolzano	246.653	10.458.252
Trentino	Lavis	8.717	1.168.958
Trentino	Giustino	12.438	897.480
Trentino	Villa Agnedo	18.727	2.134.307
Trentino	Levico	40.185	1.995.370
Trentino	Rovereto	53.637	2.757.216



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Agenda

Case study – Strass (Tirolo): impianto a bilancio energetico in pareggio

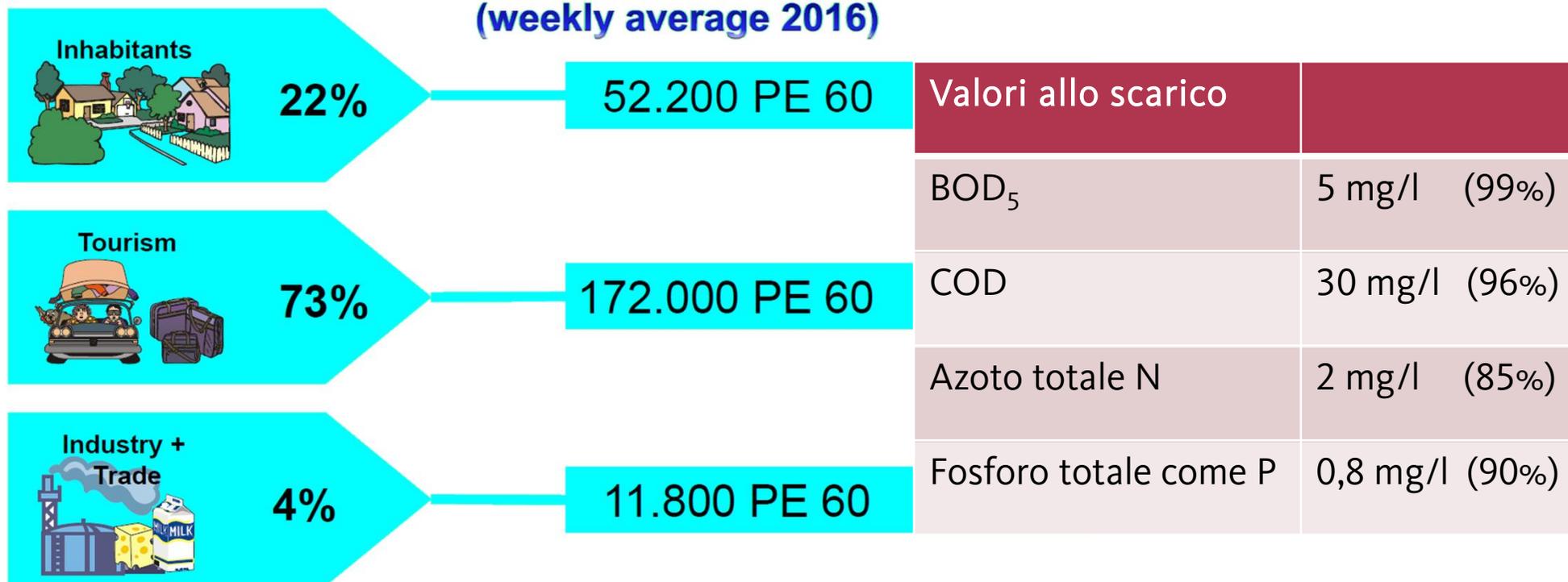
Tecnologie per raggiungere un bilancio energetico in pareggio

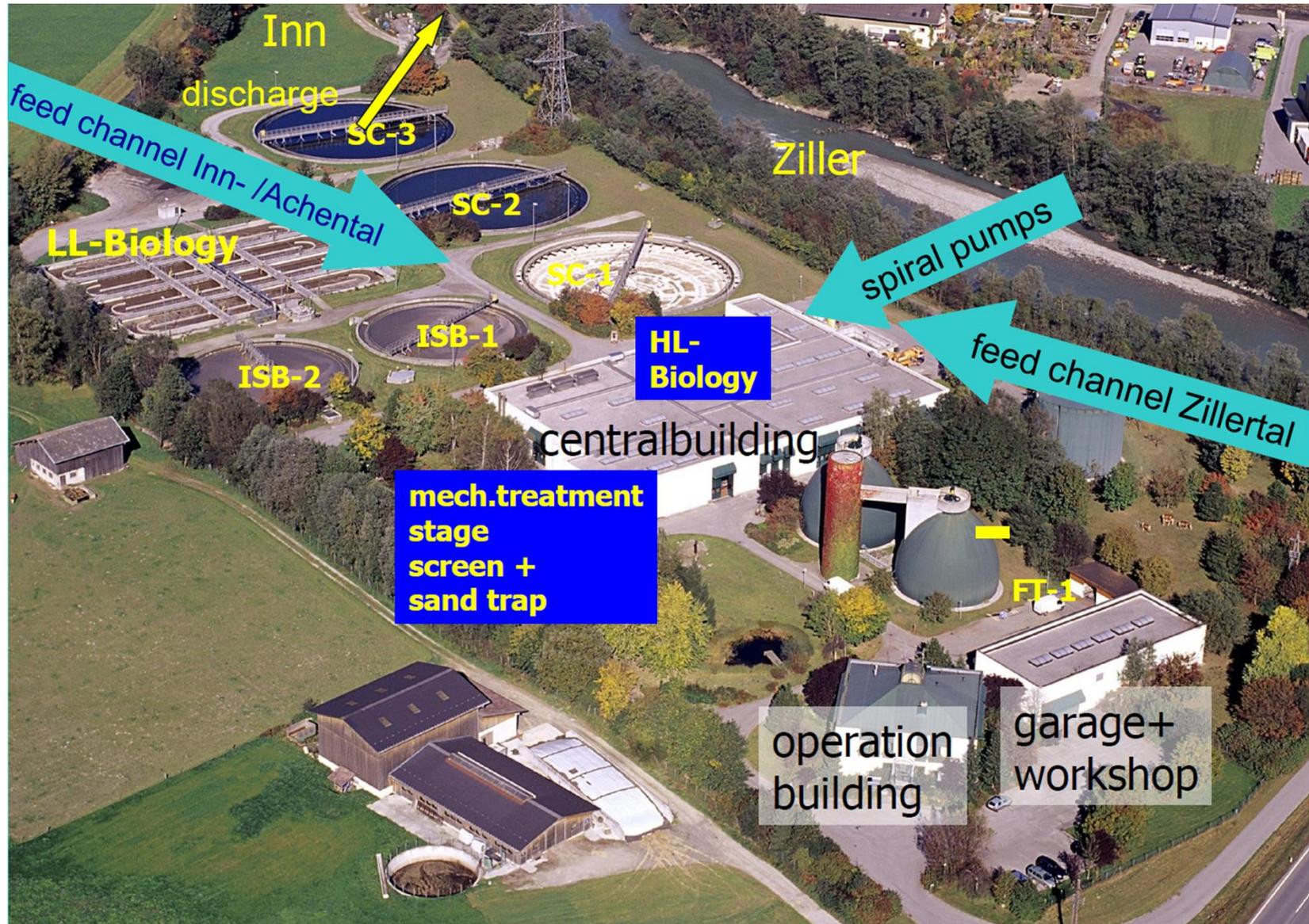
Obiettivi

Waste water design capacity 167.000 PE₆₀

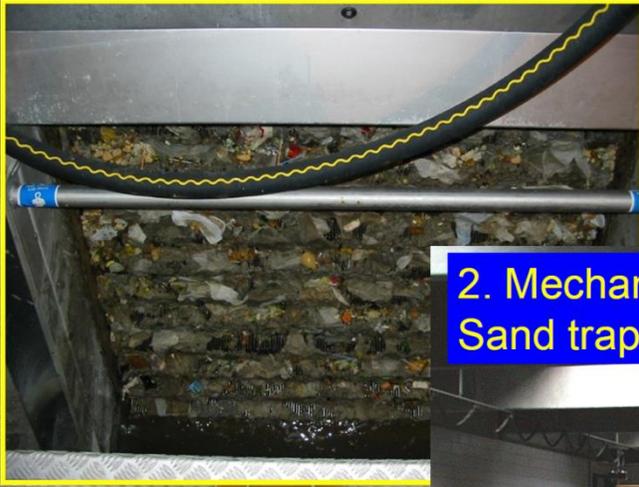
according to adaptation project October 1997

maximum capacity 236.000 PE 60
(weekly average 2016)

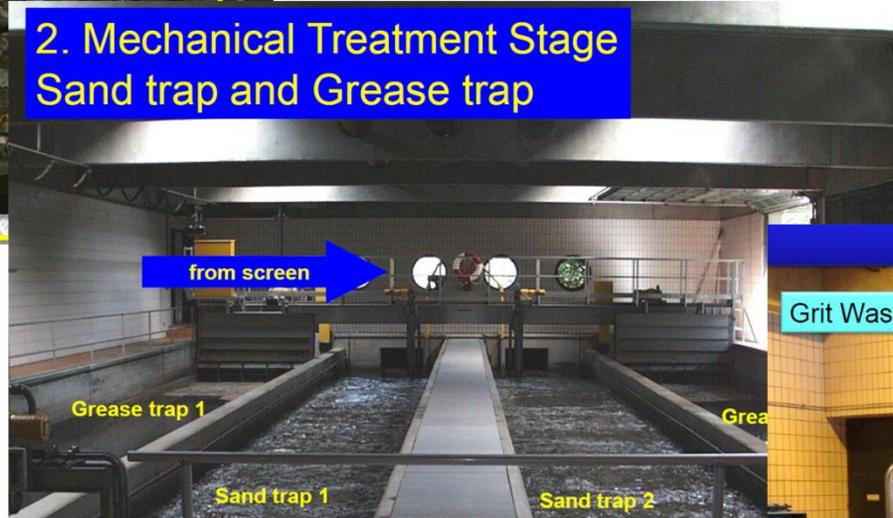




1. Mechanical Treatment Stage
Screen and Screening Waste Clarifier



2. Mechanical Treatment Stage
Sand trap and Grease trap

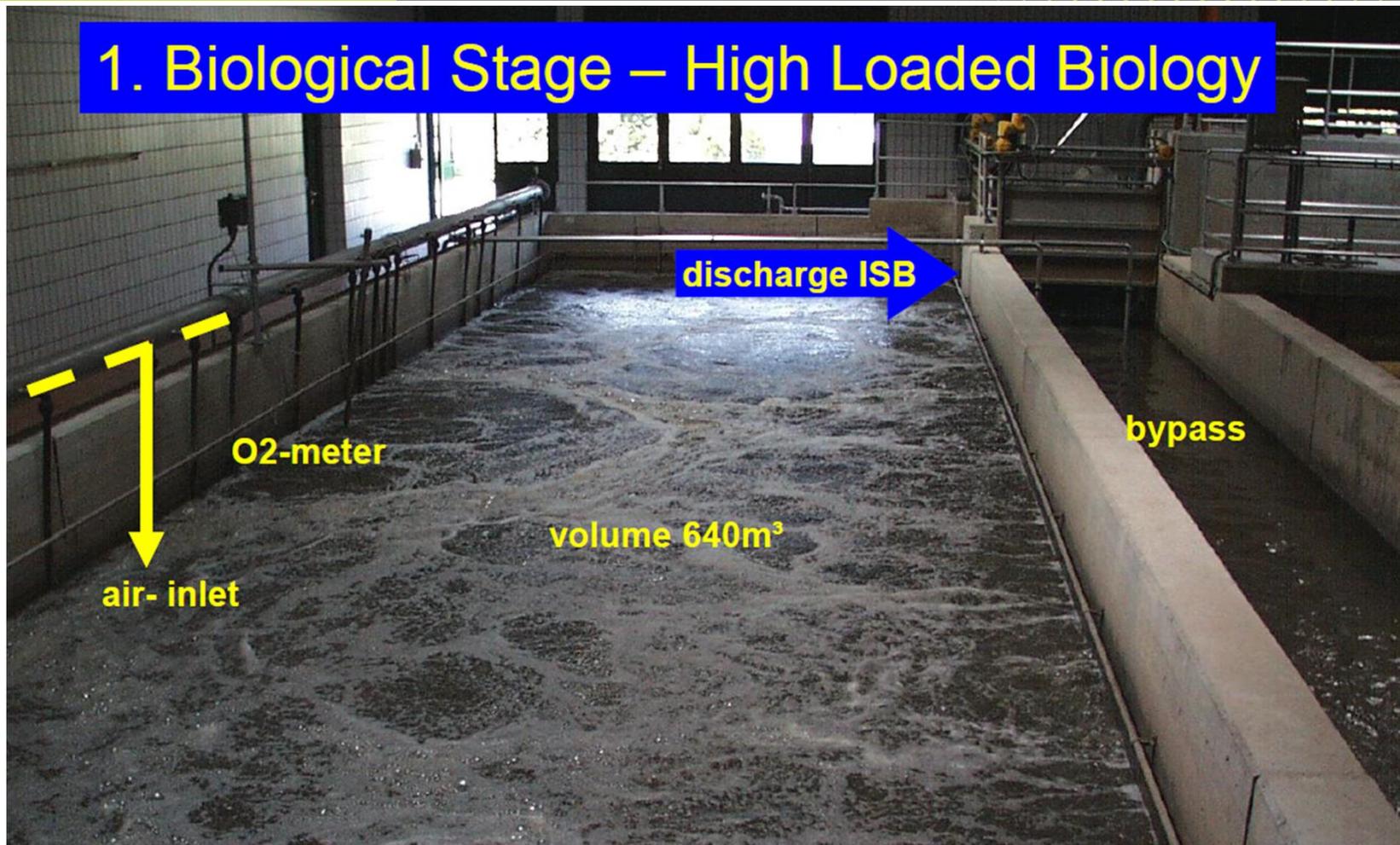


Mechanical Treatment Stage

Grit Washer

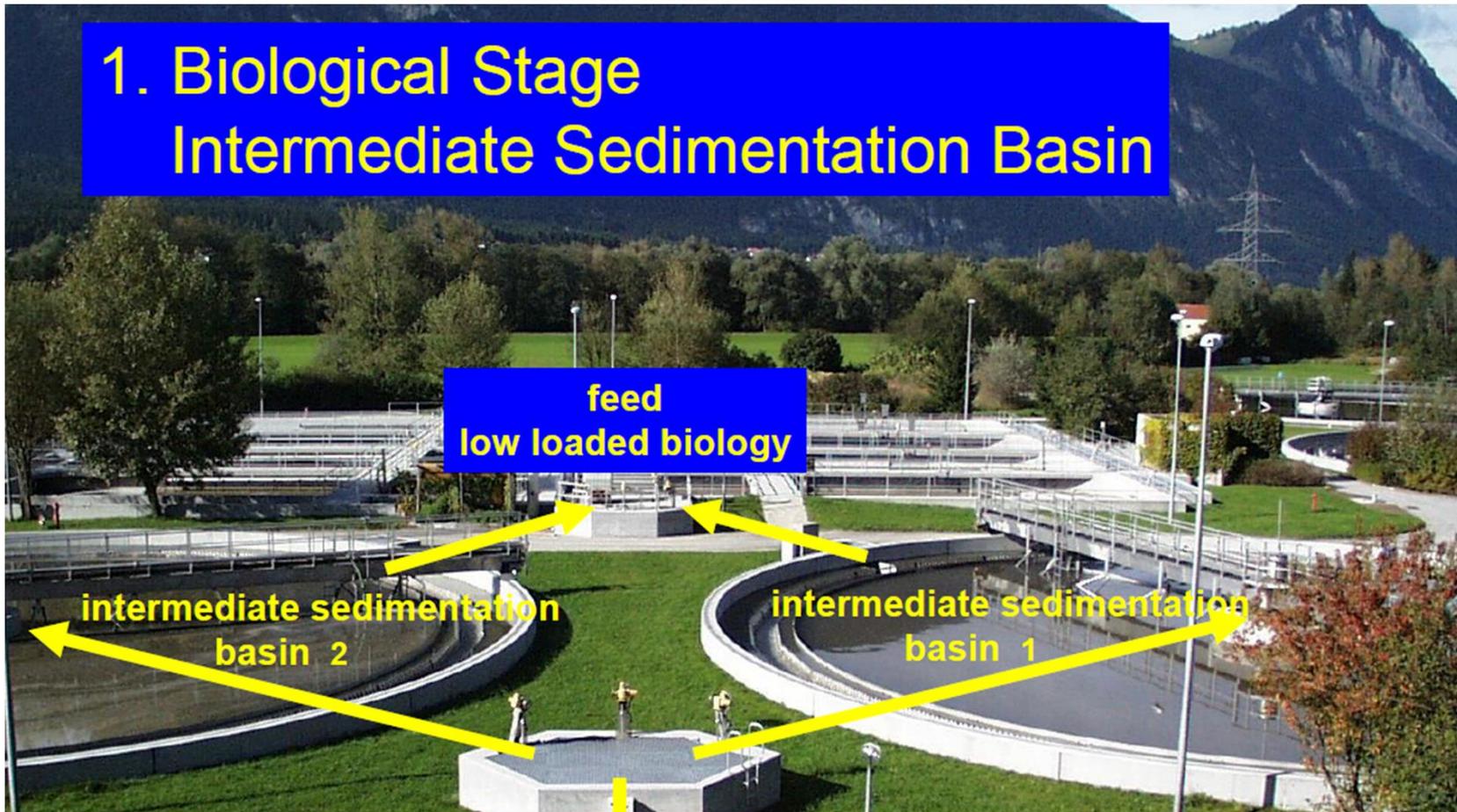


1. Biological Stage – High Loaded Biology



In the high loaded biology easily degradable carbon components are decomposed.
This is only a partial clarification (approx. 50%)

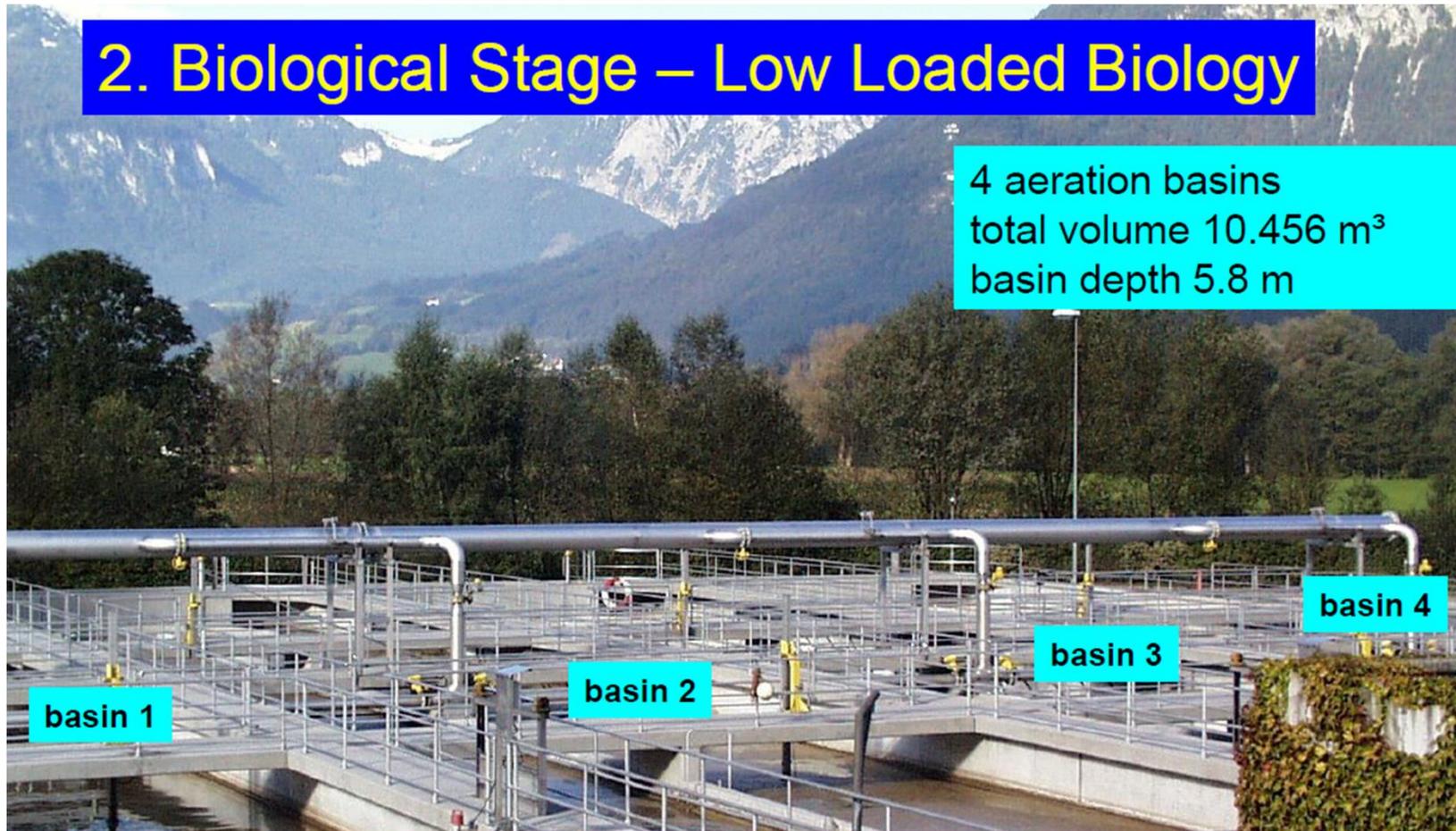
1. Biological Stage Intermediate Sedimentation Basin



The separation of the waste water – sludge mixture takes place in the intermediate sedimentation basin. To a large extent separated primary sludge is sent back again to the high loaded stage. The rest is led into sludge treatment.

2. Biological Stage – Low Loaded Biology

4 aeration basins
total volume 10.456 m³
basin depth 5.8 m

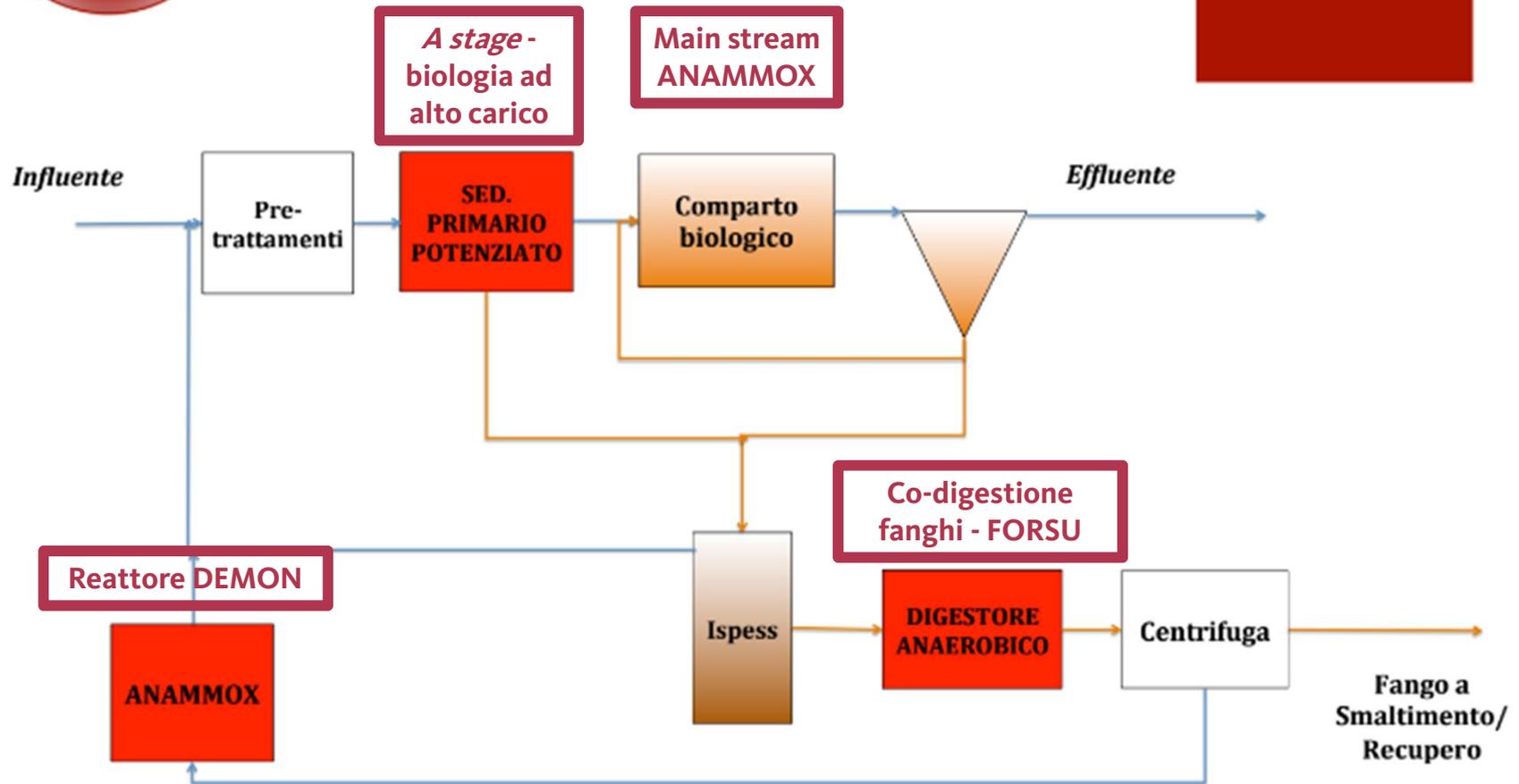


In the low loaded biology dissolved carbon components, as well as nitrogen – and phosphate compositions are decomposed. Therefore relatively large basin volumes and waiting periods are necessary.

Max.
Energia

MA.RE.

SCENARIO - 50,000 AE

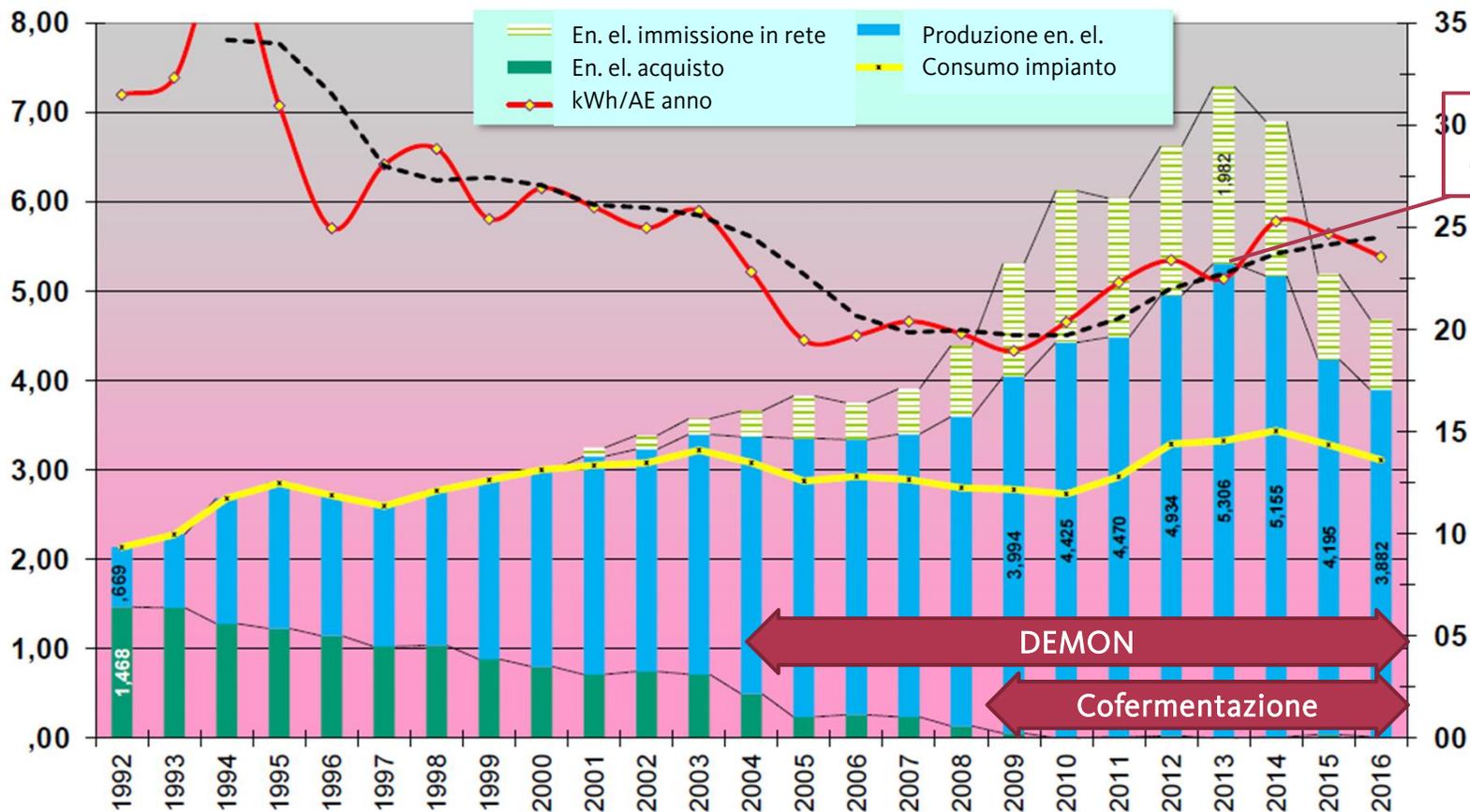


Energia elettrica

Energia elettrica – produzione – immissione – consumo

GWh/anno

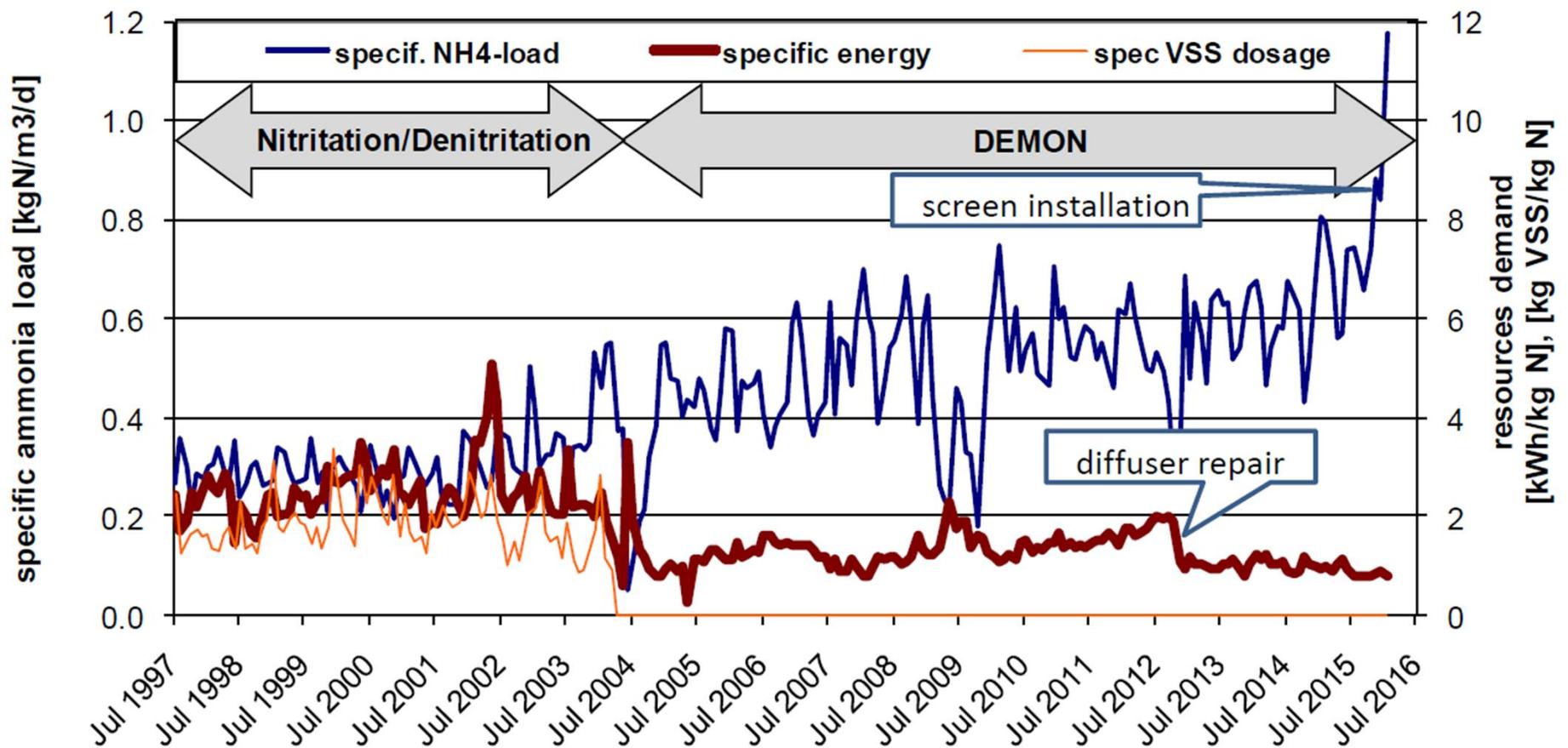
kWh/AE*anno



**Consumo specifico:
60 Wh/AE/d 22 kWh/AE/a**

DEMON
Cofermentazione

Consumo specifico rimozione azoto



Agenda

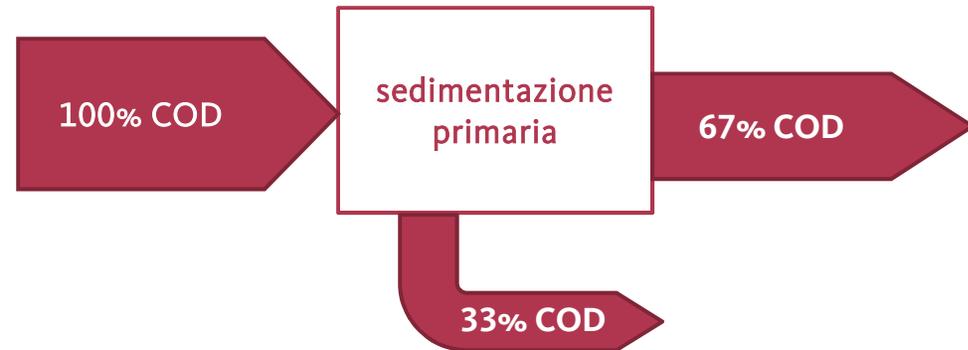
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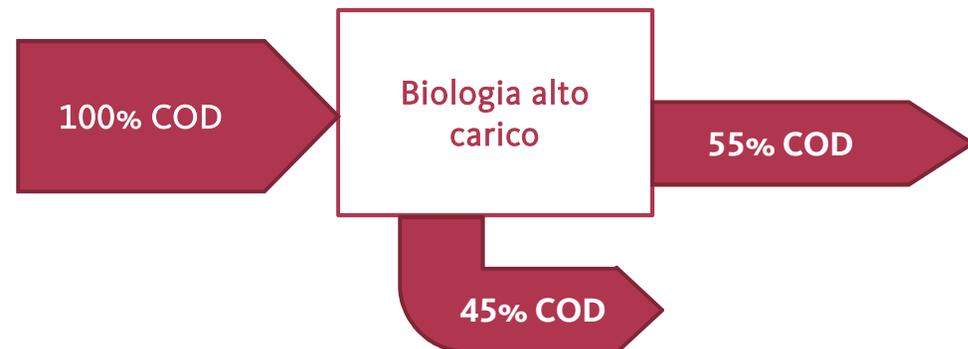
Obiettivi

A stage - biologia ad alto carico

- Sedimentazione primaria



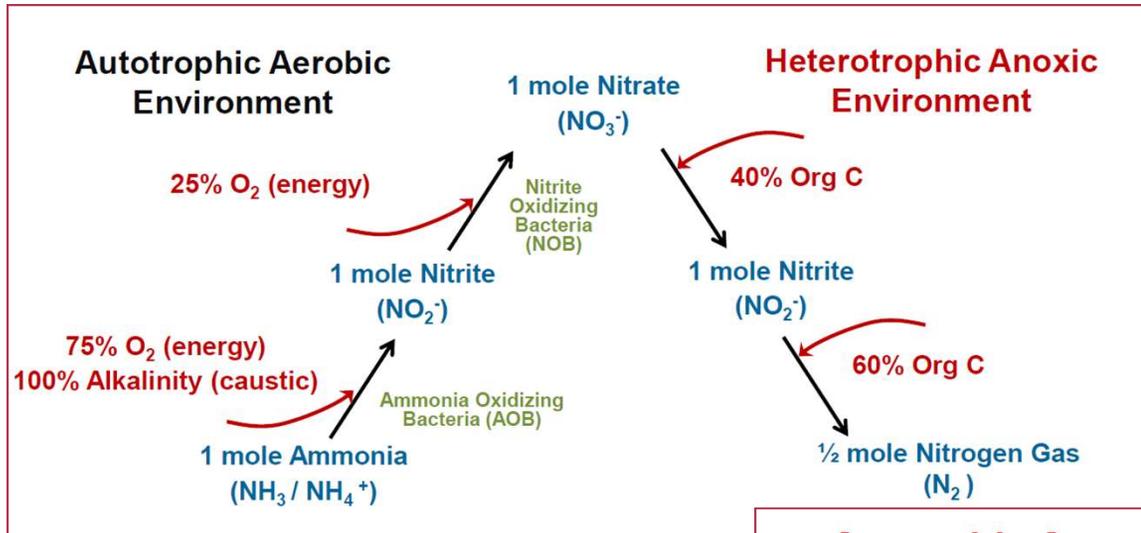
- Biologia ad alto carico al posto delle sedimentazione primaria



A stage - biologia ad alto carico

- **Volume** vasca biologica ad alto carico **640 m³**
- Età fanghi molto ridotta (range **0,5-2 giorni**)
- **Aumento** produzione **biogas**
- **Variazione rapporto carbonio/azoto**
- Gestione/trattamento **odori**

Anammox – Reattore DEMON

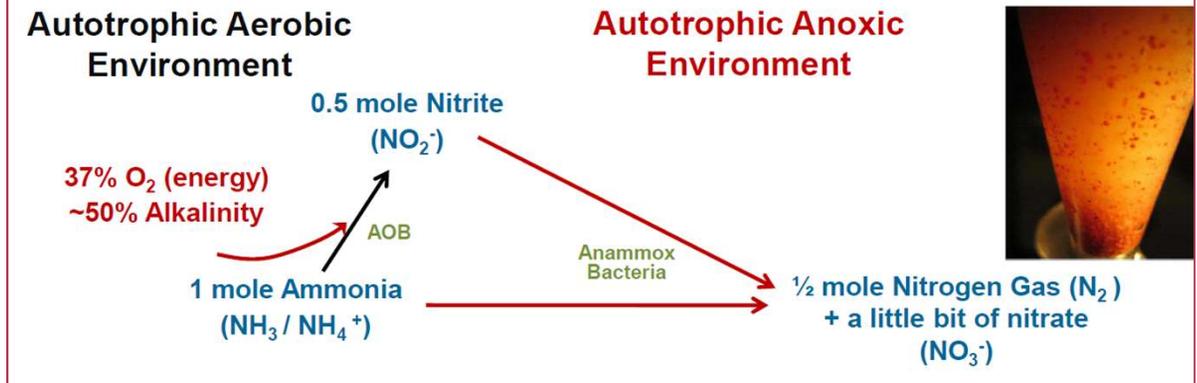


Mark W. Miller, 2015 VWEA Education Seminar, April 30th, 2015

Potenziati vantaggi:

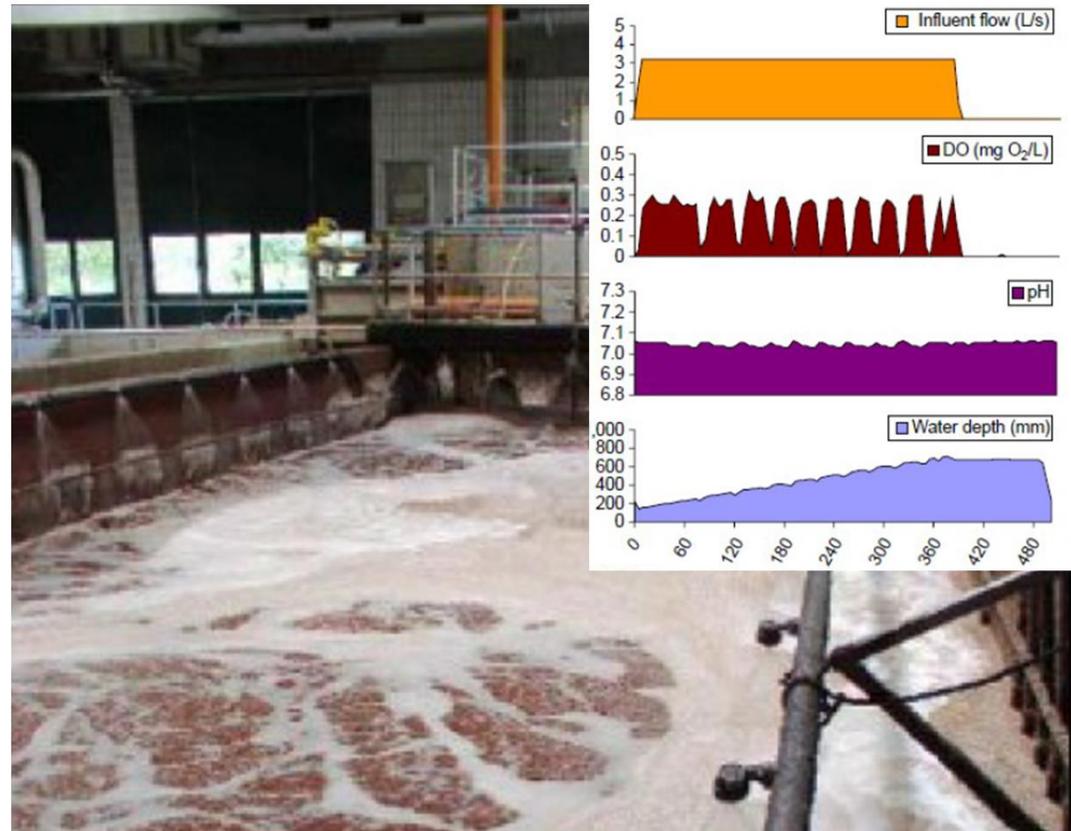
- Riduzione del consumo di ossigeno 63%
- Non necessita di un substrato organico (Riduzione consumo COD di quasi 100%)
- Riduzione della produzione di biomassa (80%)

Anaerobic Ammonia Oxidizing Bacteria = Anammox

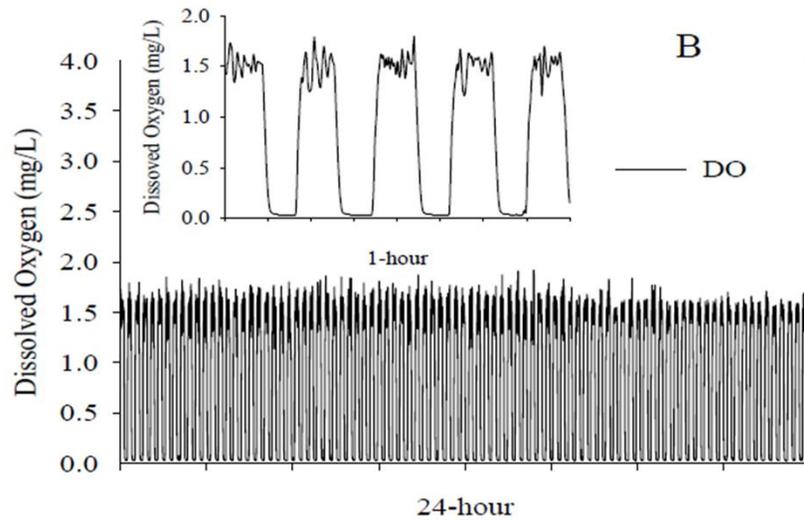


Anammox – Reattore DEMON

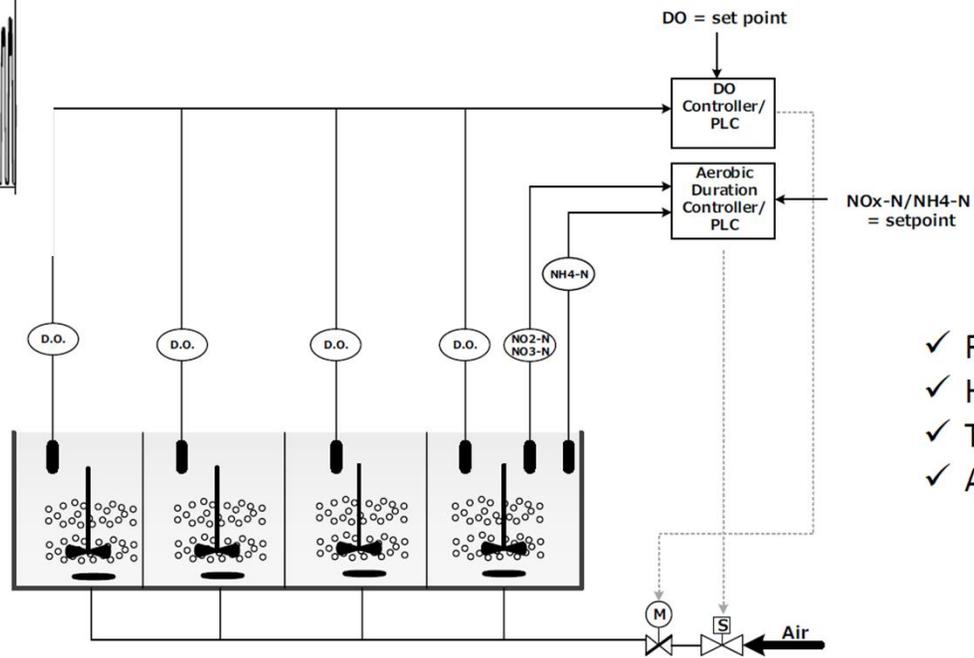
- Controllo dell'areazione attraverso il pH
- Sistema batch
- Ritenzione selettiva dei batteri
Anammox con comparto grigliatura



Controllo intelligente areazione (biologia a basso carico)

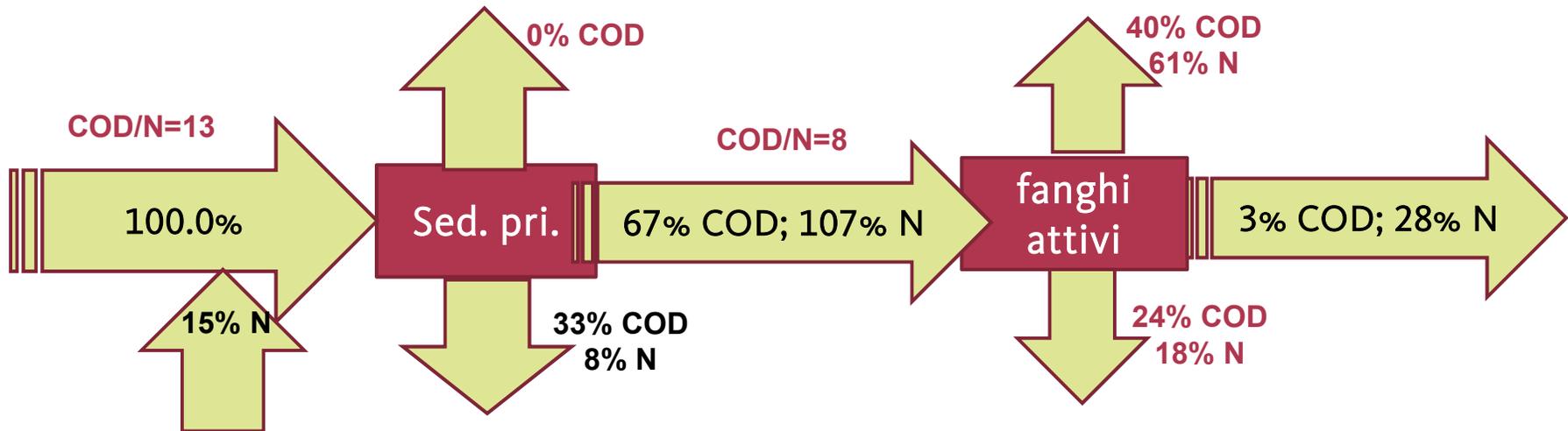


AVN Aeration Control

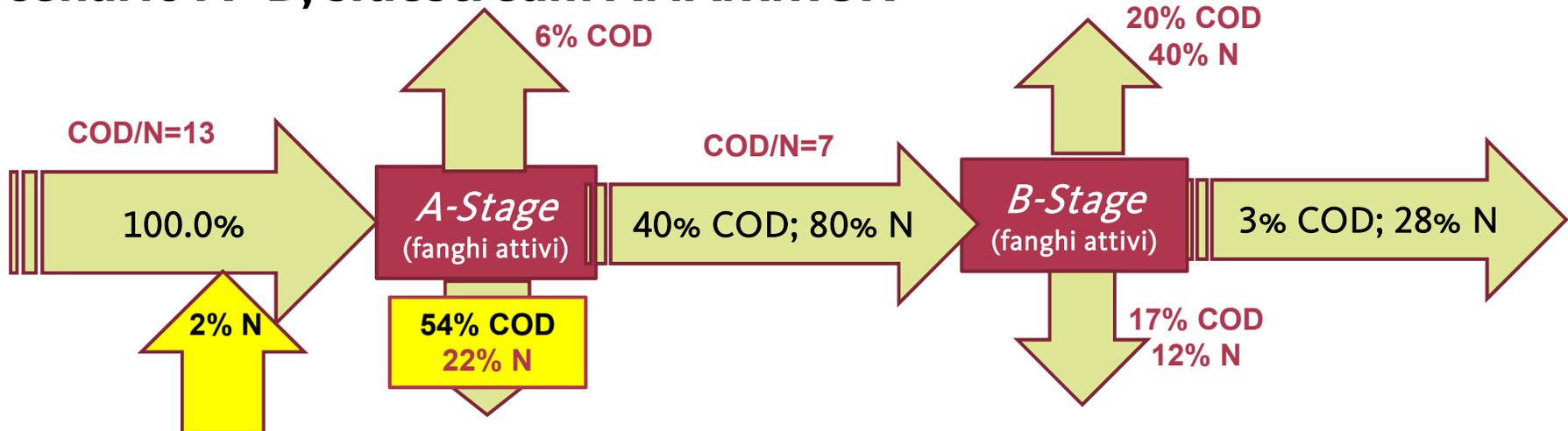


- ✓ Residual Ammonia
- ✓ High DO
- ✓ Transient Anoxia
- ✓ Aerobic SRT control

Scenario convenzionale Sed. primaria, comparto biologico



Scenario A+B, sidestream ANAMMOX



Anammox nel comparto biologico principale

Uno dei **primi depuratori al mondo** che intende sfruttare i vantaggi del processo ANAMMOX anche nel comparto biologico principale (main stream).

Trasferimento della biomassa ANAMMOX (side stream to main stream)

Nuove Sfide:

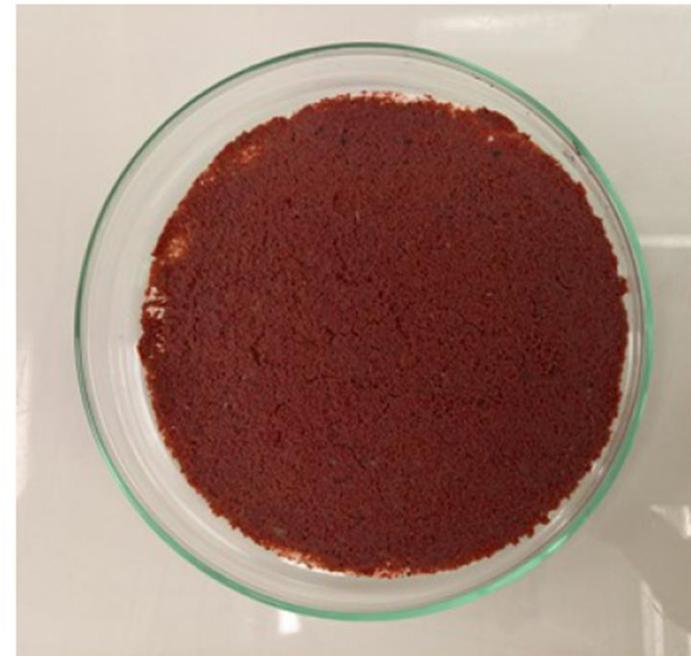
- **Competizione** dei batteri **ANAMMOX** nei confronti dei **batteri nitrificanti**
- **Temperature basse; lunghi tempi di duplicazione**
- **Ritenzione** dei batteri ANAMMOX
- **rapporto carbonio/azoto** più alto → biomassa eterotrofica va a sostituire la biomassa autotrofa



MLSS



screen pass-through



screen retained

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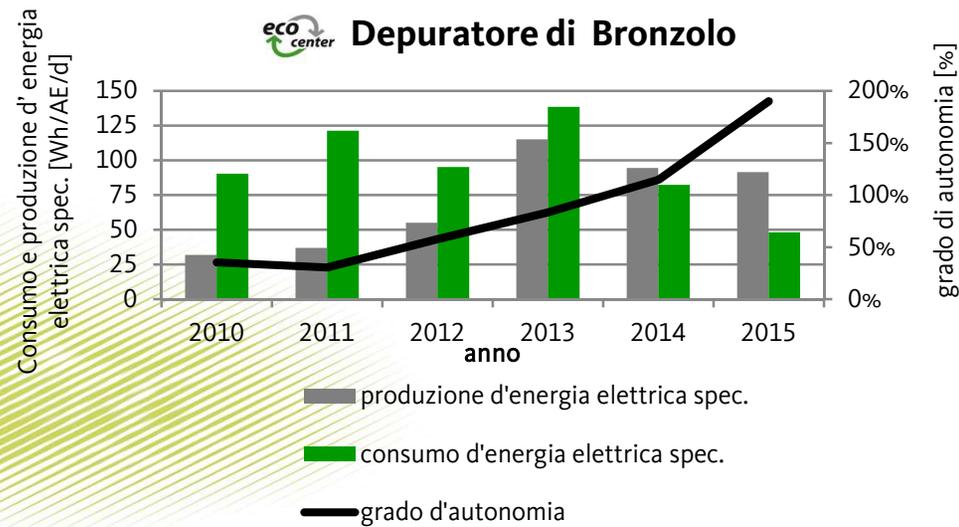
Obiettivi

Insieme verso il futuro ottimizzando il presente



Assieme ai nostri clienti portiamo i depuratori verso un consumo specifico di **55 Wh/AE/d** o **20 kWh/AE/a**

Aumentiamo la produzione di energia elettrica tramite biogas fino ad un **grado di autonomia del 100%**





SYNECO KONTAKT

Martin Sulser, MSc

martin.sulser@syneco-group.com

www.syneco-group.com

+39 0471 301731

Bibliografia

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