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# COMPACT CONSTRUCTED WETLAND ENERGIZED BY A COMBINED SOLAR-WIND POWER STATION, EVOLUTION AND PERFORMANCES UNDER NORMAL CHARGE CONDITIONS.

Victor Olmedo, Optimia medio ambiente

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# MAIN CRITERIA TO DESIGN THE WWT PLANT.

✓ **TO REDUCE THE SURFACE OCCUPIED FOR A WETLAND WASTWATER PLANT.**

✓ **TO ACHIEVE AN AUTONOMUS SYSTEM FROM THE PUBLIC POWER NET.**

✓ **FULFIL THE EUROPEAN REGULATIONS ABOUT THE EFLUENT QUALITY.**

✓ **LOW MAINTENANCE, LOW COST AND SIMPLE OPERATION FOR AN EASY ACCESS OF SMALL MUNICIPALITIES.**

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# FIRST GOAL, REDUCING THE USED SURFACE.

✓ **COMPACT VERTICAL WETLAND IN SINGLE STEP, COMBINIBG IN THE SAME PLACE, FIRST AND SECOND STAGE OVERLAPPING BOTH.**

| | **Separated stages wetland 2 $m^2$/PE** | **Bi-filtre wetland 1,5 $m^2$/PE** |
|---|---|---|
| Filter surface of 1st stage | 1,2 $m^2$/PE | 1,5 $m^2$/PE |
| Filter surface of 2st stage | 0,8 $m^2$/PE | 1,5 $m^2$/PE |
| TOTAL REDUCTION: 25% | | |

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# FIRST GOAL, REDUCING THE USED SURFACE.

## WASTEWATER PLANT DESCRIPTION :

- ✓ 2 IDENTICAL VERTICAL WETLAND FILTERS.
- ✓ A SINGLE PUMP WITH MOTORIZED VALVES.
- ✓ NATURAL AIREATION CIRCUITS IN EACH FILTER.
- ✓ A SIMPLE GRID OF 3 MM THICK.
- ✓ SLUDGE CAPACITY IN THE SURFACE: 5,89 $M^3$
- ✓ TOTAL SURFACE OCCUPIED: 39,27 $M^2$
- ✓ TREATMENT CAPACITY: 26 PE.

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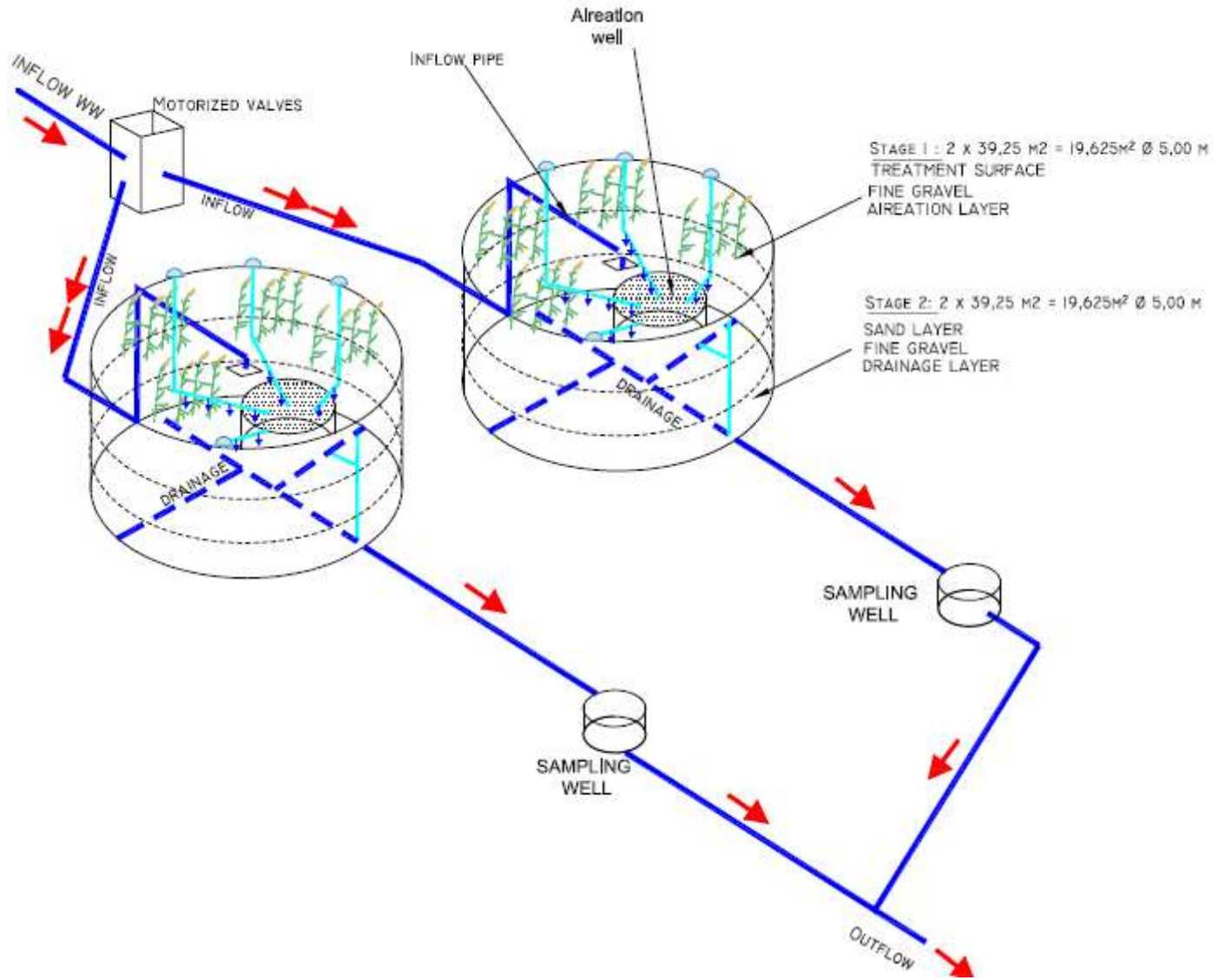

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## SECOND GOAL, AUTONOMUS POWER.

✓ IN SMALL MUNICIPALITIES, THE LOCATION OF THE WWT PLANT CARRY OUT PROBLEMS TO CONNECT AT PUBLIC ELECTRIC NET.

✓ IN MOST OF THE CASES, THE ENERGY COST IS UNAPPROACHABLE FOR A SMALL MUNICIPALITY.

TECHNICAL SOLUTION DESIGNED:

✓COMBINED SOLAR-WIND POWER STATION.

✓LOW CONSUMPTION EQUIPMENT CONSIDERED.

✓POWER MANAGEMENT BY MICROPROCESSOR.

✓BATTERY BANK TO INCREASE THE AUTONOMY.

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## SECOND GOAL, AUTONOMUS POWER.

**POWER STATION DESCRIPTION:**

- ✓ **SOLAR ENERGY GENERATED: 400 WATTS.**
- ✓ **WIND ENERGY GENERATED: 400 WATTS.**
- ✓ **3,5 KVA INVERTER WITH SURCHARGE CAPACITY.**
- ✓ **60 A CHARGE CONTROLLER.**
- ✓ **VOLTAGE SYSTEM: 24 VDC.**
- ✓ **BATTERY CAPACITY: 600 AH**
- ✓ **AUTONOMUS OPERATION TIME: 10 DAYS.**

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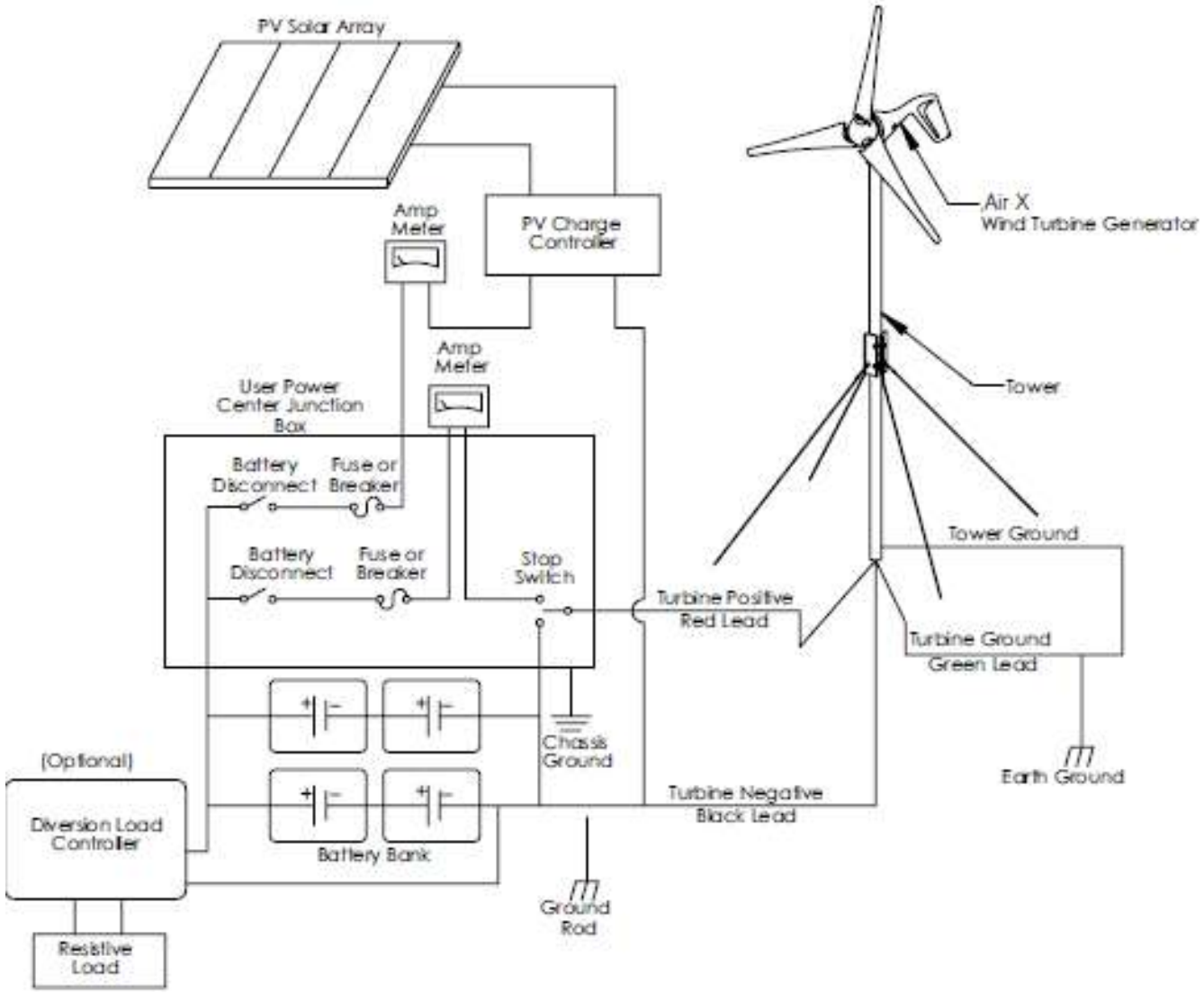

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## THIRD GOAL, FULFIL EUROPEAN REGULATIONS.

**THE PLANT IS WORKING FROM OCTOBER 2007.**

**THE START UP WAS VERY QUICK:**

- ✓ **AFTER THE FIRST WEEK, THE PURIFYING LEVEL WAS 60%.**
- ✓ **AFTER THE FIRST MONTH, THE PLANT REACHES 95% OVERALL VALUES OF PURIFYING.**

**AT THE MOMENT, THE PLANT IS VERY STABLE AND RELIABLE.**

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# THIRD GOAL, FULFIL EUROPEAN REGULATIONS.

## DURING 2008, CENTA TESTED EVERY WEEK THE PERFORMANCES OF THE PLANT.

| | AVERAGE VALUES | | % REMOVAL |
|---|---|---|---|
| | IN | OUT | |
| TSS | 237,73 | 12,87 | 94,59% |
| COD | 734,70 | 73,21 | 90,04% |
| BOD5 | 413,08 | 20,79 | 94,97% |
| TKN | 63,36 | 8,91 | 85,94% |

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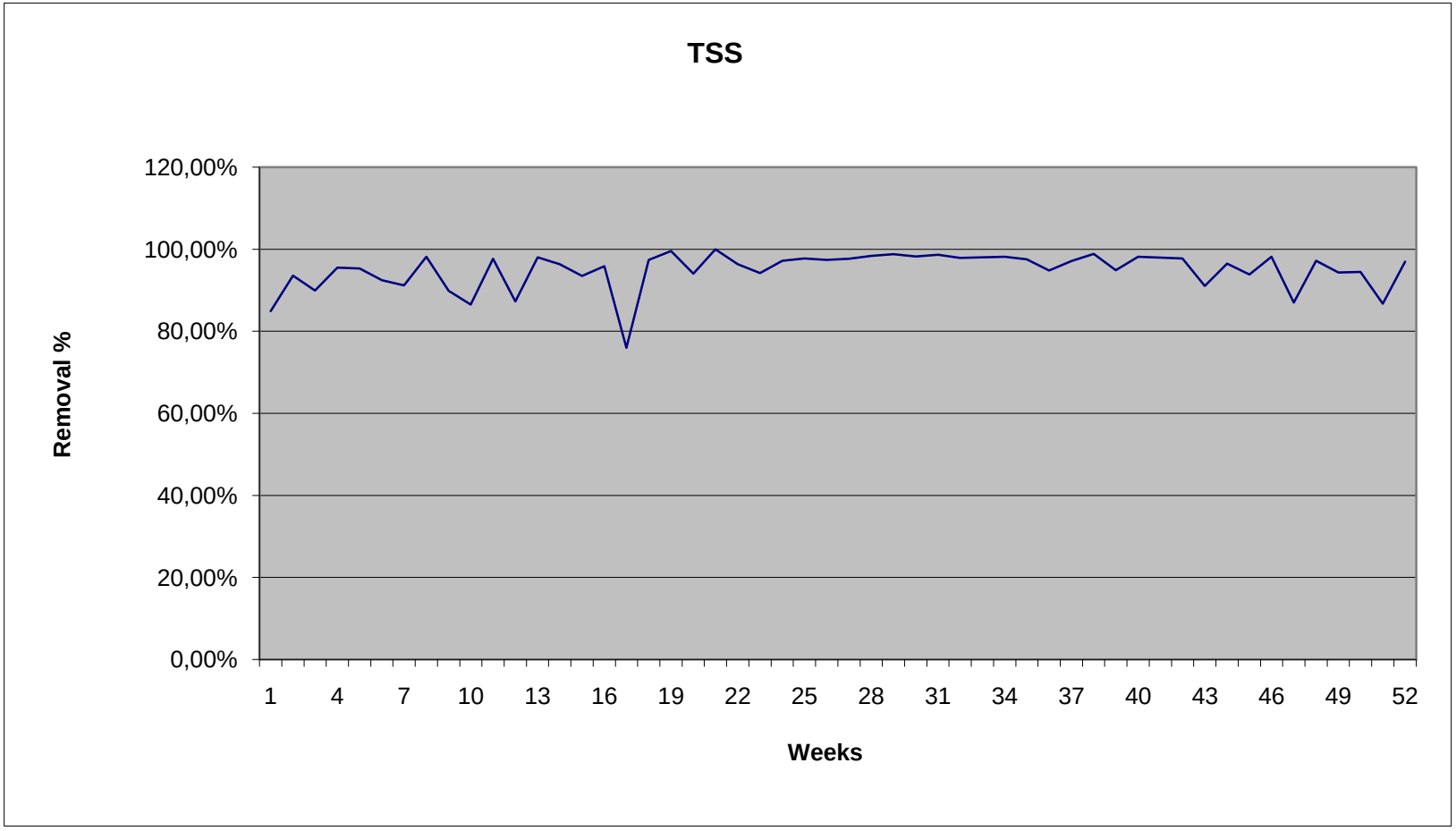
# THIRD GOAL, FULFIL EUROPEAN REGULATIONS.



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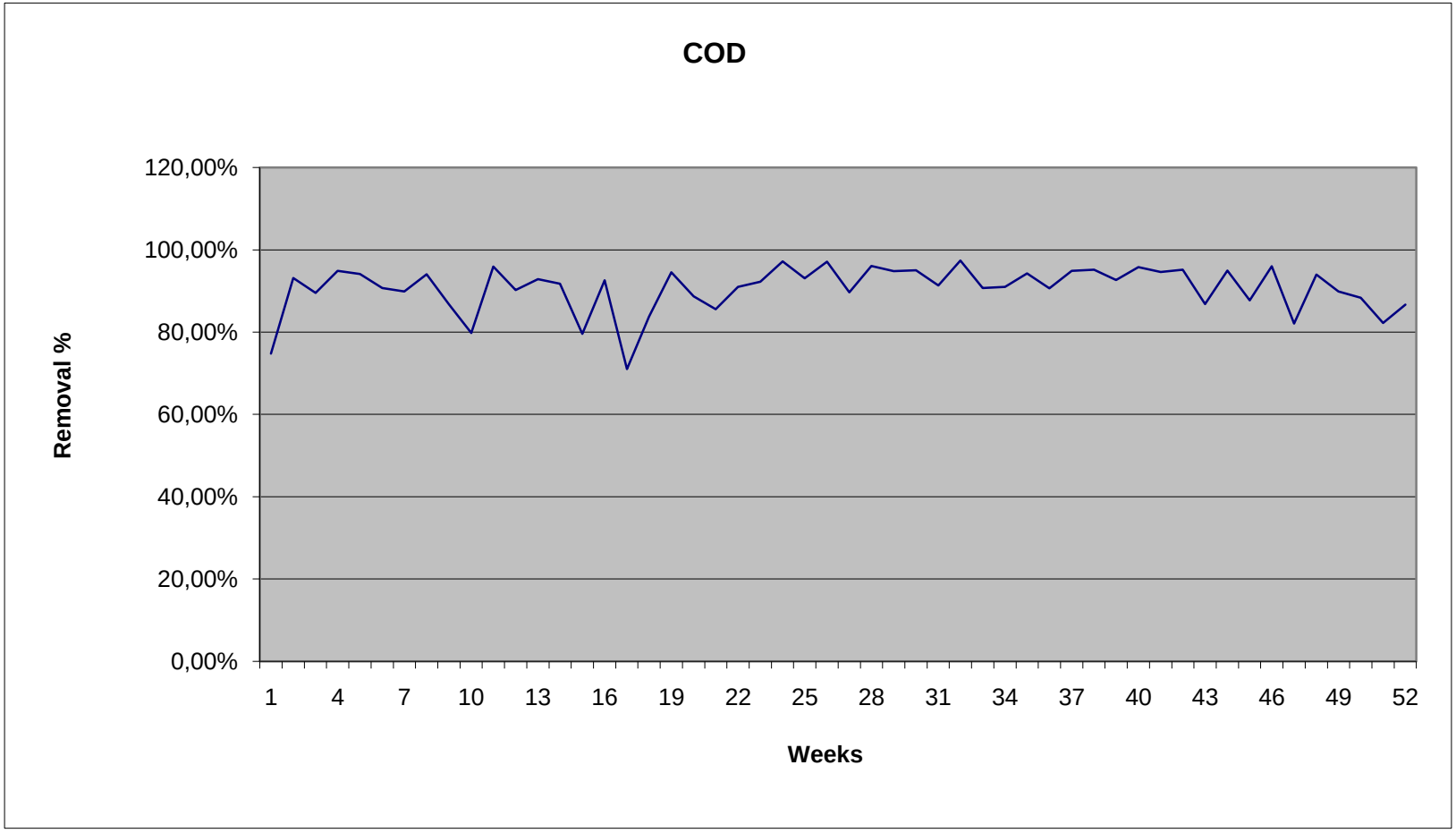

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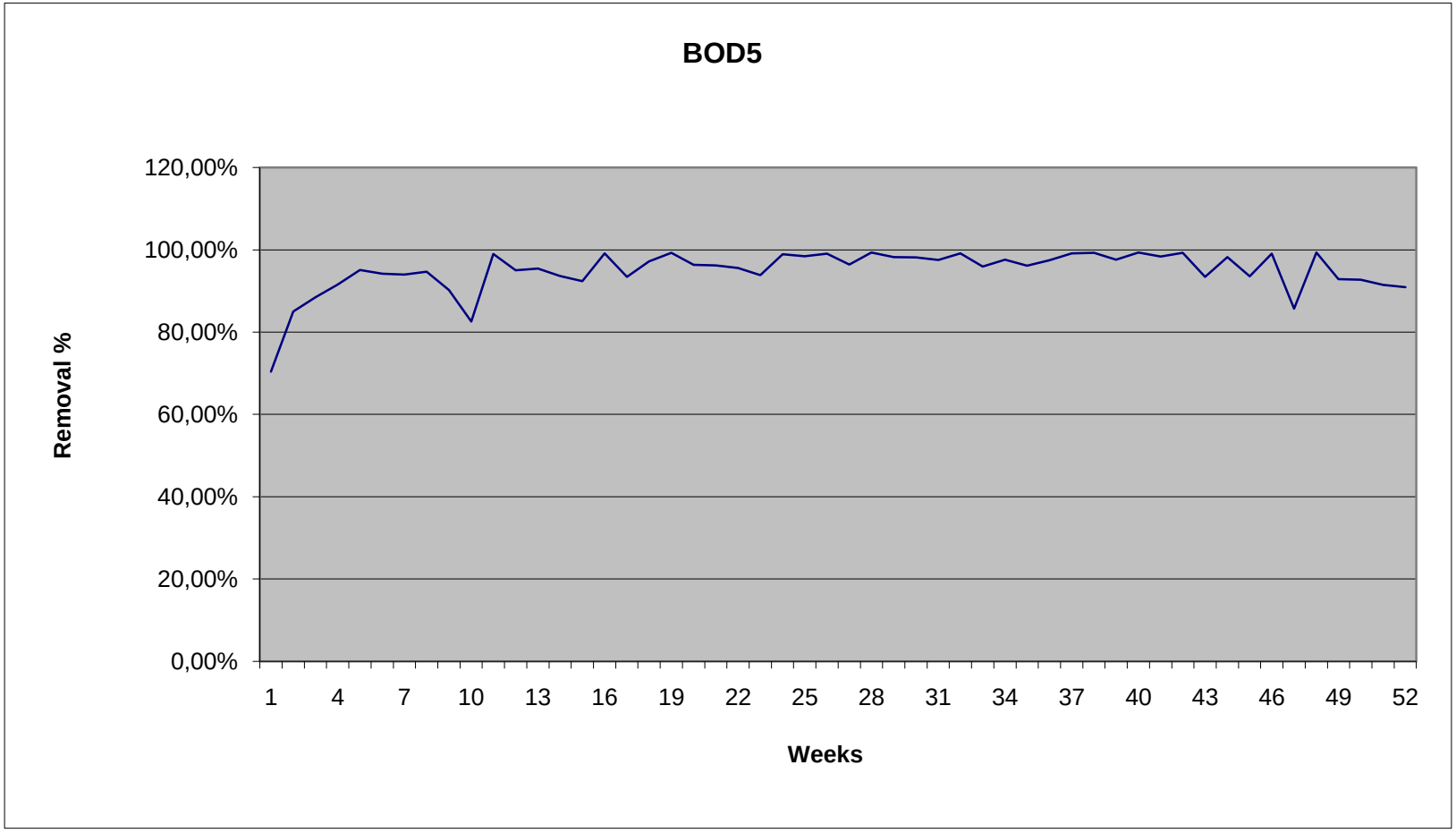

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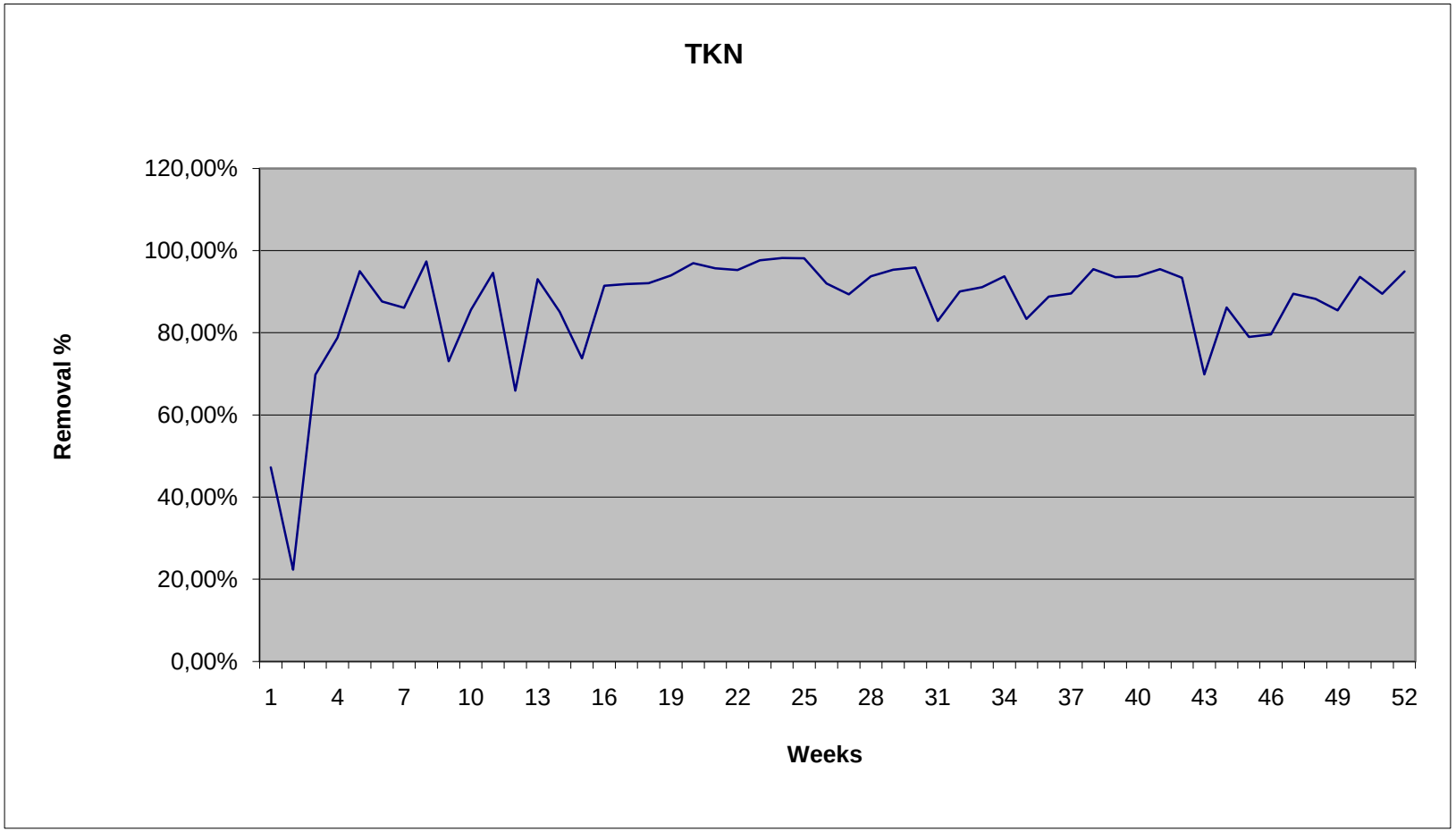

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**THANK YOU FOR YOUR ATTENTION**

volmedo@optimia.es