

NANOPAR PRESENTS:

THE PASKÍER® PROCESS

ORGANIC MUNICIPAL SLUDGE, WASTE TODAY – DESIGN FERTILIZERS TOMORROW.

LOCATED IN PUUMALA, FINLAND, NANOPAR IS A COMPANY SPECIALIZING IN INDUSTRIAL DRYING AND RECYCLED FERTILIZERS.



OUR PROMISE: IF IT CAN BE DRIED – WE CAN DRY IT.

NO ONE DOES IT BETTER!

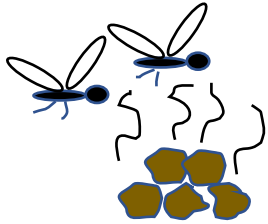
**THE PASKÍER® DRYING TECHNOLOGY IS BASED ON TO
A VACUUM ASSISTED MEDIUM WAVE INFRARED RADIATION.**



**THE EFFECT OF COMBINED VACUUM AND MEDIUM WAVE INFRARED RADIATION TAKES THE THERMAL DRYING
TO THE EFFICIENCY AND ECONOMY, NOT POSSIBLE BEFORE.**

THE TECHNOLOGY IS PATENTED.

WHEN WE LIVED IN JOHANNESBURG IN 1980'S, OUR ZULU GARDEN BOY USED TO SAY:



"NGEKE UKWAZI UJU SHIT"

"YOU CANT MAKE HONEY FROM SHIT!"

I CLAIM THAT A SHIT CAN BE TURNED TO THE HONEY".



WHERE IT BEGUN?

I AM THE CHAIRMAN OF PUUMALA CO-OPERATIVE WATER BOARD. WE HAVE A SMALL WATER BOARD, ANNUAL TURN OVER

ABOUT € 320.000 PER YEAR.

SEWAGE WATER TREATMENT PRODUCES SLUDGE WHICH IS TRANSPORTED TO THE RECEIVING DEPOSITS.

THE TRANSPORT AND GATE FEES ARE ABOUT 15 % OF OUR WATER BOARD'S ANNUAL TURN OVER.

650 WATER BOARDS IN FINLAND AND 50.000 WATER BOARDS IN THE EU ARE FACING THE SAME PROBLEM.

OUT OF THE SIGHT – OUT OF THE MIND?

I HAVE MADE MY LIVING FROM THE SEPARATION OF LIQUIDS AND SOLIDS (FILTRATION) AND THERMAL DRYING FOR OVER 30 YEARS.

BY THE SUPPORT OF THE FINNISH GOVERNMENT SPEAR HEAD  PROJECT CALLED " NUTRITION RECYCLING TRIAL PROGRAM"

NANOPAR DEVELOPED THE **PASKÍER®PROCESS** WHERE THE SLUDGE IS DRIED, MILLED AND ADDED BY SOIL AND CROP SPECIFIC

NUTRIENTS AND GRANULATED. THE FERTILIZERS HAVE FINNISH FOOD AUTHORITY APPROVAL.



RUOKAVIRASTO
Livsmedelsverket • Finnish Food Authority



THE PASKÍER®PROCESS IS INSTALLED ON TO THE WASTE WATER

TREATMENT PLANT, TYPICALLY IN TO 1 – 2 SEA CONTAINERS.

THE ANNUAL COST OF THE SLUDGE TRANSPORT AND THE GATE FEES

ARE **€ 100** MILLION IN FINLAND AND **€ 6 BILLION** IN THE EU.

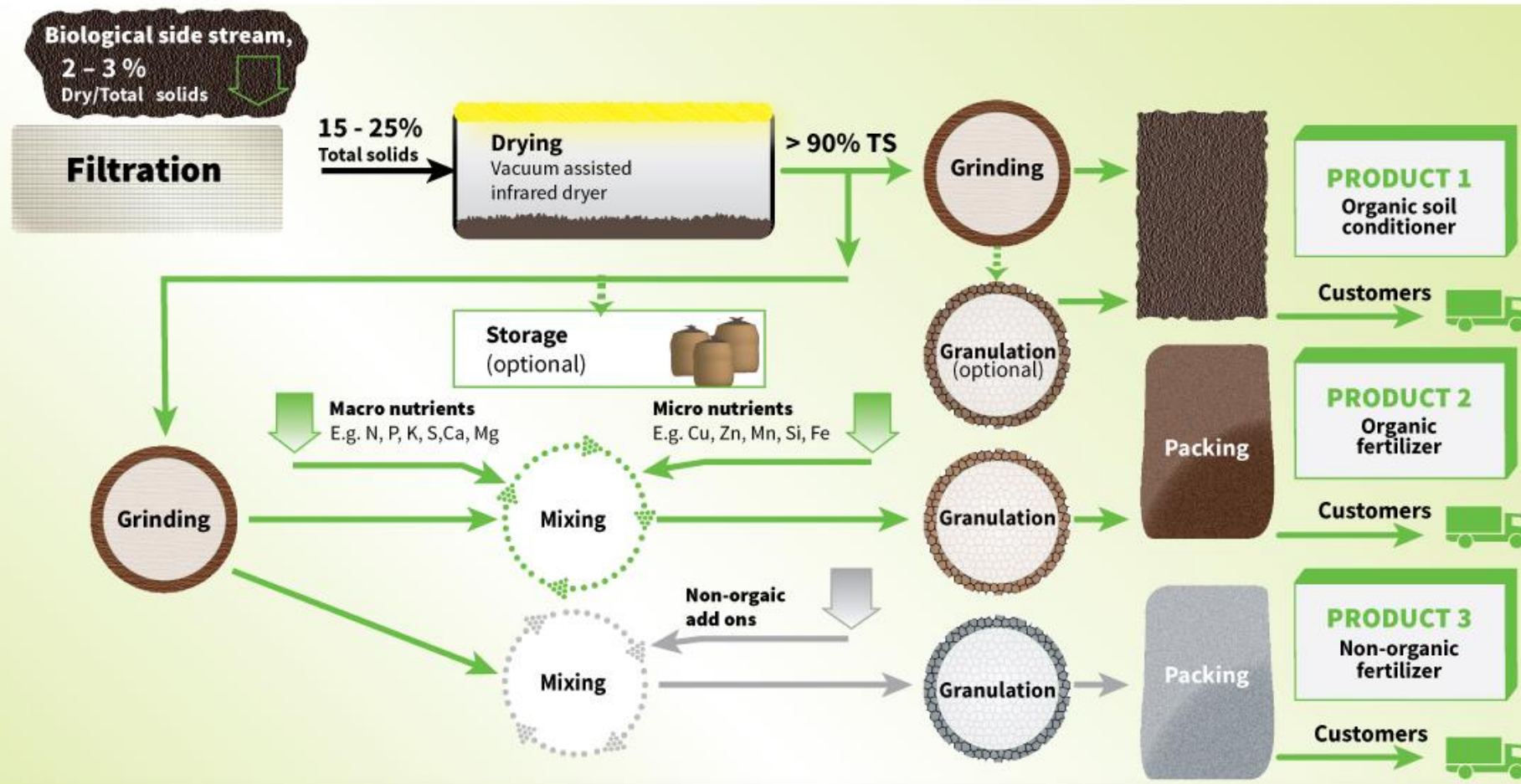
ON THE SITE DRYING PROVIDE SAVINGS OF **€ 50 MILLION** IN FINLAND AND **€ 3 BILLION** IN THE EU.



RECYCLING THE SLUDGE TO FERTILIZERS PROVIDE DRASTICAL REDUCTION OF THE CARBON FOOT PRINT:

CO₂ ekv kg/t: **PASKÍER® PROCESS 5 KG** ← COMPOSTING 95 KG ← **INCINERATION 400 KG** ← **MINERAL FERTILIZER 9700 KG**

Paskier® Process Fertilizer production process



ORGANIC MUNICIPAL SLUDGE, WASTE TODAY - DESIGN FERTILIZERS TOMORROW

THE PROBLEMS TO RESOLVE:

- 1. EU GENERATES OVER 60 MILLION TON OF ORGANIC MUNICIPAL SLUDGE EACH YEAR, AND IT IS INCREASING!**
- 2. THE SLUDGE CONTAINS ABOUT OF 80 % WATER, TRANSPORTED LONG DISTANCES.**

AVERAGE GATE AND TRANSPORT COST FOR THE SLUDGE DISPOSAL IN THE EU IS EURO 100 / M3.

60.000.000 X €100 = € 6 BILLION !

NANOPAR OFFERS SUSTAINABLE SOLUTION, THE PASKIER® PROCESS:

DRIED ORGANIC SLUDGE, PROCESSED TO DESIGN FERTILIZERS BY ADDING SOIL AND CROP SPECIFIC NUTRIENS,

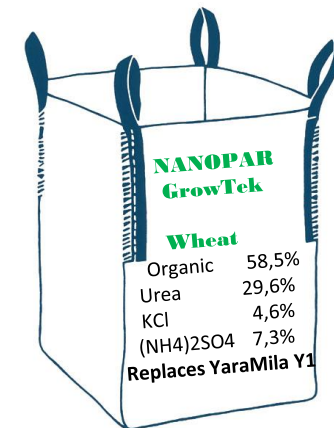
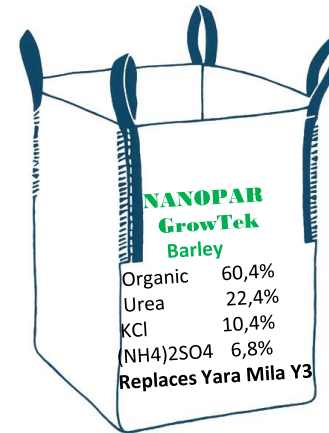
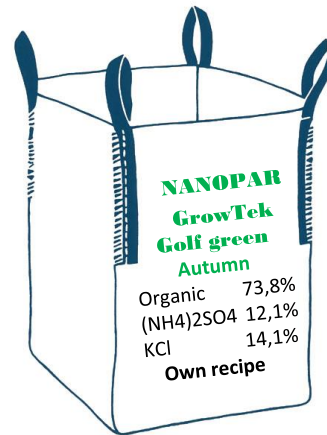
(I) CAN ZERO THE SLUDGE TRANSPORT COSTS, (II) CAN REPLACE THE 14 MILLION TON/YEAR OF MINERAL

FERTILIZERS, ORIGINATING FROM NON-RENEWABLE NATURAL RESOURCES!

THE ANNUAL VALUE OF MINERAL FERTILIZERS, MADE FROM NON – RENEWABLE RAW MATERIALS, IS **€ 6 BILLION.**

MINERAL FERTILIZERS CAN BE REPLACED, **ON GOOD PROFIT MARGINS,** BY BIO-BASED FERTILIZERS.

SUSTAINABLE AGRICULTURE: RIGHT SOURCE- RIGHT QUANTITY – RIGHT TIME – RIGHT PLACE.



THE MARKETING IS ASSISTED BY A GRANT FROM



Työ- ja elinkeinoministeriö
Arbets- och näringsministeriet

THE PASKIER® PROCESS IS TESTED, IT IS WORKING AND IS READILY SKALABLE.

Example of production cost / t

Golf Green	%	Cost €
Dried sludge	73,8	51,07
Ammonium sulfate	12,1	30,25
Potassium chloride	14,1	45,12
Total	100	126,44

Barley	%	Price €
Dried sludge	60,4	41,80
Urea	22,4	49,28
Potassium chloride	10,4	33,28
Ammonium sulfate	6,8	17,00
Total	100	141,36

Wheat	%	Price €
Dried sludge	58,5	40,48
Urea	29,6	65,12
Potassium chloride	4,6	14,72
Ammonium sulfate	7,3	18,25
Total	100	138,57

Drying cost € 69,2/m3 H2O.

Nutrient prices: Alibaba



ORGANIC MUNICIPAL SLUDGE, WASTE TODAY - DESIGN FERTILIZERS TOMORROW

THE MARKET

Theoretical.

**EU alone produce 60 MTY* of municipal sludge. 12 MTY if recycled to fertilizers. Valued at € 5 billion.
EU consumption of commercial fertilizers is 14 MTY*. Valued at € 6 billion.**

Practical.

Nanopar target is to have 1 % of the EU annual sludge production converted to design fertilizers by 2025.

600.000 ton/year of sludge

***) Eurostat.**

ORGANIC MUNICIPAL SLUDGE, WASTE TODAY – DESIGN FERTILIZERS TOMORROW.

Where is the market? Considering the current restrictions against human waste based recycled fertilizers:

The EU agricultural land is about 180 million hectares and is distributed*:

- **Cultivable about 60 %**
- **Lawn area about 33 %**
- **Food grains about 7 %**

From the above our conclusion is; the the lack of harmful substances directives and emotional restrictions against the usage of human waste based recycled fertilizers is limited to only a small part of agricultural land area.

For the time being the Paskier® Process marketing will be on focused to:

- i) **Small waste water treatment plants PROMOTING SAVINGS in the sludge transport and gate costs when drying is done on the site.**
- ii) **On site sludge sub-contractors, fertilizer distributors, and the fertilizer end users for:**

- **Fodder grains**
- **Soil improvement**
- **Gardening**
- **Landscaping**
- **Golf courses**

***)Source Eurostat**

ORGANIC MUNICIPAL SLUDGE, WASTE TODAY - DESIGN FERTILIZERS TOMORROW

THE COMPETITION.
IN THE FUTURE THER WILL BE 3 PRINCIPAL METHODS TO DISPOSAL OF ORGANIC SIDESTREAMS.

METHOD	+	-
DRYING AND PRODUCING RECYCLED FERTILIZERS	<ul style="list-style-type: none"> • Replaces commercial fertilizers • Can be installed and operated on all sizes of treatment plants • No sludge transport costs • Small CAPEX and OPEX • Typical pay-pack period is 3-4 years. 	<ul style="list-style-type: none"> • Prejudice • No directives for the time being • Not yet references • Do not dispose heavy metals • Not known what happens to harmful substances, study ongoing.
BIOCOAL	<ul style="list-style-type: none"> • Green energy • Disposes most of harmful substances 	<ul style="list-style-type: none"> • Under development • High CAPEX • High OPEX • No references • Cannot be installed on to small and medium size treatment plants • Do not dispose heavy metals • Sludge transport costs • Do not replace commercial fertilizers
INCINERATION	<ul style="list-style-type: none"> • Most common method • Disposes most of harmful substances 	<ul style="list-style-type: none"> • High CAPEX • High OPEX • Cannot be installed on to small and medium size treatment plants • Sludge transport costs • Do not replace commercial fertilizers • Do not dispose heavy metals • ASH TRANSPORT AND STORAGE?

ORGANIC MUNICIPAL SLUDGE, WASTE TODAY – DESIGN FERTILIZERS TOMORROW.

**WE HAVE PROVED THAT WE CAN DRY ORGANIC, MUNICIPAL WASTE WATER SLUDGES AT
THE ECONOMY THAT MAKES THE DRYING COMMERCIALY VIABLE.**

**WE HAVE PROVED THAT USING DRIED ORGANIC SLUDGE AS A BASE, WE CAN
PRODUCTISE DESIGN FERTILIZERS AT THE ECONOMY THAT MAKES THE
FERTILIZER PRODUCTION VERY PROFITABLE.**

WE HAVE 3 – 4 YEAR COMPETITIVE EDGE DUE TO THE PASKIER®PROCESS.

WE HAVE FINNISH FOOD SAFETY AGENCY APPROVAL 3A2 FOR OUR FERTILIZERS.



**JOIN US IN THE JOURNEY TO SUSTAINABLE,
CARBON FREE FUTURE!**