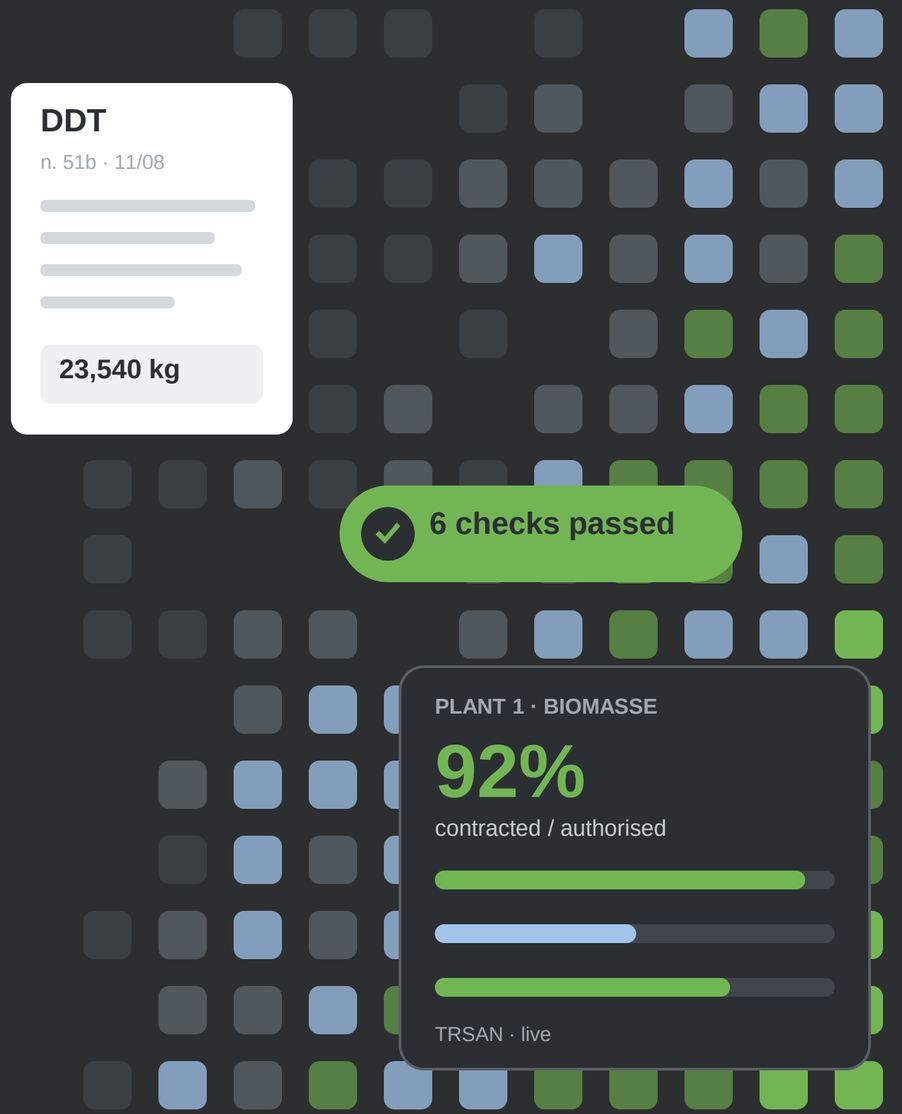
FIAMMA VERDE
LA FORZA VERDE DEL FUTURO

4 NOV. 2026

Beyond Compliance: Digitalizing Sustainability Management Systems for Integrated Business Decision-Making

dott. ing. Anda Visan

Environmental Engineer · Sustainability Coordinator, Fiamma Verde



ABOUT US

Who is Fiamma Verde







PLANT SITES

Leno (BS) · Pozzaglio (CR) · San Giovanni in Croce (CR) · Taglio di Po (RO)

4 sites

soon to enter operation

in Cremona, Brescia and Veneto

dott. ing. Anda Visan

Environmental Engineer · Sustainability Coordinator, Fiamma Verde

WEBSITE

fiammaverde.net

Scan to visit

LINKEDIN

Anda Visan

Scan to connect

Certification doesn't wait for the plant to go digital

This talk is about Phase 1: no infrastructure, no resources, and the clock ticking

THIS TALK

PHASE 1

Plant not yet running

Construction & start-up

- Paper DDTs & receipts
- Data scattered everywhere
- The clock is ticking
- No digital systems on site

CERTIFICATION

You certify with whatever data you have at this point

PHASE 2

Plant in operation

Digital & mature

- Site systems & weighbridge
- Digital, standard data
- Mature team
- Software fits & pays off

Usually, there are two roads you can take



Paper data, and an audit coming

ROAD 1 — Consultants + Excel

- ✖ No control over duplicates
- ✖ Supplier names must match for every pivot
- ✖ final_final_FINAL_v3.xlsx for the auditor
- ✖ Freezes, blocks, unsaved work
- ✖ Finance, ops and you, all in one file

ROAD 2 — Buy a software

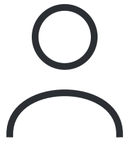
- ✖ Months of implementation
- ✖ Training for every user
- ✖ Someone still types the paper in
- ✖ Licence and maintenance budget
- ✖ Expects digital data that doesn't exist yet

Both assume something you don't have yet

- **Time**
- **Digital data**
- **Budget & people**

One person, AI, and a week

What if you could get comparable results wby doing everything internally?



1 person with data skills

Knows the process and the data

+



AI as co-developer

Writes and explains the code with you

=



TRS in ~1 week

An R Shiny app, synced on your own OneDrive

€0

licences, no consultants

Low

maintenance: logic written once, applied to every new record

Comparable

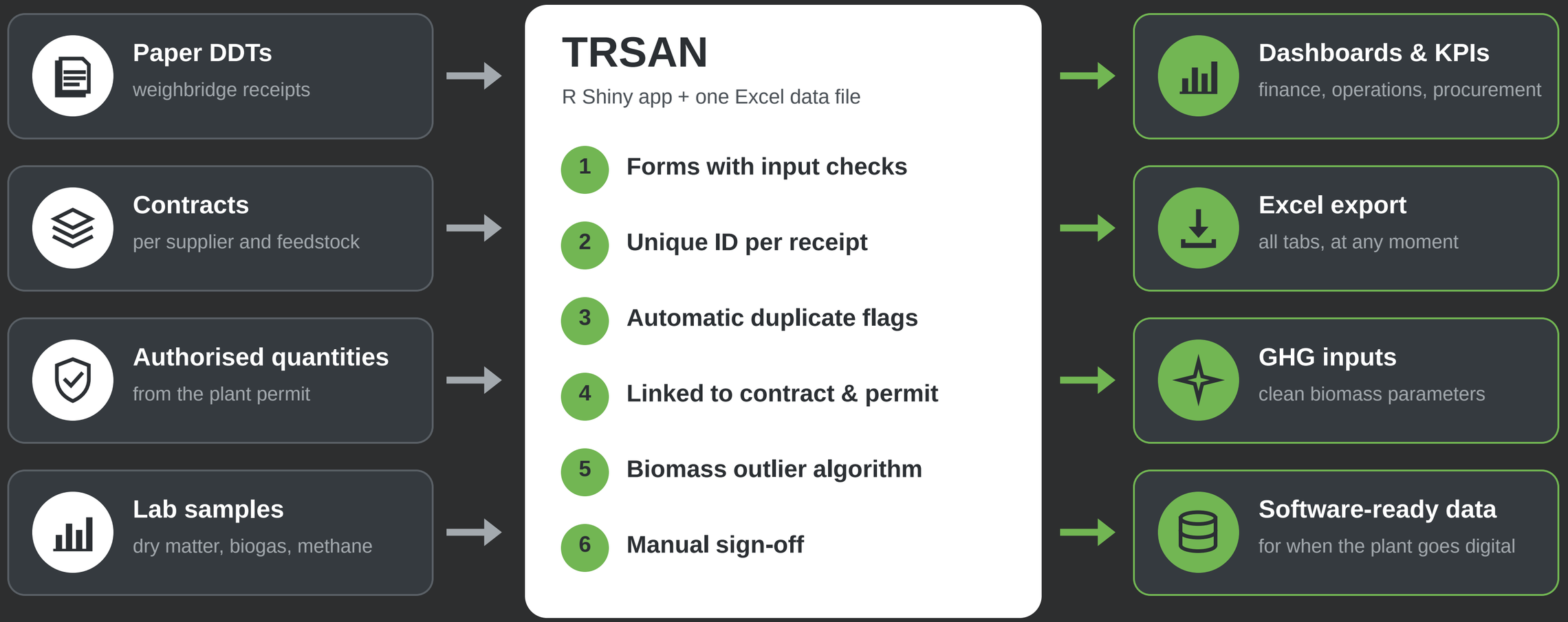
results: audit-ready traceability, KPIs, Excel exports

HOW TRSAN WORKS

Fiamma Verde · Ecomondo 2026

Paper in, checked and linked data out

Inputs stay as they are. Everything after the receipt is structured



INPUTS
4 paper sources

ONE ENGINE, LOGIC FROZEN IN CODE
6 controls applied to every record

OUTPUTS
4 ready-to-use results

From minutes to seconds per receipt

Before: typing each DDT into Excel

2–5 min

Now: TRSAN form

seconds

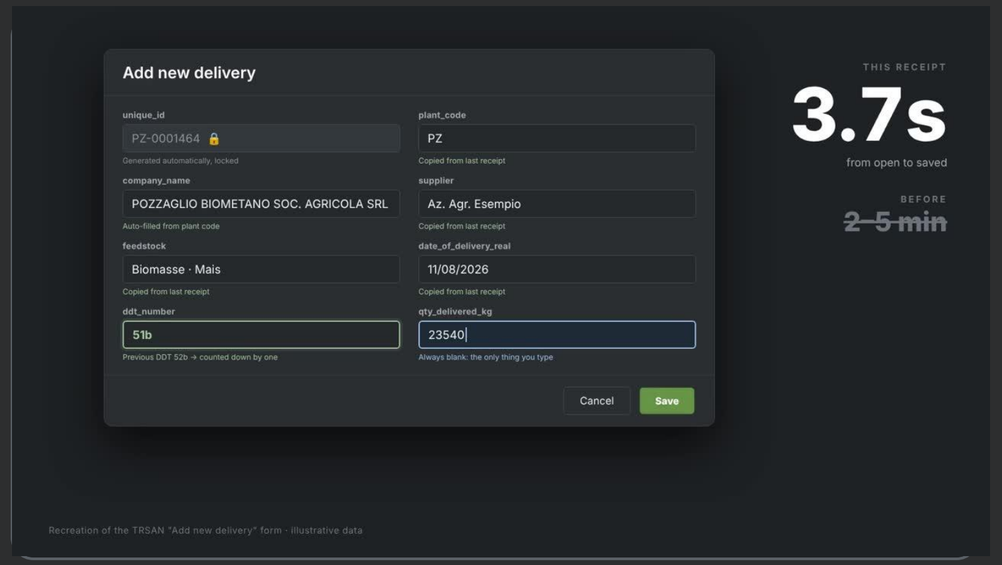
~1,500
receipts a year

→

50–120 h
of typing saved

per year, before counting the errors avoided

The form only asks for what changes. Fewer keystrokes, fewer typos

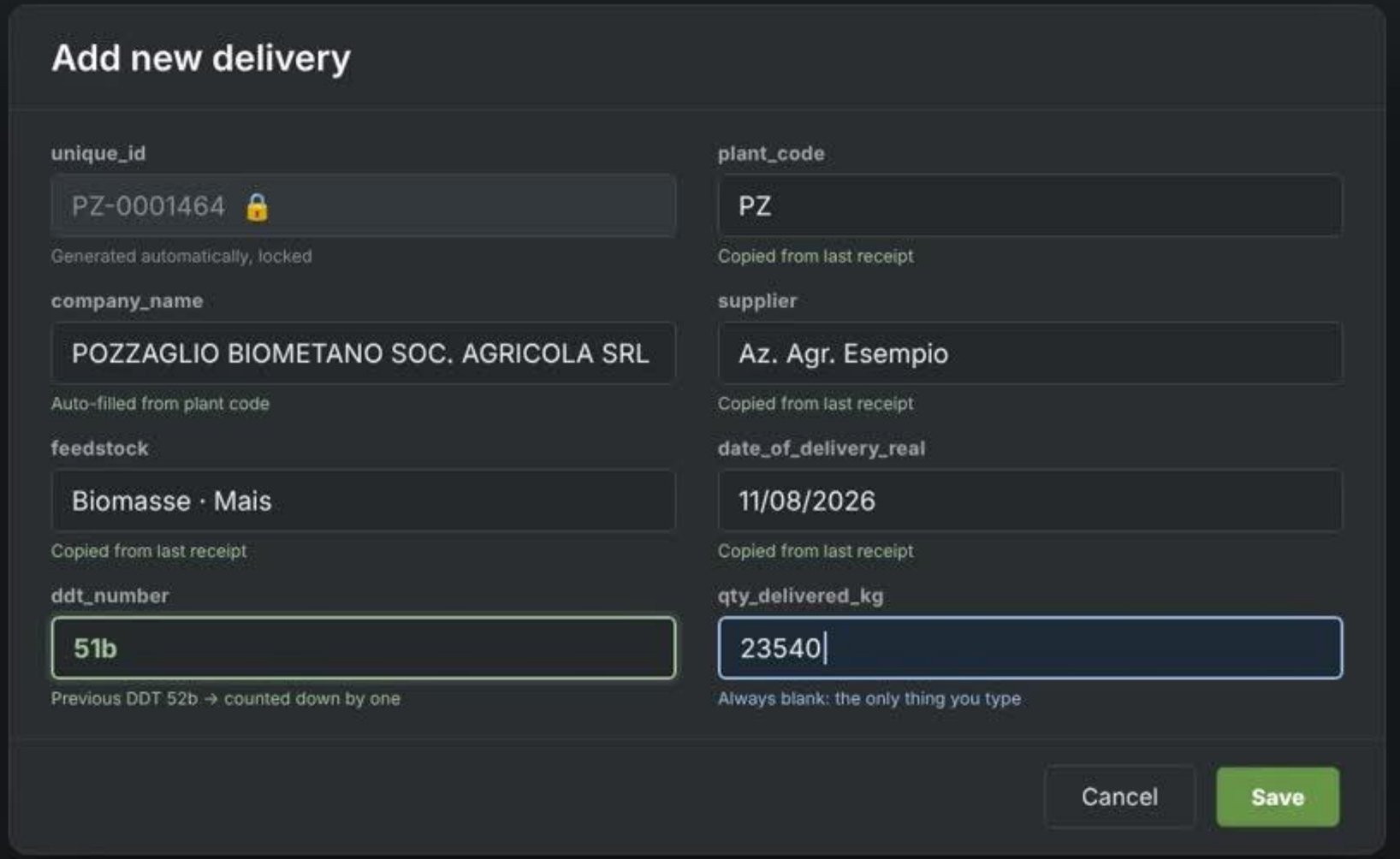


What the form does for you

Plant, supplier, feedstock
copied from the last receipt

DDT number
suggested: next in sequence

Weight
the only thing you type



THIS RECEIPT

3.7s

from open to saved

BEFORE

~~2–5 min~~

Recreation of the TRSAN "Add new delivery" form · illustrative data

Six things it checks on every record

Errors get flagged when they're typed, not found later by the auditor

Duplicate receipts

Same plant, supplier, feedstock and weight, a few minutes apart

23,540 kg · 09:12
23,540 kg · 09:28

Duplicate?

Duplicate contracts

Two contracts on the same plant, supplier, feedstock and year: deliveries can't be attributed

2025/031 · 2025/047
same key

Ambiguous

Feedstock mismatch

The contract says one feedstock, the delivery notes say another

Contract: maize silage
DDT: triticale

Mismatch

Supplier ↔ plant

A receipt from a supplier with no contract at that plant code

Supplier 014 → Plant 2
contract only at Plant 3

No match

Incomplete DDT information

Partially missing information automatically flagged

DDT ✕ · time ✕

Low trace

Not signed off yet

A supplier row nobody at the plant has reviewed: no name, no date

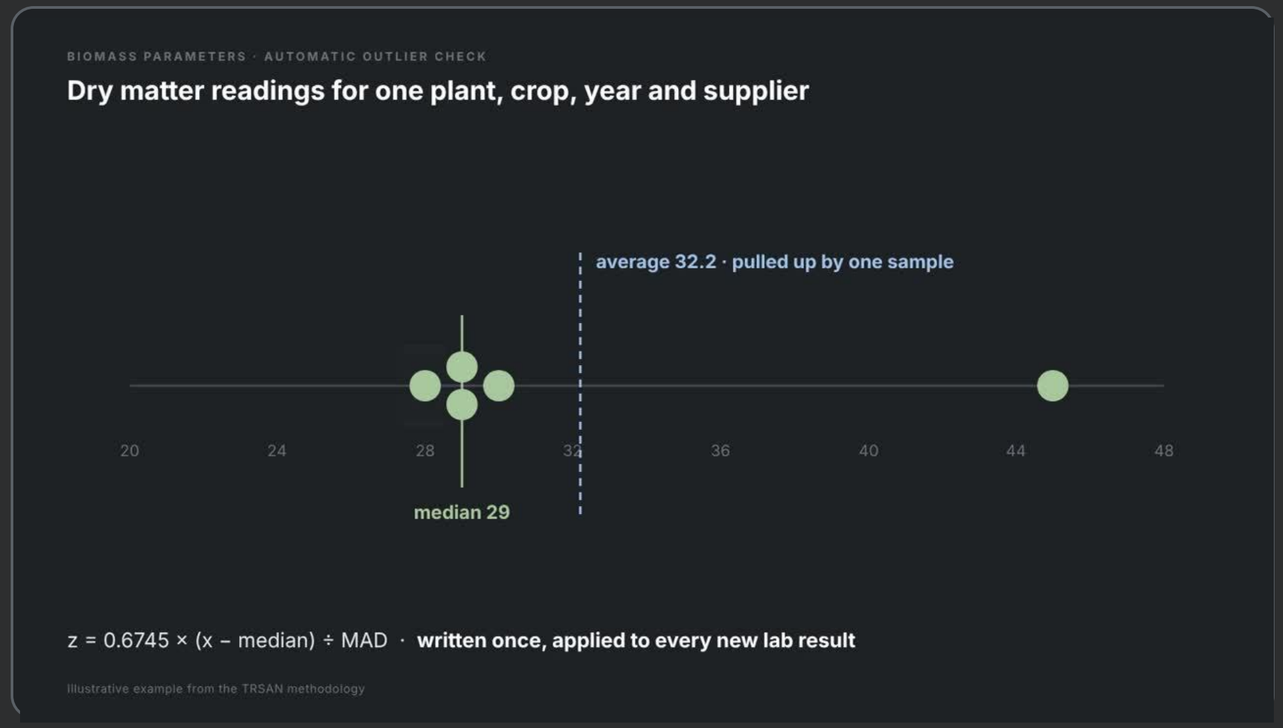
Reviewed by: –
Reviewed at: –

Pending

It never fixes anything on its own: it flags, and a person decides and signs off

Think about the formula once. It runs forever

Lab samples feed the GHG calculation, and one bad sample can skew a whole group's average



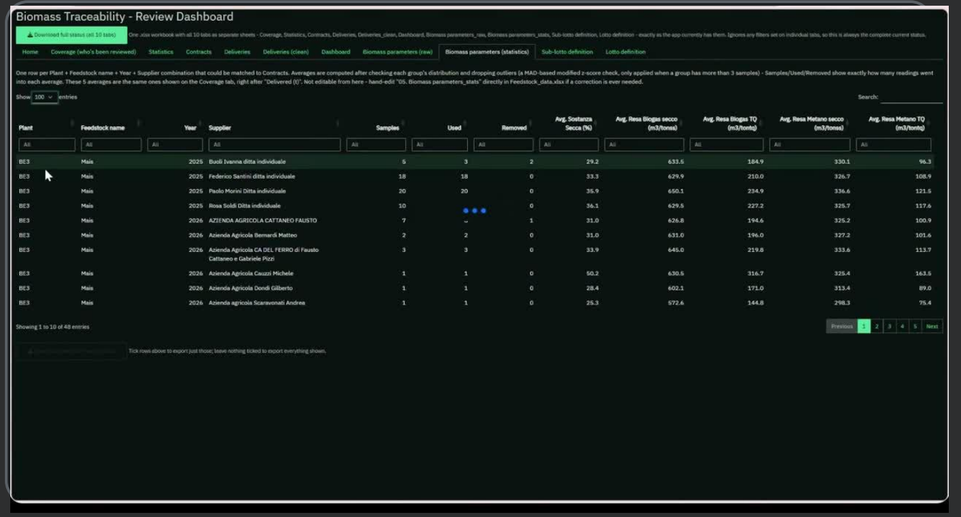
1. **Group**
   plant + crop + year + supplier
2. **Find typical**
   the median, not the average
3. **Measure spread**
   MAD: typical distance from the median
4. **Score each sample**
   z = 0.6745 × (x − median) ÷ MAD
5. **Drop clear outliers**
   |z| > 3.5 on any value: whole sample out

CHECKED BY HAND ON REAL DATA

Plant 3, maize 2025

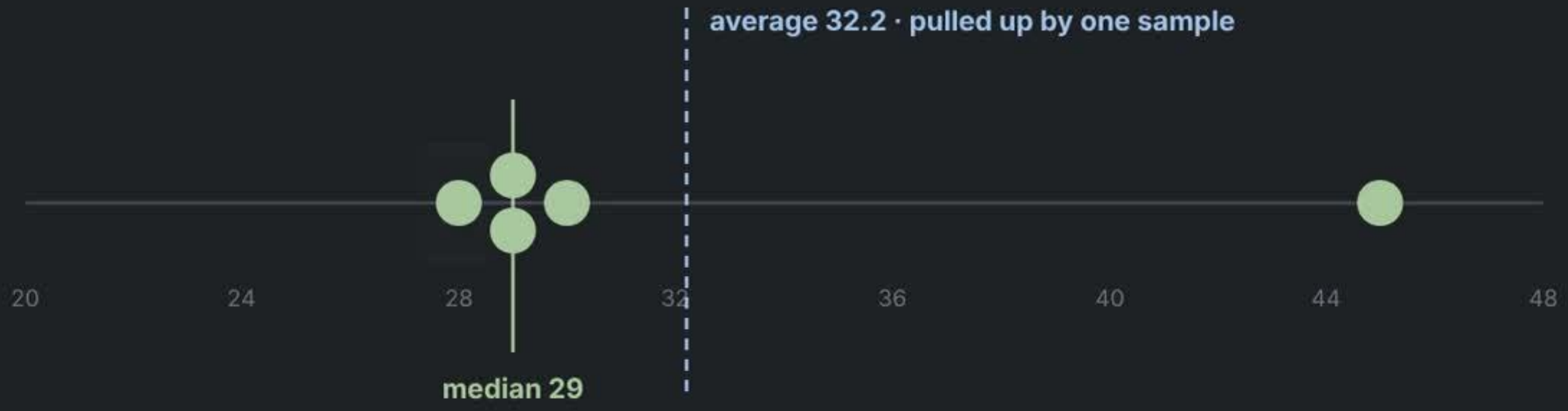
A tight 28.5–29.6% dry-matter cluster. Two readings dropped, 33.04% and 50.29%. The rest untouched

Method: modified z-score (Iglewicz & Hoaglin, 1993)



BIOMASS PARAMETERS · AUTOMATIC OUTLIER CHECK

Dry matter readings for one plant, crop, year and supplier



z = 0.6745 × (x – median) ÷ MAD · **written once, applied to every new lab result**

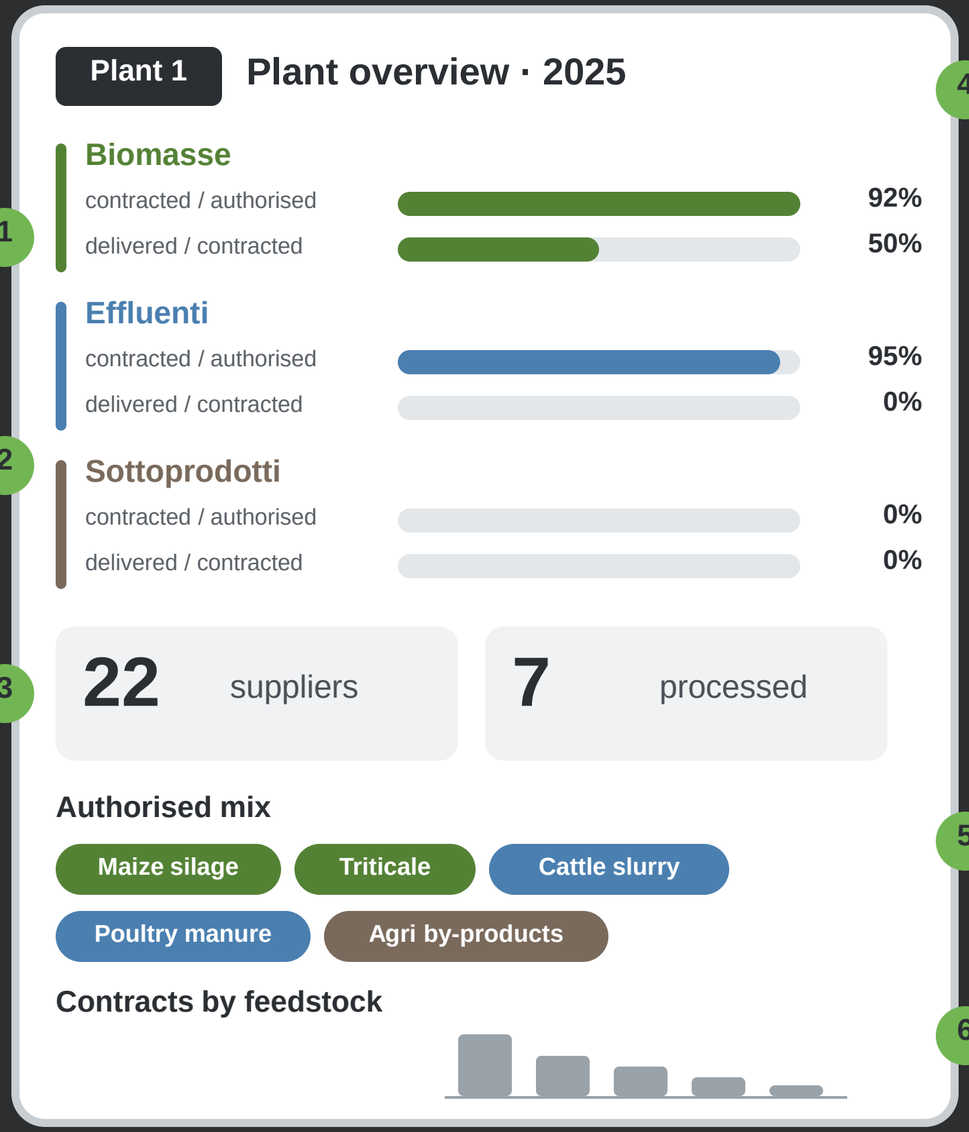
Illustrative example from the TRSAN methodoiogy

Where each plant stands against its permit

Two bars per category 1
contracted vs authorised, delivered vs contracted

One block per category 2
Biomasse, Effluenti, Sottoprodotti, each with its colour

Suppliers vs processed 3
how many exist, and how many have delivered



Border = plant status 4
red: nothing contracted · green: over 70% contracted and delivered

Authorised mix 5
every feedstock the permit allows, coloured by category

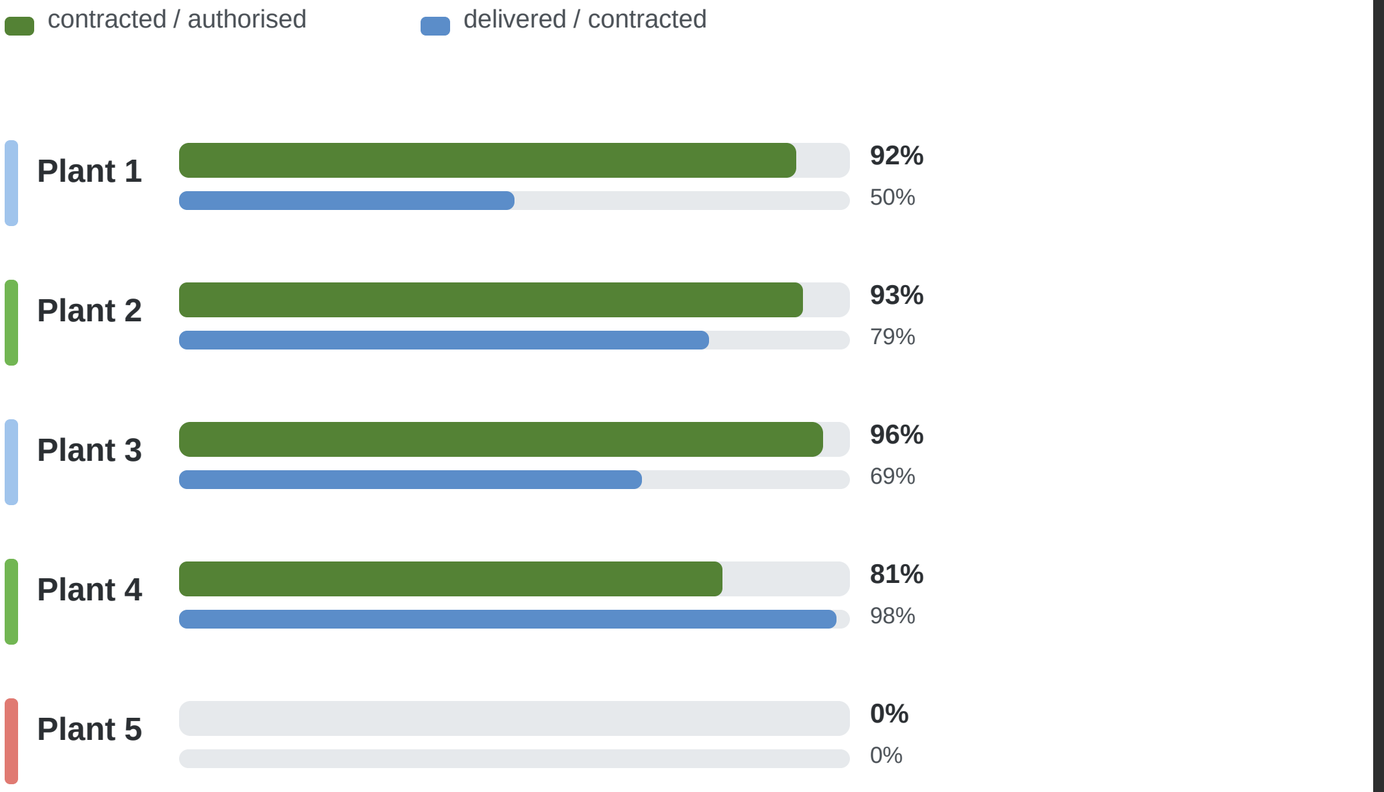
Contracts by feedstock 6
how many contracts exist for each one

Recreated from the TRSAN home tab

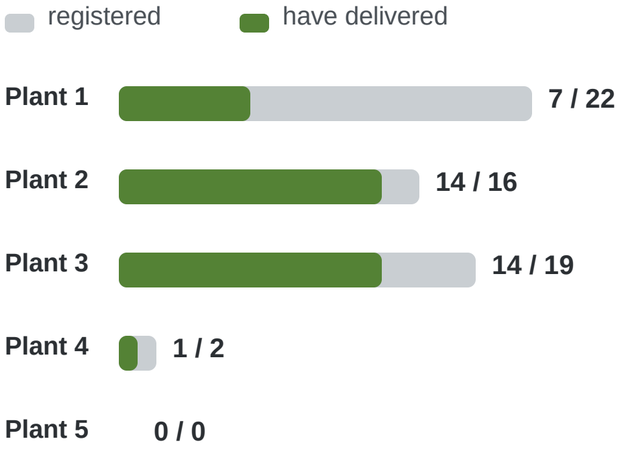
Every plant against its permit, in one view

Recreated from the Dashboard and Statistics tabs · illustrative data

Dashboard · Biomasse, per plant



Statistics · suppliers per plant



PLANT STATUS

- nothing contracted yet
- in between
- over 70% contracted and 70% delivered

Finance, operations and procurement read the same numbers, from the same file

UNDER THE HOOD

Built not to break, and downloadable at any moment

The old workbook kept corrupting. These rules are why the new one hasn't

Logic frozen in code

Written in R: nobody can press the wrong cell and ruin a formula

Rebuild, don't patch

Every save rewrites the file, with an automatic backup

All or nothing

File open or mid-sync? Error, nothing changes. No half-written data

Synced, three copies

OneDrive and your computer: always more than one place to look

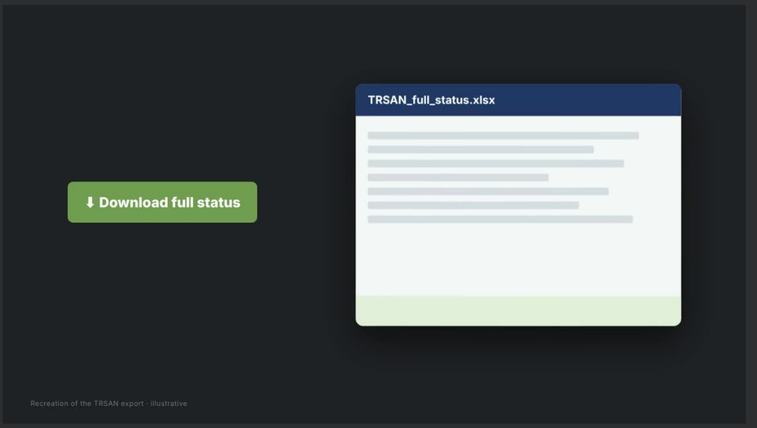
Manual sign-off

Plant Manager or Feedstock Specialist confirms, with name and time

Excel at any moment

One click exports every tab, ready for the auditor

Download full status



TRSAN_status.xlsx

All 10 tabs as separate sheets. Always the complete current status, whatever filters are set

Excel stays as the output everyone knows. It just isn't where the data lives anymore

ADDED VALUE

What a week of building bought us

Measured against the folders of receipts and the corrupting workbook it replaced

~1 week to build

With AI as co-developer. No licence, no vendor, no tender

Seconds per receipt

Instead of 2–5 minutes of searching, typing and checking

Fewer errors

IDs and matching rules catch mismatches at entry, not at audit

Always auditable

Every tonne traceable to its contract and its permit

Low maintenance

Plain R code the team owns. Rules change, code follows

Built to grow

New plants, crops and suppliers are just new rows

Shared visuals

Plant, office and certifier look at the same coverage view

Software-ready

Clean, structured data migrates when the time comes

BEST FOR

Plant before it runs → Plant in operation

TRSAN: small teams, paper-based supply chains, plants before they go digital

Once the plant is digital, software earns its place

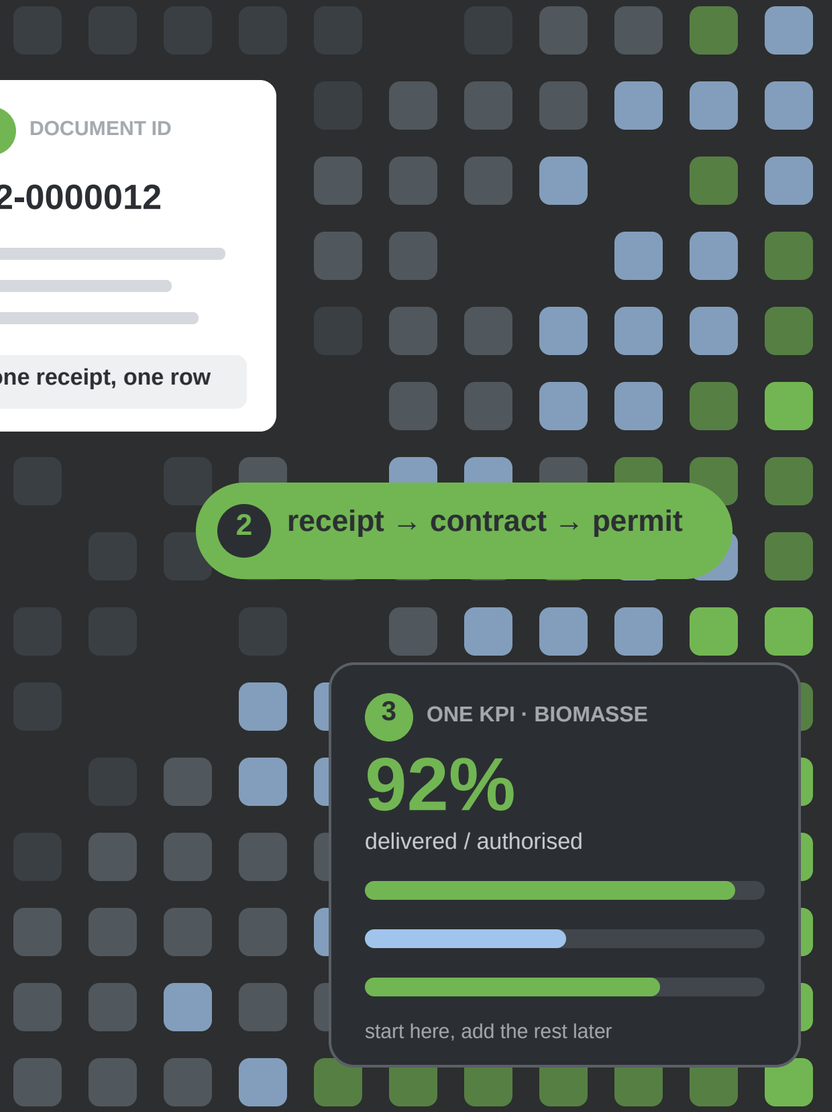
“Digitalisation doesn't have to be complex. It starts with standardising even the simplest things.”

Thank you

dott. ing. Anda Visan · Questions welcome

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THREE THINGS YOU CAN DO ON MONDAY

01

Give every document an ID

One receipt, one row

02

Write down your matching rules

Plain words first, code later

03

Build one KPI against your authorisation

Delivered vs authorised, per feedstock