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Ministerstvo životního prostředí

Bioplastics in the Czech Republic: A Decision-Ready Roadmap from Standards to Policy (2025–2030)

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“Environment for Life” SS02030008)



Purpose

- **What problem I am addressing that needs to be solved in the Czech context:**
 - Bioplastics are entering markets faster than collection, sorting, and treatment can adapt.
 - Three pressure points: **claims confusion; uneven access to suitable treatment; fees not aligned with verified benefits.**
- **Purpose of my research:**
 - Present a decision-ready policy package for the Ministry of the Environment to manage bioplastics under Czech conditions (2026–2030).
- **Specific objectives**
 - Clarify terminology and bind claims to certification and on-pack disposal instruction.
 - Present a Czech decision tree for **Extended Producer Responsibility (EPR)** fee eco-modulation linked to certification, access to treatment, and pilot evidence.
 - Propose a **three-phase 2026–2030 roadmap**: municipal pilots instrumented with tracer-based sorting/digital watermarking, quarterly dashboards, and a governance mechanism.
 - Define exclusions and procurement rules for where compostables should and should not be used.

Purpose

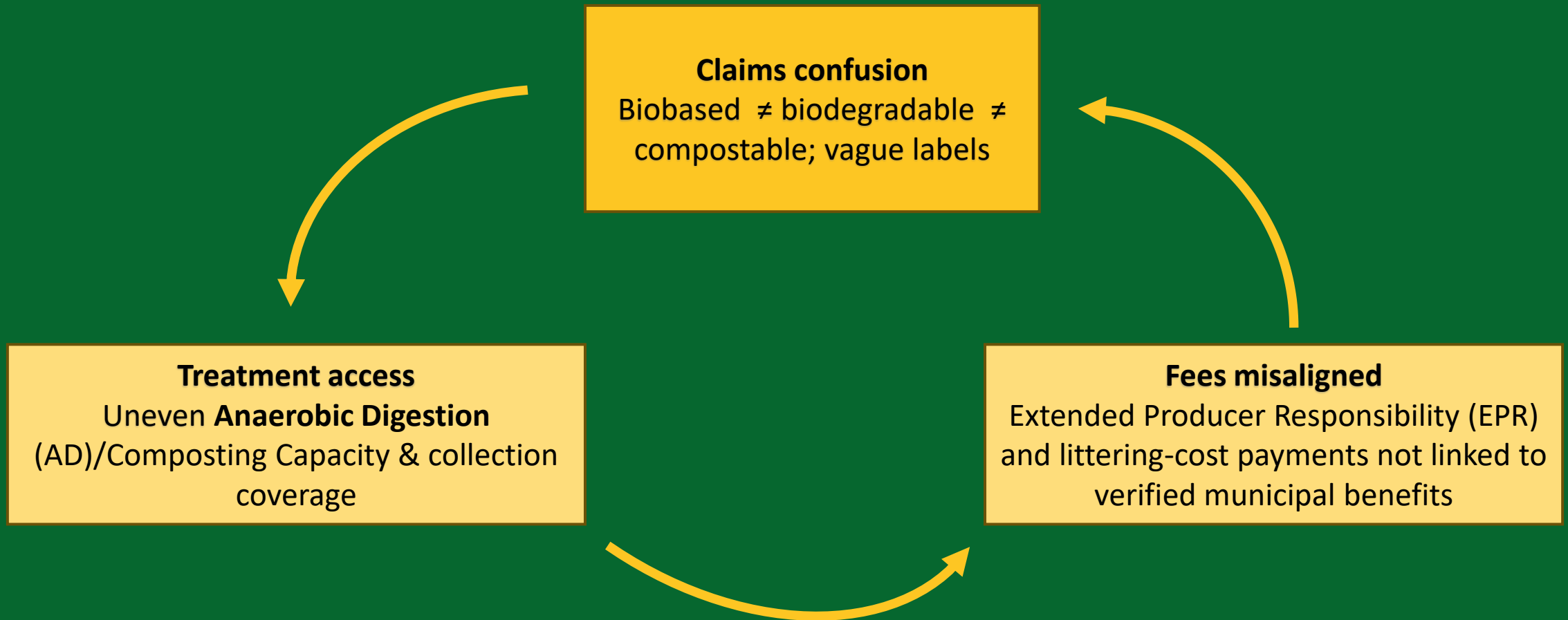
- **How this fits within CEVOOH (Project SS02030008)**
 - Part of the national research effort on waste management and the circular economy; this presentation delivers the bioplastics waste-management stream for policy use.
- **Intended outcomes**
 - Reduce contamination of plastics and bio-waste streams.
 - Prevent misleading “biodegradable” claims (greenwashing).
 - Target incentives and investments only where compostables demonstrably work in Czech conditions.



Why now: Czech context & problem statement

- Market moves faster than systems: bioplastics uptake is outpacing Czech waste-system adaptation.
- **Three pain points** for MŽP:
 - Public confusion: bio-based ≠ biodegradable ≠ compostable
 - Uneven access to suitable treatment (industrial composting/Anaerobic digestion)
 - EPR & littering-cost payments not yet aligned with real municipal costs & verified benefits.
- **Risk lens:** misleading “biodegradable” claims; microplastic fragmentation concerns; contamination of plastics/biowaste streams.
- **Policy imperative:** adapt EU framework (PPWR/SUPD/EC 2022 guidance) to Czech conditions; integrate with EKO-KOM and municipal practice.

Why now: Czech context & problem statement



Three interlinked systemic barriers slowing adaptation of Czech waste systems to bioplastics

Definitions that drive policy

- **Bio-based:** made (partly/fully) from biological resources; not automatically biodegradable.
- **Biodegradable:** must specify environment (e.g., controlled composting, soil, aquatic) & test method.
- **Compostable (certified):** meets EN 13432 (packaging) / EN 14995 (plastics), ISO 17088/ISO 18606, or ASTM D6400; disposal guidance must reflect industrial vs. home conditions.
- **Label discipline:** plain-language instructions + recognised marks (OK Compost Industrial/Home, Seedling, OK Biobased); ban vague “eco-friendly” claims.
- Don’t incentivise oxo-biodegradable or non-substantiated “marine-degradable” claims.

Definitions that drive policy

Row	Bio-based	Biodegradable	Compostable
Definition	Made partly or fully from biological resources. Says nothing about end-of-life behaviour.	Can be broken down by microorganisms in a stated environment and timeframe (both must be named). Not a disposal instruction.	Meets recognised standards for organic recycling (composting) with defined tests and limits.
Typical examples	Bio-PE, bio-PET, PLA blends, starch blends (bio-content varies).	Items marketed for soil, marine or composting conditions (claims vary).	EN 13432-certified packaging; OK Compost Industrial/Home bags and liners; selected food-service items.
What certification proves	Bio-content only (e.g., OK Biobased). No end-of-life performance guarantee.	Biodegradation under the named test and environment; does not specify collection route.	Full set under EN 13432 / EN 14995 / ISO 17088 / ASTM D6400: disintegration, biodegradation, heavy-metal limits, ecotoxicity.
Where claim applies	Marketing of bio-content; corporate greenhouse-gas accounting (feedstock focus).	Only in the specific environment and duration of the test method.	Industrial composting or home composting, depending on the certificate.

Definitions that drive policy

Row	Bio-based	Biodegradable	Compostable
Disposal instruction	None implied. Do not suggest organic recycling or composting.	Not a disposal instruction unless the environment matches the local system.	Mandatory plain-language instruction (which bin, under what local conditions).
Extended Producer Responsibility (EPR) fee — policy handle	No change by default. Optionally link to climate criteria in procurement; do not eco-modulate without capture evidence.	No change by default; claims policed by market surveillance; no fee discount.	Eligible for eco-modulated sub-fee only if ALL: (1) valid certification, (2) access to suitable treatment, (3) pilot evidence of net benefit (temporary; reviewed).
Acceptance into organics stream	No (unless also certified compostable).	No by default (environment-specific).	Yes where certified AND a collection/treatment route exists.
Acceptance into plastics stream (Materials Recovery Facility, MRF)	Yes in plastics MRFs; design-for-recycling rules apply.	Yes in plastics MRFs as conventional plastics; risk of fragmentation if poorly designed.	No — keep out of plastics MRFs to avoid contamination (unless local rules explicitly allow otherwise).

Definitions that drive policy

Row	Bio-based	Biodegradable	Compostable
Common risks / notes	“Green look” without system benefit; misleading claims about end-of-life.	Used as a generic eco-label; environment and timeframe not specified or misunderstood.	Look-alike confusion with plastics; incentives before infrastructure increase contamination.
Allowed labelling	OK Biobased (stars), bio-content percentage with method reference.	If used, state environment + method (e.g., ISO 14851, ISO 14855).	OK Compost Industrial/Home; Seedling logo; PLUS disposal instruction aligned with Czech collection.
Prohibited / avoid	Implying compostability/biodegradability without proof.	Vague “biodegradable” without environment and method; “marine-degradable” without a recognised standard.	Using the mark without a routing instruction; claiming incentives where treatment access is missing.

Standards & labeling that make claims auditable

- **Core compostability standards**

- EN 13432 (ČSN EN 13432): packaging compostability (EU/CZ)
- EN 14995: plastics compostability (non-packaging)
- ISO 17088 & ISO 18606: global compostable/packaging for organic recycling
- ASTM D6400: industrial composting (US)
- Test methods: ISO 14851 (aqueous O₂ demand), ISO 14855-2 (CO₂ in composting)

- **Recognised labels**

- OK Compost Industrial/Home (TÜV Austria) → must pair with disposal instruction
- Seedling logo (EU), OK Biobased (bio-content)

- **Why it matters for CZ**

- Ties EPR eco-modulation to verifiable performance
- Reduces MRF & organics contamination; supports municipal decision rules
- Flags harmonisation gaps (EU vs. US tests) to manage imports.

System impacts & risks

- **Misroutes & contamination**

- Compostables look like plastics → contaminate MRF plastics streams if co-mingled.
- If treatment access is missing, “compostable” items go to residuals or energy recovery.

- **Costs & incentives not aligned**

- EPR categories still lump most bioplastics under “plastics”; no systematic sub-fee yet.
- New littering-cost reimbursements (2023) affect single-use items, incl. some bioplastics.

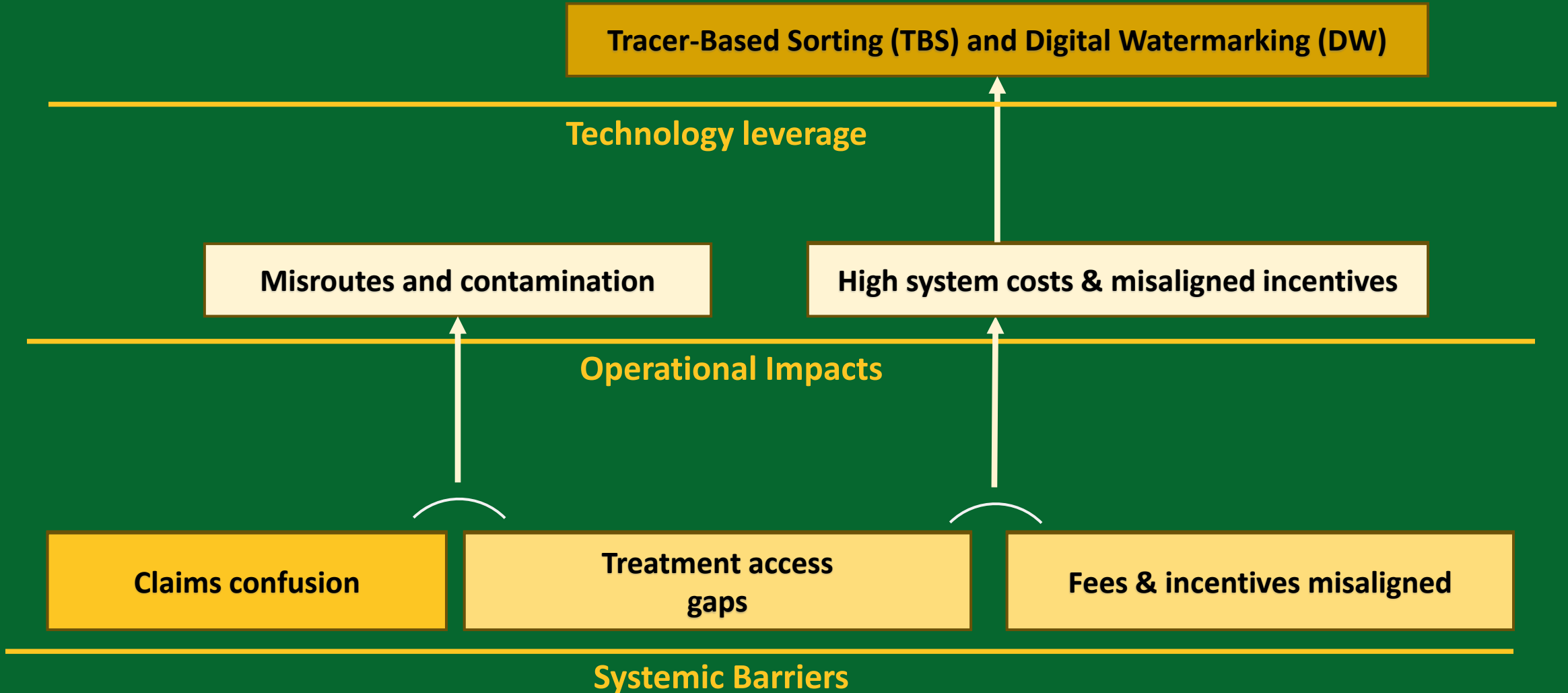
- **Claims confusion**

- Bio-based ≠ biodegradable ≠ compostable; enforcement needs clear labels + disposal text.

- **Sorting tech constraints**

- NIR limits on look-alikes & dark items; TBS & digital watermarks can help, but need CAPEX & standardisation.

System impacts & risks



Decision tree for eco-modulated EPR fees

- **The three-gate logic**

- 1. Certified compostable?**

- EN 13432 / EN 14995 / ISO 17088 / ASTM D6400 + recognised mark (OK Compost Industrial/Home).
- If no → conventional plastics fee. If yes → Gate 2.

- 2. Access to suitable treatment (coverage ≥ 70 %)?**

- Documented access for residents to industrial composting or AD in the sales territory.
- If no → neutral/higher fee (avoid perverse incentives). If yes → Gate 3.

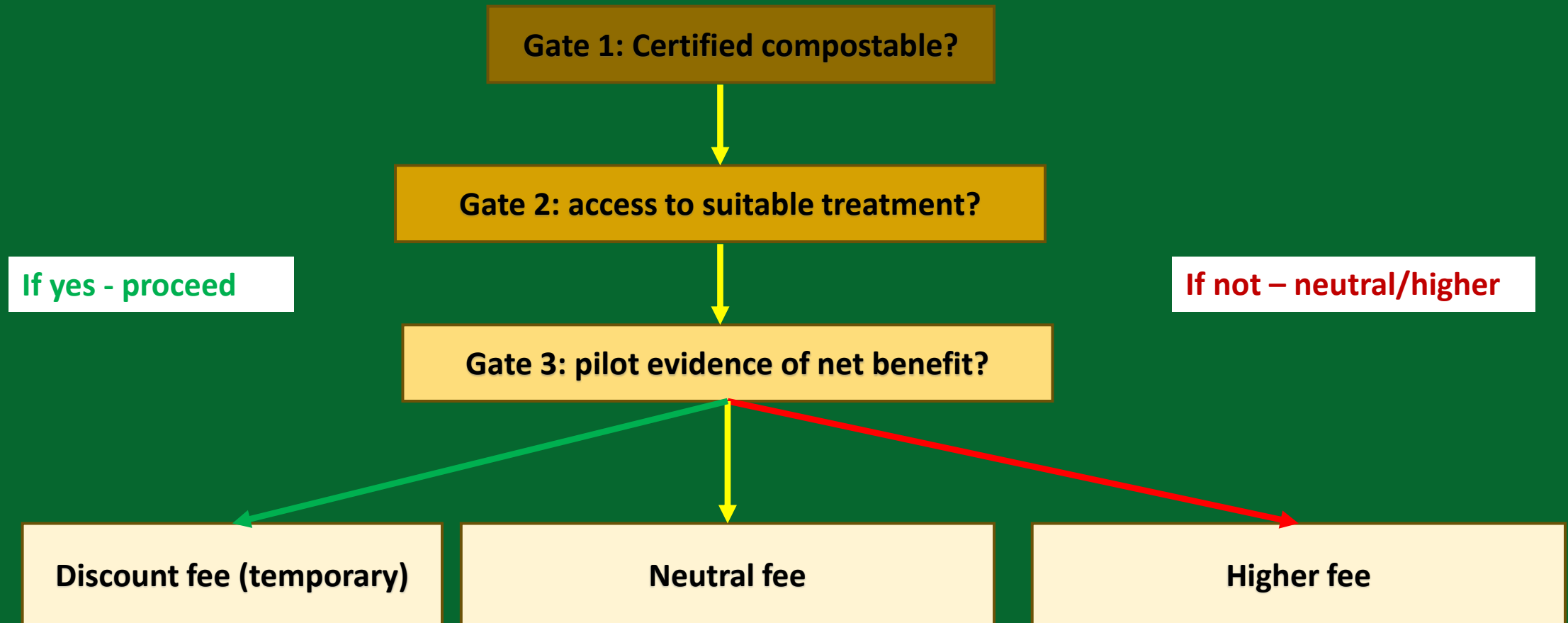
- 3. Pilot evidence of net benefit?**

- KPIs show: capture $\uparrow$, plastics-MRF (materials-recovery facility) contamination $\downarrow$, compost/AD quality = pass, net EPR cost/t improves.
- If yes → temporary discounted sub-fee (12–18 months), annual review. If no → neutral..

- **Guardrails**

- Littering-cost payments remain for applicable single-use formats.
- Certification label + plain-language disposal text mandatory; ban vague “biodegradable” claims.

Decision tree for eco-modulated EPR fees



What is happening vs. what is missing

NOW

- Bioplastics entering the Czech market mainly through packaging and food service sectors.
- Some certified products available (EN 13432 / EN 14995 compliant).
- Bioplastics currently covered under the same EPR category as conventional plastics.
- Growing public interest, business involvement, and media attention.
- Partial availability of industrial composting and anaerobic digestion (AD) facilities in urban areas.

MISSING

- National registry of certified compostable products to ensure traceability.
- Defined sub-fee and eco-modulation system within the Extended Producer Responsibility (EPR) framework.
- Uniform labelling and disposal text harmonised across municipalities.
- Municipal pilot projects with tracer-based sorting (TBS) and digital watermarking technologies.
- Dashboard and key performance indicators (KPIs) to track contamination, capture rate, and compost quality at municipal level.

Proposed municipal pilot design (2025–2027)

- **Scope & sites**

- 6–8 municipalities (mix of Prague districts + 2–3 regional cities); clearly defined SKU list (liners, food-service) certified to EN 13432 / ISO 17088 / ASTM D6400.

- **Instrumentation & ops**

- Capture measurement: bin audits + sales-to-capture reconciliation.
- Sorting assurance: TBS or digital watermarks at high-throughput MRFs where viable.
- Treatment: contracted industrial composting/AD with routine quality tests.

- **KPIs (quarterly dashboard)**

- Access to treatment (% residents); capture of certified items (%); plastics-MRF contamination from compostables (%); compost/AD quality pass rate (%); net EPR cost per t; littering incidents trend.

- **Governance & finance**

- MoU: municipality–EKO-KOM–operator; time-limited sub-fee during pilot; annual review; option to scale + invest (green bonds/guarantees/PPP).

Proposed municipal pilot design (2026–2027)



- Municipality**
(Pilot coordination & citizen engagement)
- Organises collection logistics
 - Provides access to composting / AD site
 - Leads awareness & reporting to CENIA



- EKO-KOM**
(Financial mechanism & data integration)
- Tracks EPR sub-fees
 - Provides reporting templates
 - Supports dashboard implementation

Pilot Dashboard & Evaluation (CENIA Support)

Coordination, analysis, and KPI validation for policy feedback.



- Waste Operator / Facility**
(Technical execution & monitoring)
- Collects & treats compostable materials
 - Measures contamination & compost quality
 - Shares verified performance data

Proposed municipal pilot design (2025–2027)

Pilot Timeline (Q1–Q6)

(Duration: 6 quarters = approx. 18 months, from Q1 2026 to Q2 2027)

Quarter	Main Focus	Key Activities
Q1 2026	Preparation & MoU Setup	• Sign Memorandum of Understanding (Municipality – EKO-KOM – Operator) • Select pilot area(s) and waste streams • Identify certified compostable products for inclusion
Q2 2026	Infrastructure & Labeling Alignment	• Confirm treatment routes (composting/AD) • Align local labeling and disposal text with certification marks • Install collection bins and monitoring equipment
Q3 2026	Pilot Launch & Awareness	• Begin separate collection of compostable packaging • Conduct citizen and food-service communication campaign • Establish data-logging protocols for EKO-KOM reporting

Proposed municipal pilot design (2025–2027)

Pilot Timeline (Q1–Q6)

(Duration: 6 quarters = approx. 18 months, from Q1 2026 to Q2 2027)

Quarter	Main Focus	Key Activities
Q4 2026	Mid-term Monitoring	• Track capture rate and contamination data • Verify compost/digestate quality at facilities • Adjust collection logistics if needed
Q1 2027	Performance Assessment	• Review KPIs quarterly via dashboard • Compare results with baseline plastics data • Estimate cost–benefit balance for municipality
Q2 2027	Scaling & Policy Feedback	• Compile final pilot report • Provide policy recommendations to Ministry of Environment and EKO-KOM • Identify replication opportunities in other municipalities

Proposed municipal pilot design (2025–2027)

A proposed CENIA–EKO-KOM Municipal Bioplastics Pilot Dashboard

Indicator	Baseline (2025)	Current (Q2 2027)	Target / KPI	Trend
Access to suitable treatment (%)	42 %	65 %	≥ 60 %	● ↑
Capture rate of certified compostables (%)	0 %	38 %	≥ 35 %	● ↑
Plastics-MRF contamination (%)	11 %	7 %	≤ 8 %	● ↓
Compost / AD quality pass rate (%)	82 %	89 %	≥ 85 %	● ↑
Net EPR cost per tonne (CZK)	3 240	2 980	≤ 3 000	● ↓
Littering incidents / 10 000 residents	27	19	≤ 20	● ↓

● = On track ● = Needs attention ● = Off track

Roadmap 2026–2030

- **Objective:** Move from pilot evidence to stable, data-driven national policy for bioplastics management.
- **Phase 1 — Pilot Implementation & Learning (2026–2027)**
 - Conduct 6–8 municipal pilots coordinated by CENIA, EKO-KOM, and partner municipalities.
 - Track capture rate, plastics contamination, compost/digestate quality, and cost per tonne.
 - Validate the eco-modulated fee structure through temporary, performance-linked sub-fees.
 - Evaluate technology options for tracer-based sorting and digital watermarking.
 - Produce quarterly dashboards and publish an integrated mid-term report by Q2 2027.
- **Phase 2 — Scale-Up & Infrastructure Alignment (2028–2029)**
 - Extend composting and anaerobic digestion capacity in pilot and new municipalities.
 - Retrofit large-scale sorting facilities with tracer-based or digital watermarking technology where feasible.
 - Standardize labelling and disposal instructions nationally, referencing verified certification marks.
 - Integrate pilot data into EKO-KOM's reporting and dashboard system for broader monitoring.
 - Begin gradual harmonisation of Extended Producer Responsibility (EPR) sub-fees across materials.

Roadmap 2026–2030

- **Phase 3 — Policy Integration & Optimization (2030)**
 - Adopt stable national EPR fee categories for compostable packaging.
 - Formalize the Czech national framework for bioplastics management, aligned with EU requirements.
 - Mandate annual data reviews and reporting through the CENIA–EKO-KOM dashboard.
 - Launch communication and training support for municipal and industrial stakeholders.
 - Ensure continuous recalibration of incentives based on performance evidence.
- **Principle across phases:** No permanent incentives without verified evidence — all measures are time-limited, performance-linked, and recalibrated annually.

Roadmap 2026–2030

Year	Key Focus	Outputs
2026–2027	Pilot Implementation & Learning	Municipal pilots, data collection, interim report
2028–2029	Scale-Up & Infrastructure Alignment	Expanded composting & AD capacity, national labeling standard
2030	Policy Integration & Optimization	National framework, stable EPR categories, annual KPI review

Each phase builds on verified data and is recalibrated annually.

KPIs & dashboards

- **Purpose:** Transparent, auditable decision triggers (reported quarterly)
- **Access to suitable treatment (%)**
Share of residents with a collection route to **industrial composting or Anaerobic Digestion (AD)**.
- **Capture rate of certified compostables (%)**
Collected certified items ÷ estimated items placed on market in the pilot area.
- **Plastics contamination due to compostables (%)**
Mis-sorted compostables in **materials recovery facilities (MRFs)** ÷ total plastics inbound.
- **Compost/AD quality pass rate (%)**
Batches meeting disintegration and chemical limits under Czech norms.
- **Net EPR cost per tonne (trend)**
Municipal costs minus producer payments, normalised per tonne managed.
- **Littering incidents per 10,000 residents (trend)**
Recorded by municipalities/clean-up services for relevant single-use formats.
- **Dashboard outputs** (  )
 - Quarterly updates with trend lines and targets.
 - Visual thresholds (green/yellow/red) to indicate performance.
 - Policy triggers: *pause or resume eco-fee discounts based on KPI results.*

Exclusions & procurement rules

⚠ Exclusions — do not incentivise compostables when:

- **No guaranteed capture:** events/venues without controlled bio-waste collection.
- **Low-likelihood formats:** long-life rigid items; secondary/tertiary packaging.
- **Ambiguous claims:** missing recognised certification and/or disposal instruction.
- **Oxo-degradable or unsubstantiated “marine-degradable”** products.

✓ Procurement rules — allow only where conditions are met:

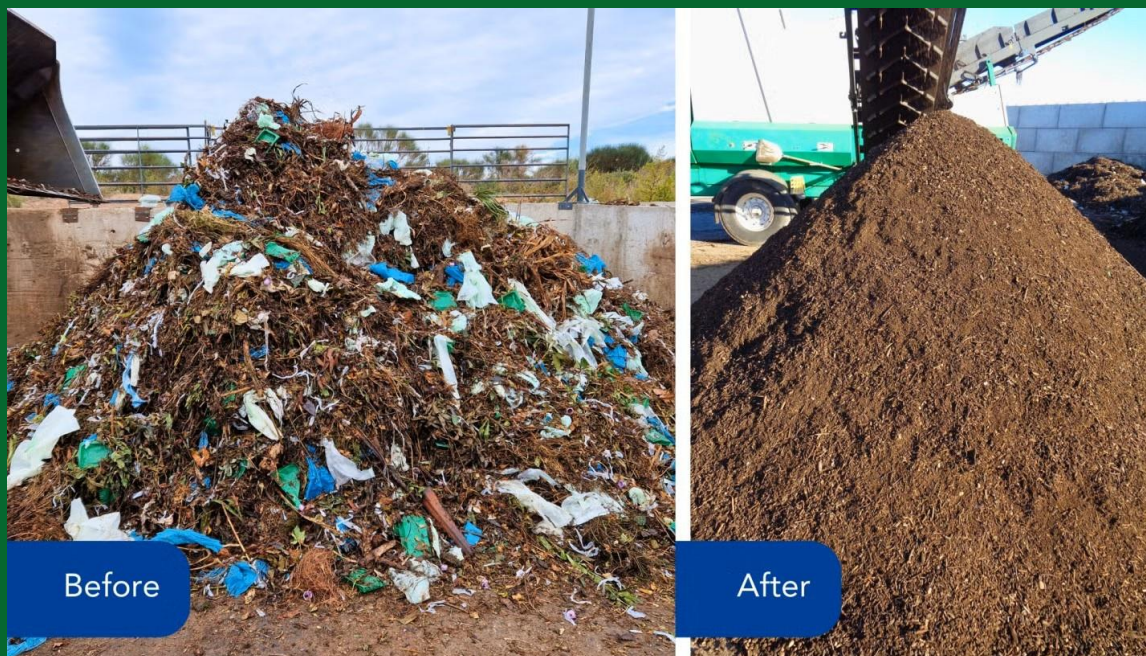
- **Eligibility:** Recognised **compostability certification** (e.g., EN 13432 family) **and** on-pack **plain-language** disposal instruction aligned with local collection.
- **Operational proof:** Written confirmation from the **treatment operator** (industrial composting or AD) that the item is accepted.
- **Performance clauses:** Buyer may suspend/terminate purchasing if KPIs fall below thresholds (capture ↓, MRF contamination ↑, compost/AD quality fails).
- **Enable correct use:** Supplier provides **bin signage** and **staff training materials** as contractual deliverables.

Governance & finance levers + closing asks

- **Bioplastics Task Group (governance)**
 - **Convener:** Ministry of the Environment; members: CENIA, municipalities, **EKO-KOM** (EPR operator), sorters, treatment operators, producers.
 - **Cadence & remit:** Quarterly KPI review; recommendations on fee levels and labeling enforcement; citizen communication; **annual state-of-play report**.
- **Finance levers (de-risk investments)**
 - **Conditional EPR sub-fees:** time-limited, KPI-linked during pilots.
 - **Green bonds / sustainability-linked loans:** AD/composting expansions; sorting retrofits.
 - **Guarantee schemes / blended finance:** crowd-in private capital for detection and data systems.
 - **Performance-based grants:** rewards for municipalities meeting capture and quality targets while reducing contamination.
- **Closing asks (for decision-makers)**
 - **Endorse the 2025–2027 pilot programme** and authorise a conditional EPR sub-fee category under KPI monitoring.
 - **Mandate harmonised labeling with disposal instructions** for any compostability claim on the Czech market, with the Task Group delivering the first annual review within 12 months.

Thank you for your attention

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- “Project reference: CEVOOH — Centre
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Environmental Security (SS02030008).”



“Bioplastics are only as sustainable as the systems that manage them — from certification to collection, treatment, and evidence-based policy.”

Image source: Packaging Gateway (2023),

Study highlights varying biodegradation of compostable bioplastics



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