Ruolo della discarica nella gestione sostenibile dei rifiuti

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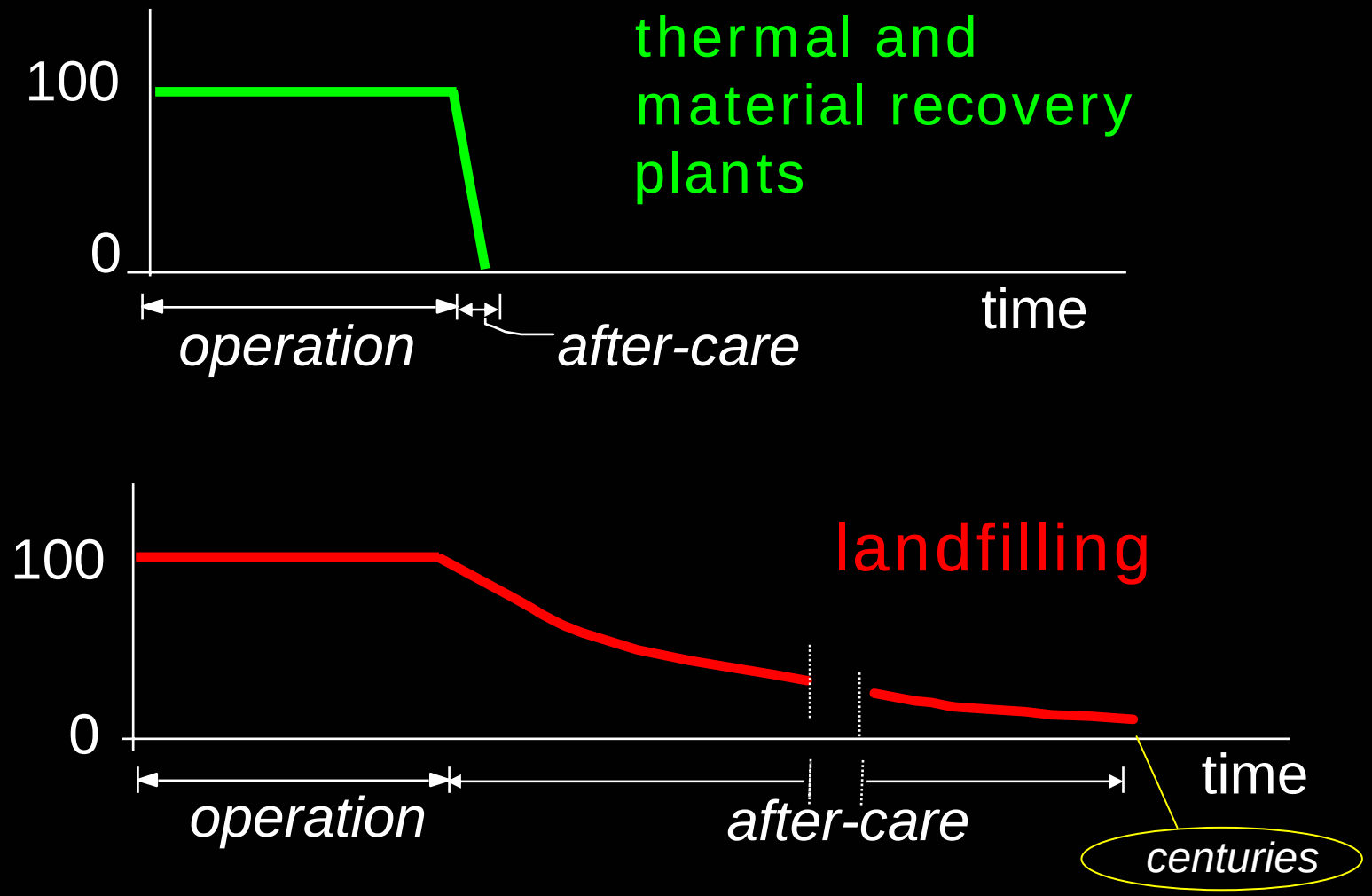
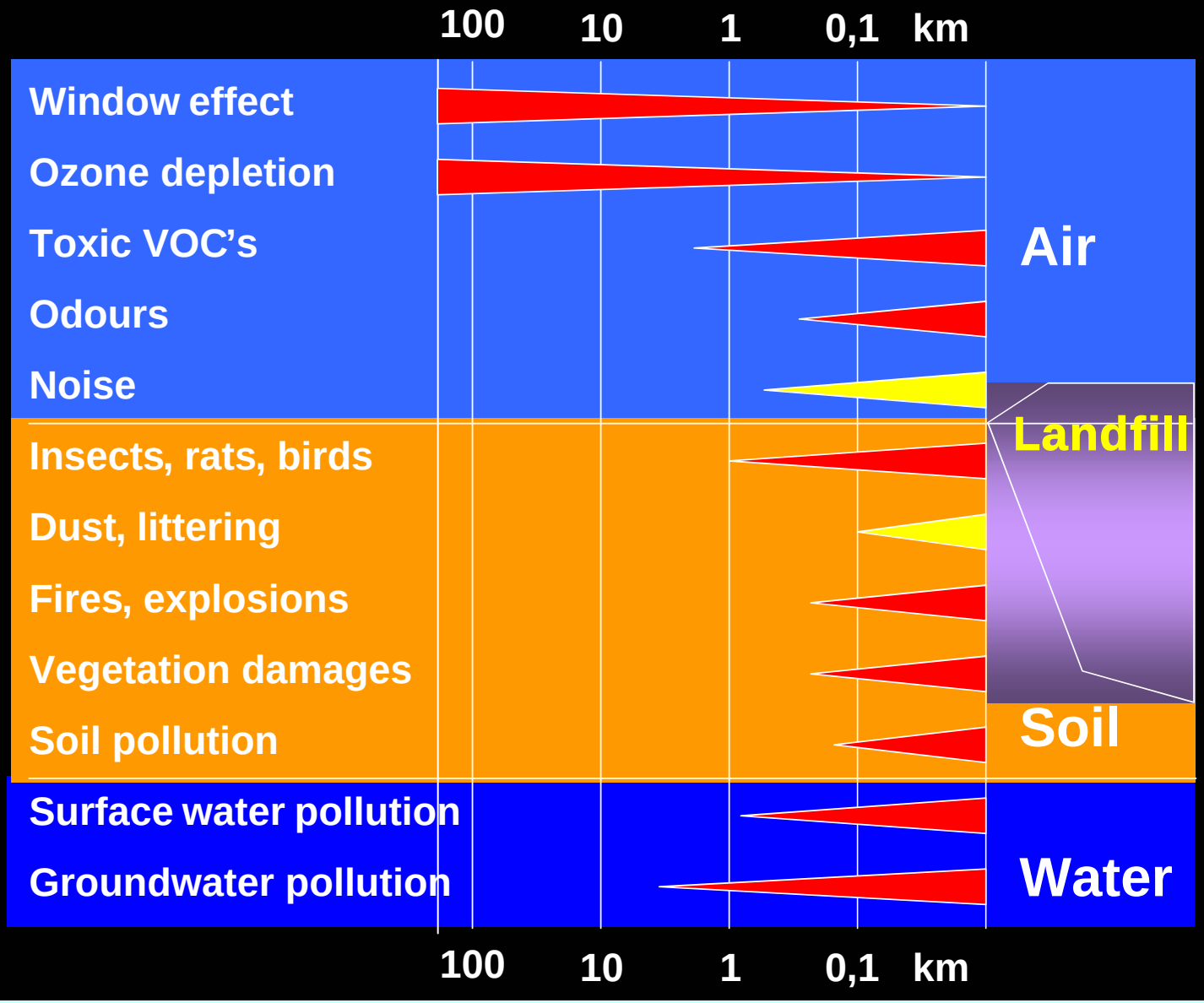
Long Term Impacts in Waste Management



Impacts of landfilling



La discarica è la madre di tutte le strategie di gestione sostenibile dei rifiuti

La quantità è un problema!

La qualità è un problema!

Waste Management Hierarchy

Minimizzazione

Recupero di materiali

Recupero di energia

Discarica

Waste Management Hierarchy

Ecoproduction

Waste Management Hierarchy

Ecoproduction

3Rs: Recovery, Reuse,Recycle

Waste Management Hierarchy

Avoidance — *Ecoproduction*

Material recovery — *3Rs: Recovery, Reuse,Recycle*

Energy recovery — *Alternative energy*

Landfilling

Waste Management Hierarchy

Avoidance	***Ecoproduction***
Material recovery	***3Rs: Recovery, Reuse,Recycle***
Energy recovery	***Alternative energy***
Landfilling	***Sustainable landfilling***

Waste Management Hierarchy

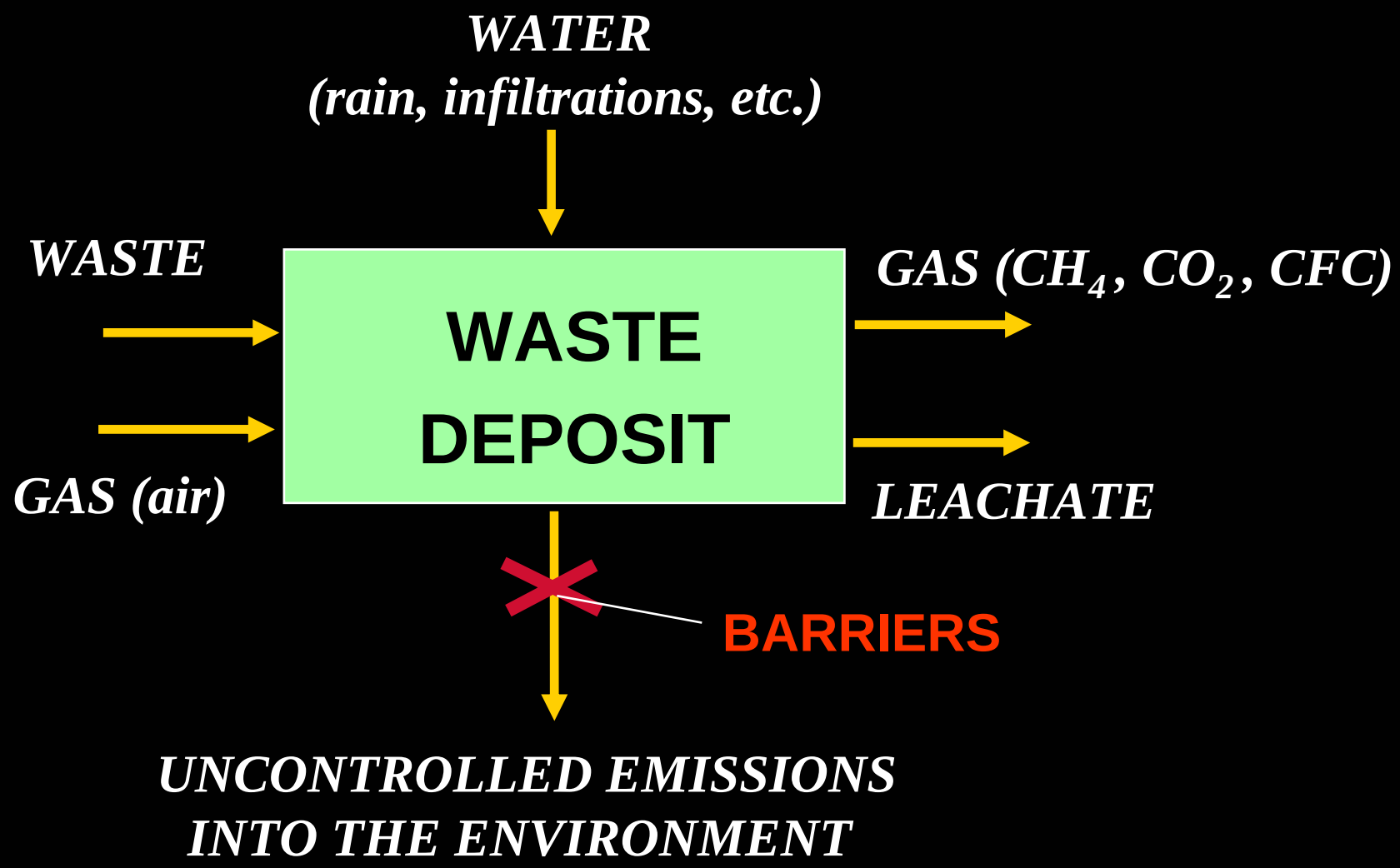
Ecoproduction

3Rs: Recovery, Reuse,Recycle

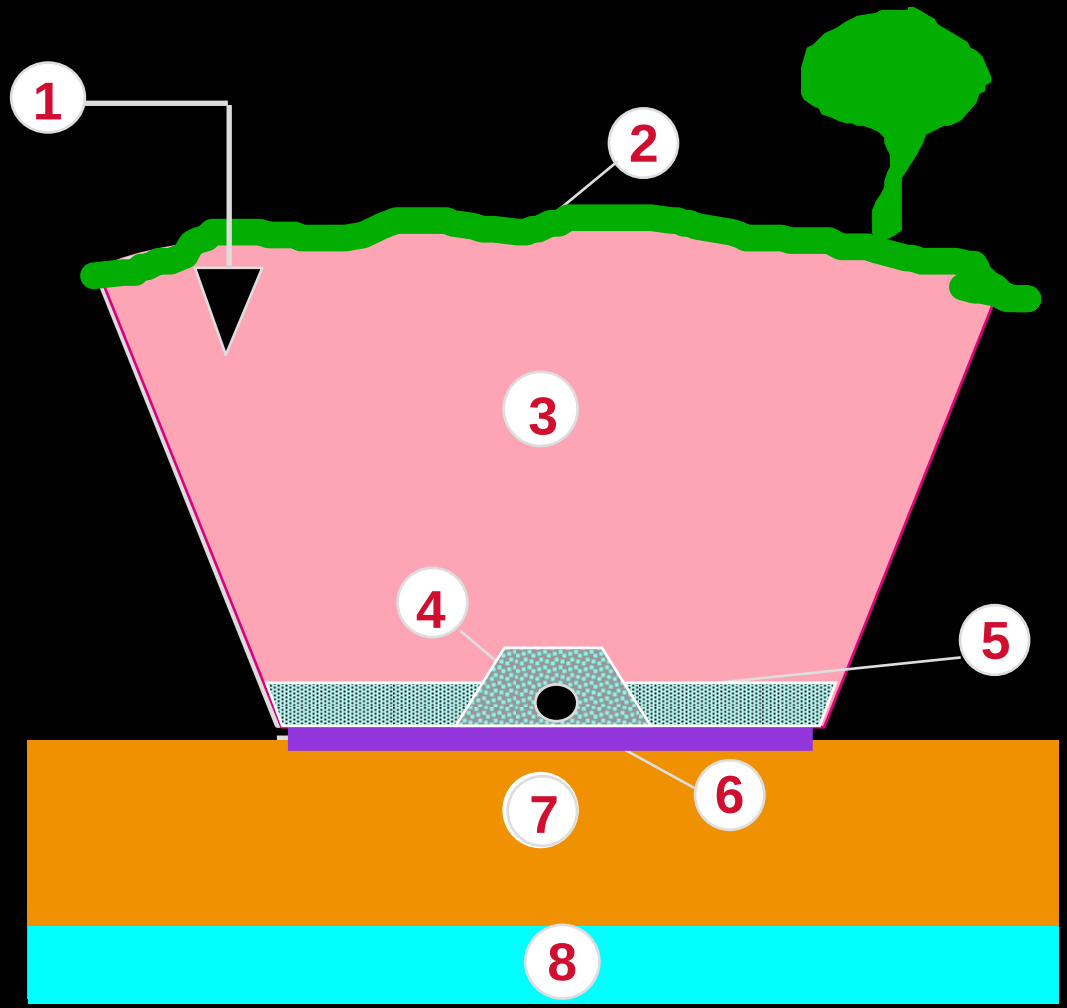
Alternative energy

Sustainable landfilling

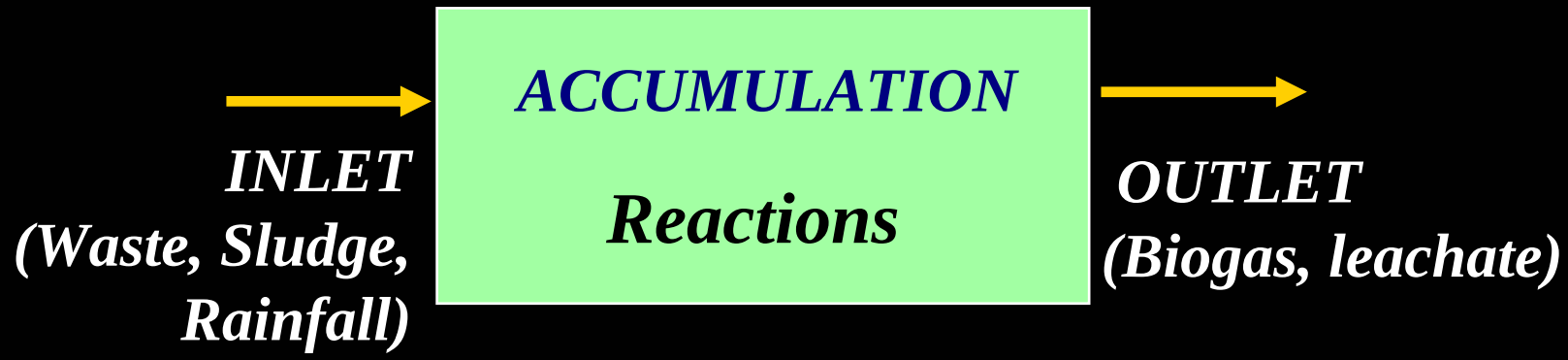
Landfill reactor



Multibarrier concept



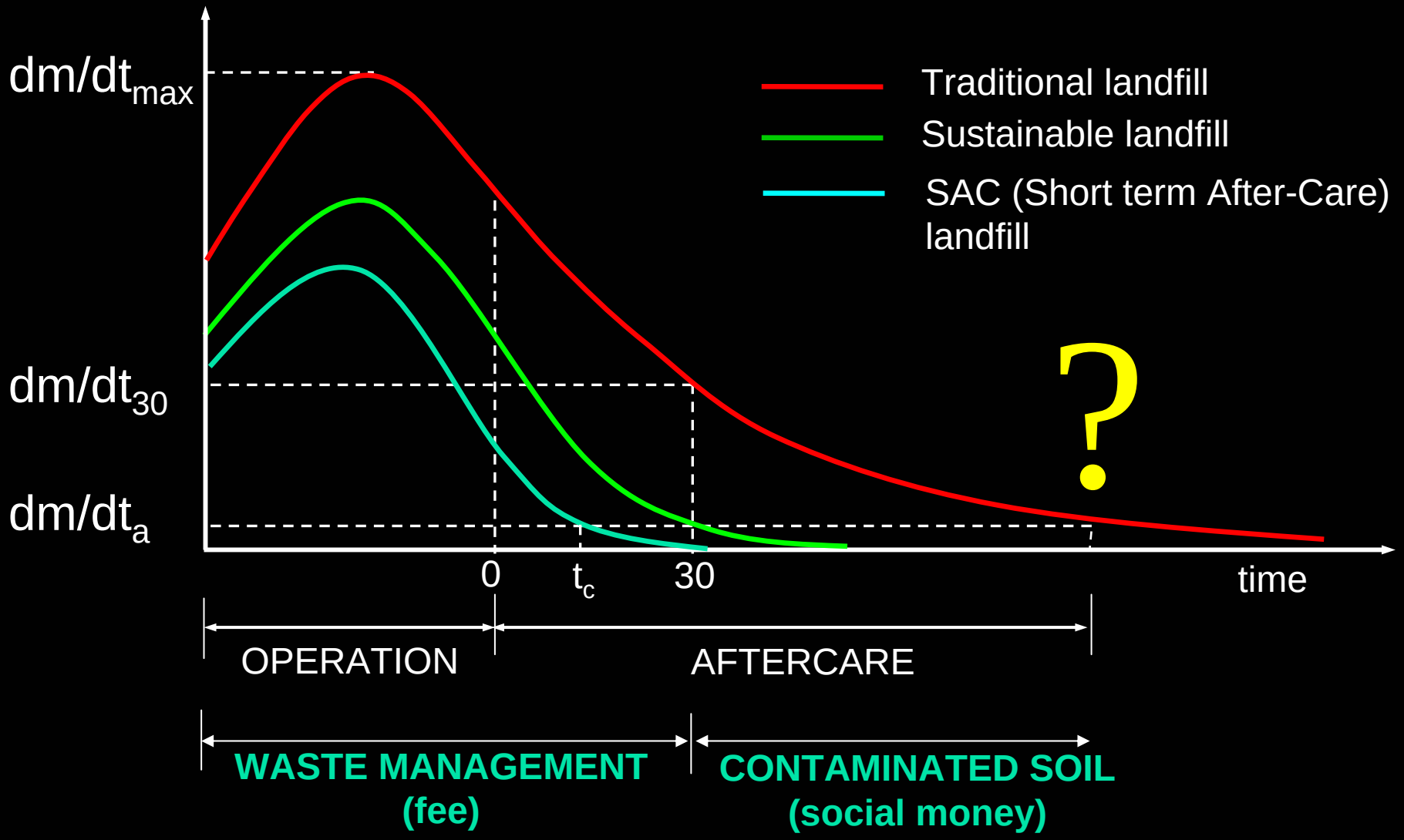
General Mass Balance



Accumulation (dm/dt)= Inlet - Outlet - Degradation

Kg C or N/year

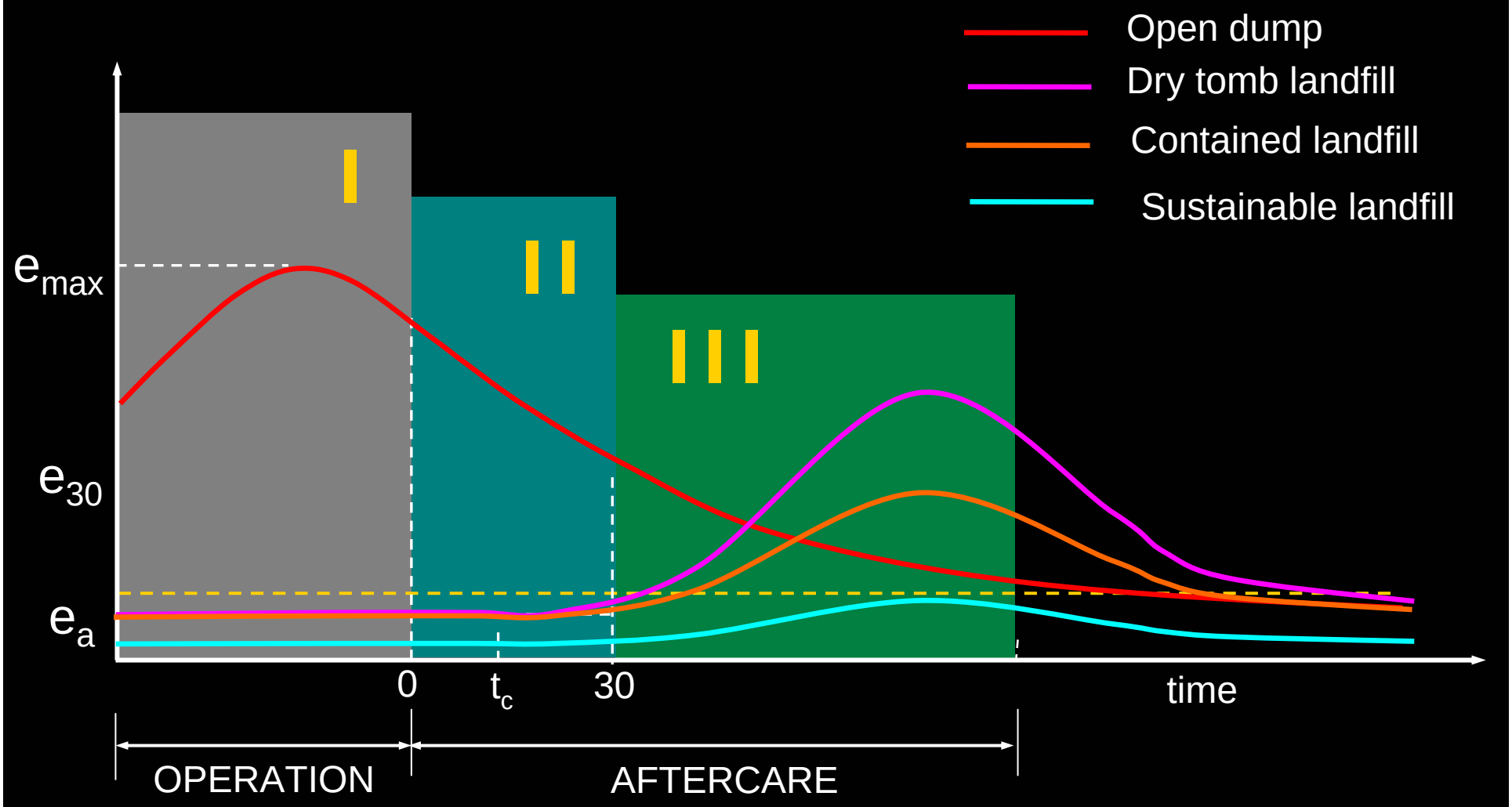
Long term landfill accumulation



Duration of physical barriers

DURATION, years	10	30	>100
Geomembrane			
Clay liner			
Drainage			
Top cover			
Natural barrier			?

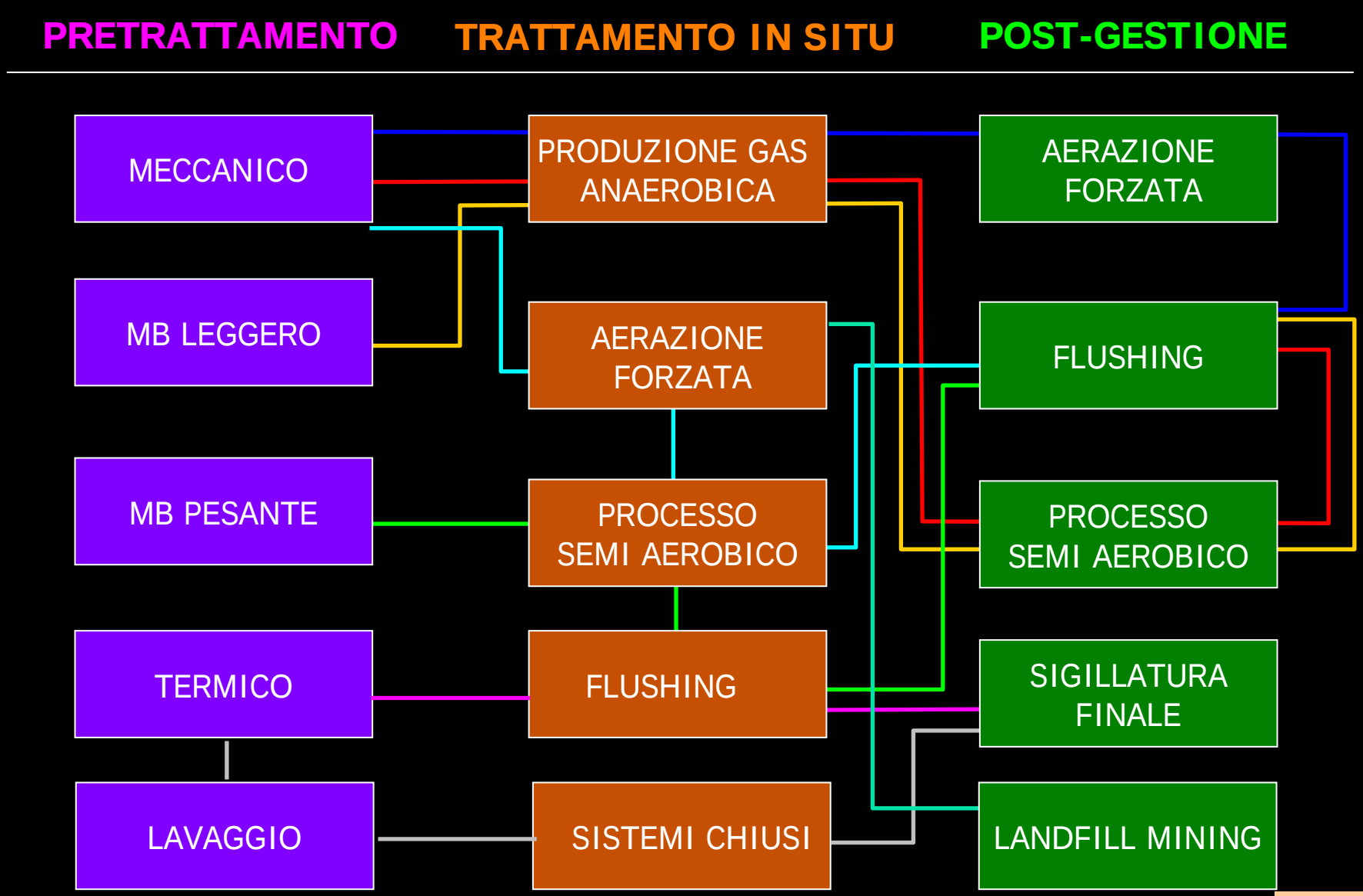
Long term landfill impact



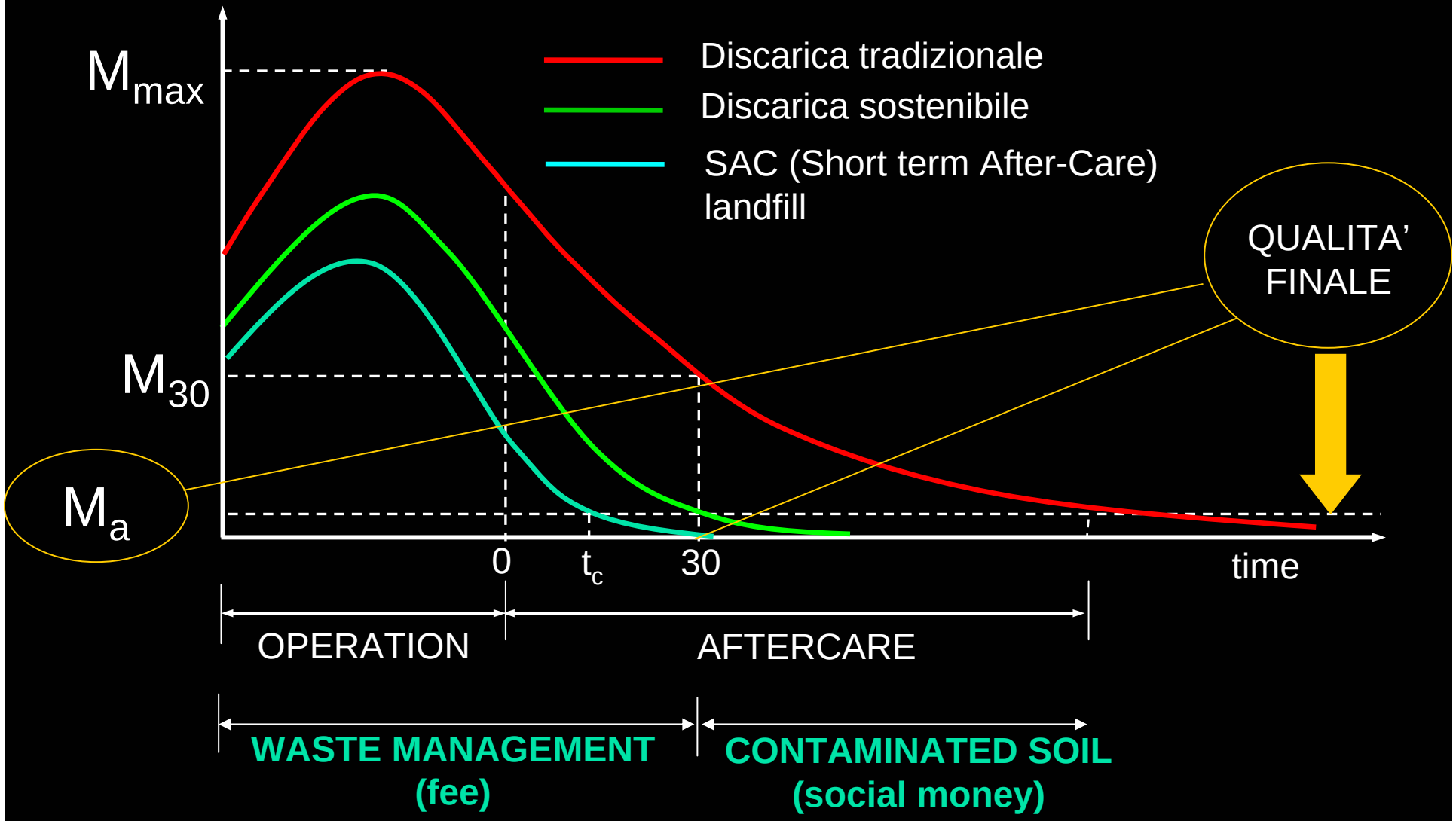
Operation alternatives

OPERATIONS	x_{Si}	Q_i	x_L	q_{Lr}	x_G	q_{Gr}	dm/dt fix	dm/dt mob	rV
Mechanical Pretreatment			+		+		+		+
Biological Pretreatment	+								
Thermal Pretreatment	+ +	+ +							
Waste minimisation		+							
Leachate recirculation			+						+
Open top cover/ flushing				+ +					+
In situ aeration						+	+ +		+ +
Anaerobic degradation			+		+		+		+
Lining								+ +	

Scenari di discarica controllata



Accumulo in discarica di lungo termine

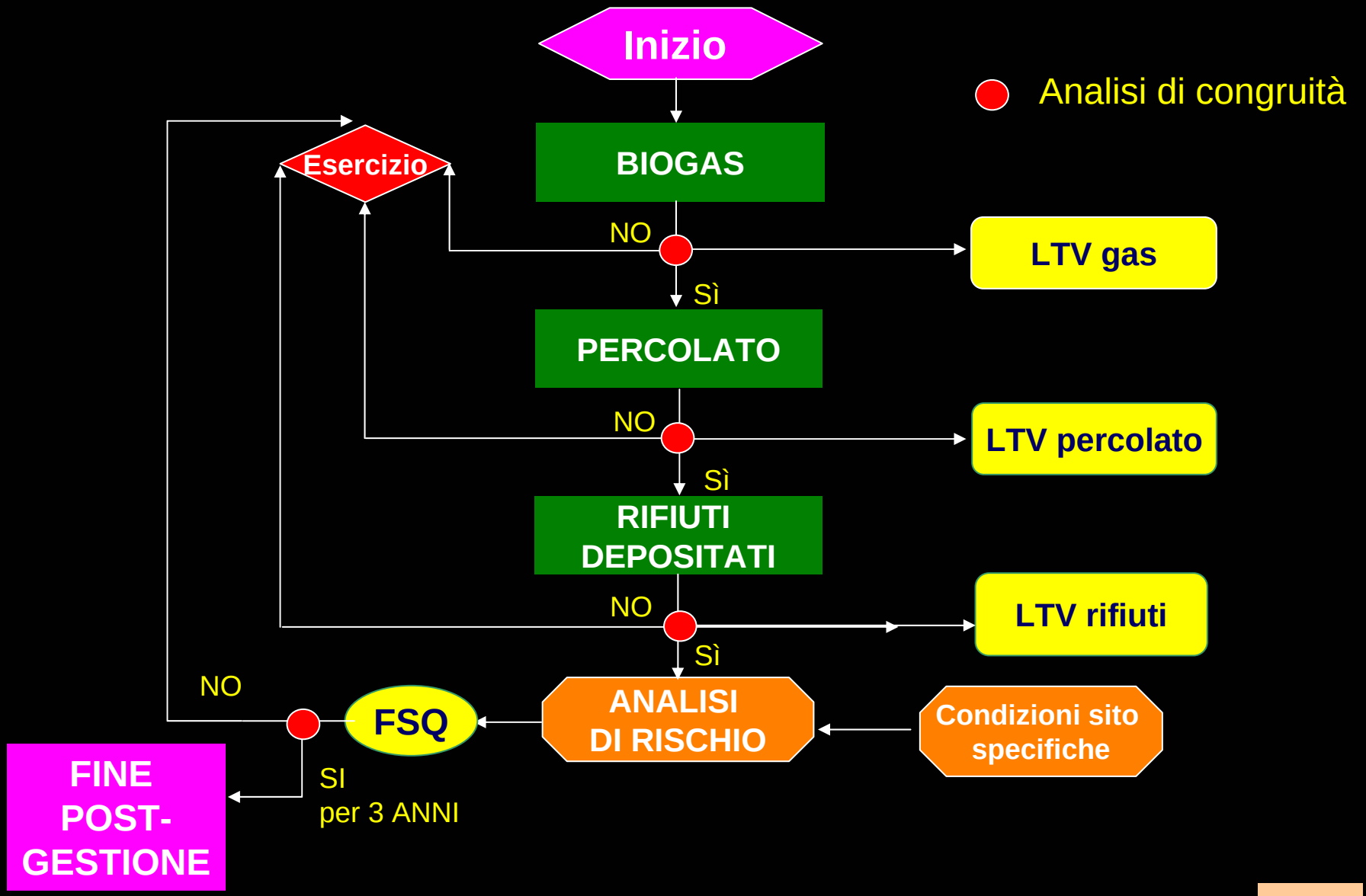


Final storage quality (or equilibrium)

- The definition of final storage quality (FSQ) plays an important role in defining available options and approaches to sustainability in landfilling and consequently in waste management
- FSQ of the waste should include both gas production, leachate quality/emissions and landfill stability
- FSQ is at the moment poorly defined or undefined – but implicitly implied in practically all landfill legislation

Common strategic approach to landfilling

Procedura Fine PostGestione



Landfill quality parameters

- ***LTV (Legislation Threshold Value)***
  the set of requirements which must be fulfilled at a given time, as set out in legislation.

- ***FSQ (Final Storage Quality)***
  site-specific values acceptable for the environment.

- *CSQt (Current Storage Quality at t years)*
  parameters values measured at a certain time *t after the closure of a landfill*

Landfill quality parameters

- ***BATV (Best Available Techniques Value)***
  the most effective and advanced stage in the development of activities and their methods of operation which indicate the practical suitability of particular techniques for reducing the emissions on the environment as a whole. It includes the techniques developed on a scale which allows implementation under economically and technically viable conditions, taking into consideration the costs and advantages, whether or not the techniques are used or produced inside the State in question, as long as they are reasonably accessible to the operator.

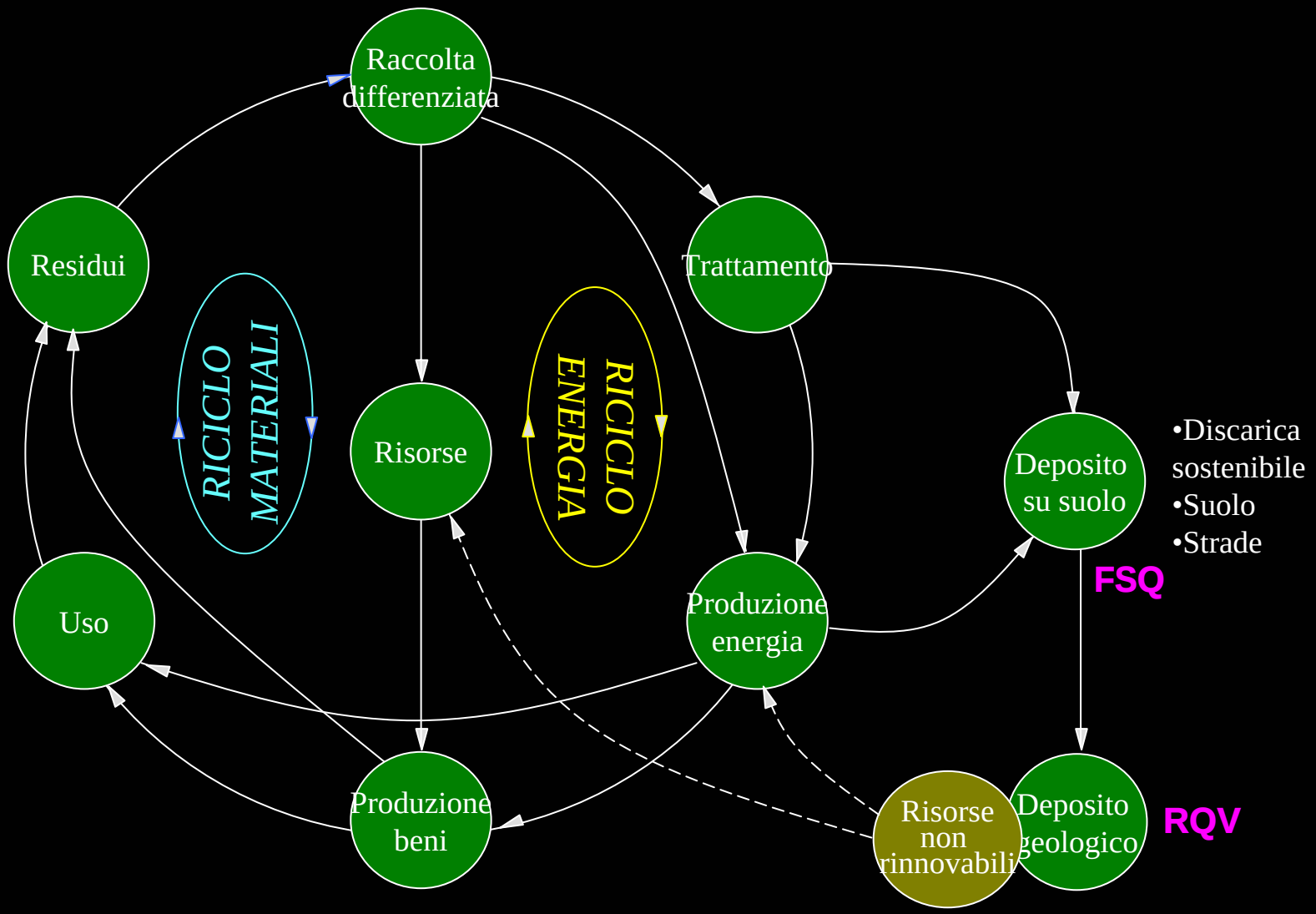
- ***BTV (Best Technology Value)***
  the most effective technology in achieving a high general level of protection of the environment as a whole in the long-term.

- ***RQV (Rock Quality Value)***
  parameters values before the direct or indirect introduction as a result of human activity, of substances into the air, water or land which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment.

	Original Value	LTV proposed	BTV MT	BTV MBT	BTV Aeration	BTV PAF	BTV Therm. Treatm.	Discharge Values (It)
Biogas % CH4, % CO2 CO2/CH4 l/(m2 h)	 40-60 40-60 - 4-12							
Leachate COD BOD5 BOD5/COD TOC N-NH4+	mg/l 30000 15000 0.6 3000	 1500 200 0,1	mg/l 15590 7840 - 4694 4024	mg/l 540-4000 9-158 - - 11-340				mg/l 135 25
Waste RI4 (mgO2/kg DM) GB21 (l/kgTS) TVS Eluate: BOD5 COD BOD/COD TKN N-NH4+	 148 - - 290 1085 0,27 48 13,2	 10 20		 - 0-20 - mg/kg TS 1000-3000	 1,7-3,2 0,1 - mg/l 15-34 71-153 26-55	 3,92 - - mg/l 14 70 0,11 6,5 3,3	 mg/l 30-100 60-240 0,2-0,5	

(Various sources)

Ruolo strategico della discarica



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Sardinia Symposium: la selezione

400 lavori selezionati, da un comitato scientifico internazionale, su 740 lavoro offerti

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