



PNAI

PLATTFORM NACHHALTIGKEIT IN
ANÄSTHESIOLOGIE UND INTENSIVMEDIZIN

Ökologische Nachhaltigkeit in der Anästhesie und Intensivmedizin

Was gibt es Neues?



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Sustainability

To ESAIC is committed to implementing the Glasgow Declaration and drive initiatives towards greater environmental sustainability across anaesthesiology and intensive care in Europe.

The Glasgow Declaration on Sustainability in Anaesthesiology and Intensive Care

[Read the Consensus Document on the EJA website](#)

More interesting links



[Download for free the sustainability's toolkit >](#)

[Download the Executive bundle on reducing carbon footprint >](#)



Direct Emission

SCOPE 1

- Choose **TIVA or Regional Anaesthesia** when possible
- Choose the inhaled agent with the **lowest Global Warming Potential** available (sevoflurane < isoflurane < desflurane)
- **Desflurane should be avoided** and only used when strictly clinically indicated, and when there is not a valid alternative available
- **Nitrous oxide** should only be used when other alternatives are not available
- All halogenated drugs should be used at the **lowest possible** fresh gas flow (FGF) during **induction** and **steady phase** of anaesthesia
- Aim at **minimal FGF (< 0.5 lpm)**, whenever safe and technically feasible during steady phase
- Although still under-studied, the use of **Vapor Capture Technology** together with **minimal FGF** in an **Air-Oxygen mix** might have a significant positive impact in your carbon footprint
- Anaesthetic drug requirements should be tailored according to **depth of anaesthesia (pEEG) monitoring** to avoid unnecessary gas or propofol consumption

Executive bundle to reduce your carbon footprint



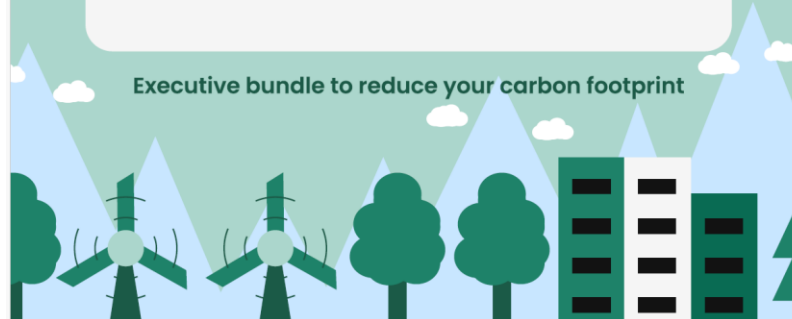


Energy use optimisation

SCOPE 2

- Set **OR temperature goal within a 18–22 °C** range, provided that hypothermia prevention measures (eg warming blankets, warming fluid devices) and monitoring are in place. **Newborns are excluded** from this recommendation
- **Burn Unit Operating theatre** optimum temperature range is 24°C to 30°C
- OR **relative humidity** should be maintained between 30% and 60% at all times
- **Theatre doors** and **hospital windows** should be kept **closed** at all times to reduce temperature loss
- **Scavenging systems** should be turned off at night and during weekends, except in designated ORs for emergent surgical procedures
- **Switch off** computers and Wi-Fi network during off-hours. Last person to leave the OR must turn off lights and computers that still remain operative
- Label equipment that can be **turned off safely after use**
- Please dispose **batteries** properly
- **Surgical hand rubbing** is preferred over surgical hand scrubbing
- **Close water tap** when it is not in use

Executive bundle to reduce your carbon footprint





Waste management and supply chain

SCOPE
3

- **Avoid single use devices** that do not provide a clear benefit in patient care
- Document overage actively and use these items first in order to reduce waste
- Ask Industry providers for **energy efficiency labels** for new electronic devices according to the European A-G scale
- Ask for **PP or silicone** reusable devices over PVC / DEHP
- **Think twice** before opening a sterile package, supply kit or any other product
- In a case where multiple ampoules of saline are required to dilute medication, consider the use of an **appropriate size of saline bags** (50 or 100 ml)
- Use **reusable** equipment and materials instead of disposables ones
- **Appropriate waste segregation** is crucial for reducing clinical waste and achieving a higher proportion of recycled waste
- Waste from **plastic suction bottles** can be reduced by reusing the containers and lining them with disposable liner

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Waste management and supply chain

SCOPE
3

- Empty drug ampoules or crystalloid fluid solutions bags are **not bio-hazardous**
- They can follow standard glass / plastic recycling protocols
- **Limit** the preparation of **drugs** to be used "in case of emergency"
- Use **prefilled** syringes when feasible (eg atropine, ephedrine, adrenaline)
- **Reduce propofol waste** by using 20 mL propofol ampoules. Reserve the 50- and 100-mL bottles for TIVA/TCI syringes. Avoid leftovers and **remember to discard propofol in a designated area** (usually the sharps bin), not in the sink!
- **Separate and recycle** uncontaminated paper/cardboard, medical plastic and metal to certified sustainable recycling companies
- Be sensible for **high recycling potential materials**. Non-woven polypropylene (PP) wrapping paper or halogen gas aluminum bottles have a high recycling potential
- Recycle or appropriately **dispose electronic equipment** and batteries to certified sustainable recycling companies

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Beyond consensus – zusätzliche Handlungsfelder

- Balance zwischen Public Health und PatientInnensicherheit
- Implementierung im Unterricht
- Überversorgung vermeiden





Public Health *trotz* PatientInnensicherheit?

- Sauberes vs. steriles Einbringen eines Harndauerkatheters
- Einsparung 6,7 Tonnen CO₂, €60.000 (bei 1.100 Betten)

1. Urinary tract infection

A. Clean versus sterile technique for the insertion of a transurethral catheter

**Very low
GRADE**

The evidence is very uncertain about the effect of a clean technique for the insertion of a transurethral catheter compared to a sterile technique for the outcome measure urinary tract infection.

Source: Duffy (1995) from Mitchell (2021)

B. Clean versus sterile meatal area cleaning before insertion of a transurethral catheter

**Very low
GRADE**

The evidence is very uncertain about the effect of a non-antiseptic meatal cleaning agent on urinary tract infection when compared with an antiseptic meatal cleaning agent.

Source: Mitchell (2021), Khahakaew (2021)

2. Bacteriuria

A. Clean versus sterile technique for the insertion of a transurethral catheter

**No
GRADE**

No evidence was found on the effect of a clean technique for the insertion of a transurethral catheter compared to a sterile technique for the outcome measure bacteriuria.

Source: -

B. Clean versus sterile meatal area cleaning before insertion of a transurethral catheter

**Low
GRADE**

Using a non-antiseptic meatal cleaning agent prior to catheter insertion may result in little to no difference in bacteriuria when compared with an antiseptic agent.

Source: Mitchell (2021), Khahakaew (2021)





Überversorgung

- 82-jährige Patientin mit pathologischer proximaler Femurfraktur
- Metastasiertes Plattenepithelkarzinom, TVT
- Karnofsky-Index 20
- Apaxiban, Buprenorphin, Paracetamol, Pregabalin
- Statt operative Versorgung: PENG-Block mit Phenol bzw. einseitige Spinalanästhesie (eventuell vor Ort).





ESICM: 5 Schritte zum nachhaltigen ICU

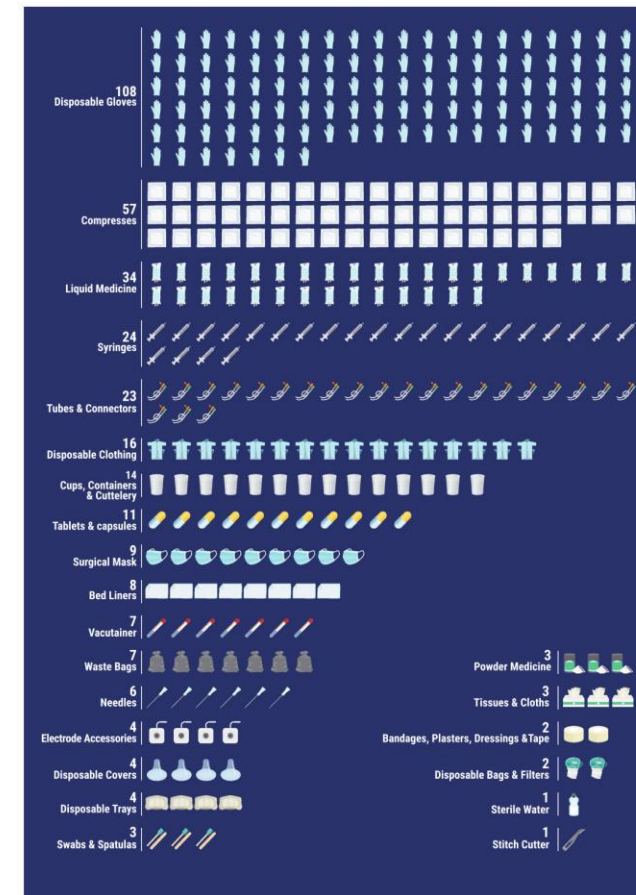
- Einbetten in bestehende Krankenhausinitiativen
- Evaluieren des aktuellen Zustands
- Gründen eines Green-Teams
- Ziele setzen
- Unterstützung einholen von Abteilungs- und Krankenhausvorstand





Waste audit

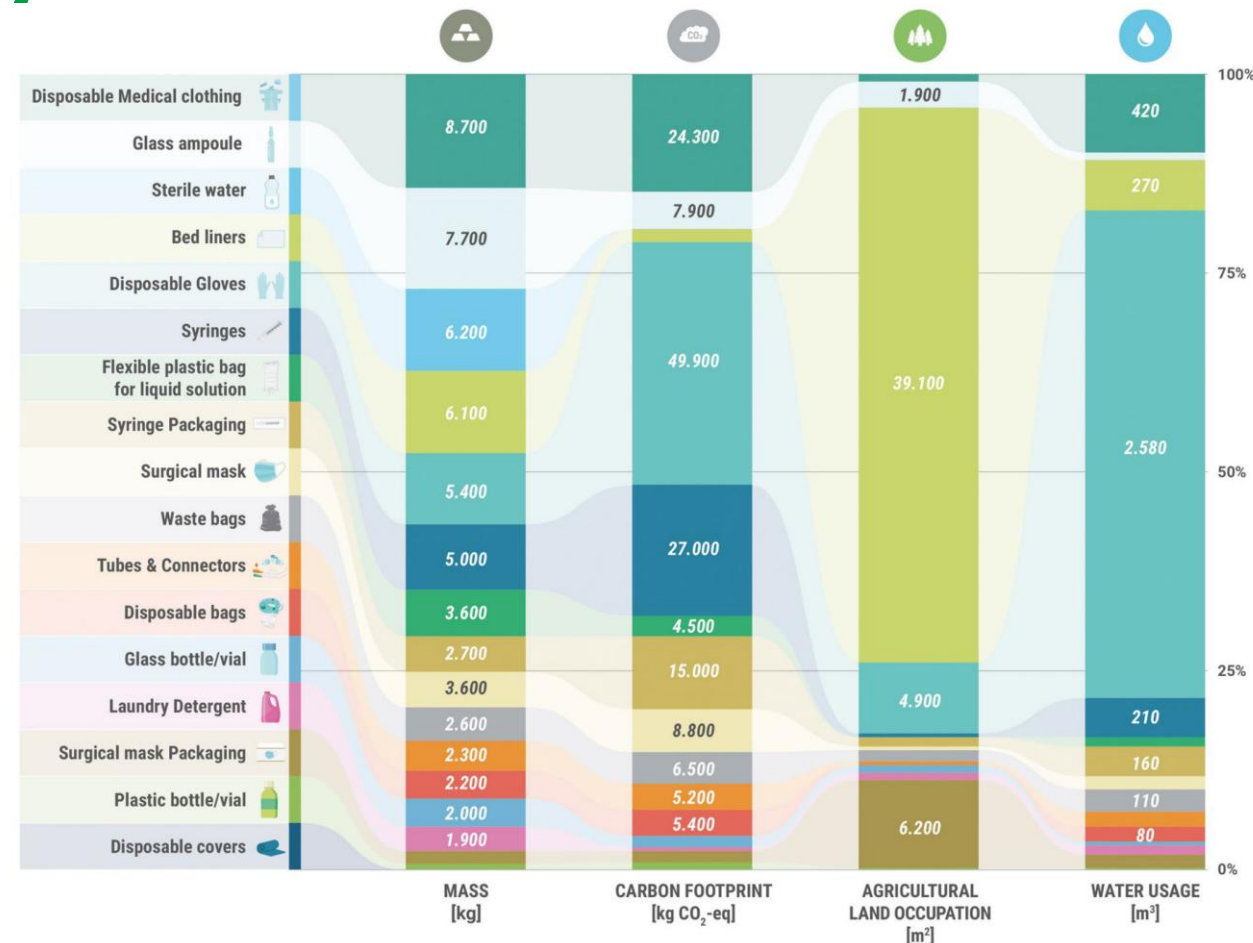
- 108 Handschuhe
- 57 Kompressen
- 34 flüssige Medikamente
- 24 Spritzen
- 23 Schläuche und Katheter
- 16 Einmalkleidung
- 14 Becher, Behälter und Besteck
- 11 Tabletten und Kapseln





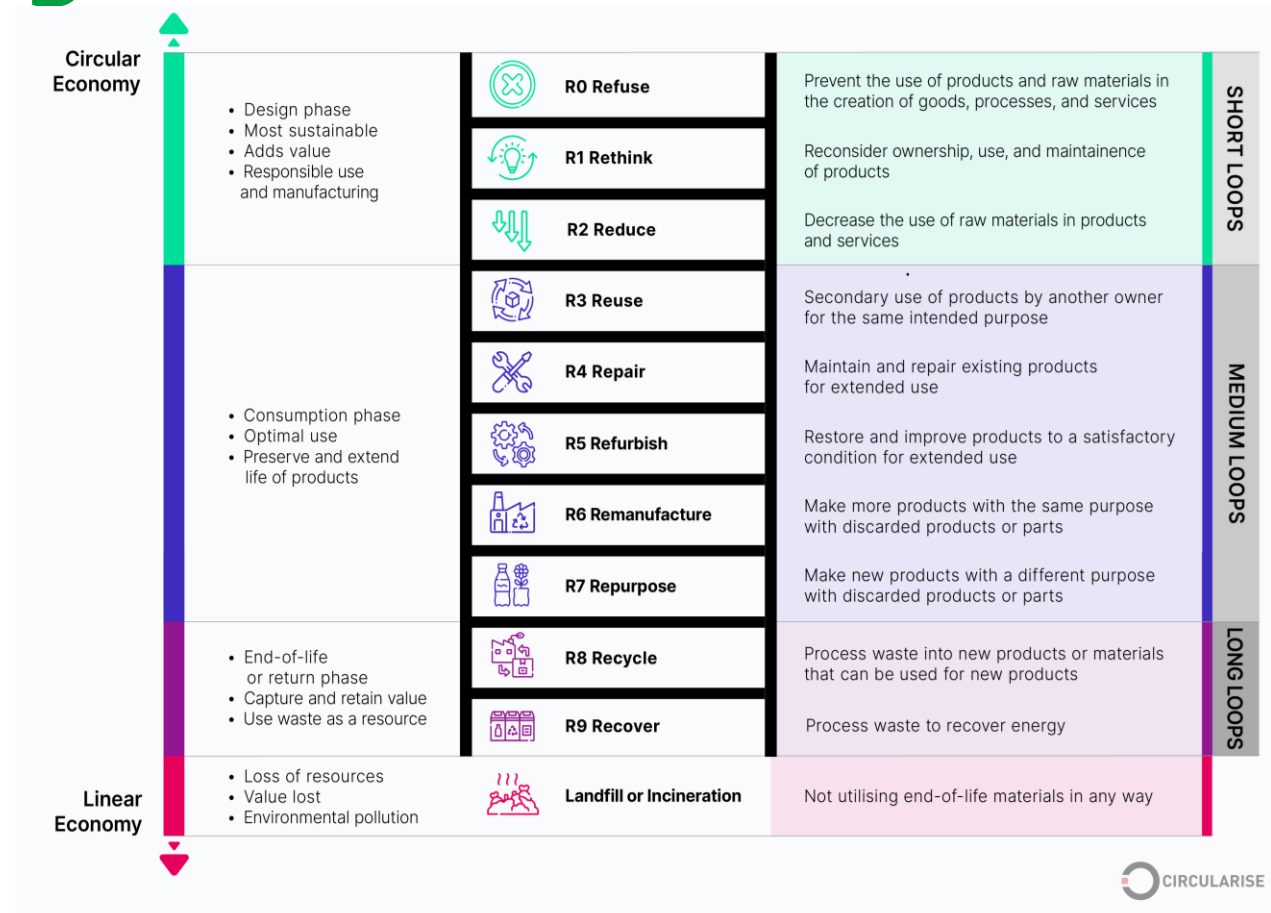
Materialflussanalyse

- 17 kg Masse
 - 300 Liter Wasser
 - 4 Quadratmeter Landverbrauch
 - 12 kg CO₂-equivalent
 - oder 67 Autokilometer
- pro Patient/Tag (ohne Med.)





10-R Strategie

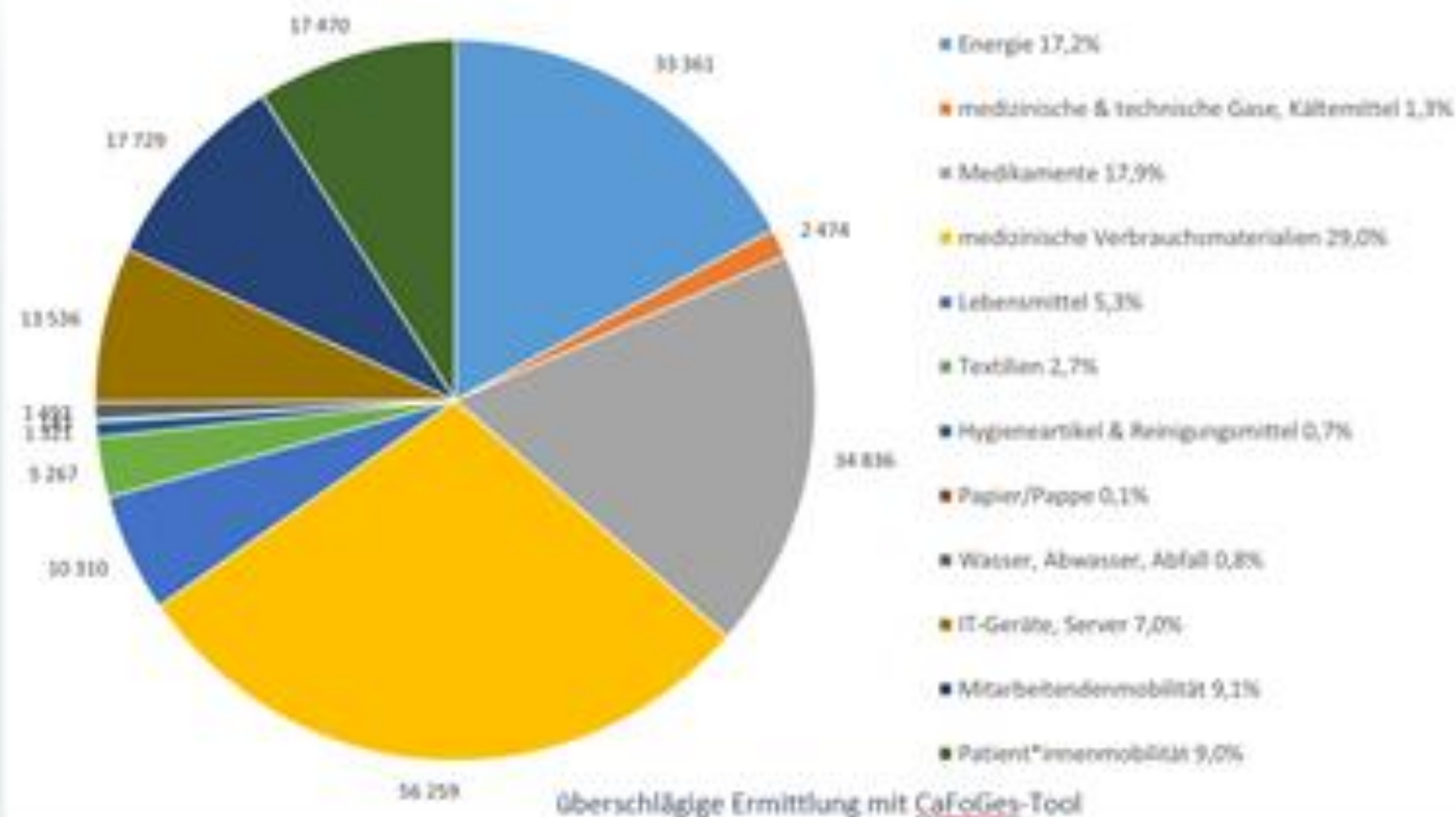


Die Klimarelevanz der KAGes

Bereiche, die einen großen CO₂-Fußabdruck hinterlassen:



Betriebsjahr 2022 - 194.241 T CO₂ / Jahr
(market based)





Ausblick S₁-Leitlinie

- Ressourcen- und Energiemanagement
- Hygiene
- Übertherapie bzw. Überdiagnostik
- Geplante Fertigstellung: Dez. 2024



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