

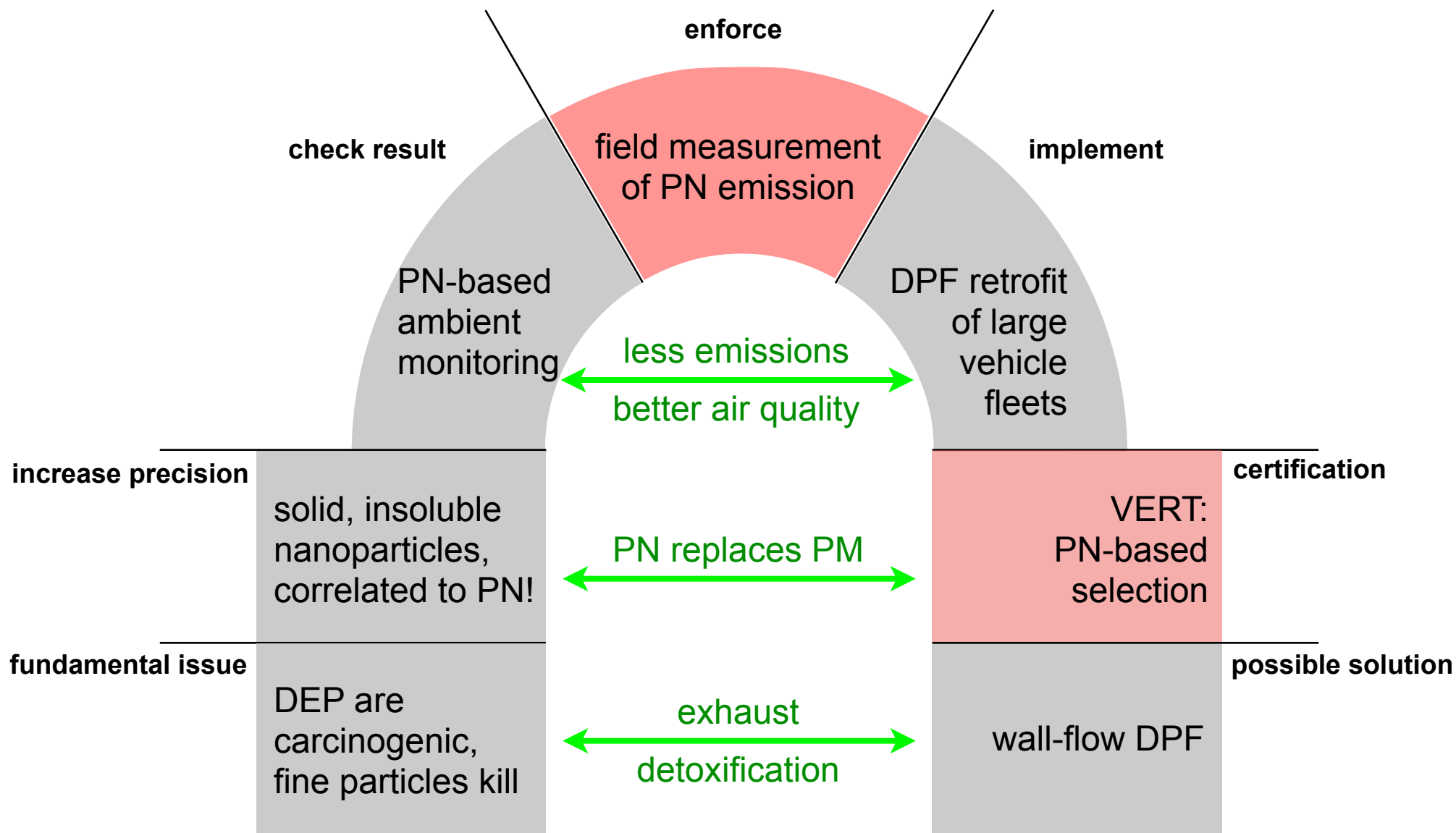


# PN Measurement - a Brief History

- 1988 WHO: Diesel exhaust probably carcinogenic (class 2)
- 1990 OSH: tighter Diesel exhaust limits at the workplace
  - ➔ **Swiss tunneling projects at stake!**
- 1994 VERT: PN superior metric - stop measuring PM
  - ➔ **induce change of paradigm PM -> PN in exhaust measurement**
- 2000 SUVA: DPF mandatory in tunneling sites
  - ➔ **DPF must be PN certified (VERT protocol)**
- 2002 BAFU: DPF mandatory on all construction machines
  - ➔ **ensure that each single DPF is working properly !?!**



# Archway to Healthier Breathing Air





# PNC Beyond the Tailpipe

- Homologation: OK! (PMP)
  - passenger cars – Euro 5b (2011)
  - heavy duty vehicles – Euro VI (2013)
  - Non-Road Machinery – 2016?
  - USA? Japan?
  
- mobile homologation (PEMS)
  
- Conformity of Production testing?
- In-Use-Compliance testing?
- Inspection & Maintenance testing - PN Regulation in CH

➔ Measuring Equipment is Available



# Flow-Through Filter System

(filter failure is not always as obvious)





