

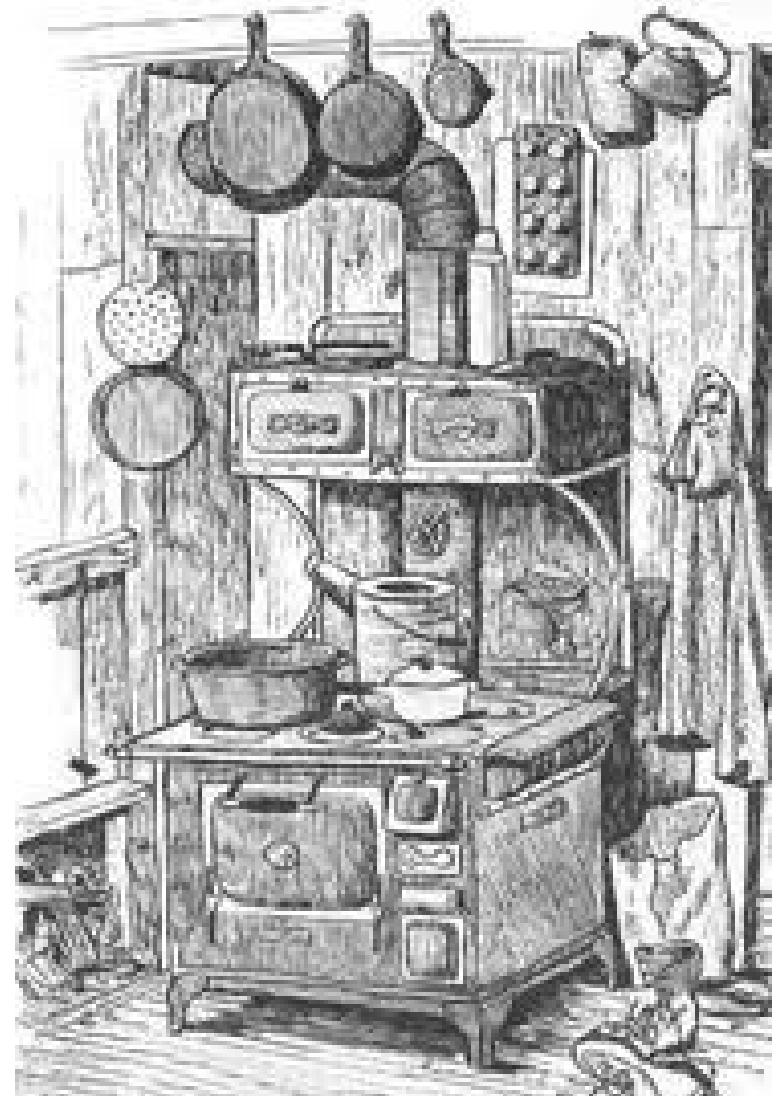
# Micro-gasification



Mgr. Tomáš Miléř, Ph.D.

Hostětín, 13. února 2013

# milíř X kamna



milíř X kamna

kombinace obou:



# Produkce dřevěného uhlí v Brazílii















3  
0

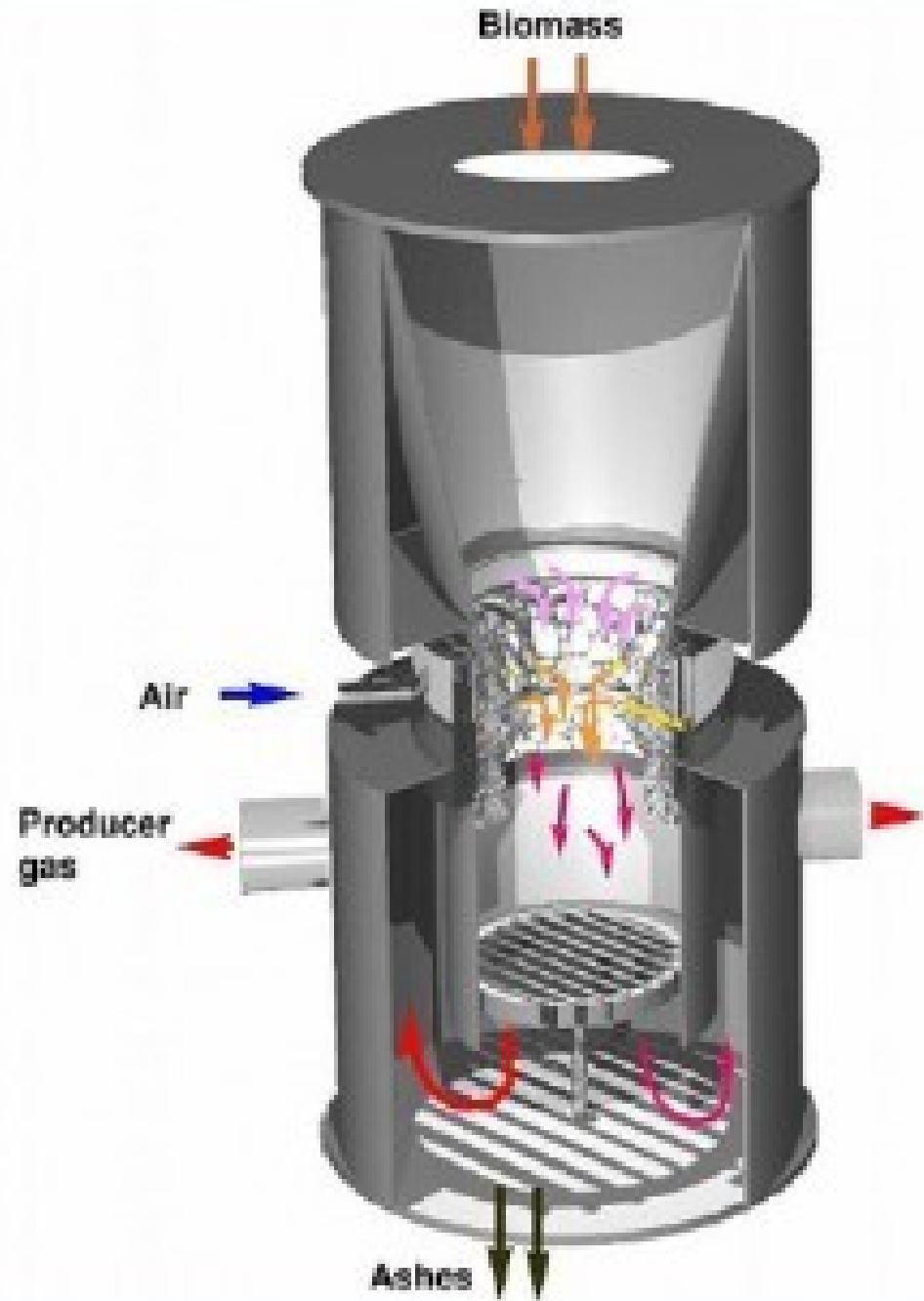
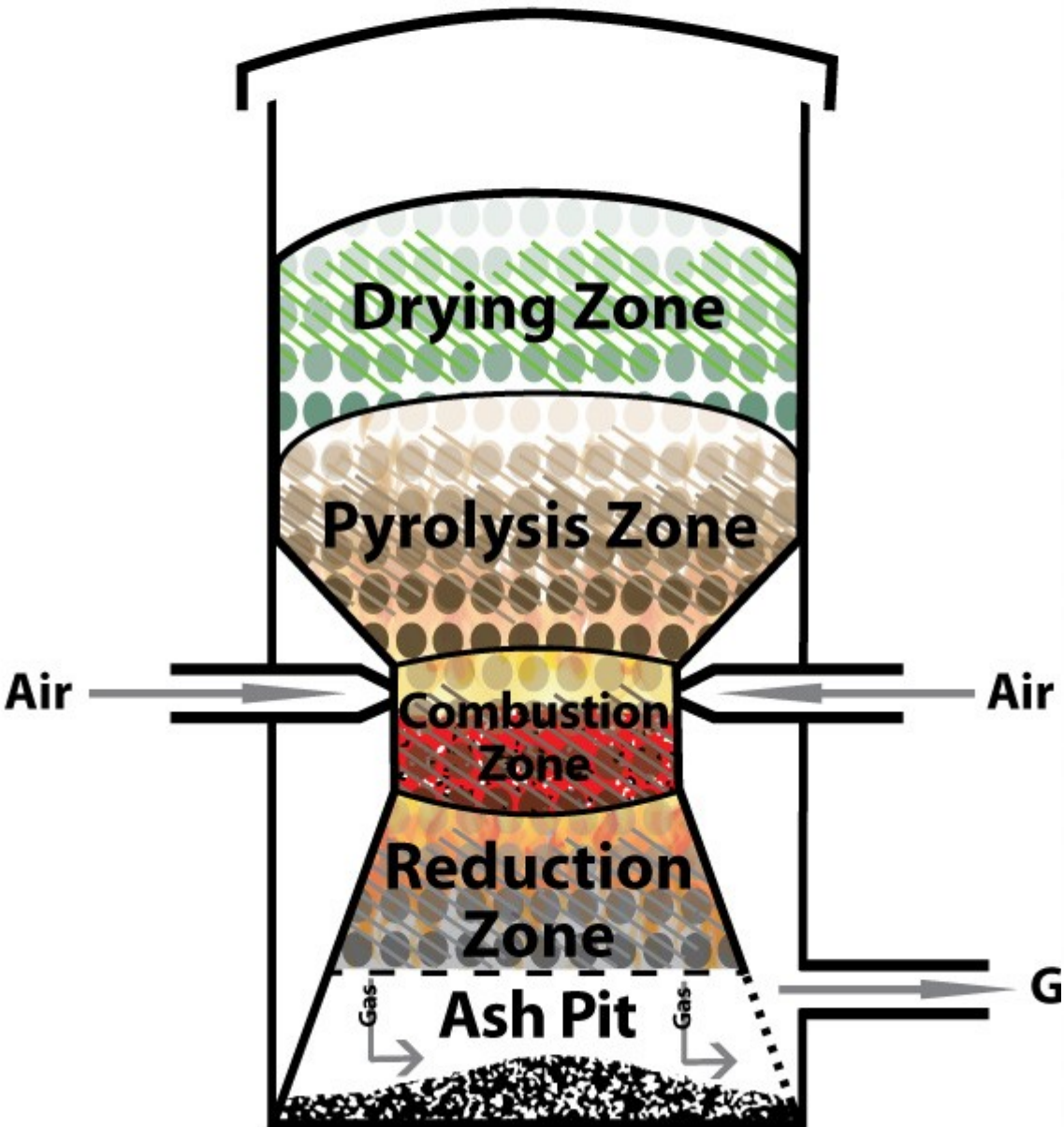
M. G. M. S. P.  
Bauart 21. Apr.  
Bauart 6. Nov.  
Nennschubkraft  
Leistung 75000 W  
Zug 15000 kg  
Drehm. 17400 kg

Hand

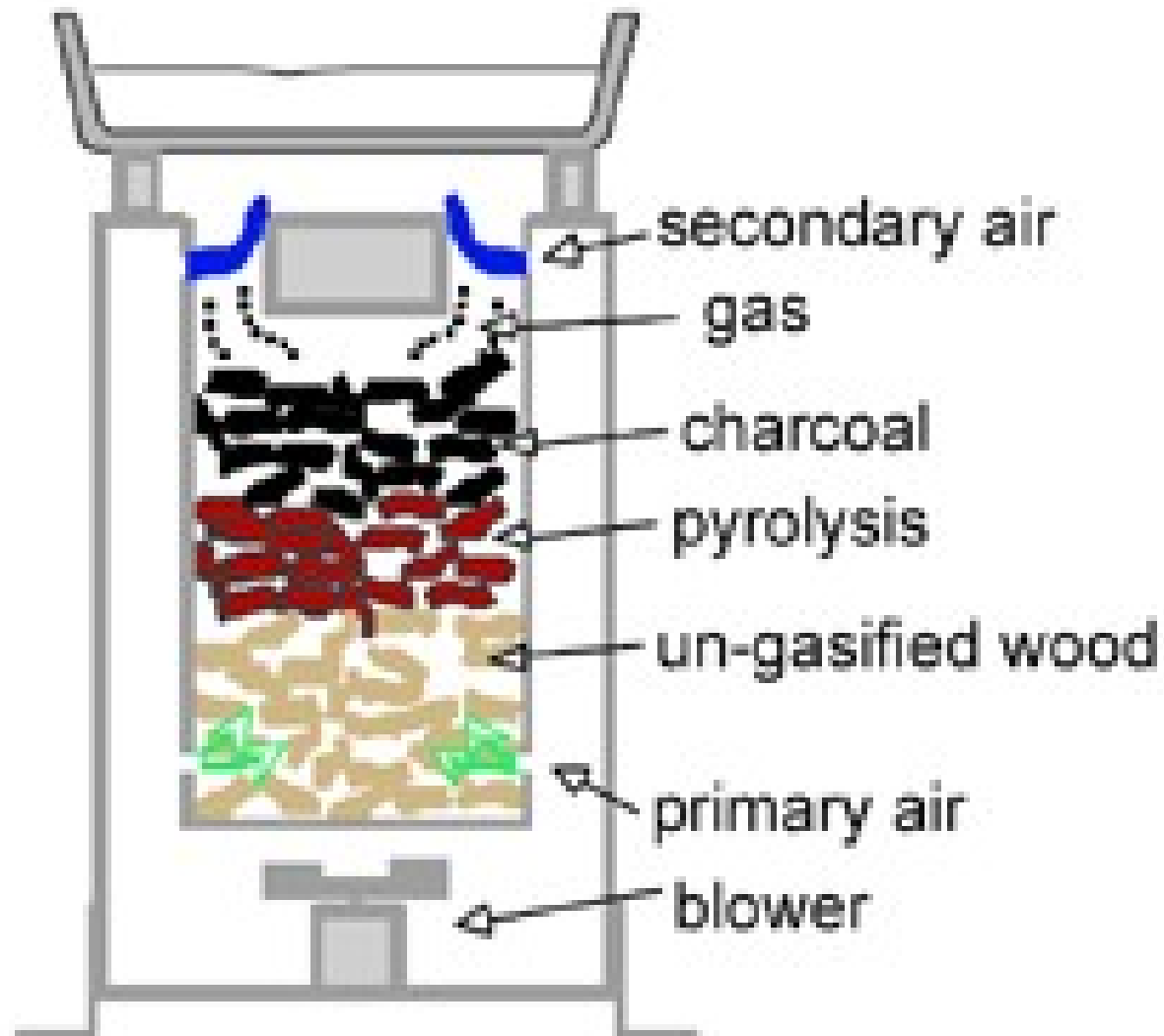
Informational sign with text and images.

# Downdraft Gasifier

Nozzle and constriction (Imbert)



# Top-lit updraft gasifier (TLUD)



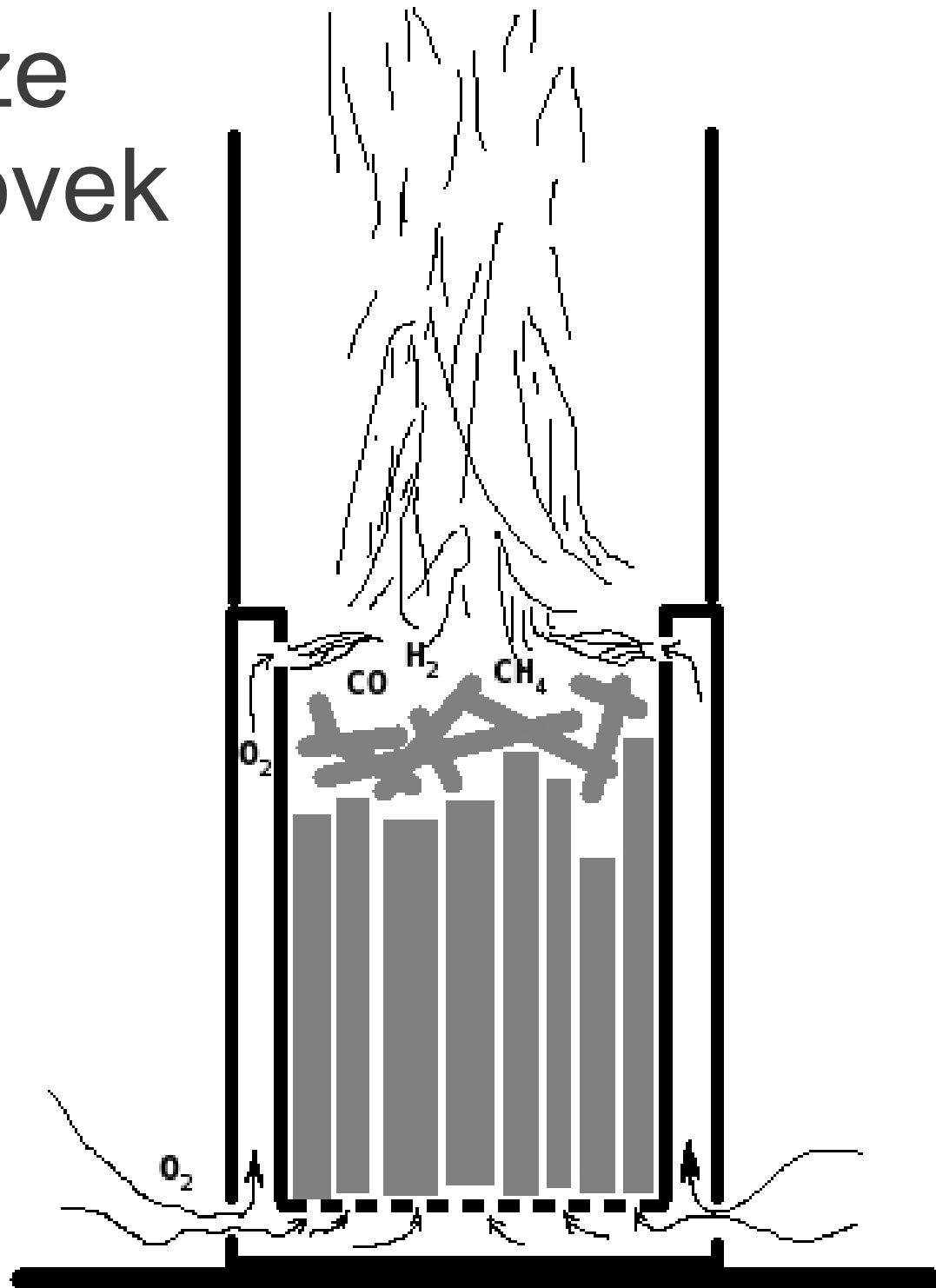
# iCan TLUD Stove



TLUD ze  
tři plechovek



# TLUD ze tří plechovek















# Champion TLUD



A 2-pot stove structure of mud with chimney.

Fig. 4

# Woodgas Camp Stove



# Anila



# Anila



4 kg dry waste biomass

1 kg dry hard wood (Prosobis)



Wood burns from the top down

As the waste material reaches 360 deg C it begins release gases and turn into charcoal



The Pyrolysis gases burn hot and last for more than 1 + 1/2 hrs

At the end of the process all the biomass has changed into charcoal

# Anila













# Čínské aplikace



Daxu



TN ORIENT JXQ-10

# Průmyslové aplikace



# KIRDI: Gasi-501



# Mobilní jednotka Biochar b100



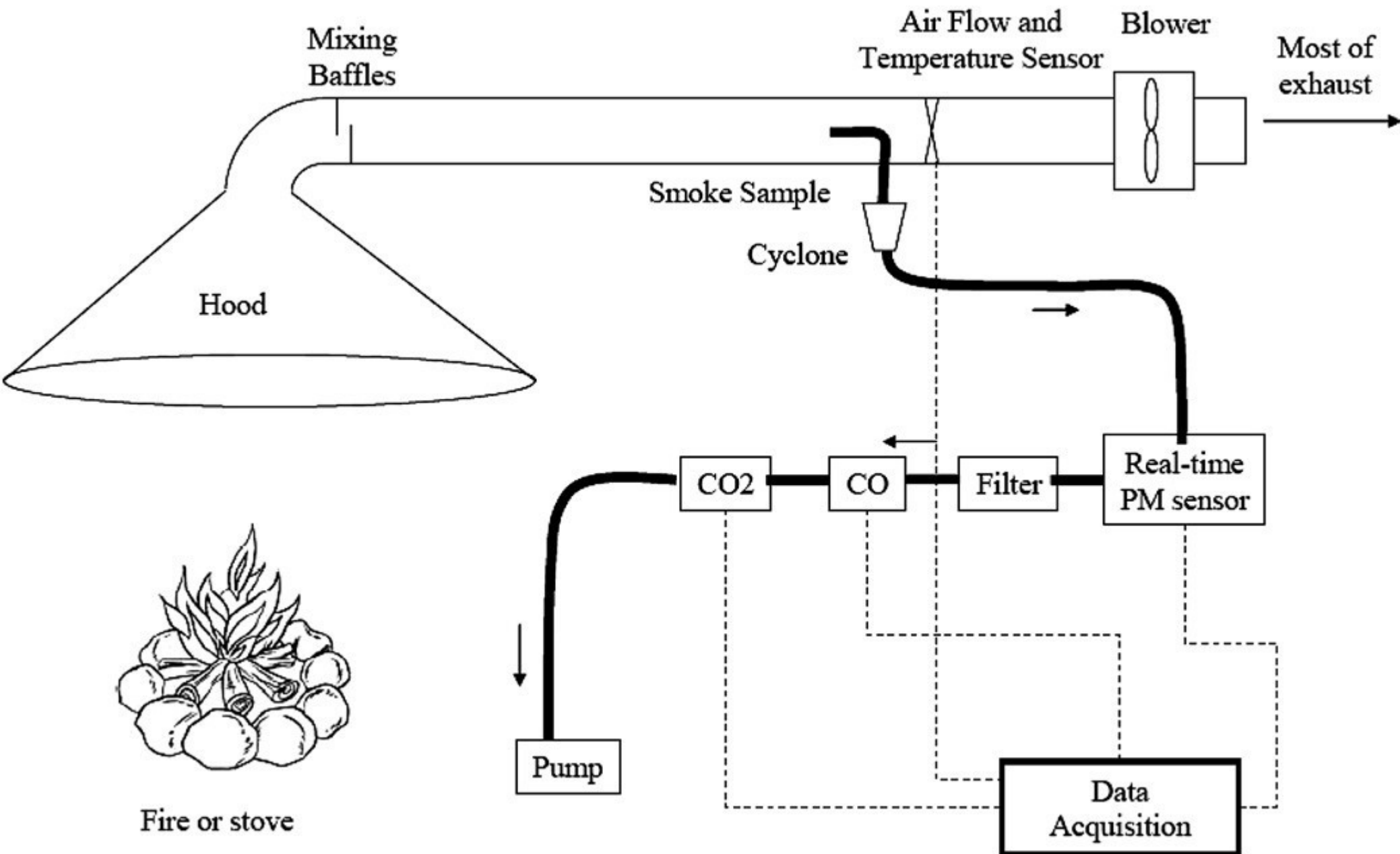


# Testování kamen

- Tepelná účinnost
  - Water Boiling Test (WBT)
  - Controlled Cooking Test (CCT)
  - Kitchen Performance Test (KPT)
- Výtěžnost uhlu
- Spaliny (CO, CO<sub>2</sub>, PM...)



# Testování kamen



# Analyzátor spalin HORIBA PG-250C



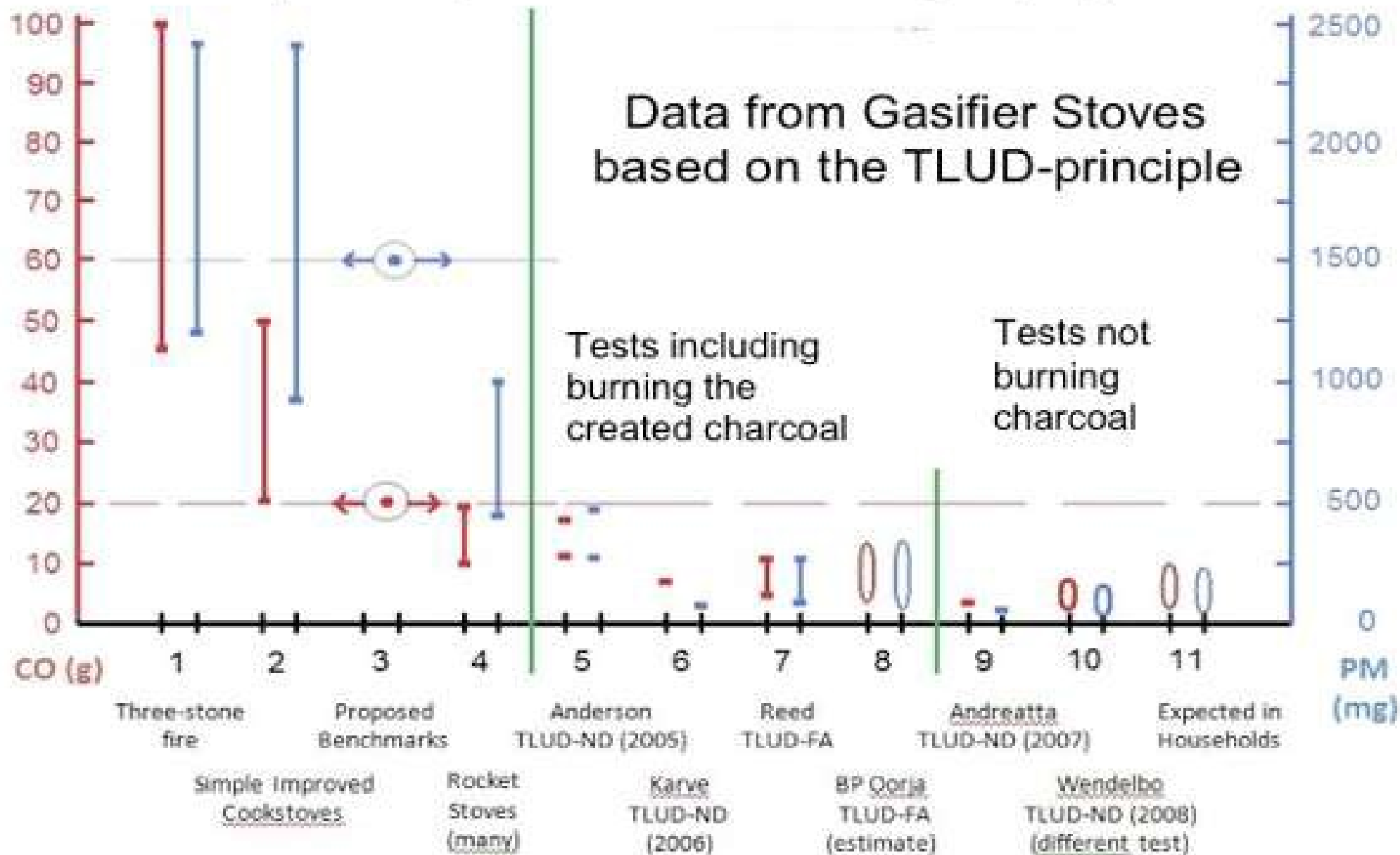
# Analyzátor spalin HORIBA PG-250C

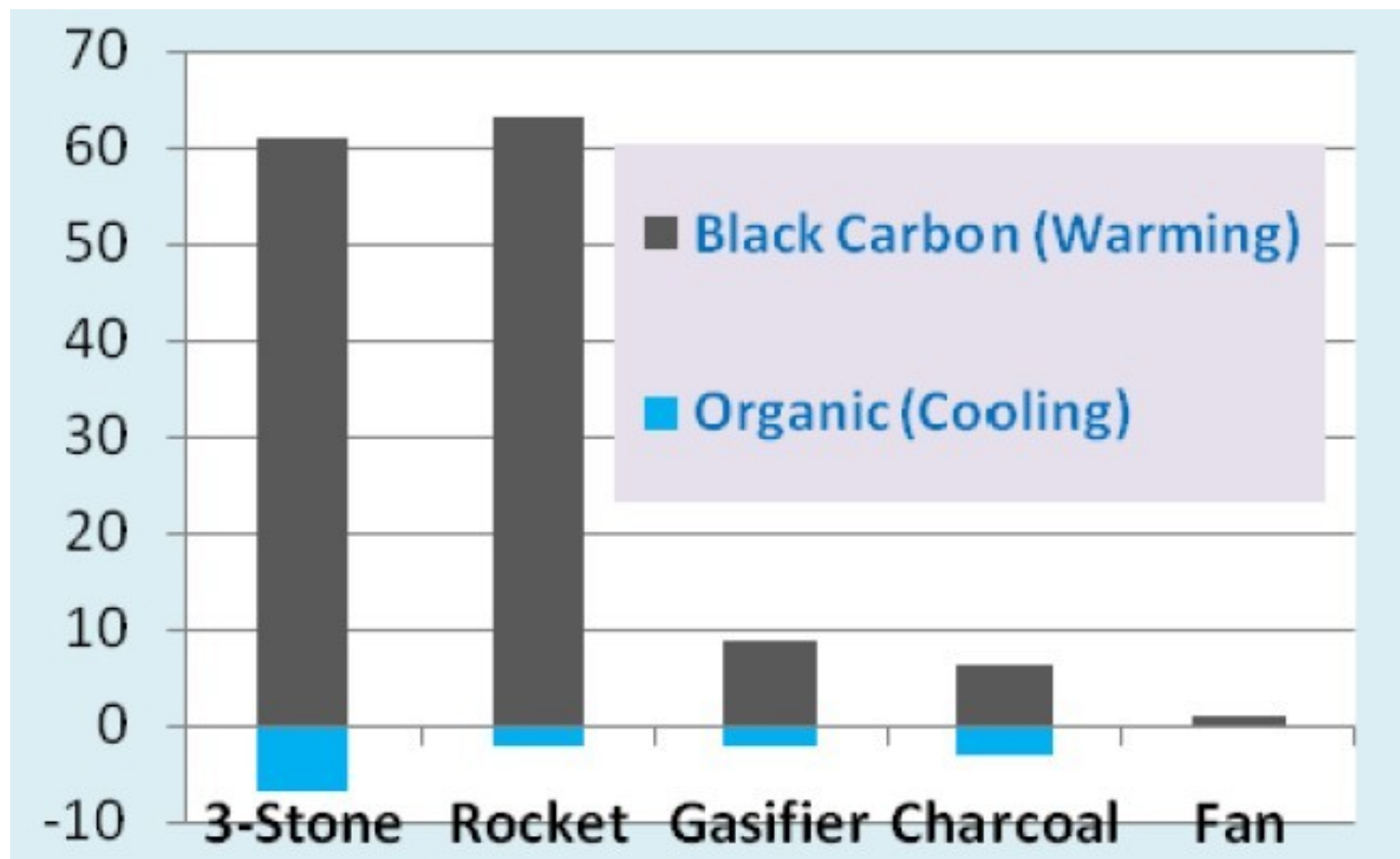
$\text{NO}_x$ ,  $\text{SO}_2$ ,  $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{O}_2$



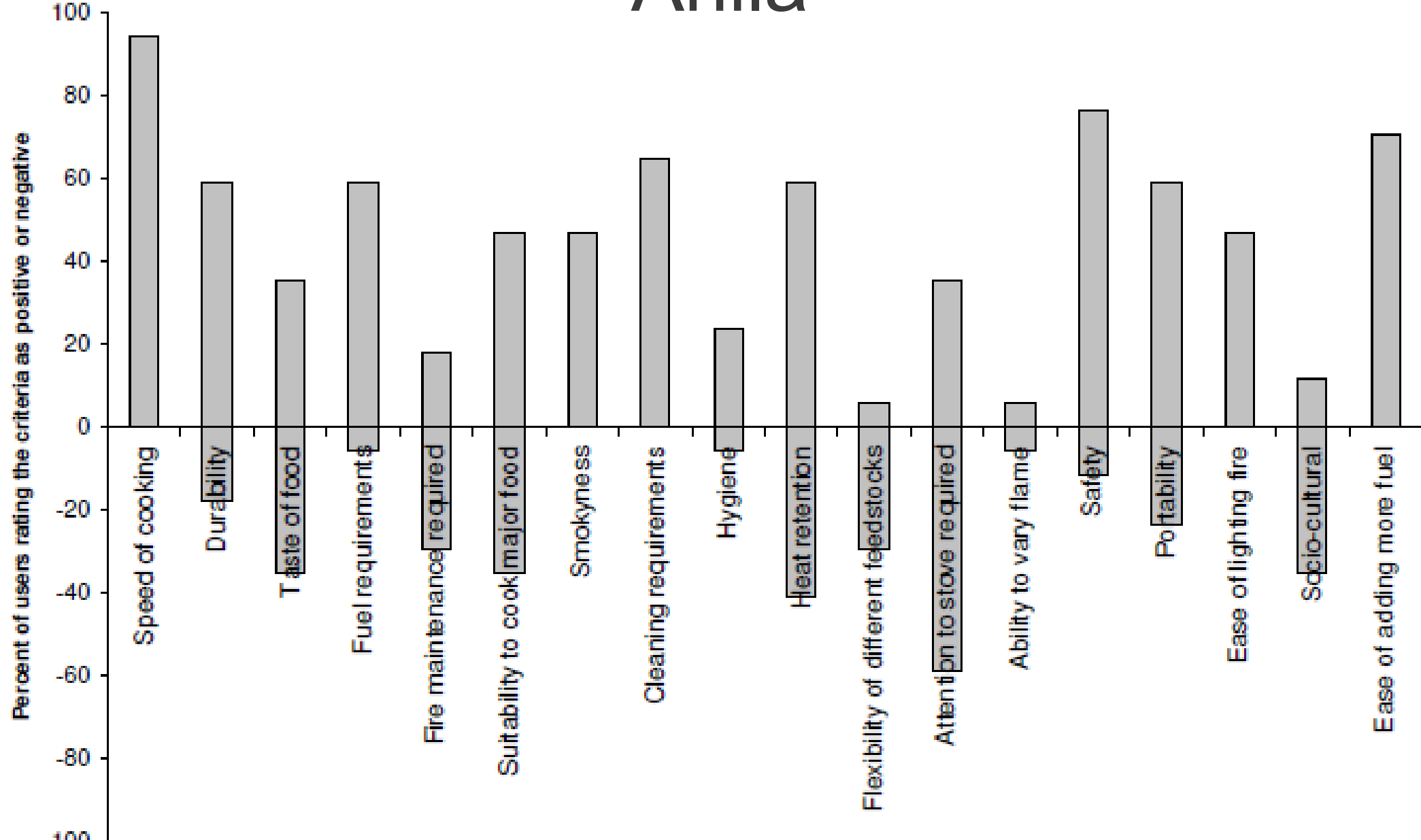
# Emissions of Carbon Monoxide (CO) & Particulate Matter (PM) from TLUD (Top-Lit UpDraft) Gasifiers and Other Cookstoves

(Measured by the Standard 5-Liter Water Boiling Test (WBT))



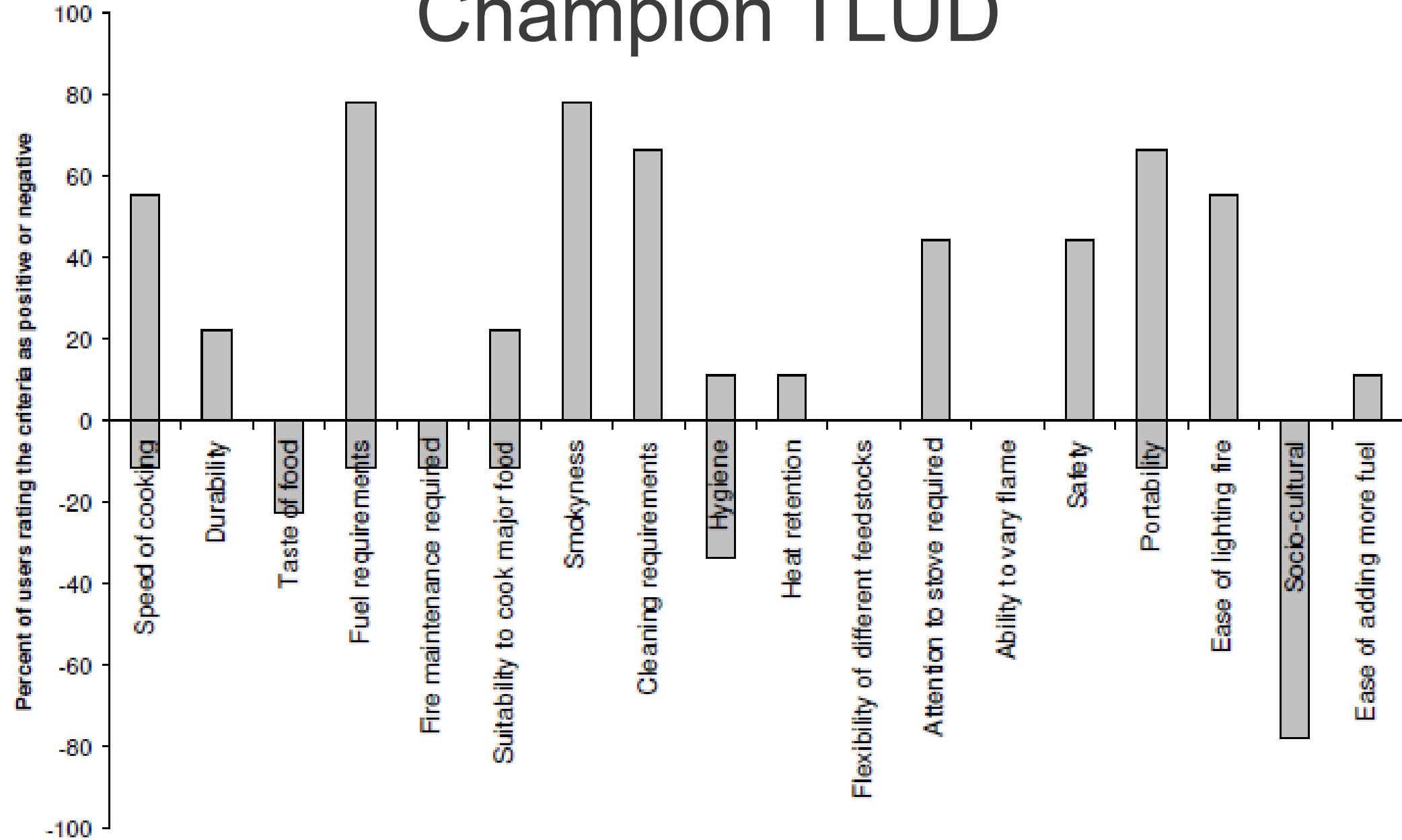


# Hodnocení uživateli (Kambodža, Indie) Anila

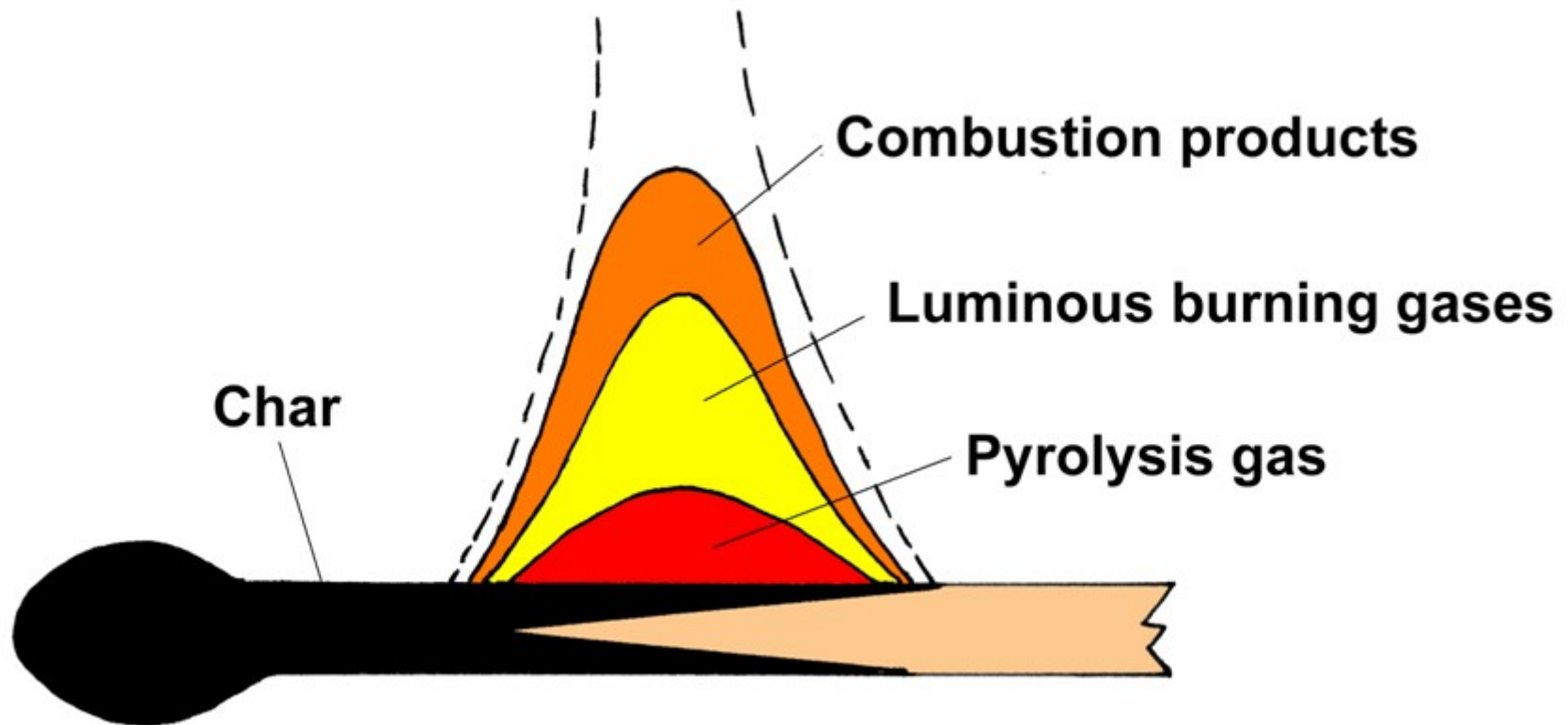


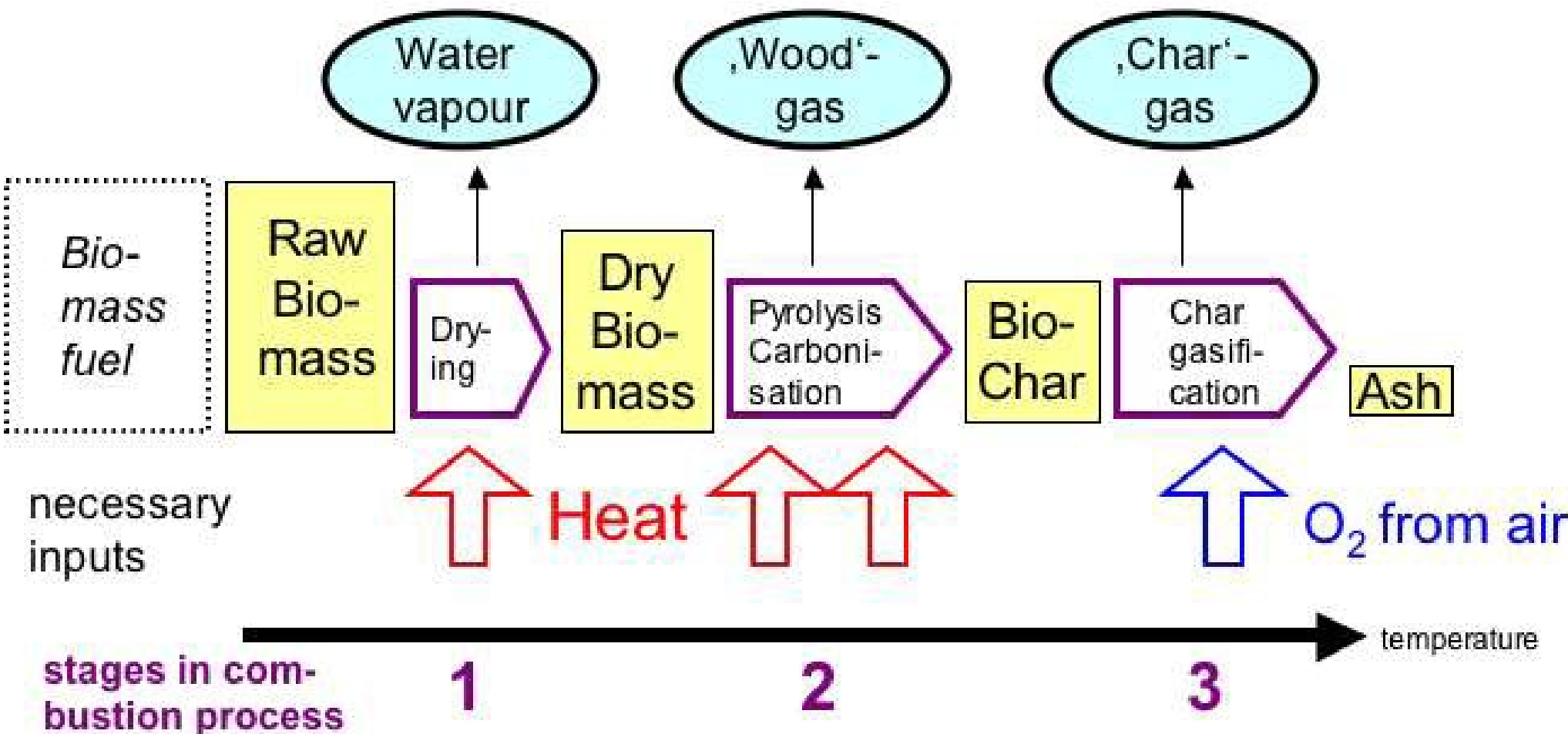


# Hodnocení uživateli (Kambodža, Indie) Champion TLUD



# Flaming pyrolysis





Legend:

- solid
- Gas
- Changes in fuel
- ↑ Process Input
- ↑ Process Output

Design:  
Christa Roth

Emissions

Vapours + gases

Bio-mass fuel

$H_2O$  Smoke\*  $H_2O + CO_2 + \text{Heat}$   $CO^*$

4 Combustion  
Gas-Air-Mix + flame

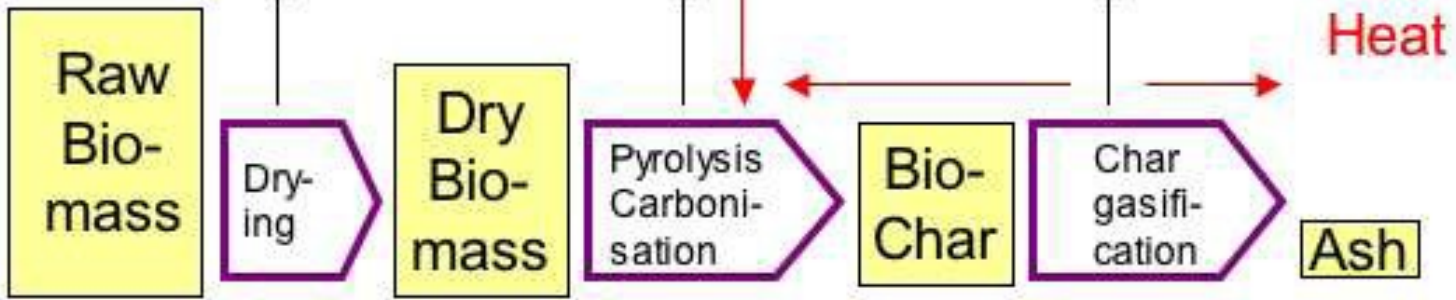
Water vapour

Wood-gas

air

Char-gas

\* = occurs if insufficient air and/or vapours cool down



necessary inputs

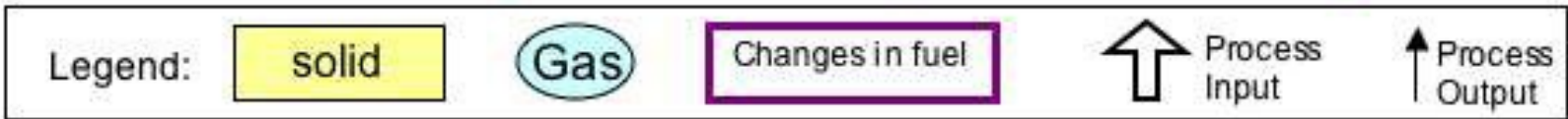
Heat Heat Heat  $O_2$  from air

stages

1

2

3



Design: Christa Roth

Combustion:  
Visible flame +  
usable Heat

Mixing zone of rising hot  
gases with secondary air

Initiate pyrolysis by lighting  
top of fuel bed with a fire  
starter material

Self-sustaining flaming  
pyrolysis front progresses  
downward through the bed of  
raw solid fuel, leaving behind  
char above

Primary air enters at the  
bottom of the fuel bed and  
moves upwards

Design: Christa Roth

