ROYAL INSTITUTE OF TECHNOLOGY

”From process to system view”

Dept of Chemical Engineering

ROYAL INSTITUTE OF TECHNOLOGY

Challenge we ARE addressing:

- Production and use of sustainable fuels of the 2nd and 3rd generations

ROYAL INSTITUTE OF TECHNOLOGY

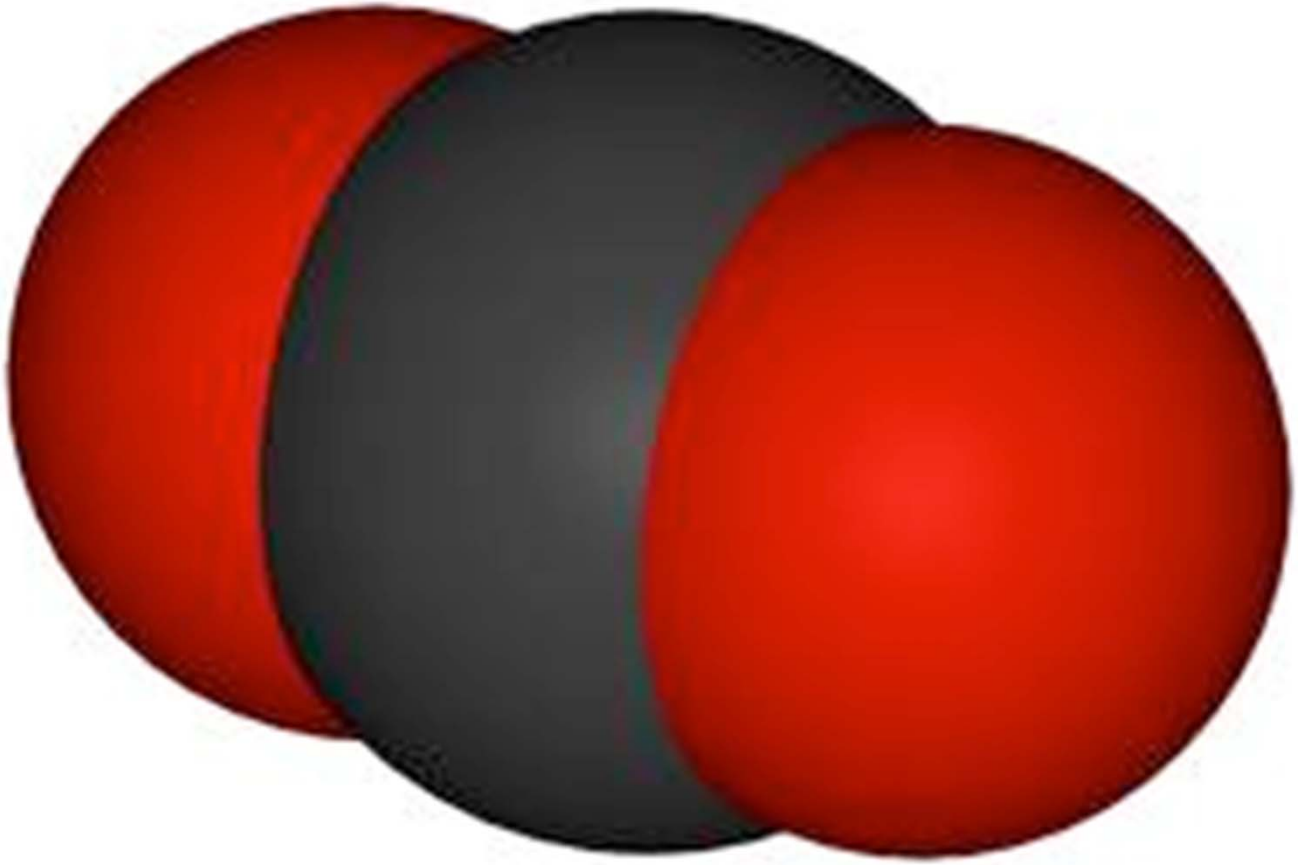
For that we need:

Sustainable raw materials?
What is that?
In a broad sense?

KTH
VETENSKAP
OCH KONST

ROYAL INSTITUTE
OF TECHNOLOGY

ROYAL INSTITUTE
OF TECHNOLOGY



Carbon dioxide?

ROYAL INSTITUTE OF TECHNOLOGY

Carbon dioxide!

If you can use the carbon dioxide as raw material....

ROYAL INSTITUTE OF TECHNOLOGY

...you avoid introducing new fossil carbon based fuels by using the same ”carbon atom” once again! (or twice, three times, etc....).....

ROYAL INSTITUTE OF TECHNOLOGY

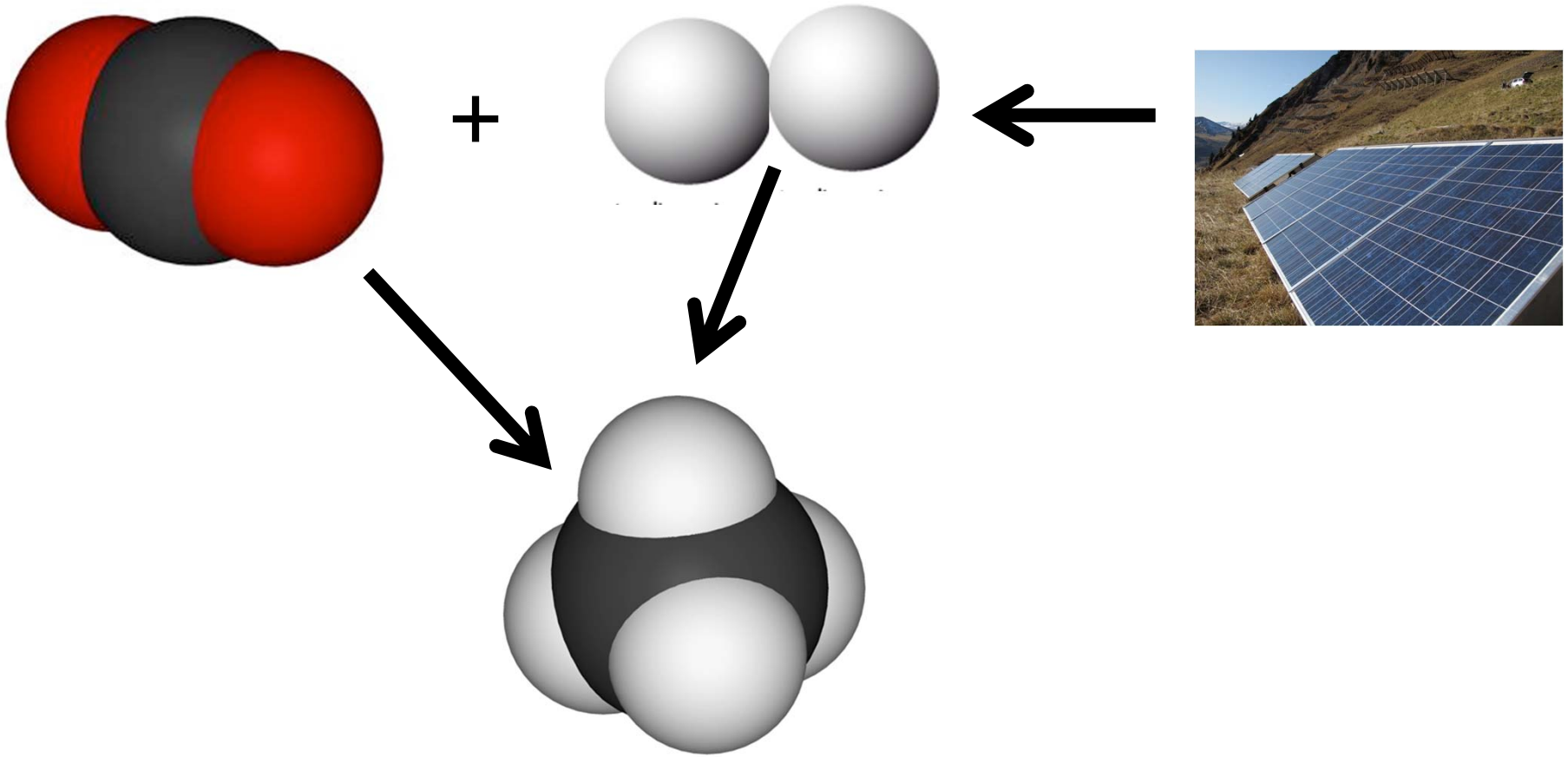
...and if the carbon dioxide comes from a renewable source then you create a renewable fuel!

Double bonus!

ROYAL INSTITUTE
OF TECHNOLOGY

”Just” add electricity!

ROYAL INSTITUTE OF TECHNOLOGY



Carbon dioxide and hydrogen gives methane

3rd generation renewable fuel

We work with the reaction between carbon dioxide and hydrogen and with system aspects on the whole concept.

ROYAL INSTITUTE OF TECHNOLOGY

To make this viable we need surplus electricity that needs to be stored in some form!

Possible case in grids with a high part of non continuous generation Wind, solar....

ROYAL INSTITUTE OF TECHNOLOGY

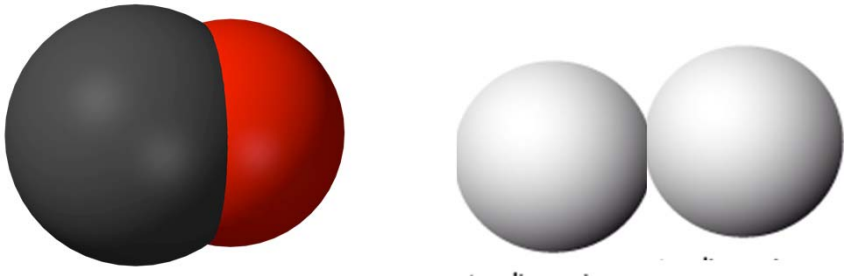
Carbon sources as CO_2:

- any fermentation biogas plant gives a mixture of carbon dioxide and methane

But also e.g.:

- cement industry
- steel industry

Gasification gives syngas = carbon monoxide and hydrogen



gives **different fuels depending on the process chosen**

2nd generation!


We have not reached the summit yet so we keep on climbing!