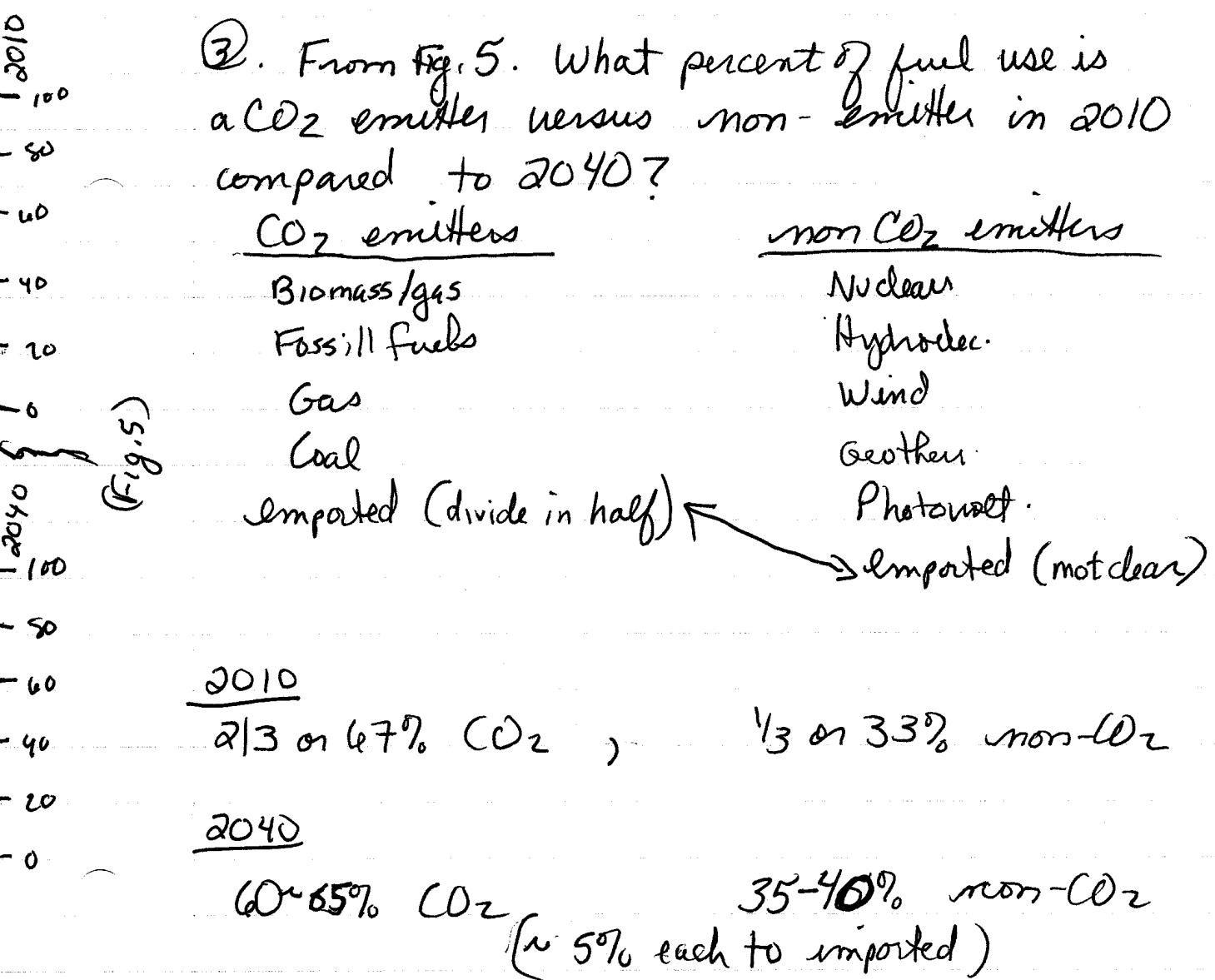# Ch.1 HW

① Describe a) use of wind, b) use of biomass & c) use of hydroelectric in Germany in Fig.1 d) Why is hydroelectric data as you see it?

② Use Fig. 4. What percent of wind power generators were in use in 1995 compared to 2005?

③. From Fig.5. What percent of fuel use is a CO_2 emitter versus non-emitter in 2010 compared to 2040?

CO$_2$ emitters	non CO_2 emitters
Biomass/gas	Nuclear
Fossill fuels	Hydroelec.
Gas	Wind
Coal	Geother.
Imported (divide in half) ←	Photovolt.
	→ Imported (not clear)

2010

2/3 or 67% CO_2 ,   1/3 or 33% non-CO_2

2040

60~65% CO_2 35-40% non-CO_2
(~ 5% each to imported)

- 2010
- 100
- 80
- 60
- 40
- 20
- 0

(Fig.5)

- 2040
- 100
- 80
- 60
- 40
- 20
- 0

CR. 1 HW Ren. E.

(Fig. 1)

① Figure 1.

```
60 -
50 -
40 -
30 -
20 -
10 -
 0 -
```

a) Wind energy changed from ~ 2 T Watt Hours in 1990 to ~ 25 (TWh) in 2004

b) Biomass shifted from ~1 TWh in 1990 to ~10 TWh in 2004

c) Hydro electric stayed ~ stable over time peaking at ~25 TWh in 2000.

d) All the rivers & lakes, that could be, have already been dammed for hydro electric use.

② Figure 4

2005 - 17,600 wind installs
1995 -   3528   "   "

Percent $\frac{1995}{2005} = \frac{3528}{17600} = 20\%$

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(4) Fig. 7 & 8

List ~~countries~~ continents whose renewable energy use is more CO_2 emitter than not in order of highest to lowest. (Top 4)

			Total %
Africa	50% renewable	97% Biomass	48.5
Latin Am	28% renewable	62% Biomass	17.4
China	21% renewable	88% Biomass	18.5
Other Asia	33% renewable	92% Biomass	30.4

Highest — Africa
Other Asia
China
Latin Am.

(5) What are the definitions of alternate energy, renewable energy & CO_2 emitters?

alternate energy — non-fossil fuels

renewable energy — fuels which can be replenished

CO_2 emitters — fossil fuels, & plants which give off CO_2 when used