HEUN Review of chapters 3-9

p.n48 We begin by noting that direct energy travels with material through an economy (and opposite to money flow).

Fig. 3.1 Energy content (˙E ) of material flows (˙R, ˙ S , and ˙K) from Figure 2.1.

(Energy flow symbols from Howard Odum).

49 the direct energy associated WITH flows of steel

EQU. 3.4 WHERE IS FLOW01 ON DIAGAM?

LIKEWISE e1 FROM BIOSPERE???

Note that ˙E 1 is the gross direct energy production rate of society. For example,

firms extract crude oil (a component of ˙E01) and refine it into petroleum products (a

component of ˙E1) that are consumed by society. The direct energy consumption of

extraction and refining firms is a component of ˙E11 ??All this needs to be made clearer relativeto diagram

Eq 3.11 ref 3 EROI should not be attributed to Ayers but Hall (e.g.1986)

Fig 3.5 Energy module should be moved to LEFT of goods and services as it must come first

(OK chicken and egg, but conceptually)

The First Law of Thermodynamics around APPLIED TO ? the biosphere (0)

The First Law around APPLIED TO the goods and services sector (3) i

Table 3.1 Can you add in KJ for each component??? As a separate column?

Chpt 4

In Chapter 3, the First Law of Thermodynamics accounted direct energy (˙E ) flowing

among sectors of an economy. In this chapter, we will adapt the First Law to account

FOR THE embodied energy in the material flows of an economy.1

p. 58 Total energy (T) is defined as the sum of direct energy (E, see Chapter 3) and embodied

energy (B).DEFINE EMBODIED ENERGY

59 bottom: waste heat is ignored when accounting for total energy ????? It is in equations

60

The final term ( ˙Qout) is a proxy for all direct energy (˙E) consumed (i.e. turned into heat)

within the sector.

Fig. 4.2 Total energy flows (T˙ ) in a one-sector economy.(see fig 3.3 ).

dBK;1

dt = ˙B11 􀀀 ˙B1 􀀀 ˙B10 + ˙Q10: (4.21)

>>>>>Add In words this say that the change in the embodied energy etc etcc I think o be perf3ectly clear you should give the final equation in words each time !!!!!!!!!!!!!!

p. 64 The term ˙B10 in Equation 4.21 represents the disposal rate of embodied energy from

Society (1) to the Biosphere (0). (i.e. dumps etc). …depreciated physical <<<<assets.

Fig 4.4 see comment fig 3.5

Chpt 5

The monetary flow is an easy and logical (if hardly perfect ) l proxy for the value of the material

and energy flows. At least most ordinary humans accept that.

Fig. 5.1 Flows of value (˙X ) for a single sector. The value flows are associated with each of the

dfferent material and energy flows outlined in previous chapters. ----------I do not see a green flow

Why are the/re not dashed lines indicating money (value) ??? How are we connecting to title of chapter???

Fig. 5.1 Flows of value (˙X ) for a single sector. The value flows are associated with each of the

di\_erent material and energy flows outlined in previous chapters. ??? is value flowing in opposite direction??

The contrast between THE BIOPHYSICAL REAL) FLOWS OF Figures 2.2 and 3.3, on the one hand, and THE USUAL ECONOMIST’S DEPICTION OF Figure 5.3, on the other, is striking <<<<<<<NOTE HOW I AM TRYING TO HIT THE READER OVER THE HEAD …

Fig. 5.3 Flows of value (˙X) for a one-sector economy. <<<NOW IS ThIS THE ECONOMISTS VIEW?? (yes) Or what? Link with what comes before

The next 2? sections are representing the economists’ view of value. Be explicit when you are representing economists when your biophysical perspective

5.2.2 Value generation INCLUDING BIOPHYSICAL INPUTS (˙Xgen) <<TELL THE READER YOU ARE SHIFTING PERSPECTIVES…

Fig. 5.4 Flows of ??BIOPHYSICAL?? value (˙X) within a two-sector economy. AGAIN I AM CONFUSED. THE RROWS ARE SHOWING THE FLOW OF BIOPHYSICAL VALUE (UPGRADED STUFF) BUT THE FLOW OF M0NEY IS OPPOSITE. (DOTTED LINES). YET YOU SAID YOU WERE VALUING VALUE IN MONEY, WHICH YOU ASRE NOT SHOWING FLOWING. MAYBE IT’S THE FLOW OF BIOPHYSICAL VALUE….ALSO FIG 5.5

5.5 Value in the US auto industry

To estimate value flows through the automobile industry (ONE OF THE FEW SECTORS OF THE US ECONOMY WITH N ADEQUATE DATA BASE) , we use publicly..

Define KLEMS and PERKS

From fig 5.6 I see you are using dollars to represent the biophysical flows….