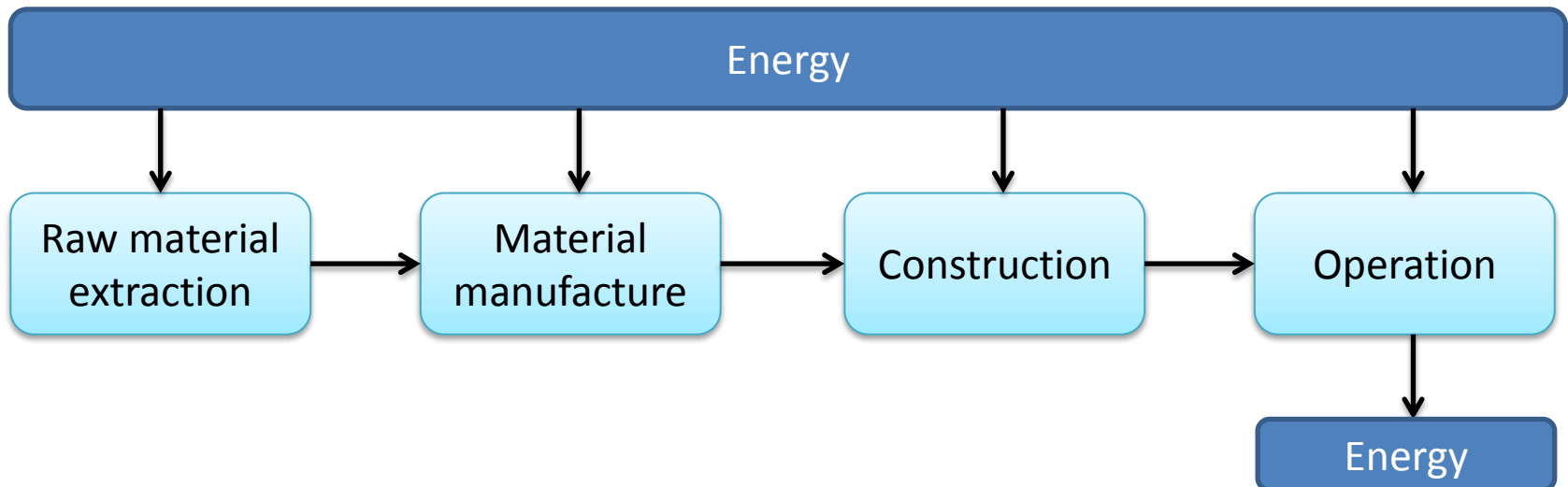


Example

- Wind Turbine V.S. Photovoltaic System
- Compare energy efficacy and environmental impact
- Use input-output-based life cycle inventory method

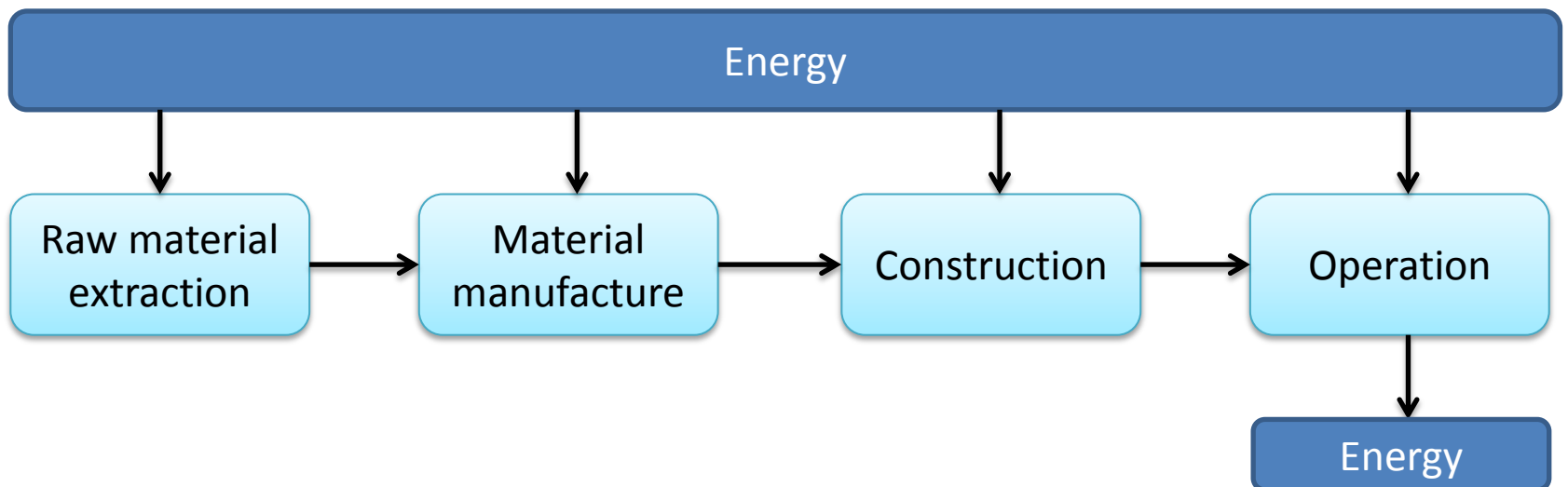
Wind Turbine Characteristics

- Total power output: 3000 kW
- Capacity factor: 33%
- Expected service life: 20 years
- Life cycle boundary:



Photovoltaic System Characteristics

- Total power output: 1 kW
- Capacity factor: 13.6%
- Expected service life: 25 years
- Life cycle boundary:




Data Input

- Input material data for each components

S 編輯 組裝 'Nacelle'

Input/output | Parameters

名稱: Nacelle

影像: 

註解:

Status: 否

原料/組裝	數量	單位	分佈	SD ² 或 2*SC	最小值	最大	註解
Cold rolled sheet, steel, at plant/RNA	9.8	ton	未定義的				Cover
Cold rolled sheet, steel, at plant/RNA	13.65	ton	未定義的				Frame
Cold rolled sheet, steel, at plant/RNA	6	ton	未定義的				Generator
Cold rolled sheet, steel, at plant/RNA	1.07	ton	未定義的				Brake System
Cold rolled sheet, steel, at plant/RNA	24.76	ton	未定義的				Gear Box
Cold rolled sheet, steel, at plant/RNA	4.06	ton	未定義的				Revolving system
Cold rolled sheet, steel, at plant/RNA	1.07	ton	未定義的				Crane
Cold rolled sheet, steel, at plant/RNA	3.64	ton	未定義的				Other
Aluminium extrusion profile, primary prod., prod. mix, aluminu	0.72	ton	未定義的				Cable
Aluminium extrusion profile, primary prod., prod. mix, aluminu	0.25	ton	未定義的				Gear box
Copper wire, technology mix, consumption mix, at plant, cros	0.99	ton	未定義的				Cable
Copper sheet, technology mix, consumption mix, at plant, 0,€	0.25	ton	未定義的				Gear box
Copper sheet, technology mix, consumption mix, at plant, 0,€	1.46	ton	未定義的				Other
Aluminium extrusion profile, primary prod., prod. mix, aluminu	1.46	ton	未定義的				Other
Polyvinylchloride resin (B-PVC), bulk polymerisation, productio	0.69	ton	未定義的				Other

Data Input

- Wind Turbine has four main components

The screenshot shows the LCA Explorer software interface. On the left is a sidebar with a tree view of product stages. The main area displays a table of components for a Wind turbine. The table has columns for Name, Project, and Status. The components listed are Base, Nacelle, Rotor, and Tower, all with 'Wind turbine' as the project and '否' (No) as the status. The status '否' is highlighted in red in the original image. To the right of the table are buttons for New, Edit, View, Copy, Delete, and Used by. At the bottom right, there is a checkbox for 'Show as list'. The bottom status bar shows '5 items' and '0 items selected'.

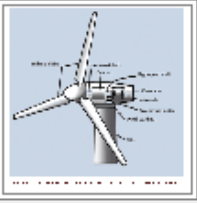
Name	Project	Status
Base	Wind turbine	否
Nacelle	Wind turbine	否
Rotor	Wind turbine	否
Tower	Wind turbine	否

Data Input

- Assemble Wind Turbine

編輯 組裝 'Wind Turbine'

Input/output Parameters

名稱: Wind Turbine 影像:  註解:

Status: 否

原料/組裝	數量	單位	分佈	SD ² 或 2*SC 最小值	最大	註解
Base	1	p	未定義的			
Nacelle	1	p	未定義的			
Rotor	1	p	未定義的			
Tower	1	p	未定義的			
(Insert line here)						

製造工序	數量	單位	分佈	SD ² 或 2*SC 最小值	最大	註解
Assembly of generator and motor, auxiliaries and energy use	1	p	未定義的			
(Insert line here)						


Data Input

- Assemble PV System

S 編輯 組裝 'PV System'

Input/output | Parameters

名稱: PV System

影像: 

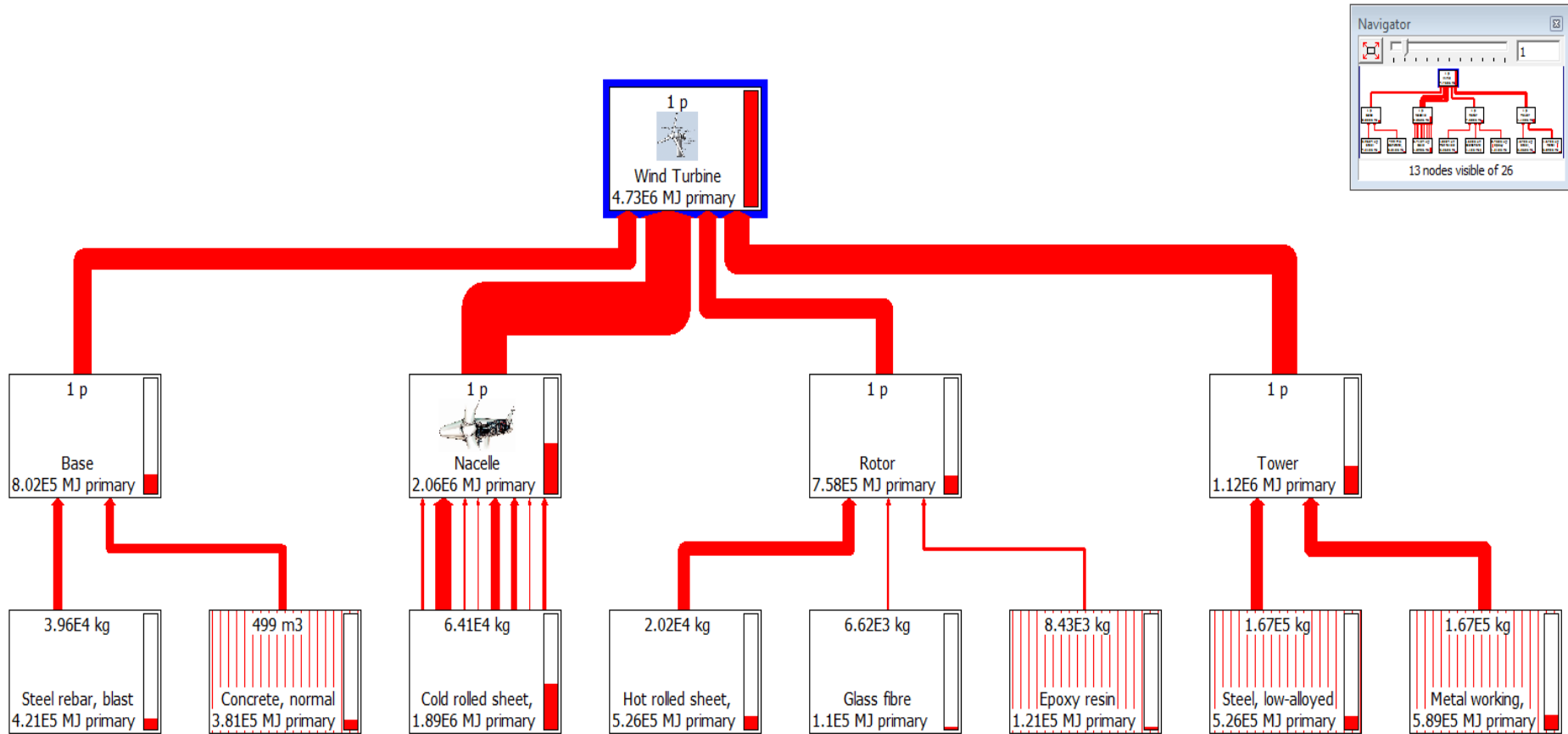
註解:

Status: 否

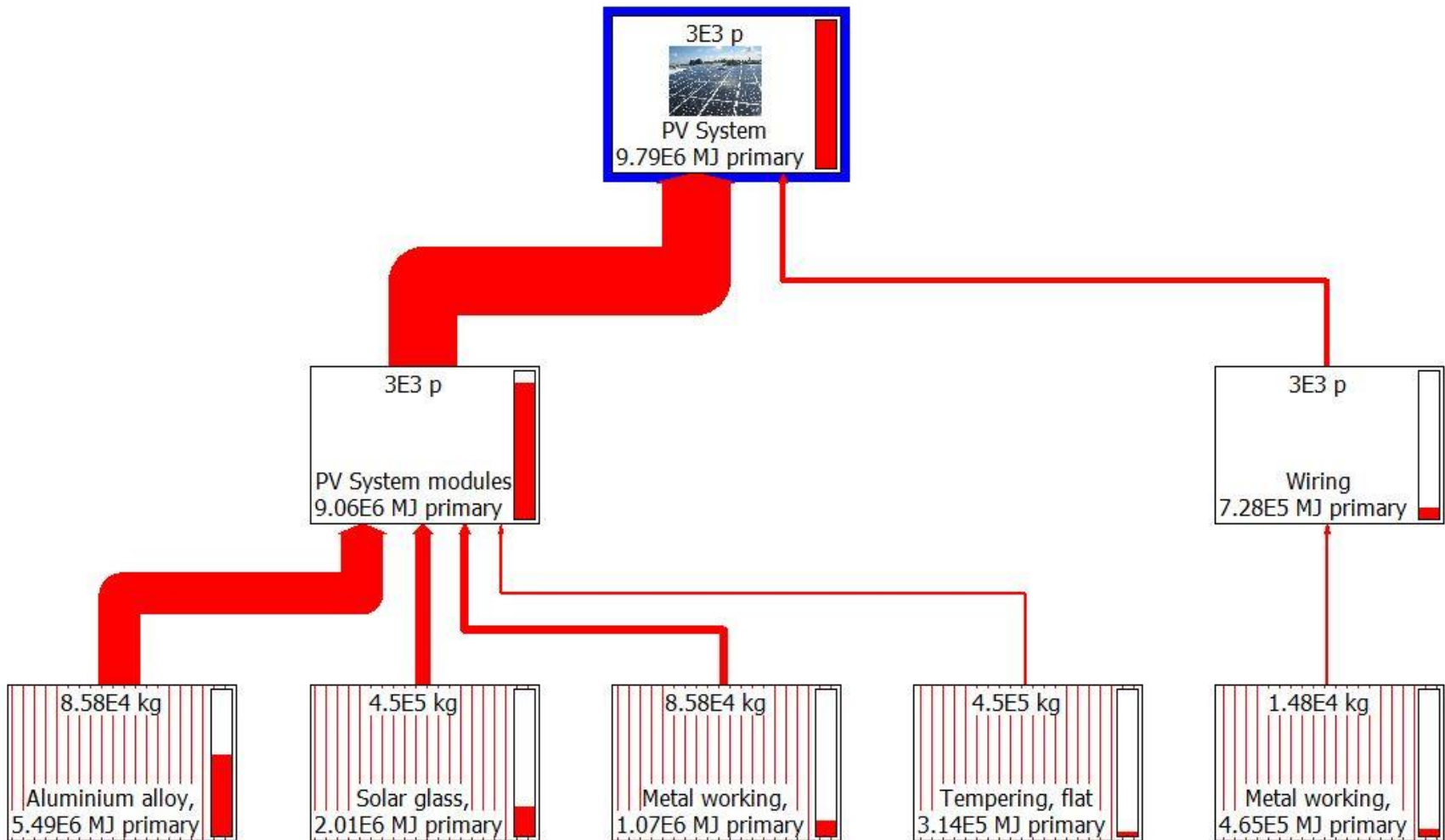
原料/組裝	數量	單位	分佈	SD ² 或 2*SL 最小值	最大	註解
PV System modules	1	p	未定義的			
Wiring	1	p	未定義的			
(Insert line here)						

製造工序	數量	單位	分佈	SD ² 或 2*SL 最小值	最大	註解
(Insert line here)						

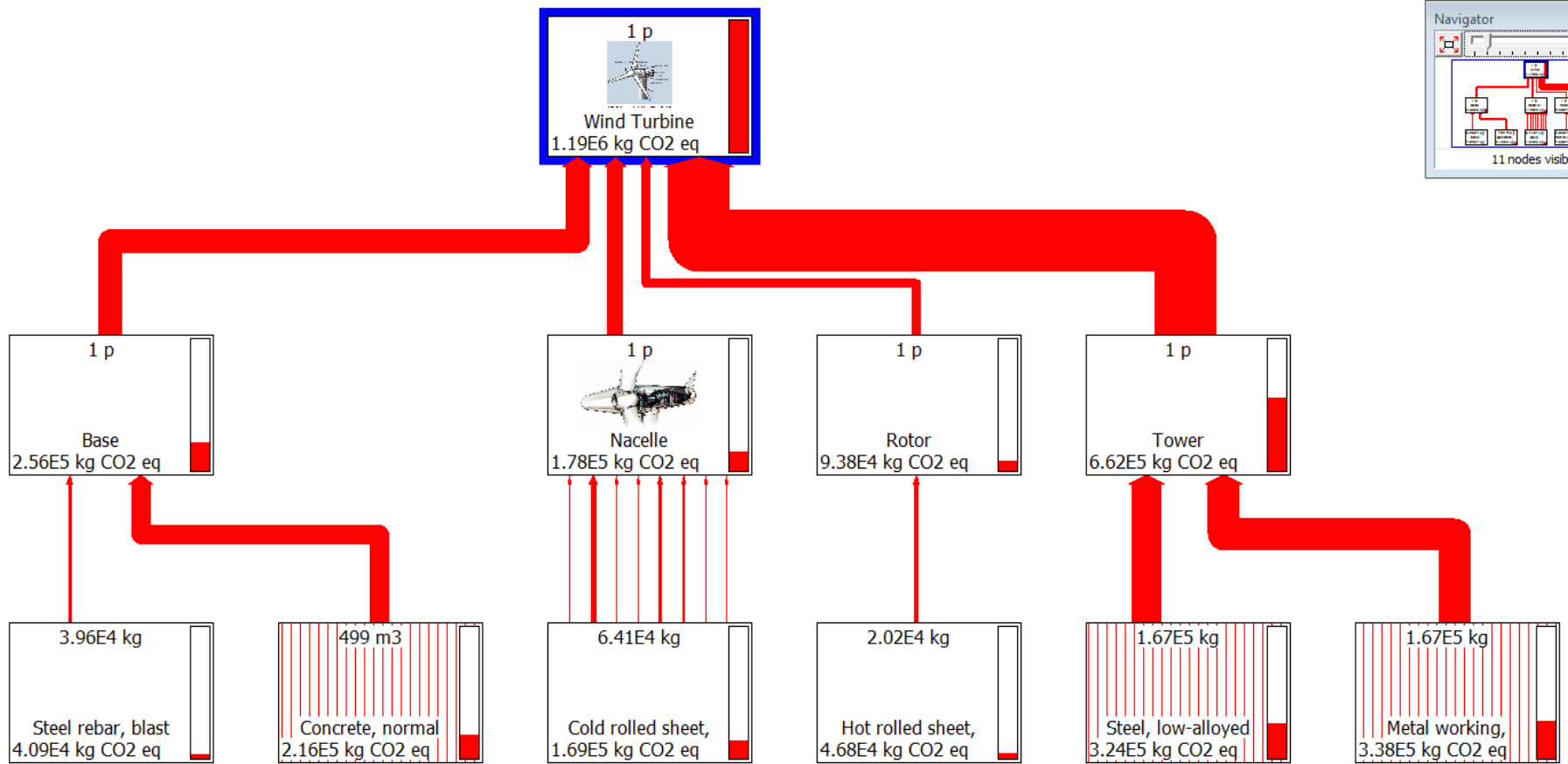
LCI Analysis – Primary Energy



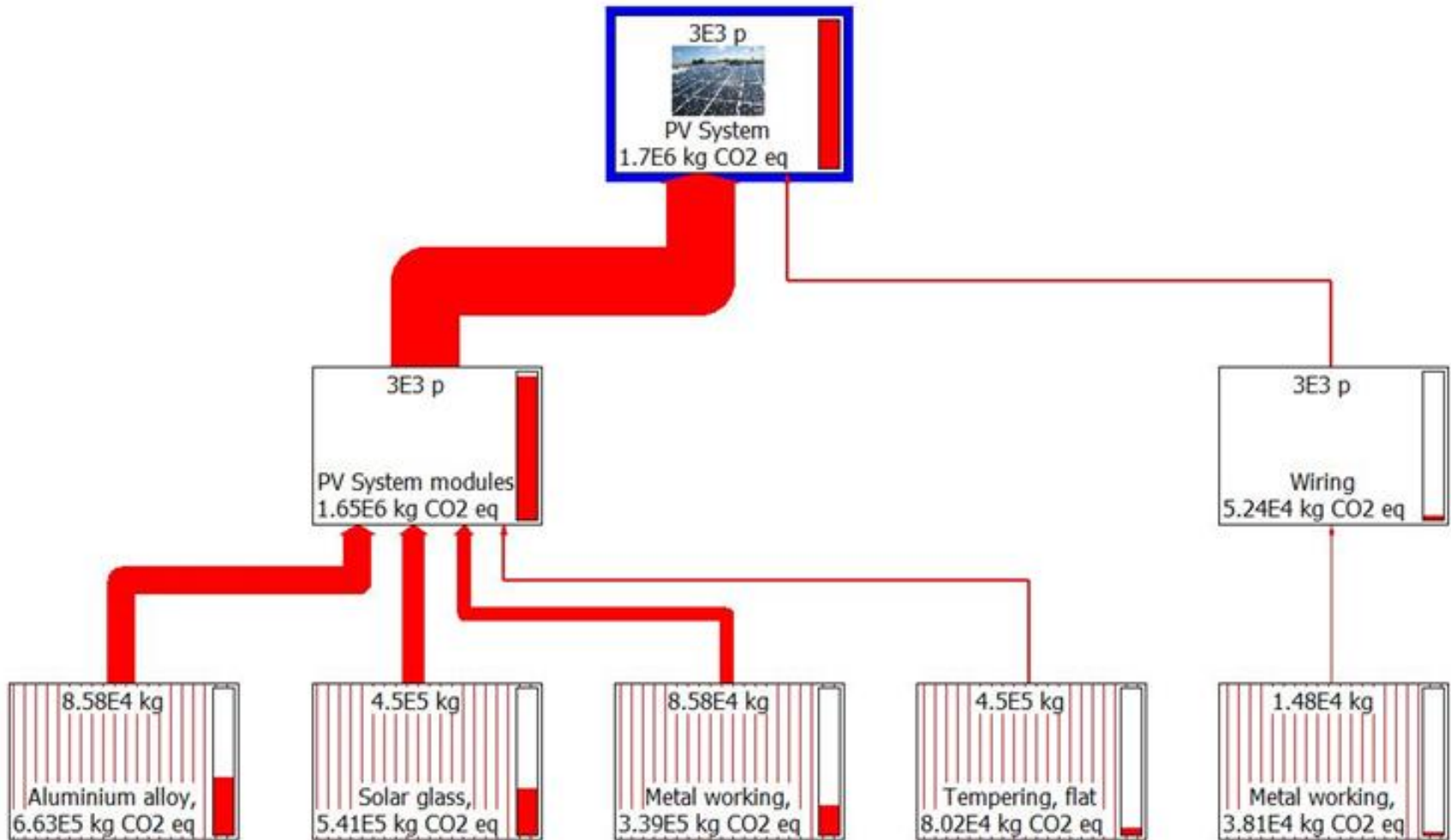
LCI Analysis – Primary Energy



LCI Analysis – CO₂ Emission



LCI Analysis – CO₂ Emission



Impact Assessment

- Wind Turbine

Life Cycle Stage	Primary Energy (GJ)	GHG	Total emissions produced/(avoid) (ton CO ₂ -e)*
Construction Energy	4370	CO ₂ -e	1190
Life Cycle Energy Output (20 years)	624,412	CO ₂	(57,883)
	-	CH ₄	(156)
	-	N ₂ O	(37,170)
Total Emission Avoided			94,019

- *Source: Department of Climate Change 2008: 202

Impact Assessment

- PV System (3000 units)

Life Cycle Stage	Primary Energy (GJ)	GHG	Total emissions produced/(avoid) (ton CO ₂ -e)*
Construction Energy	9,790	CO ₂ -e	1,760
Life Cycle Energy Output (25 years)	321,667	CO ₂	(28,532)
	-	CH ₄	(242)
	-	N ₂ O	(19,279)
Total Emission Avoided			46,293

- *Source: Department of Climate Change 2008: 202

Reference

- Department of Climate Change (2008) National greenhouse and energy reporting (measurement) determination 2008, Canberra: Commonwealth of Australia