


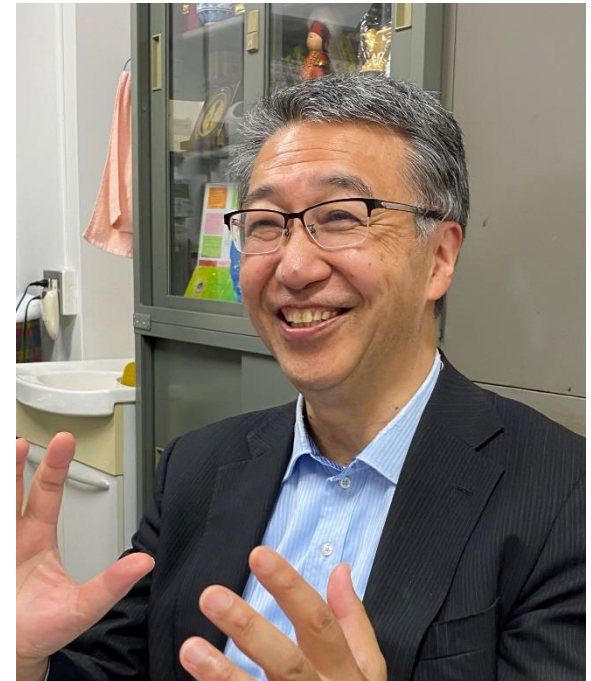
14th UNISEC-GLOBAL Virtual Meeting

- *Opening Remarks* -



Today's main theme is
"Lost Dark Sky,"
so.....

Let's talk about "Entropy" and its
relationships with global issues.

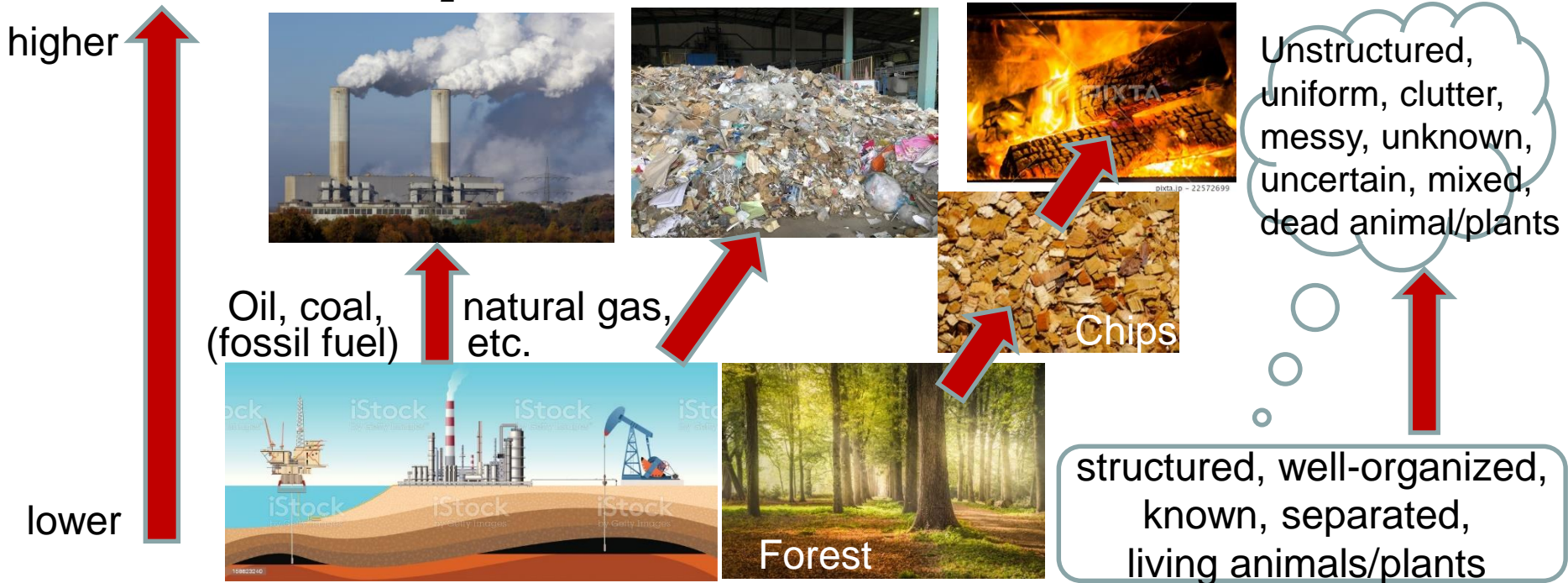


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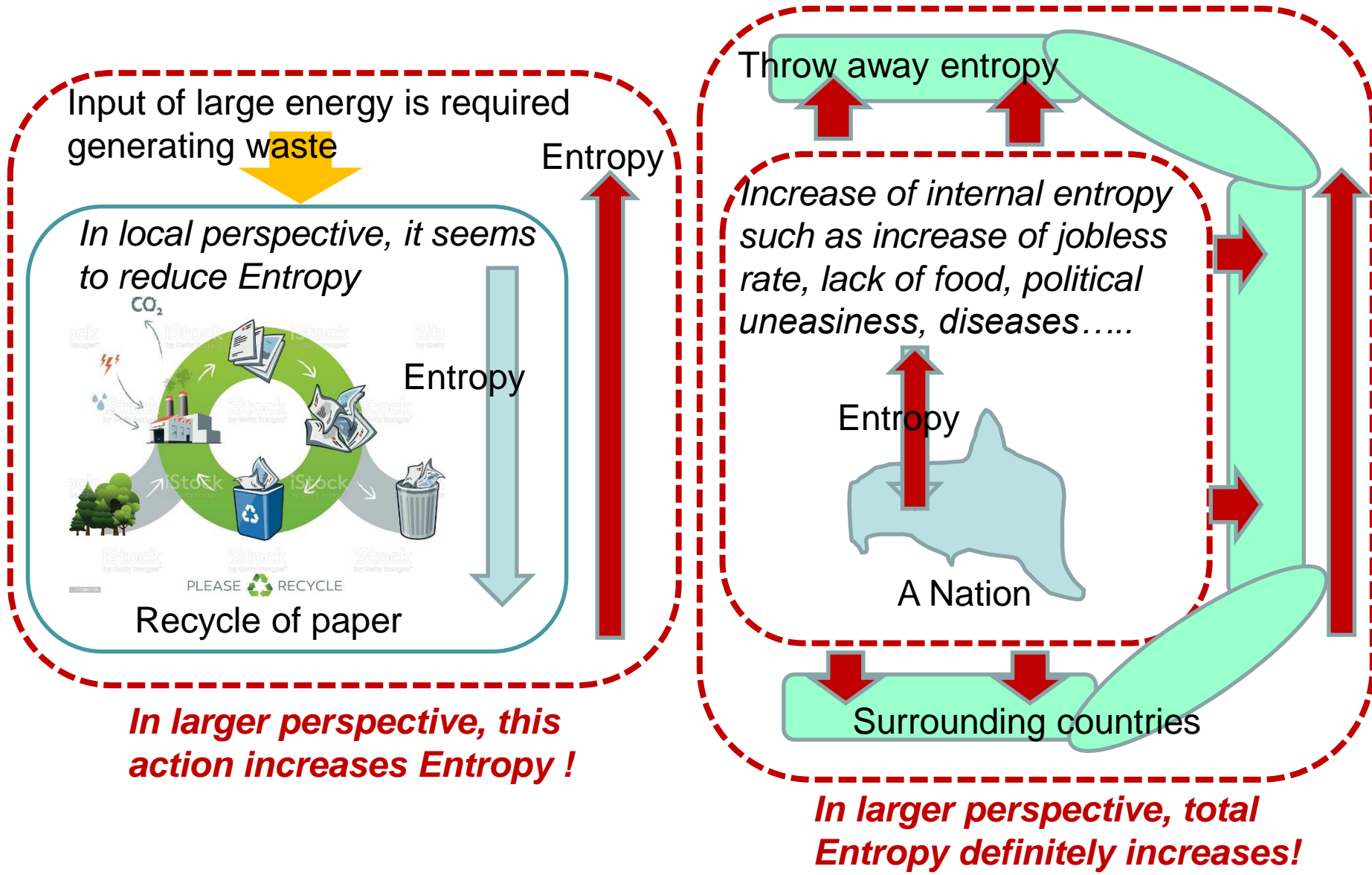
Entropy and irreversible process

- Entropy (in Thermodynamics, Statistics, Information theory) is related to **number of possible states**, which indicates the level of **randomness, unpredictability, uselessness, etc.**
- 2nd Law of Thermodynamics: **Entropy of isolated (closed) systems cannot decrease with time**, and they always arrive at a state of thermodynamic equilibrium, where the entropy is highest.

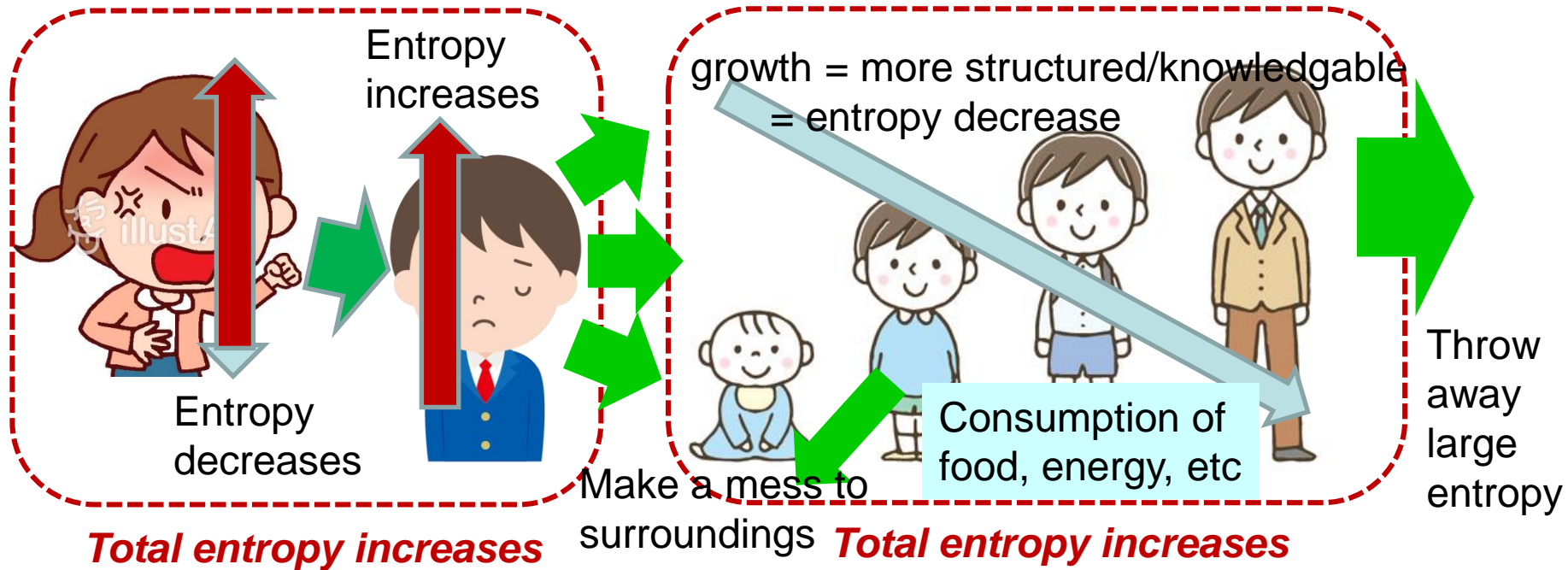
CO₂, CH₄, heat, waste....



Total entropy always increase



Outcomes of increase of entropy



Many global issues can be interpreted as "Entropy Crisis"

Global warming

Air pollution

Micro plastics

Space debris

Entropy and human being

- with information theoretic entropy -

- In information theory, if you get to know something, entropy decreases. (“**unpredictability**” decreases)
- Man grows by taking **negative entropy** (“**negentropy**”)
 - From food and water to **structured body**
 - Get **knowledge** to increase prediction capability
 - In order to decrease entropy, “human system” is **made open and throws away generated entropy** to the surroundings
- Human being is very **sensitive to the increase of entropy**(?)
 - Entropy increasing environment makes man nervous, uneasy and desire to escape
- “Curiosity” is “**the desire to reduce internal entropy**”
 - In some islands in Pacific Ocean, some people disappear on ships every year even though there is enough food on islands
 - Human being intuitively desires to go to space because he wants to reduce internal entropy or Earth entropy gets larger(?)

How to mitigate Earth entropy increase

- Any activities to reduce entropy generates additional entropy and total increase will be larger than the case “nothing is done”
- 2nd Law of Thermodynamics: Entropy of isolated (closed) systems cannot decrease with time.

