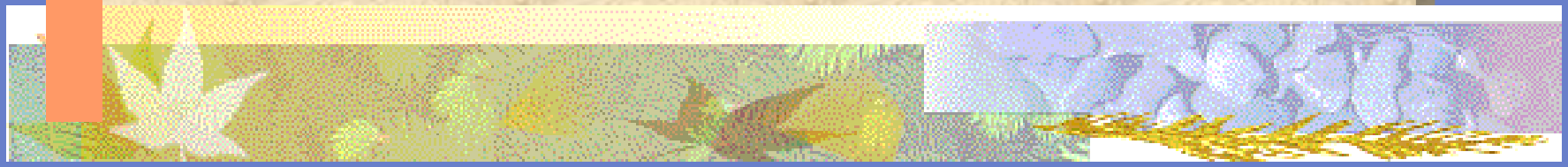
Reduction of CO_2 Emission in Yoshida Campus by Using Environmental-Friendly Energy Sources and Saving Energy



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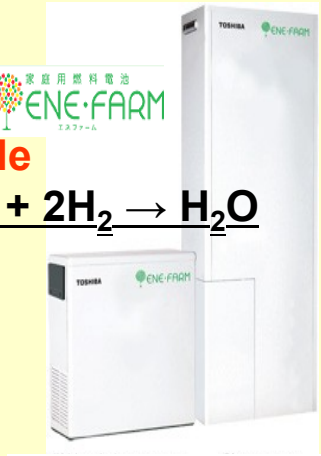
Introduction and Strategy of our work

Energy supply side

- *Applicable energy sources into Yoshida campus with less CO_2 emission*

Solar Photovoltaic Cell

Fuel Cell

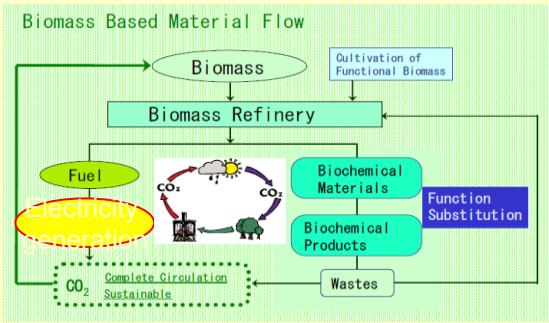


Principle

O_2 (air) + $2H_2 \rightarrow H_2O$

Fuel cell unit Hot-water supply unit

Biomass Plant

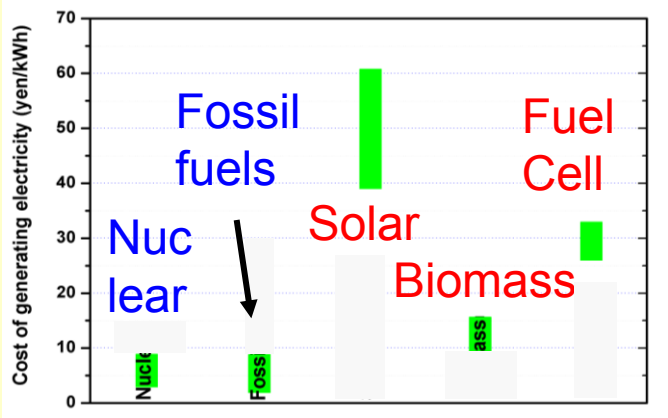


Advantages	**Use of solar energy**	**Use of thermal energy generated with electricity**	**Carbon neutral**
Assumption	**All roof area**	**Several for each buildings**	**15% of electricity**

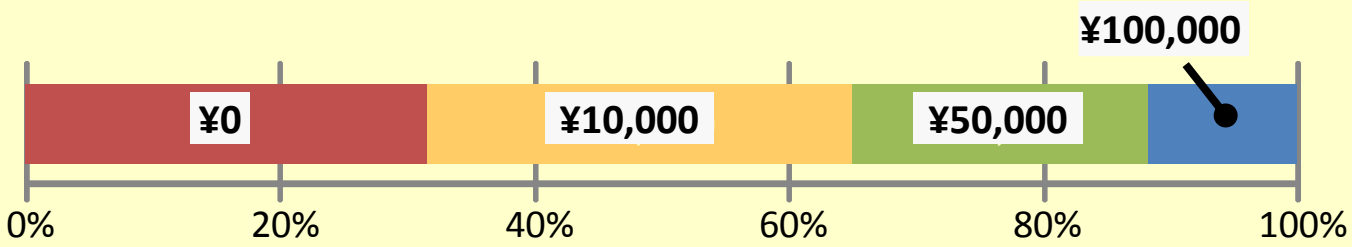
Up to 40% *amount of CO_2 emission in 2008 is possibly reduced !*

Energy supply side

The high energy cost is an obstacle.



■ *Questionnaire survey about Acceptable tuition increase*

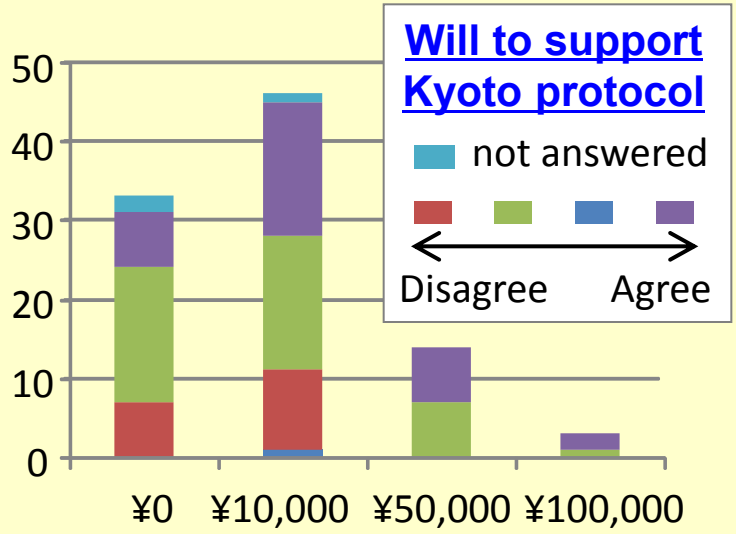


Difficult…

However, *People who agree with efforts for CO_2 reduction tend to accept tuition increase.*

➡ **Education plays an important role to improve their conscious**

which is also the reason for university to take action prior to others because information and advertisement about global warming is spread around, though not a few people haven't understood our serious situation.



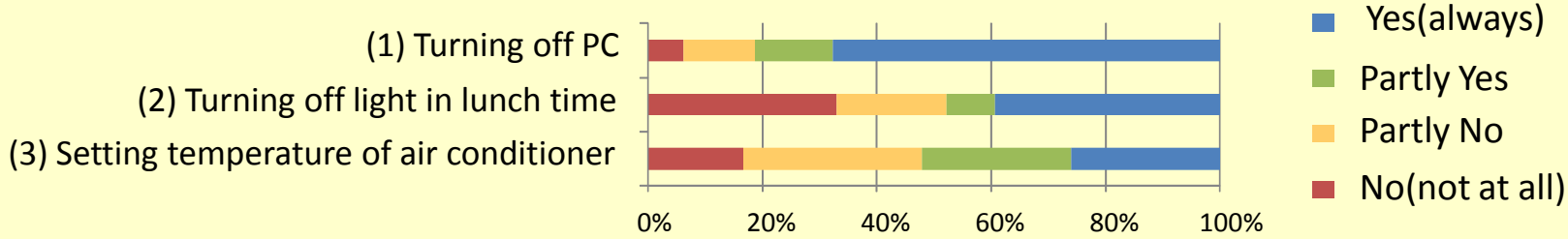
Energy consumption side

Kyoto University's report [1] says that **pro-environmental efforts can save 8%** of energy consumption which will also contribute to the reduction of CO_2 emission.

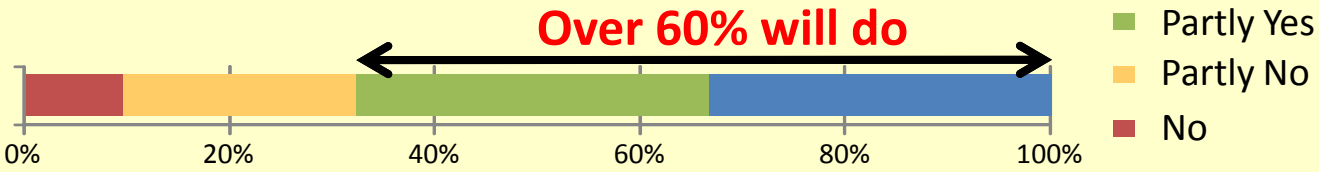
[1] Kyoto university pro-environmental behavior manual<-http://eprc.kyoto-u.ac.jp/old/report/manual.pdf->

Q6 Do you know this report? → **Half** respondents answered YES.

Q7 Do you usually do pro-environmental efforts listed in the report?

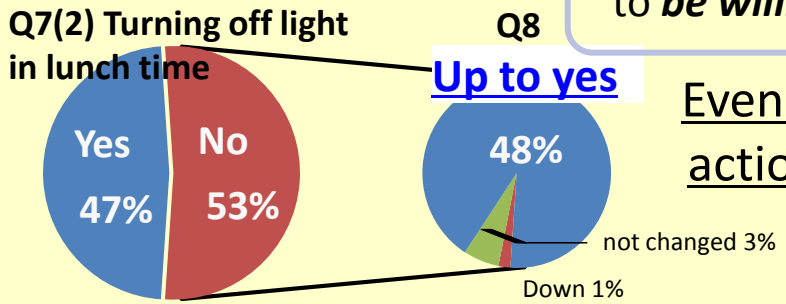


Q8 Willingness to save energy if they know the way



Change of motivation

Most of people who answered ***No or partly No*** for Q7 tended to ***be willing to change their minds to save energy*** (Q8).



Even this simple questionnaire could get their actions started.

Trigger is needed !

Policy, Information, Education etc…

Conclusion

- Under our assumption, up to 40% amount of CO_2 emission in 2008 is possibly reduced by introduction of solar cells, fuel cells and a biomass plant into Yoshida Campus, while most people think that nuclear, geothermal and wind are not applicable for the campus.
- Tuition fee increase is not the best-applied motivation policy for CO_2 reduction in Yoshida Campus. It's still necessary to find another acceptable approach based on the Kyoto protocol.
- Our conscious about turning off unnecessary appliances is expected to be enhanced if we pay more attention on the promotion of Kyoto University in the future.

Recommendation

New energy sources are expected to be introduced.

- To provide sense of crisis for global warming

- To share the responsibility upon it.

- ***Private "Carbon (corporation) tax" system:***

  A part of electricity costs increased should be charged on laboratories or working units depending on their amount of power used.

- ***Attention-getting introduction (advanced and large-scale system):*** **Big impact means students in the university could be proud of it, which would be a motivation to try their individual action for saving energy.**