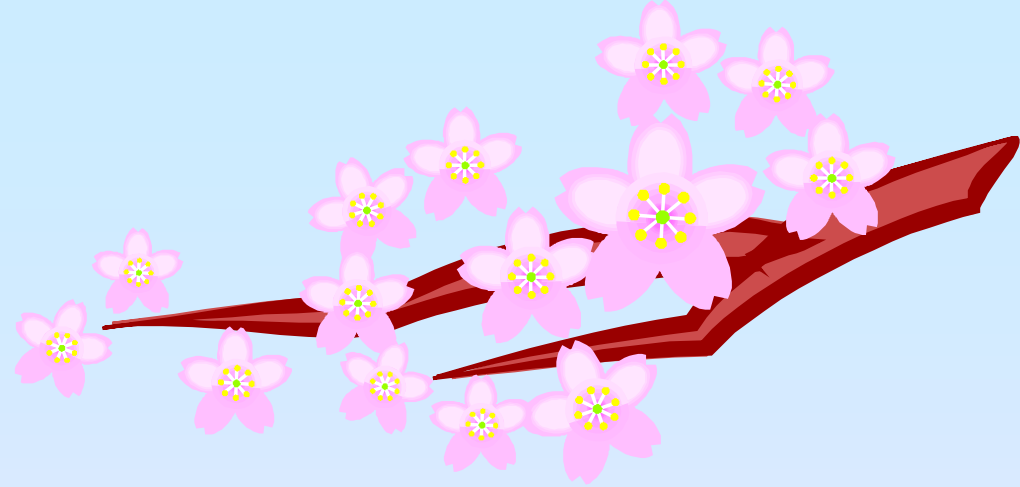


LCA-VIII 2008

Sep. 30, 2008



Rebound effects of videoconference in different countries

Kazue Takahashi^{*1,2}

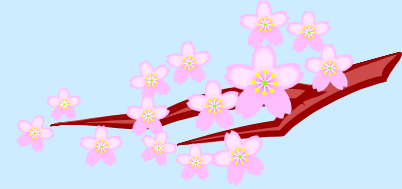
Masayuki Tsuda^{*1}, *Jiro Nakamura*^{*1}, *Yasunari Matsuno*^{*2}
and Yoshihiro Adachi^{*2}

^{*1} NTT Energy and Environment Systems Laboratories, NTT Corporation

^{*2} Graduate School of Engineering, The University of Tokyo



Outline

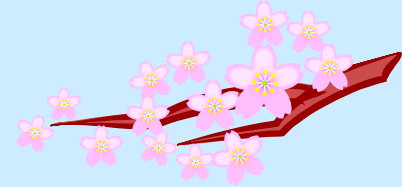


- ▶ **Background and aim of this study**
 - ▶ **Effects of ICT services**
 - ▶ **Aim of this study**
 - ▶ **Definition of rebound effects of ICT services**

- ▶ **Results and discussion**
 - ▶ **Data collection**
 - ▶ **Life cycle Inventory assessment**
 - ▶ **Discussion**

- ▶ **Summary and next step**

Effects of ICT Services



Positive effects

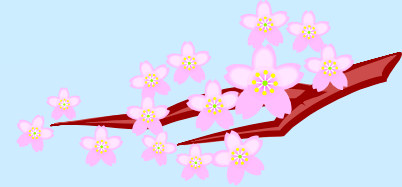
- ▶ Reduce environmental burdens
 - ▶ Dematerialization
 - ▶ Substitution of transportation
 - ▶ Increased efficiency

Negative effects

- ▶ Increase environmental burdens
 - ▶ Energy consumption
 - ▶ Natural resources
 - ▶ E-waste
- ▶ Rebound effects
 - ▶ Extra time use
 - ▶ Extra cost use



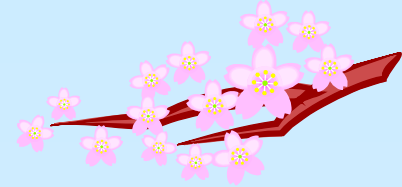
Aim of this study



- Compare the videoconference in different countries
- Quantify changes in user activity resulting from videoconference use in **USA, France and Japan**
- Evaluate environmental impacts (CO₂ emissions) of videoconferences **including the rebound effects**
- Verify the feasibility of our evaluation method for ICT services based on questionnaire results



Definition of effects of videoconferences



Video-conference (VC)



Rebound effects

Extra time use



Face-to-face meeting (FM)



Transportation



Induced Activities

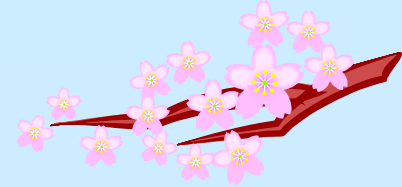


Direct effects

Indirect effects



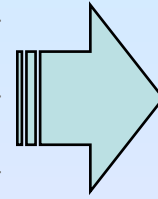
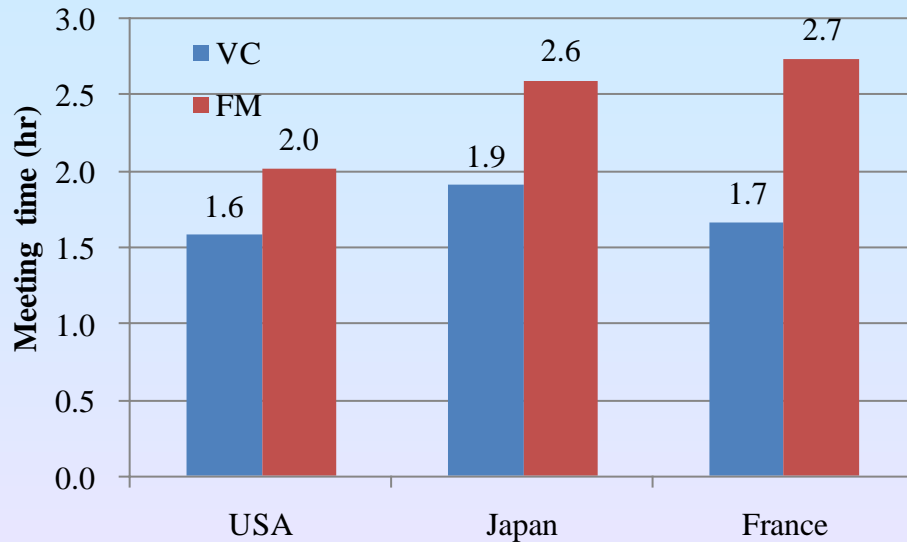
Basic Data collection



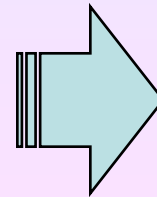
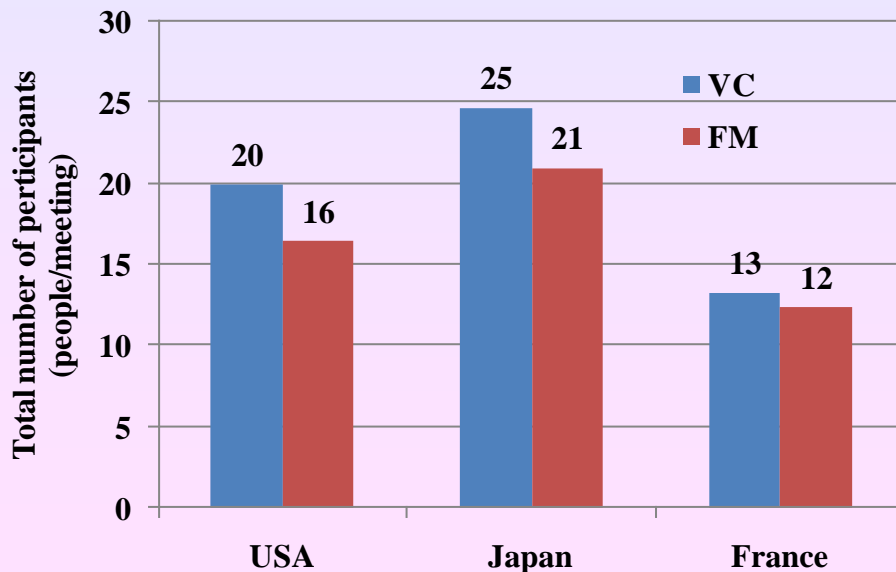
- **Commercial Internet questionnaire system**
- **Questionnaires translated into corresponding native language**
- **All respondents had videoconference experience**

Country	Responder (people)	Year
Japan	1,107	2004
USA	90	2008
France	100	2008

Direct effects (Meeting time & Participants)



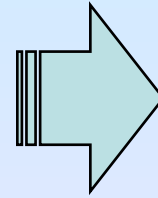
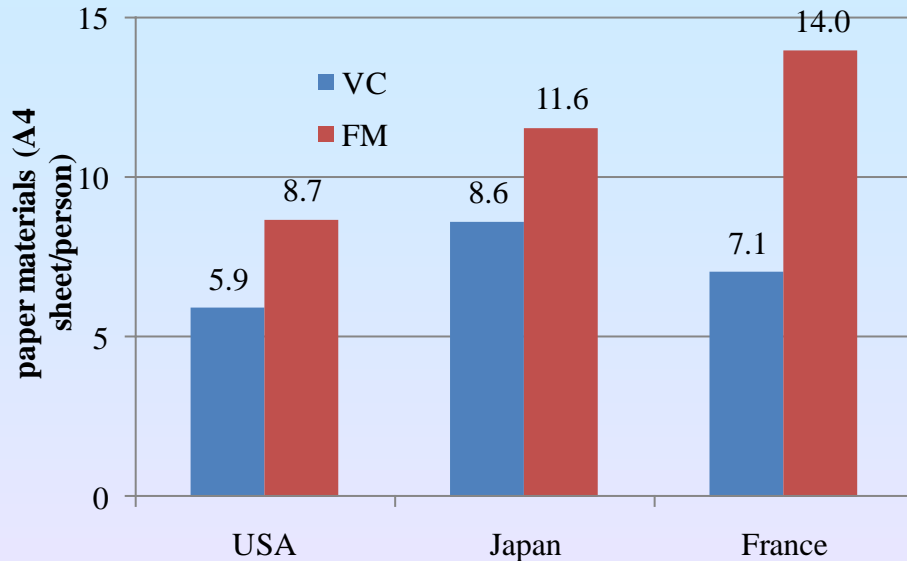
Meeting time reduced by using videoconference
Average reduction:
about **0.7 hr**



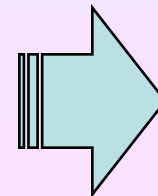
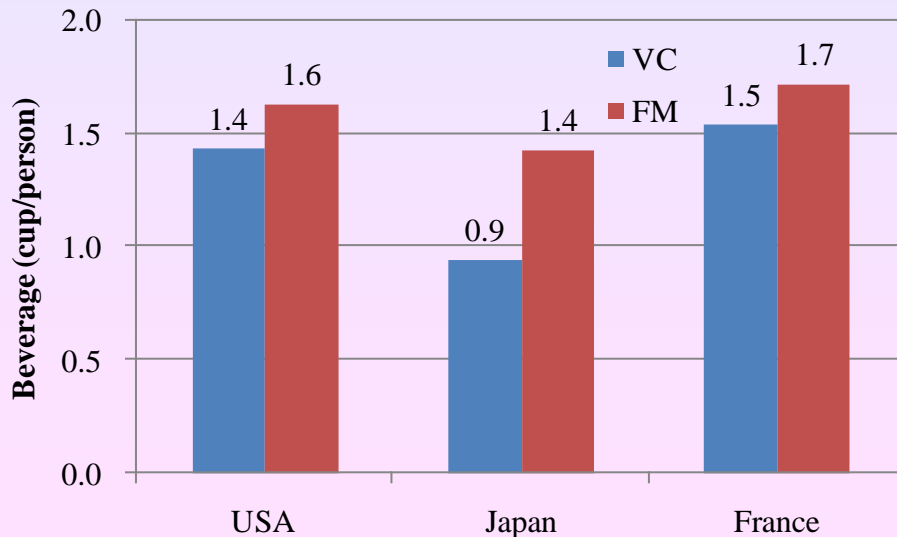
More participants by using videoconference
Average increase:
about **3 people**

VC: Videoconference
FM: Face-to-face Meeting

Direct effects (Paper & Beverage consumption)

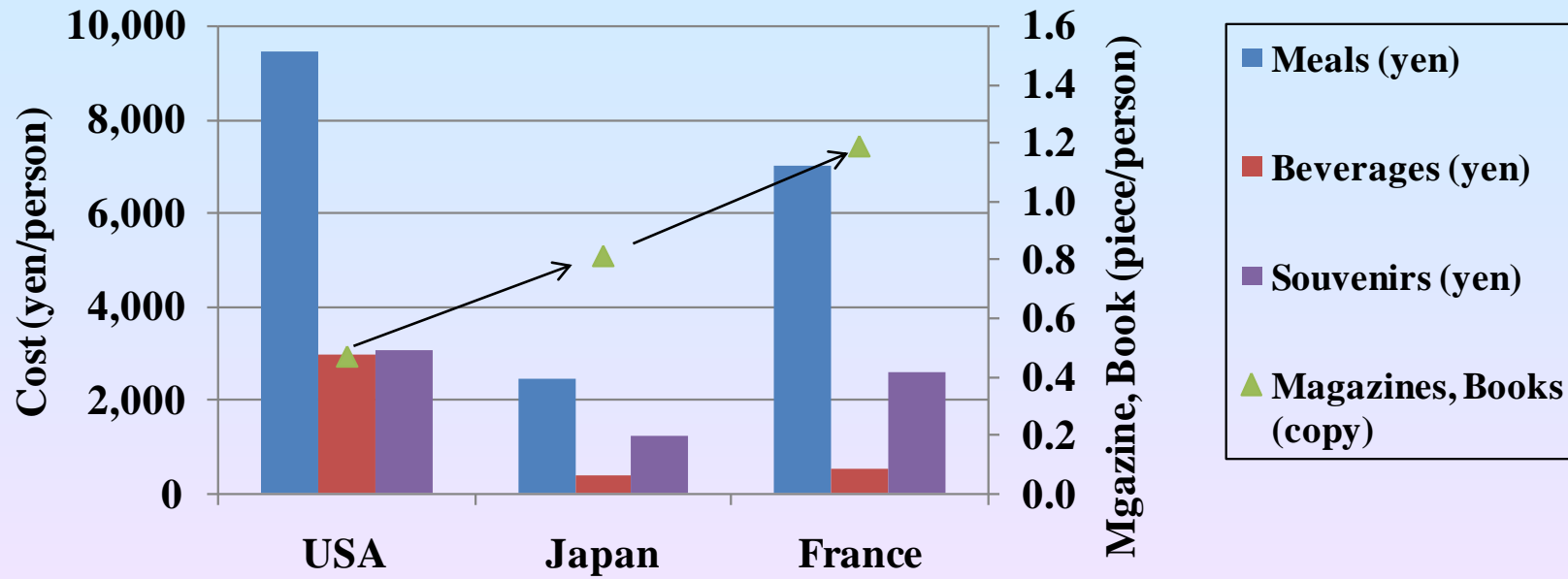
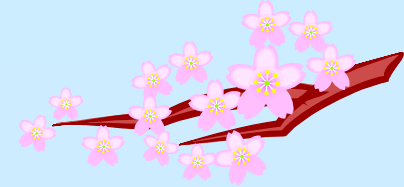


Paper consumption reduced by using videoconference
Average reduction:
about 4 sheets



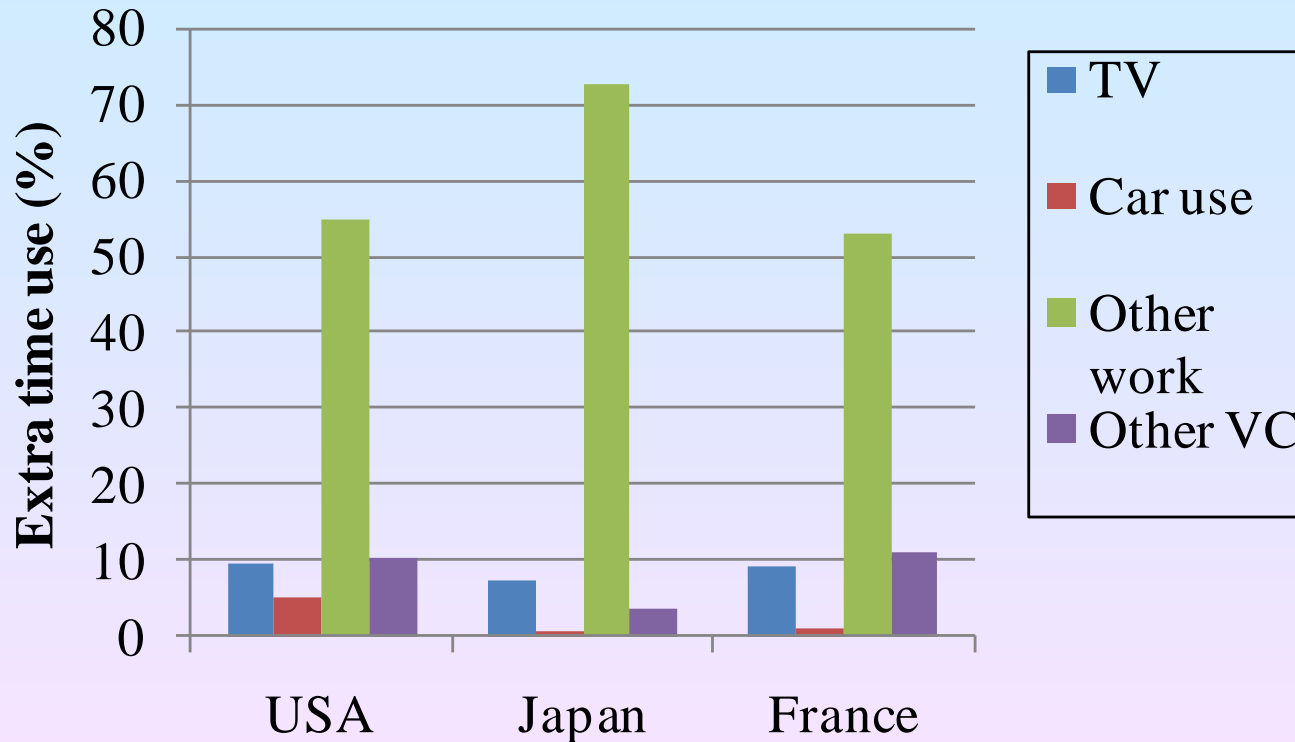
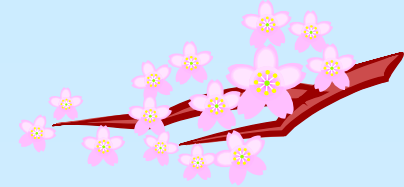
Beverage consumption reduced by using videoconference
Average reduction:
about 0.3 cups

Indirect effects (Induced activities)



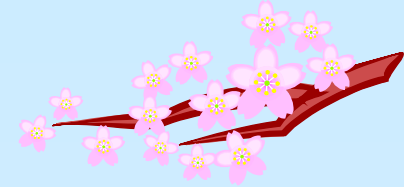
**Induced activities have relatively high economic impact
4,500 – 15,000yen / person**

Rebound effects (Extra time use)



Time saved by using videoconferencing, average about (8 hr), was largely used for other work.

Life cycle inventory analysis



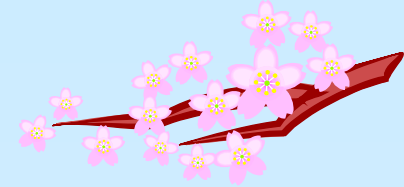
Function unit

Exchanging visual and audio information and hold a business meeting

Conditions

- **Videoconference models are based on Internet questionnaire results**
- **Where data for evaluating USA or French case studies were not obtained, Japanese data were substituted**
- **Background data (CO₂ emission) is Japanese data**

Evaluation model

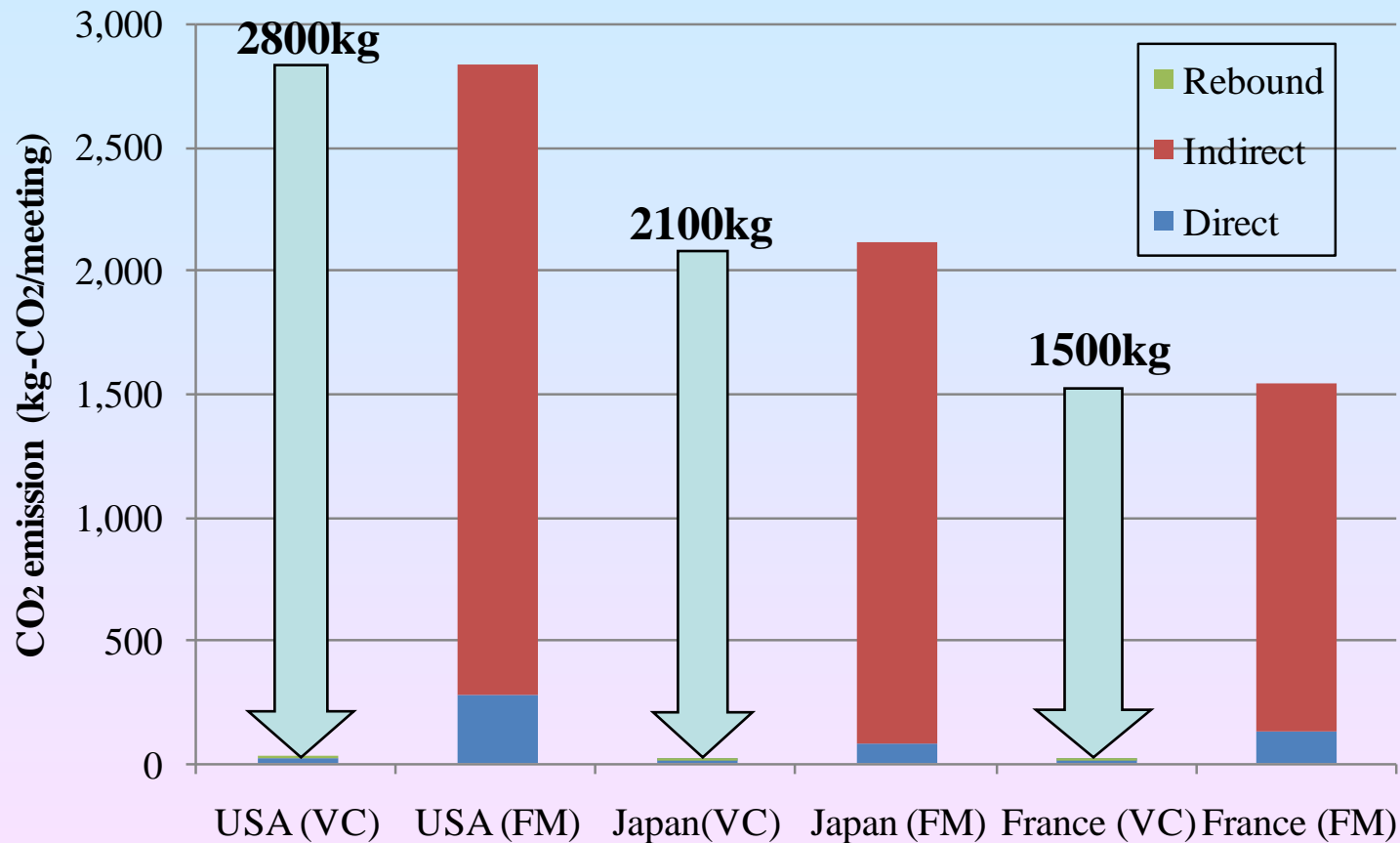
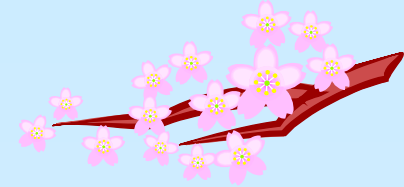


	Participants (people)	Transportation people (people)	Meeting time (hr)	One way time (hr/person)
USA	20	0	1.6	0
	16	6	2.0	2.7
Japan	25	0	1.9	0
	21	10	2.6	3.5
France	13	0	1.1	0
	12	5	2.8	2.2

Blue data : VC

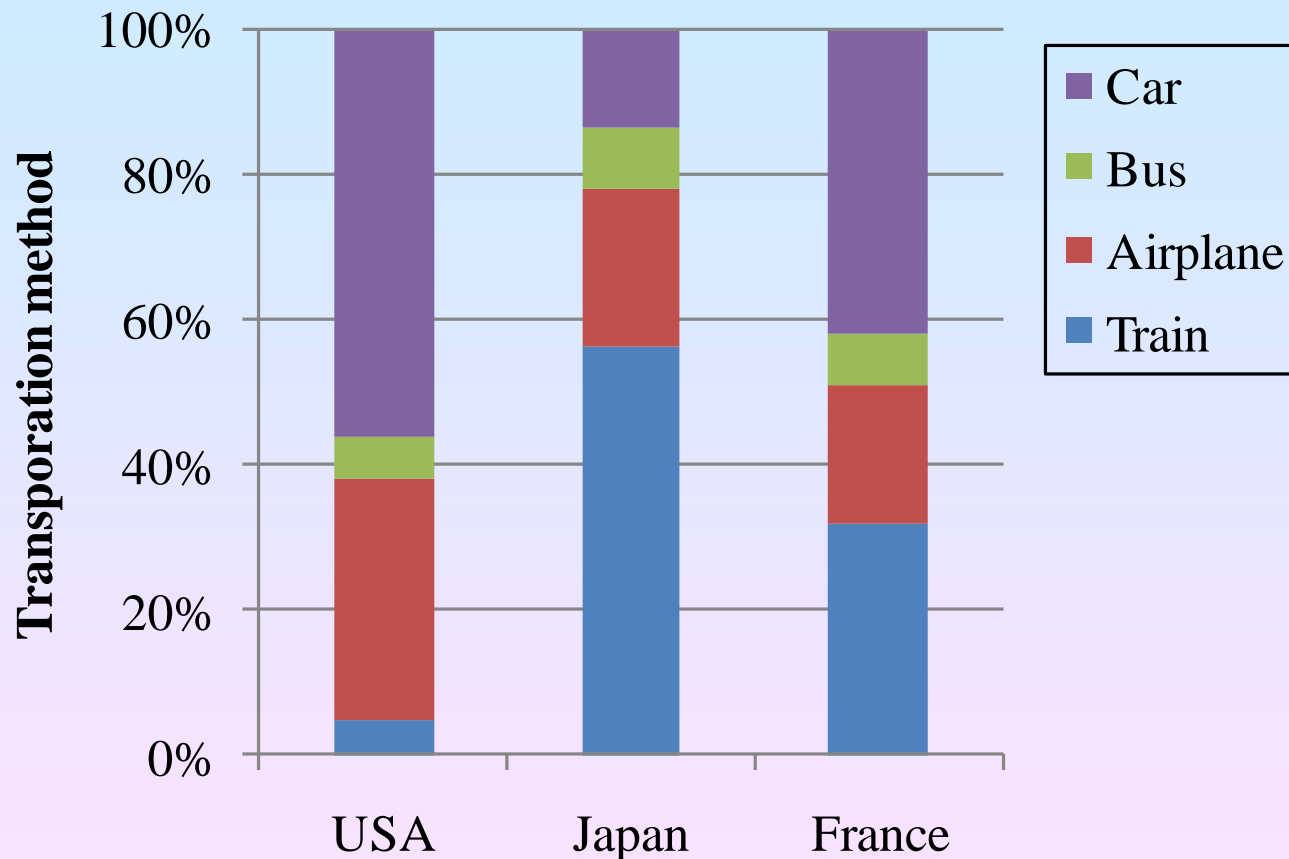
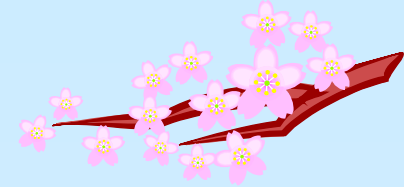
Red data : FM

CO₂ emissions of videoconferences



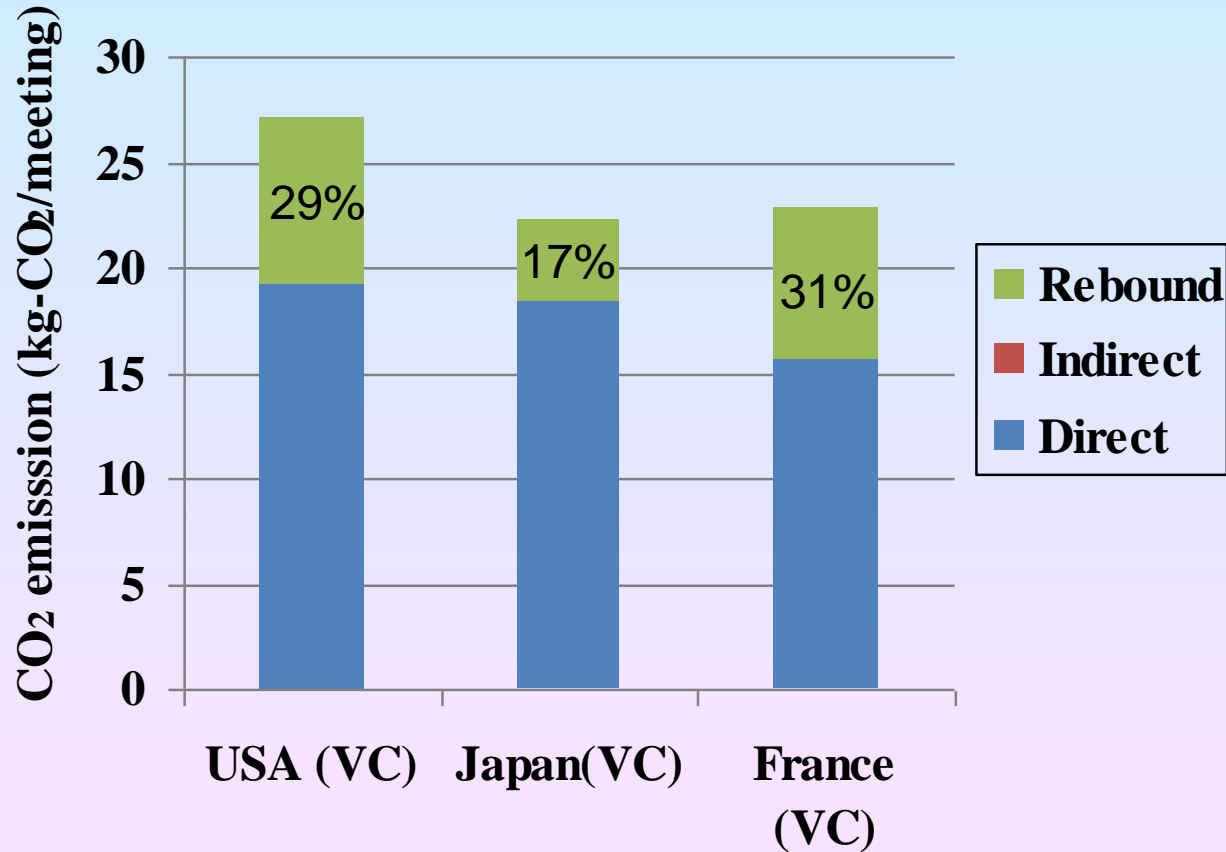
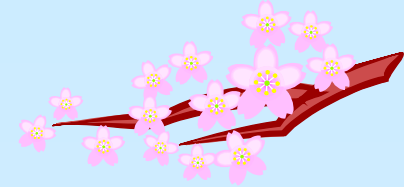
- CO₂ emissions are reduced by using videoconferences whenever rebound effects are considered
- Highest reduction effect in USA
- Most indirect effects caused by transportation use

Differences of transportation



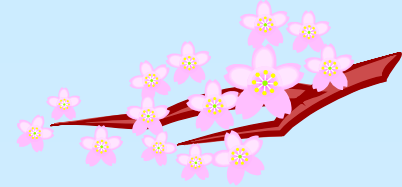
**Transportation method reflects the situation in each country.
This is the main reason for the differences in environmental impact.**

Influence of rebound effects



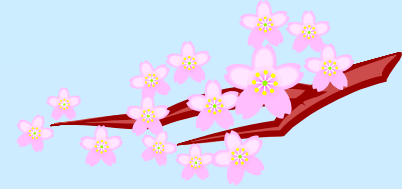
Environmental impact of rebound effects is not negligible

Summary

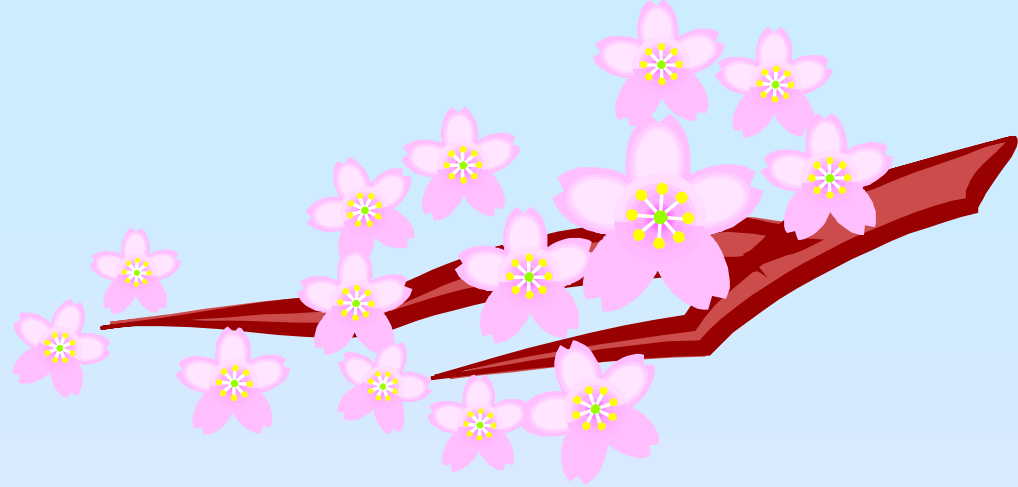


- **The changes in user activity resulting from the use of videoconferences in the USA, France and Japan were quantified. The results reflect factors including the cultural background, and social system in each country.**
- **Highest reduction effect in USA because transportation is mainly by car and airplane.**
- **The environmental impact of videoconferences including the rebound effects were evaluated and the introduction of videoconferences reduced this impact.**
- **Rebound effects should not be disregarded.**
- **This method is applicable to other ICT services in any country.**

Next steps



- **Environmental inventory data should be checked more precisely for comparison**
- **More data should be gathered for USA/France**
- **Japanese foreground data should be updated**
- **Definition of rebound effects should be discussed using more case studies**
- **Economic rebound effects (saved cost use) should be considered**



Thank you!

