



ISU 3Is space education engaging with REACH and its impact on space and society

C Welch

2nd ESA Workshop on REACH
Regulation and Impacts in the
Space Sector and Beyond

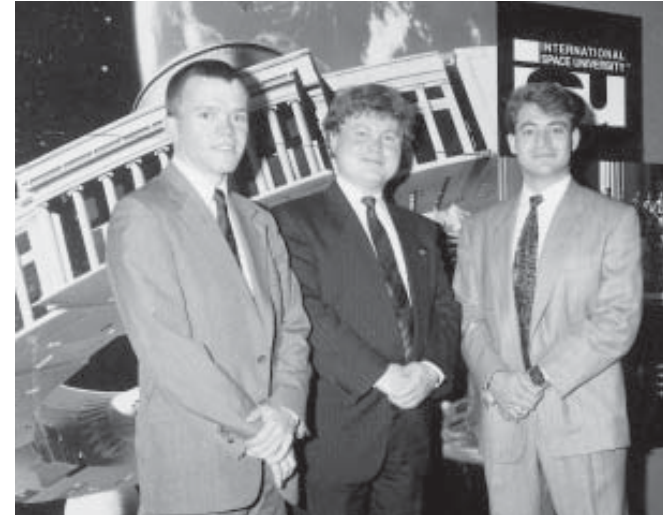
13 November 2018

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1. ISU Background

- In 1985, Peter Diamandis, Todd Hawley and Robert D Richards created the *Space Generation Foundation*.
- Among the ideas that came from the SGF was that of 'an international space university' (another was the SGAC).
- ISU believes in “*a peaceful, prosperous and boundless future through the study, exploration and development of Space for the benefit of all humanity*”



1.1 ISU Educational Philosophy

■ ISU '3Is':

- Three aspects of ISU are key to success in meeting the present and future challenges of international space cooperation:

- **Interdisciplinary**
- **International**
- **Intercultural**

■ ISU disciplines

- 3Is Space
- Space Engineering
- Space Sciences
- Human Performance in Space
- Space Applications
- Space Management and Business
- Space Policy, Economics and Law
- Space Humanities

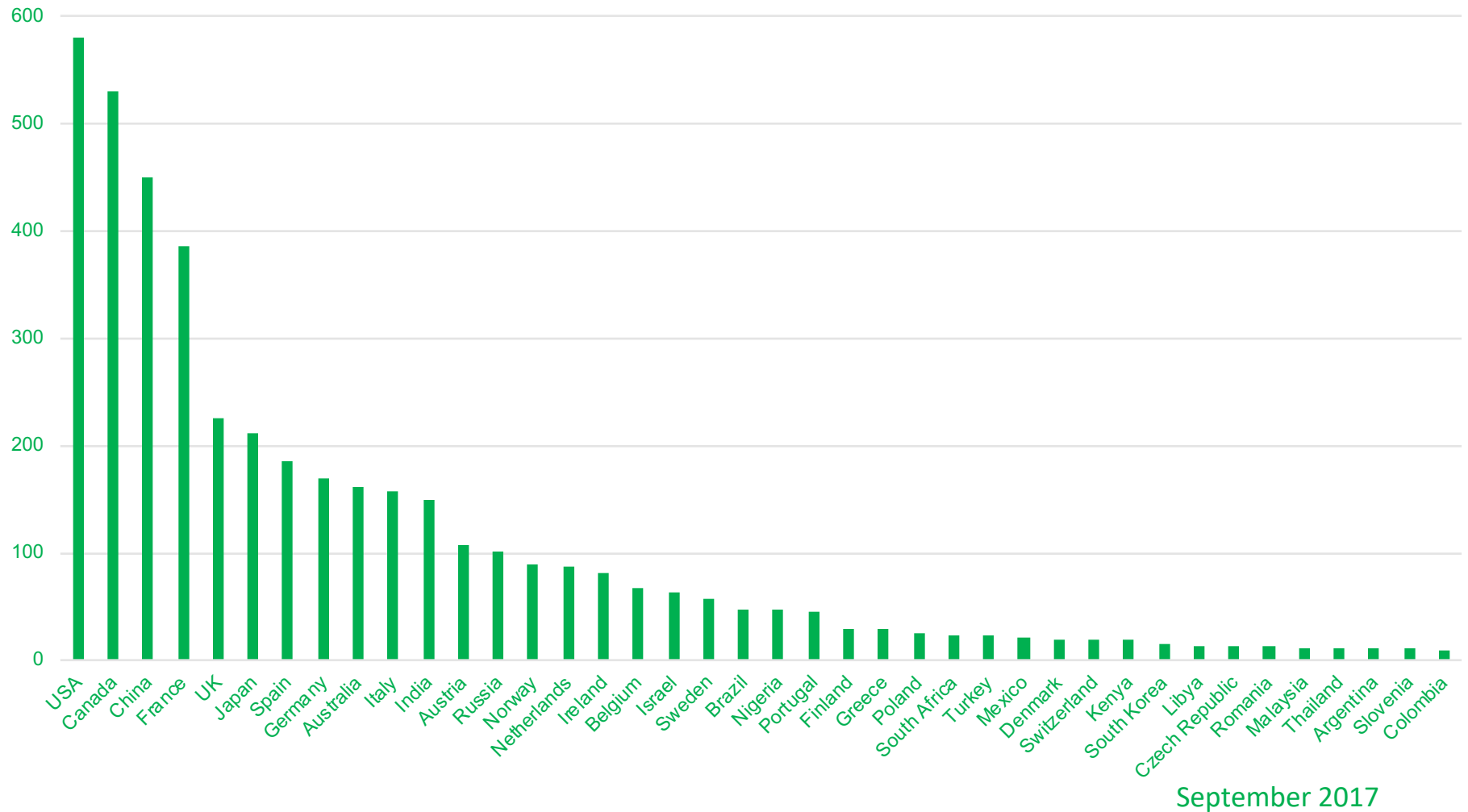
ISU students, faculty and visiting lecturers are drawn from a broad range of backgrounds, providing a rich environment in which to implement this **3Is** educational philosophy.

1.2 ISU Community



The 4400+ ISU alumni come from over 105 countries

1.3 ISU Alumni Nationality (top 40 countries)



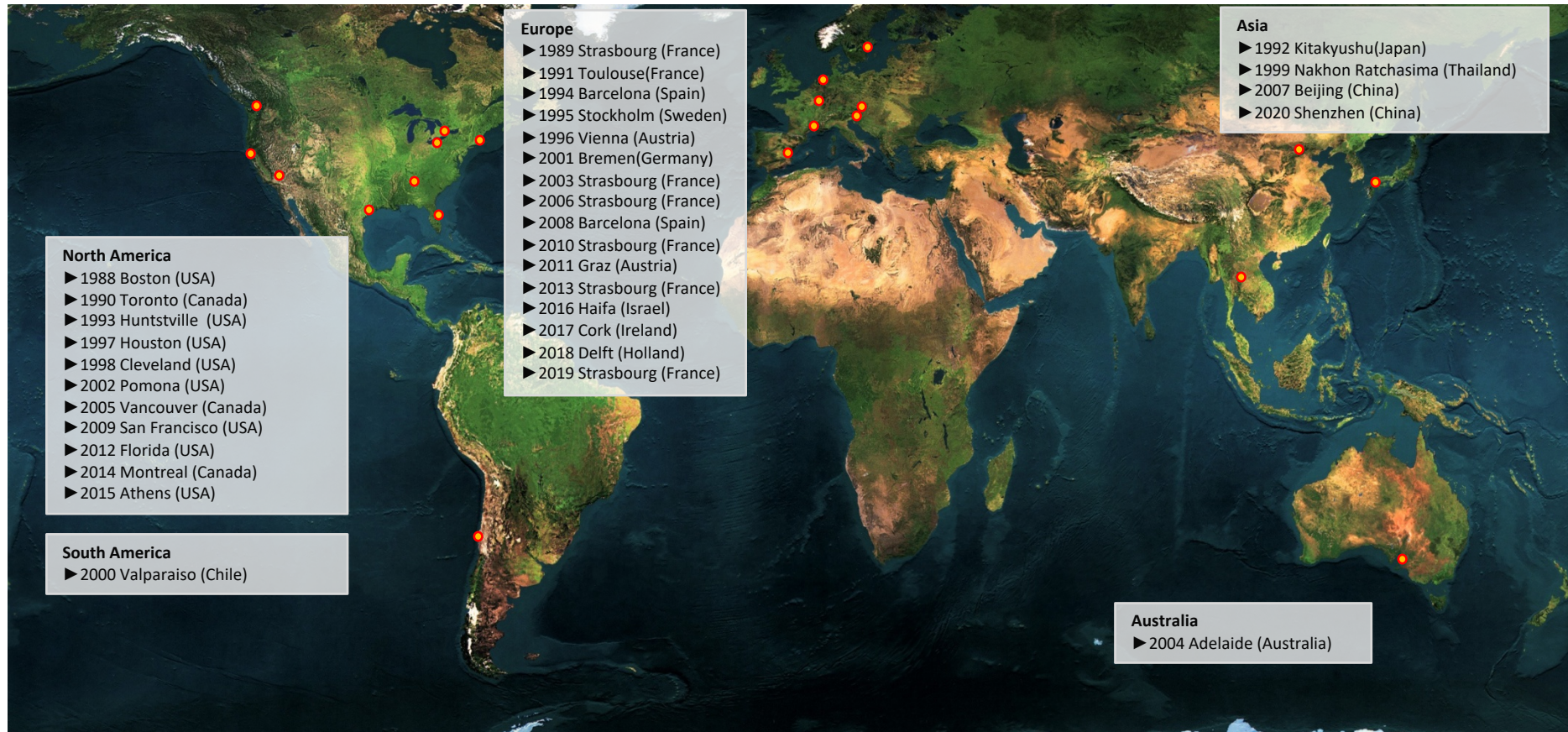
1.4 ISU Programs

- Over the last three decades, ISU has continually developed its programs and activities.
- They are dedicated to the development of future and current space professionals from all nations seeking advancement in space-related fields.
- MSc in Space Studies (MSS)
- Space Studies Program (SSP)
- Southern Hemisphere Summer Space Studies Program (SH-SSP)
- Executive Space Course (ESC)



1.6 ISU Program Locations

- Central campus faculty based at the Strasbourg HQ.
- Approximately 70 other ISU 'global faculty' plus adjunct and associate faculty.
- A wide range of visiting lecturers.

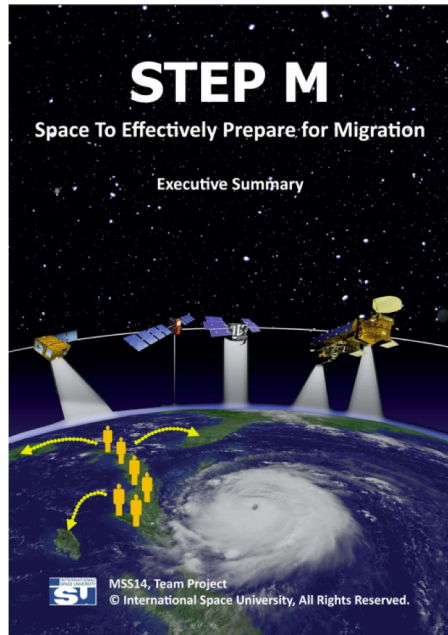


2. ISU 3Is Team Projects

- A 3Is Team Project (TPR) is a core component of every ISU program.
- The TPR develops students' ability to organize themselves to work on a significant space-related problem in a 3Is team environment, integrating their other learning.
- The TPR topics are chosen by ISU to be relevant to the current global situation.



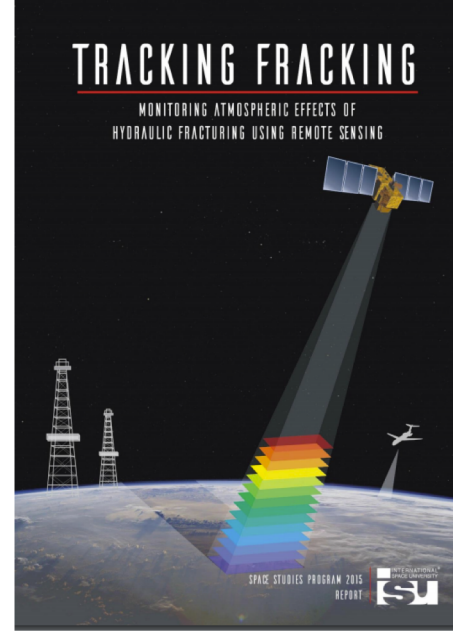
2.1 Some recent TPR topics



Space to
Effectively
Prepare for
Migration



Space for
health



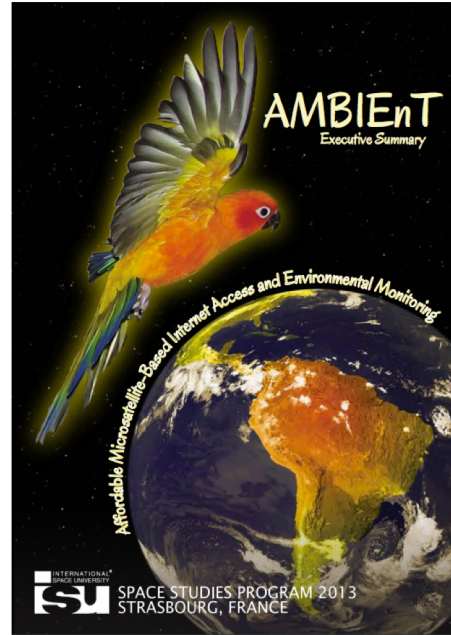
Monitoring
effects of
hydraulic
fracturing



Space
solutions for
water
management



Space-based
solution for
illegal fishing



Microsatellite-
based internet
access and
environmental
monitoring

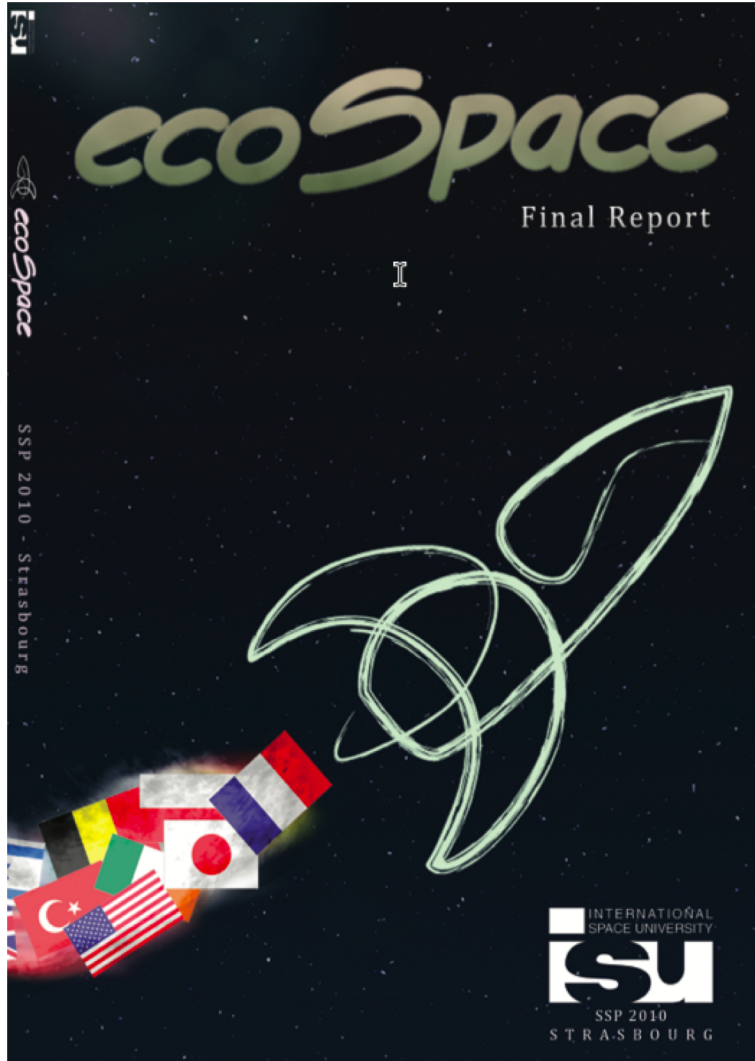


An integrated
Arctic
Network

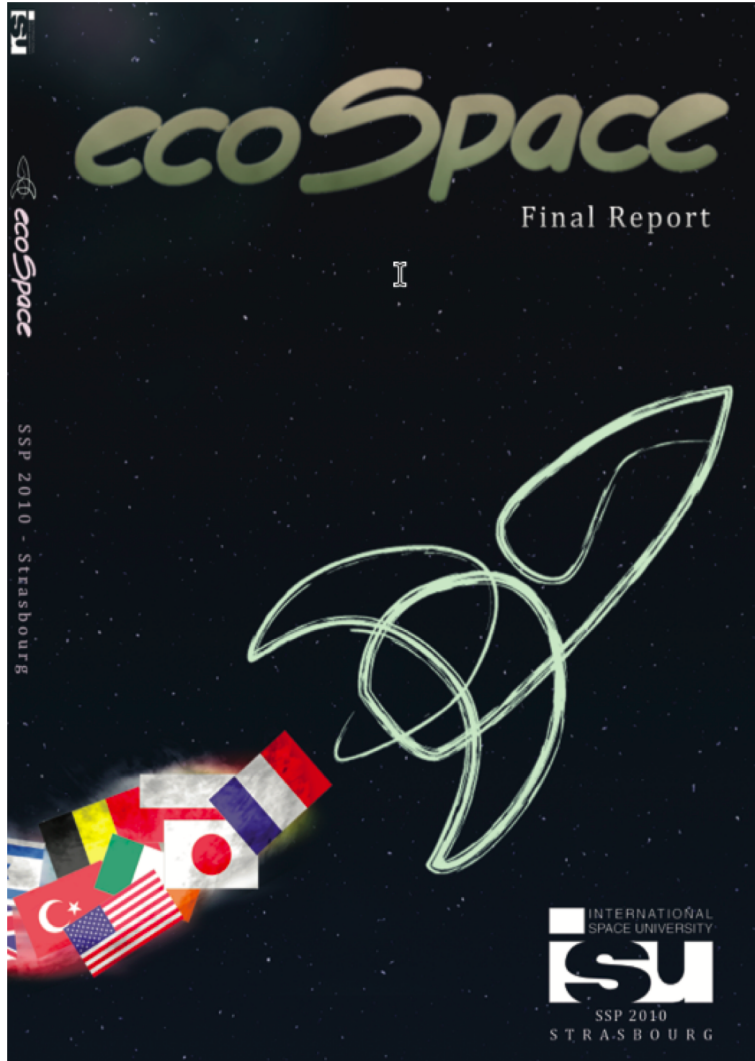


ecoSpace

3. ISU, the environment and society



- ecoSpace – Initiatives for Environmentally Sustainable Launch Activities
- Carried out by 38 SSP participants in 2010.



- Mission statement: To identify the impact of the launch industry on human health and the environment and to provide recommendations to space agencies and the launch industry as to how current and future launch industries could be more sustainable.

- The ecoSpace team addressed five main areas:
 - Launch vehicles and propellants
 - Propellant impact on human health and the environment
 - Economic aspects of the launch industry
 - Space industry policy and law
 - Educational outreach and public awareness

- Educational outreach and public awareness
 - Examined current outreach practices
 - Performed ecoSpace survey
 - What is the public's knowledge of space activities and their environmental impact?
 - What is the public's attitude towards the environmental impact of space activities?
 - What actions is the public willing to take to promote sustainable space activities.

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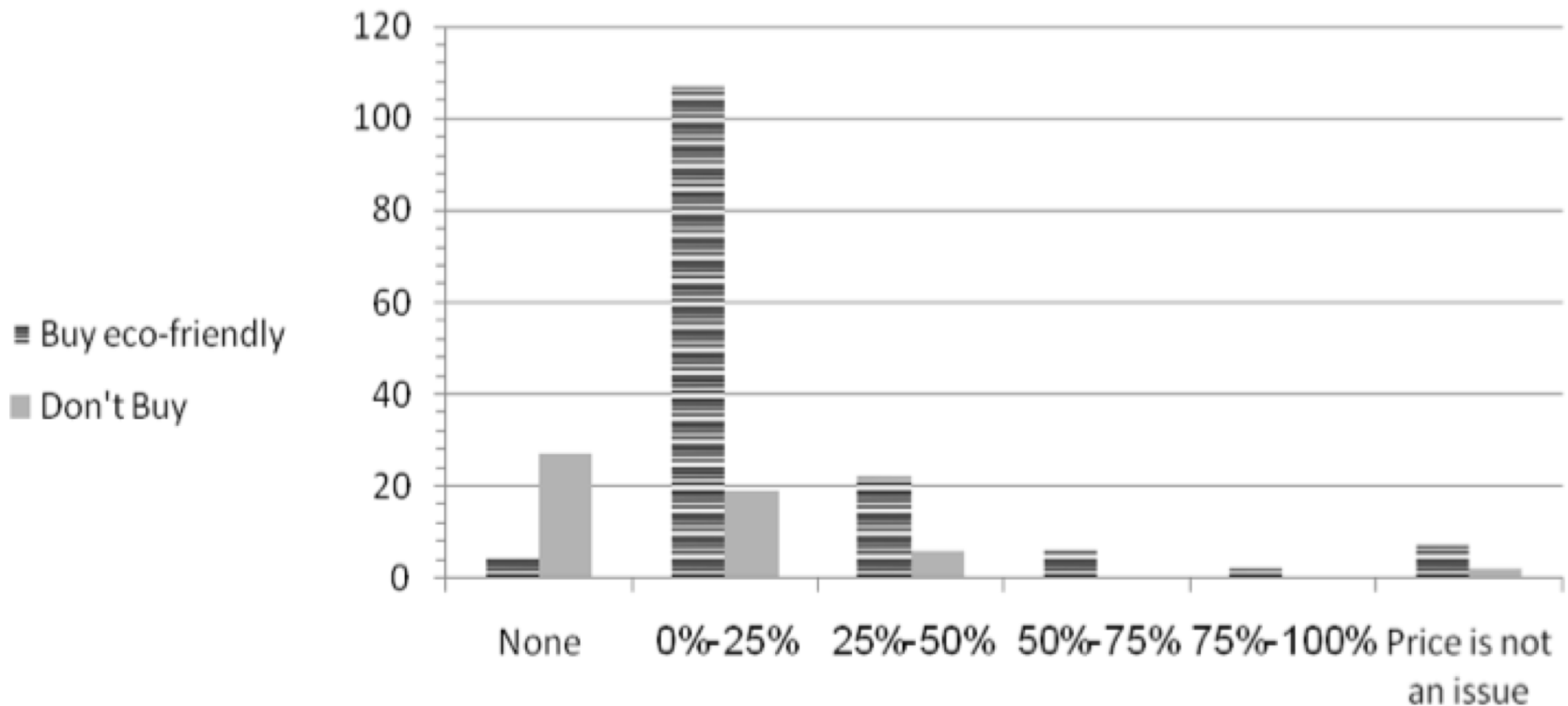


Figure 6-1: Willingness to pay more for green space services

■ Conclusions

- Need for an educational program about the environmental impact on space activities.
- The buying eco-friendly products and the willingness to pay more for such products can be extended to space based services
- Space tourism companies must take into account the environmental impact of their activities.
- The public has no clear understanding of the effects of the launch industry on the environment and human health. This must be clarified

- ecoSpace Public Outreach Products
 - ecoSpace websites



- Social networking outreach for ecoSpace

- Selected recommendations:
 - ISEB be used to distribute educational packages.
 - ecoSpace package for journalists to be developed.
 - Establishment of a Sustainable Space Development Board
 - Educational outreach division
 - Professional training programs for the sustainability of the launch industry
 - Yearly meeting for interested parties to participate and share knowledge

- Overall ecoSpace recommendations
 - Establishment of a Sustainable Space Development Board
 - Expand ICAO scope to include space activities
 - Promote green propellant R&D
 - Develop launch industry environmental monitoring and metrics
 - Promote best practice through outreach and awareness
 - Create international agreement for space launch sustainability

**ISU TPR reports are online at
<https://bit.ly/2I9NOY1>**

**If you have any questions,
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