



International Partnership
for Hydrogen and Fuel Cells
in the Economy

Youth-focused Integrated Training Program on Green Hydrogen Technology

Delivering the Skills for Success in a Carbon-free Energy Future

F. Chang Díaz

President, Estrategia Siglo XXI

CEO, Ad Astra Rocket Company

November 16, 2023

Summary



1. Who are we?
2. Vision and Motivation for the H₂ School
3. The Team
4. Program Structure
5. Candidate Profiles and Training areas
6. Training Infrastructure

Who are we?



- **Estrategia Siglo XXI (*Strategy for the XXI Century*), or simply, "Strategy 21"**
 - We are a private, non-profit, impartial, independent and apolitical NGO, operating in Costa Rica since 2004
 - We work to implement the "Plan de Medio Siglo" (50-year Plan) that aims to turn Costa Rica into a developed nation by 2050, through environmentally sustainable science, technology and innovation,
 - We promote education and training in distributed, clean, carbon-free energy technologies that reach and benefit communities more directly than the more common centralized approach
 - We promote disruptive carbon-free energy technologies such as green hydrogen and its adjacencies, oxygen and clean water

Vision and Motivation for the Hydrogen School

As communities transition to a clean, carbon-free, hydrogen economy, a new industry will be catalyzed, requiring also a new workforce, trained with the skills to build, operate and maintain the new technological infrastructure

The Journey Begins by Leveraging:



1. The experience of Strategy 21 in organizing intensive and focused education and training modules for the nation's youth, such as our signature program "Escuela Internacional del Espacio" (International Space School)
2. The existence of an operational, state-of-the-art green hydrogen ecosystem in Costa Rica with all the elements of the value chain, an ideal teaching tool not available anywhere in the Latin American Region
3. A team of green hydrogen experts with experience in teaching and training through Ad Astra's technical internship program
4. A facility in a high impact location, an area with one of the highest levels of poverty and unemployment in the country

The Team



International Partnership
for Hydrogen and Fuel Cells
in the Economy

- **WKKF** enables the implementation of the training program by Strategy 21 through a \$300k, 3-y grant
- **Strategy 21** manages the training program, including the recruitment process, training supervision, participant follow-up and impact evaluation.
- **Ad Astra Rocket Company** provides classroom and mentoring support as well as hands-on teaching on green hydrogen infrastructure



W.K.
KELLOGG
FOUNDATION®



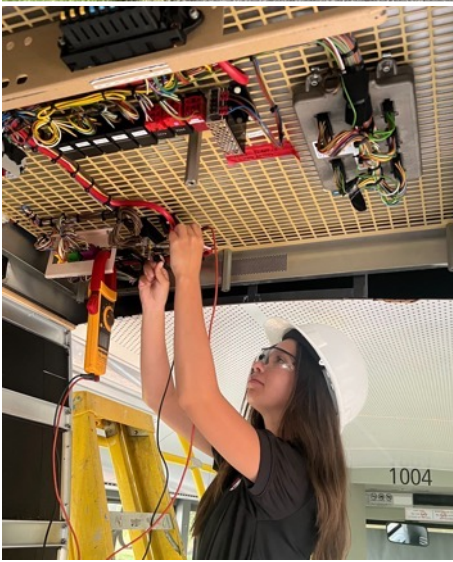
ESTRATEGIA
SIGLO XXI
Declarada de Utilidad Pública en el 2013



School Has Started

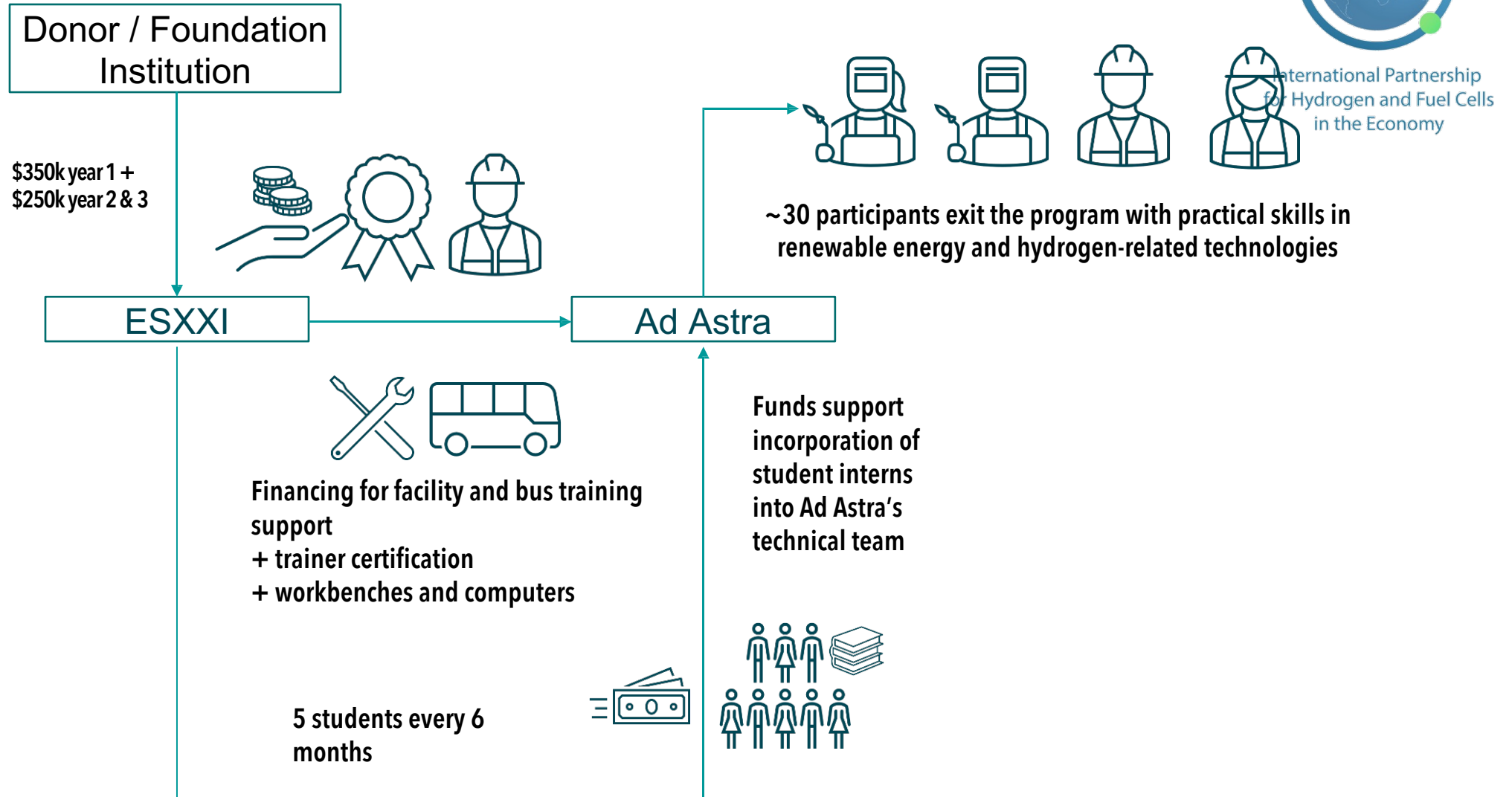


Dayanara Navarro and Jonathan Ramírez,
first interns of the Hydrogen School

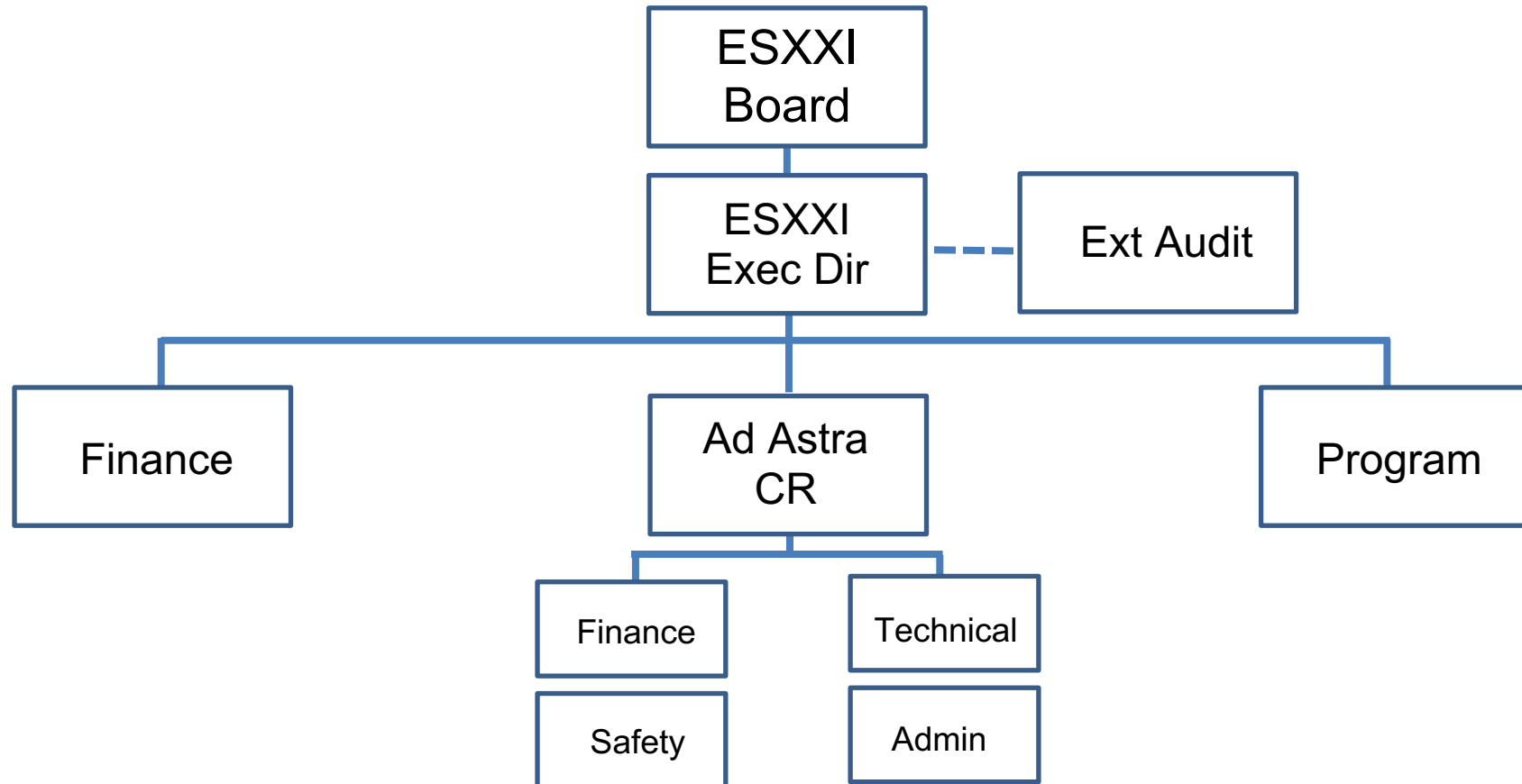


- Initial 3-y seed funding from WKKF
- Training began Sept 4, 2023
- Team seeks to increase number of students and extend opportunity internationally
- Program can be replicated worldwide
- Expansion proposals submitted to additional sponsors + WKKF
- Costa Rica and South Africa co-chair International H₂ Skills Task Force

Program Structure



Program Organization



Program Structure



Year 1

- **ESXXI** Announcement calls, selection and recruitment, focusing on target demographics
- **Ad Astra** 5- month hands-on training program execution
- **Class -1** (4 months) and **Class - 2** (4 months) selected and take part in the program. Evaluation and impact assessments are held after each training period.

Year 2

- **Class 3** (5 months) and **Class 4** (5 months) are selected and take part in the program. Evaluation and impact assessments are held after each training period.

Year 3

- **Class 5** (5 months) and **Class 6** (5 months) are selected and take part in the program. Evaluation and impact assessments are held after each training period.
- An overall evaluation and impact assessment of the whole program is performed
- Results and lessons learned are publicly-shared with all relevant stakeholders through a dissemination webinar.

Candidate profile and Training Areas



PARTICIPANTS ENTRY PROFILES

- Age: 18-25.
- Preferably, high-school level education with basic training in technical skills in areas such as
 - Electromechanical systems
 - Electronics
 - Mechanical systems and Machining
 - Maintenance
 - IT and Network Management
 - Business, Customs and Commerce
 - Executive Assistance

TRAINING PROGRAM MODULES

- Safety protocols and best practices
- Fundamentals of Green Hydrogen Technologies
- Electromechanical systems and techniques
- Pressure systems and techniques
- Civil design and construction techniques
- Systems maintenance and repair
- Automation and Control Software
- Business models around Green Hydrogen.
- Accounting and management best practices
- Soft skills: Teamwork, leadership and entrepreneurship



International Partnership
for Hydrogen and Fuel Cells
in the Economy

Ad Astra's State-of-the-art
Green Hydrogen
infrastructure and fleet of
fuel cell electric vehicles
provides an excellent
training venue

Módulo compresión H70

2.1 kg H₂/día H2V

64 kg almacenamiento H2 @ 15 bar, 450 bar, 930 bar

Dispensador H35

78 kW solar PV
5 kW eólico
Red eléctrica CR

Dispensador H70





International Partnership
for Hydrogen and Fuel Cells
in the Economy

- Fleet of 13 Van Hool A330 hydrogen fuel cell buses and inventory of spare parts have been acquired
- Vehicles will become training platforms for the Hydrogen School and operate as part of 1 MW Ecosystem expansion project.