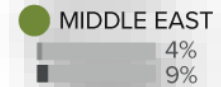
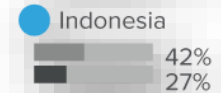
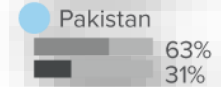
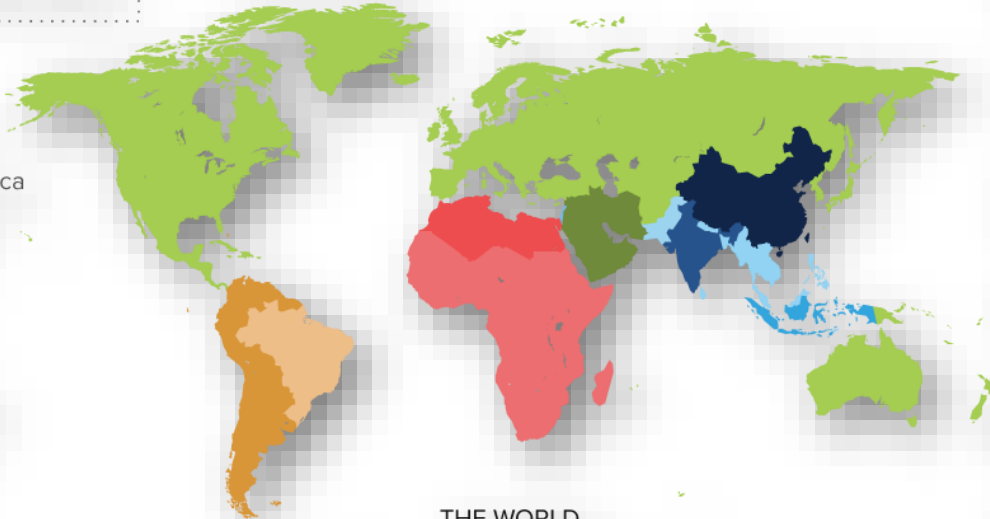
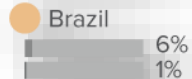
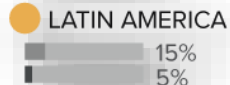
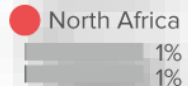
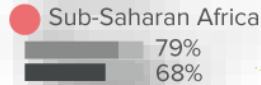
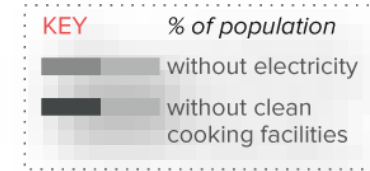


Millennium@EDU SUSTAINABLE EDUCATION MEETING
New York City, Sept 20-21, 2017

Possible Solutions for Energy and Water Supplies in Remote Schools

Alan Lin, Ph.D.
Director, Strategic Business Development
System Business Group
Tatung Company (<http://www.tatung.com/>)
Email: alan.lin@tatung.com

Energy-Poor World Map



<http://www.action4energy.org/>

The Reality for Millions of Children Worldwide



Keys to Quality Education

- Professional workers, such as teachers
- Contents and teaching materials
- **School/Classroom:**
 - Children in many countries in Sub-Saharan Africa are often squeezed into overcrowded classrooms, classrooms that are falling apart, or are learning outside.
 - For example, **in Malawi, there are 130 children per classroom in grade 1 on average.**
- **Facilities:**
 - Many schools lack of basic facilities, such as **electricity & running water, toilets.**
 - **No electricity in 78% of primary schools in Odisha, India.**
 - **In Chad, only one in seven schools has potable water,** and just one in four has a toilet.
 - **Globally, 31% of schools do not have clean water and 34% lack adequate toilets.**
 - About 800 children under five die every day from diarrhea linked to inadequate water, sanitation and hygiene.
 - And 600 million children - or one in four worldwide - will be living in areas with extremely limited water resources by 2040.
- ...



<https://www.globalcitizen.org/en/content/10-barriers-to-education-around-the-world-2/>
<http://www.wateraid.org/what-we-do/the-crisis/statistics>
<http://theirworld.org/news/world-water-day-millions-of-children-at-risk>
<http://www.thehindu.com/todays-paper/tp-national/no-electricity-in-78-of-primary-schools-in-odisha/article17747744.ece>

Sustainable Energy..

Electricity from the Sun...



Roof-top Solar PV
Denfeng Primary School,
New Taipei City – 361.92kWp



Floating type Solar PV
Farm Ponds
Taoyuan City, – 449.28kWp



Ground mounted Solar PV
Landfill Restoration Park
Taipei City, – 1,996.8kWp

Container-type Off-Grid Power System



<http://helicalholdings.com/outposts/helical-outpost-solar/>



<http://www.gatewaycontainersales.com.au/solar-containers-mobile-transport-storage/>



<http://www.moveit.tech/en/gallery/solar-container/>

Mobile (20ft container) classroom project in Myanmar

- 6kW Solar Home System with storage- by **Tatung**
- 24 pcs Solar Multi-Module- by **Gintung**
- Servers and computers
- Air conditioner
- Classroom software system

Sustainable Water..

Water from underground... & Powered by the Sun...

A Charity Project in Myanmar

The moment
of initial
installation



3-month
after the
installation

9-month
after the
installation



1-year
after the
installation

Solar Pumping, the Installation...



Water from the Air...

1600L per day – Atmospheric Water Generator

Technical Specifications

- Total Power Consumption: 23.8kW
- Input Power of Compressor: 20.6 KW
- Compressor Type: Hermetic scroll compressor
- Power Supply: 380V / 50Hz / 3 Phase 4 line
- Refrigerant: R407C
- Storage & transport temperature: (DB:-10~70 °C)
- Fan type: Centrifugal backward curved
- Water generation amount (30°C / 80%RH): > 1500L / day
- Dimension: .H 1700 * D 1700 * W 2500 (mm)
- Weight: 1,150 kg

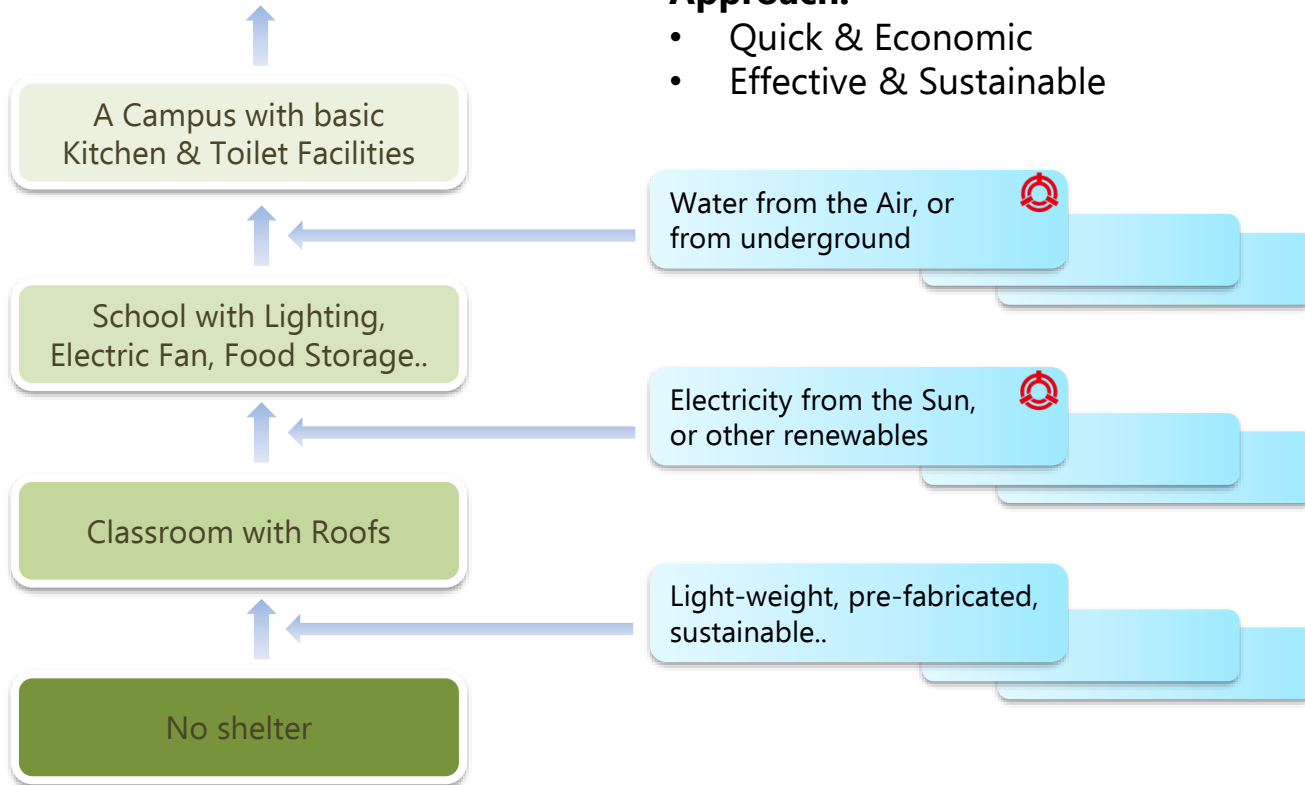


Water from the Air... & Powered by the Sun...

Solar Atmospheric Water Generator in Dubai, UAE



For Better School Facilities

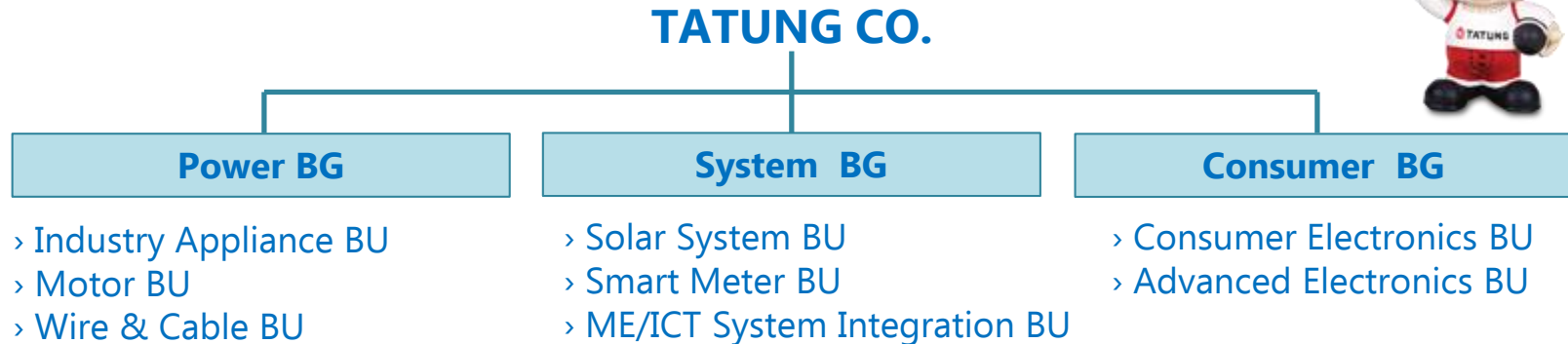


Approach:

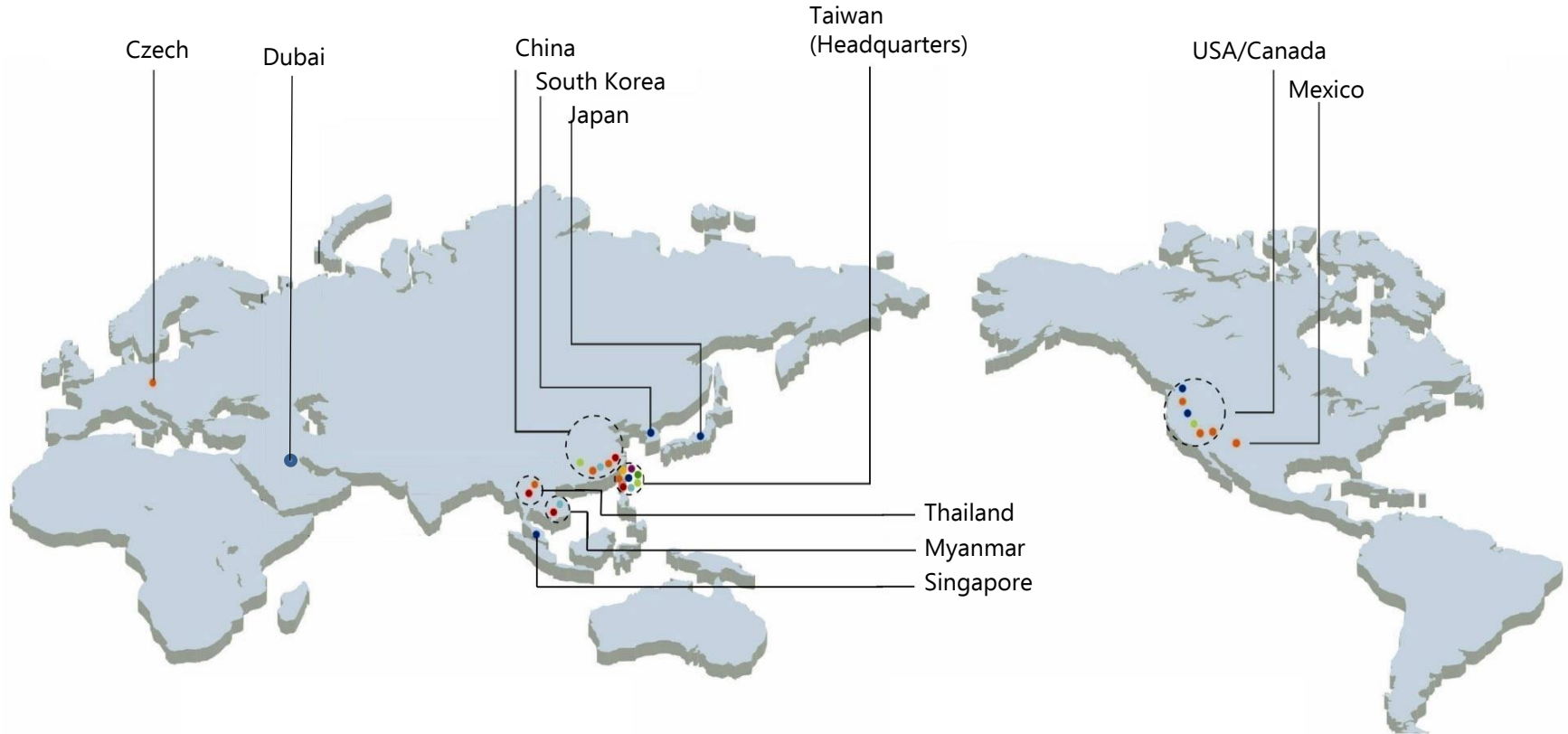
- Quick & Economic
- Effective & Sustainable

Overview of Tatumg Company

Established	1918
Capital	US\$760M, (Group Consolidated US\$1.5 billion)
Revenue	US\$686M (Group Consolidated US\$3.6 Billion) in 2014
Employee	Over 30,000 worldwide (Group consolidated)
Headquarters	Taipei, Taiwan



Tatung's Worldwide Operations



Tatung's **SDG** Solution Ideas to Support the **Sustainable Development Goals**

- **S**elf-sustainable utilities
 - **E**lectricity, from the Sun
 - **W**ater, from the **A**ir (or underground), & **P**owered by the Sun
- **D**eploying at where the children live and in need
- **G**eneralized approach
 - Economical & Effective

Better Utility, Better School, and Better Education

