The Ecosystem of Knowledge Transfer in Green Technologies

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Yau Lee Holdings Limited
(HKEX: 406, listed in 1991)

Yau Lee Construction Co., Ltd.
(Established in 1958)

Green Integrated Corporation in the Building Sector

We Build  We Serve  We Create

<table>
<thead>
<tr>
<th>Public Housing Estate</th>
<th>Design &amp; Build Hospital and Government Office Building</th>
<th>Fitting Out, Building Renovation &amp; Maintenance</th>
<th>Property Development</th>
<th>Hotel Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yau Lee Wah Concrete Precast</td>
<td>Yau Lee Curtain Wall and Steel Works</td>
<td>Leena Theme Painting Limited</td>
<td>InnoVision Architectural Services</td>
<td>VHSoft Technologies</td>
</tr>
<tr>
<td>REC Engineering (E &amp; M Operation)</td>
<td>Green Technologies &amp; Solutions</td>
<td>Ming Hop Co., Ltd. (Plumbing &amp; Drainage)</td>
<td>Excelcrete</td>
<td>Low Carbon Materials</td>
</tr>
</tbody>
</table>

Strong vertical supply chain  |  Specializes in Modular Fast Track Construction  |  Green Solutions Providers
Development of Semi Precast Construction Method
Year 2005 – Typical floor required no timber used

1. Welded walls (Type A)
2. Semi-precast walls (Type C)
3. Precast bathrooms
4. Polymer tray
5. Precast lift shaft
6. Precast staircase
7. Corridor wall
8. Tower Crane

Precast Concrete by Volume: 60%

- Semi-precast construction system saved 2,447 trees** in one 3 Blocks Project

Yau Lee saved around 40,000 trees in last 10 years
Precast Concrete Products

Precast Façade

Volumetric Precast

No. 1 Producer in HK/China region

Precast Bay Window Facade

Precast Balcony

Precast Bathroom with noise barrier

Staircore
Other products in factories

No. 1
Cooking Bench

Steel Mould

Drywall

No. 1
Aluminum Window

Metal Gate set

GRG/GRC
Precast Bathroom Products

Precast Bathroom – 4th Generation
- Further developed in year 2013
- Hong Kong Housing Authority Project
  Hung Shui Kiu Area 13 Phase 3
  Features:
  - Box structure with base and ceiling
  - Ceiling with half structural slab
  - Structural walls with simple in-situ rebar lapping details
  - Installation after casting of floor slab

1st Generation (2000) Implemented at Tong Ming Court

4th Generation (2013) Implemented at Kai Tak & Anderson Road Housing Development projects

Gained IP Rights
Online Project Management

VHDrawings™ Document and Drawing Solutions
• With an unique AI technology to recognize the CAD files
• Strengthen Internal Management

VHSmart™ Construction Intelligent Management System
• Real-time site inspection and routine progress monitoring at fixed and remote sites location
• Use of mobile device to inspect and take photo in potentially risky area

Gained IP Rights
Holiday Inn Express Hong Kong SoHo

- Opened on September 2012
- Gross Floor Area: 9,163 m²
- Number of floors: 36 storey
- Number of guest rooms: 274 nos

Electricity: HK$2.16M/ year
Gas: HK$0/ year
Extra Investment: HKD13M
Energy consumption reduced: 2,566,680 kWh
Energy Bill Saved: HKD3.33M/ year

Payback period: 4 years
Holiday Inn Express Hong Kong SoHo

The World’s First High Rise Building / Hotel Achieved Four Platinum or Equivalent of Green Awards

- **HK BEAM-Plus Platinum (Final)**
  - Achieved points: 79.8
  - (Achieved max. points under energy used)

- **US LEED Platinum**
  - Achieved Points: 82
  - (Achieved max. points under energy used)

- **BCA Green Mark Platinum**
- **Three-Star**

- **HK Green Building Council**
- **US Green Building Council**
- **Singapore BCA**
- **China Green Building Council**

- **Green Building Award 2012 Merit Award**
- **Asian Institute of Intelligent Buildings Intelligent Hotel (Distinction Rank)**
- **Quality Building Award 2014 Merit Award**
- **Outstanding Hotel Partner Award 2012**
- **The 2013 HICAP Sustainable Hotel Award**
- **Construction Manager of Year Awards 2012 - Gold**
Building Services Capability
REC Green Technologies / REC Green Energy Solutions

Green Building Solutions
• Research, design and build energy saving products and green products

Energy Optimization Engineering Solutions
• Energy consumption can be significantly reduced if optimization process is carried out on the building systems in regard of the architectural, constructional and building services engineering aspects
iFancoil

Energy Saving Smart Intelligent Fan Coil Unit – iFCU™

Energy Saving Solution by using high efficiency permanent magnet motor and control driver

**Advantages**

(1) Energy consumption is reduced by 40%-80%
(2) Variable speed
   - 5 speeds control (Super, High, Medium, Low, Extra Low)
(3) Temperature control accuracy up to ±0.5°C
(4) Motor heat dissipation is lowered from 58% - 95%
(5) Much lower noise level

<table>
<thead>
<tr>
<th>Speed</th>
<th>iFCU™ Motor (°C)</th>
<th>AC Motor (°C)</th>
<th>Diff. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1.2</td>
<td>26.9</td>
<td>95%</td>
</tr>
<tr>
<td>Middle</td>
<td>2.3</td>
<td>18.1</td>
<td>87%</td>
</tr>
<tr>
<td>High</td>
<td>4.9</td>
<td>11.6</td>
<td>58%</td>
</tr>
</tbody>
</table>

Operating temperature rise of motor

**Fully automatic & save money with better comfort!**
HKGBC – An Organization Aims

Vision
To help save the planet and improve well-being for the people of Hong Kong by transforming the city to a greener built environment.

Mission
To lead market transformation by advocating Green Policies to the Government, introducing Green Building Practices to all stakeholders, setting Standards for the building profession, and promotion a Green Lifestyle to the people of Hong Kong.
Green Policy Advocacy
HK “30/30” Roadmap – Target

- **30%** Absolute reduction *(10364 GWh)* in Electricity Consumption in Buildings by 2030 *(2005 baseline: 34548 GWh)*
- **60%** intensity reduction *(33421 GWh)* as compared to the projected electricity consumption in 2030
Green Practices for Professional Green Building assessment [BEAM Plus]

BEAM Plus
• A voluntary green building assessment scheme developed locally suitable for compact high-rise cityscape in the sub-tropical areas.

Development in Brief
• BEAM scheme was established in 1996, since then a number of updates were released. In 2010, BEAM Plus v1.1 was released in 2011 and the current version is v1.2.
By the end of 2013, 460 projects were registered under BEAM Plus, of which 110 projects had completed Provisional Assessment (PA).

Up to Mid-Aug 2014, more than 550 projects have been registered and more than 164 projects have completed PA, of which 5 projects have also completed Final Assessment (FA).

A total of 32 projects have achieved Platinum rating in either PA/FA.
Building Energy Performance Recognition Scheme (Office Occupants)

- The tool will analyze the electricity consumption of the applicant and compare with similar office type.
- Energy performance rating will then be advised.(Platinum/ Gold/ Silver/ Bronze/ Green/ No Rating)

Web Based Platform

Website

http://www.hkgbc.org.hk/bestoo

Ratings of Certification and Label
Green Building Product Labelling Scheme

- Building Professionals want to specify Green Building Product in their contract to Promote Green
- General Public may be willing to pay at higher price for a Greener Building Product
- A labelling system is required for market differentiation

<table>
<thead>
<tr>
<th>Ratings</th>
<th>Benchmarked Scores for each product</th>
</tr>
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<tbody>
<tr>
<td>Platinum</td>
<td>&gt;90</td>
</tr>
<tr>
<td>Gold</td>
<td>81 – 90</td>
</tr>
<tr>
<td>Silver</td>
<td>71 – 80</td>
</tr>
<tr>
<td>Bronze</td>
<td>61 – 70</td>
</tr>
<tr>
<td>Green</td>
<td>50 – 60</td>
</tr>
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</table>
Creating a Ecosystem for Green Products

- CIC Carbon Labelling Scheme
- BEAM Plus Interior
- BEAM Plus Neighbourhood
- BEAM Plus New Building with social aspect included
- Energy Benchmarking Tools
- BEAM Plus Existing Building to reflect actual performance
- Green Product Labelling Scheme
- Hong Kong

Hong Kong

HKGBC BEAM Plus
Key Finding

• **Transfer in Green Technologies**
  – IP right is important but not sufficient
  – The technology must be sound and cost effective

• **Market differentiation**
  – New Product has little Brand
  – Labelling system or third party certification scheme for endorsement can create awareness
  – An overall target such as HK3030 create market demand

• **Government Procurement Policy**
  – Innovation Friendly Policy
  – Willing to try out new technology, provide preference for local investor
  – Three suppliers policy kill innovation
  • Innovators want to create a market hub but cannot wait until other suppliers to be available.
  • **Without job reference, especially Government job reference. It is very difficult to explore overseas.**
  • Job reference is **MOST IMPORTANT**
My Suggested Solution

• Set up a Bureau level of Innovation Unit to pre-approve new technology so that it can be adopted in the departmental level. The front line officer can specify it without being question later.

• Government needs to establish a clear target such as waste and energy reduction in order to create a market demand.