The goal of this presentation is to share with the viewers our knowledge of greenhouse construction & maintenance, put in a format that will help you plan for a new greenhouse or make improvements to your existing house.
WHAT TO EXPECT

- We will look at several styles of greenhouses by different manufactures so as to give an idea of what is available out in the market place.
- We will also review components & systems common to our selected greenhouses, so that you can make a better selections when choosing a path to a new or improved greenhouse.
LET’S GET STARTED
WHAT & WHERE YOU CAN BUILD

Know what your legal restrictions are before you get started.

1. Do your homework and be subtle before you formally declare your intentions to build.
2. Clarify the definitions of: ‘Permanent Structure’ ‘Out-Building’ ’ Temporary Building or Structure’, and what is a landscape feature (It may be a greenhouse to you, but a pergola to your HOA).
4. Clarify County or City building code guidelines.
5. Feel-out your neighbors about your plans to avoid future problems.
SITE SELECTION & DEVELOPMENT
Choose an open area away from other buildings and trees – if possible.
SITE DEVELOPMENT

Orient on an East/ West axis
SITE DEVELOPMENT

Clear the site of ALL obstructions
Crown site so water runs away
SELECTING A STRUCTURE
SELECTING A MANUFACTURER

Our Favorite Greenhouse Manufactures

• Imperial Builders & Supply, Apopka Florida
• Atlas Manufacturing, Alapaha Georgia
• Conely’s Greenhouse Manufacturing, Montclair California

Free Standing Grand Truss Bow by: Imperial
SUGGESTED MODELS

- Grand Sawtooth by Imperial

576 sq/ft 24’ x 24’ w/ 10’ side walls
16’ tall, With peak vent
PROS & CONS

Grand Sawtooth by Imperial Builders:

**PROS**
- Made in Florida
- Lots of custom options
- Knowledge of Florida building codes
- Best design for maximum ventilation
- Pole in ground construction
- Gutters
- Local Shipping

**CONS**
- Imperial’s products are geared toward commercial construction & growing
- Best to have a contactor erect
SUGGESTED MODELS

- Scholar by Atlas Manufacturing
  
  576 sq/ft 16’ x 36’ w/ 8’ side walls
  14’-6” tall, With peak exhaust fan.
  Also available in 12’
Pros & Cons

Scholar by Atlas Manufacturing:

Pros
• Made in Georgia
• Lots of custom options
• Affordable shipping
• Atlas produces a full line of hobby greenhouses & accessories
• You deal directly with manufacture
• Considered a kit house
• 12’ & 16’ widths for narrow site location

Cons
• Conforming to Florida building codes can involve up charges for engineering
• Requires concrete footers, slab or beams to anchor to
• No ridge or peak vent, must have a peak exhaust fan
**SUGGESTED MODELS**

- **The Easy Grow by Atlas Manufacturing**

  270 sq/ft 10’ x 27’ w/ 5’ side walls 8’ tall at peak. With peak exhaust fan & roll-up curtains
The Easy Grow by Atlas Manufacturing:

**PROS**
- Made in Georgia
- Lots of custom options
- Affordable shipping
- Atlas produces a full line of hobby greenhouses & accessories
- Classified as a temporary structure
- Easy to build
- Very affordable
- Fits in narrow space. 10’ wide by 11’ 16’ & 27’

**CONS**
- Film covering for roof
- Narrow
- Less sturdy
- Low overhead hanging space
SUGGESTED MODELS

- Gable Executive By Conely’s
  - 576 sq/ft 24’ x 24’ w/ 10’ side walls
  - 16’ tall, with ridge vent
3. **Gable Executive** by Conley’s Manufacturing:

**PROS**
- Familiar with product
- Ridge vent available
- 10’ sidewalls available
- Gutters
- Pole in ground construction

**CONS**
- Made in California
- Engineering drawings are difficult to acquire
- Expensive shipping
- Less custom options
MY FAVORITE IS

- **Grand Sawtooth** by Imperial Builders
COMMON GREENHOUSE DETAILS

- **Structural Frame:** Galvanized steel.
- **Roof:** Corrugated Polycarbonate panels.
- **Side walls:** Corrugated Polycarbonate panels.
- **Ridge vents:** If possible, for maximum ventilation.
- **Peak Vent:** Automatic roll up poly woven curtain.
- **Wall Vents:** Automatic roll up poly woven curtain.
- **Single swing Door:** Aluminum with window or vent.
- **Sliding Door:** Polycarbonate covered aluminum frame w/ framed sliding screen door.
GREENHOUSE DETAILS

- **Structural Frame:** Galvanized steel.
GREENHOUSE DETAILS

- **Roof**: Corrugated Polycarbonate panels.
GREENHOUSE DETAILS

- Side walls: Corrugated Polycarbonate panels.
GREENHOUSE DETAILS

- Ridge Vent: open/close vent
GREENHOUSE DETAILS

- **Peak Vent:** Automatic roll up poly curtain.
**GREENHOUSE DETAILS**

- **Wall Vents:** Automatic roll up poly curtain with metal lath for shade & security.
GREENHOUSE DETAILS

- Single swing Door: Aluminum with window/screen or vents.
GREENHOUSE DETAILS

- Sliding Door: Polycarbonate covered w/ screen.
MECHANICAL SYSTEMS
MECHANICAL SYSTEMS

- Electrical
- Air Circulation
- Heating
- Water
- Cooling
- Benches & Racks
MECHANICAL SYSTEMS

- **Electrical**

1. 100 amp service with Breaker Box
2. Underground Feed
3. Master control panel
4. Individual controls
MECHANICAL SYSTEMS

Air Circulation

1. HAF – Horizontal Air Flow Fans by Coolaire style # FH18B11
2. Peak exhaust fan with louvers, by Valutek style # 109847
MECHANICAL SYSTEMS

- Heating

1. Gas Units: Shown is a 45,000 Btu Modine Hotdog HD45 Heaters with stainless Kit
2. 250 Gallon propane tank or Natural Gas hookup is needed
Water System

1. Tie-in to city water or well, 150 gallons needed for one watering cycle
2. 350 – 500 gallon under ground storage tank
3. Rain water storage (1” of rain off of 576 sq ft roof = 350 Gal.
4. 50 gallon per day Reverse Osmosis filtration system to supplement rain water
5. Dosatron Fertilizer Injector .05 – 14 Gpm
6. Hose inductor
Misting System

1. Overhead Misting for general watering & Summer cooling. With Filters & Timers included.
2. Under-bench Misting for summer cooling & Winter heating. With Filters & Timers included.
MECHANICAL SYSTEMS

- Benches & Racks

1. Stationary built-in metal frames with wire mesh tops.
2. Rolling top frames for extra space.
3. Metal tubes & wire mesh for hanging plants
**24’ x 24’**

*Imperial Grand Sawtooth*
10’ x 27’ Atlas Easy Grow
HELPFUL PRODUCTS
HELPFUL PRODUCTS

Aluminum U-channel with wiggle wire:
Easley convert any framed in space in into a climate controlled growing area.

Available from Imperial Building Supply, Atlas Greenhouse & FarmTek.
The Best Horizontal Air Fan is manufactured by American Coolair

In greenhouses, proper air circulation helps plants grow better by increasing the amount of carbon dioxide at the plant level and reducing condensation on plant surfaces, reducing the risk of disease. Eliminate air stratification, reduce condensation, and eliminate hot and cold spots effectively and economically with American Coolair EK and FH fans. These fans feature aluminum propellers directly mounted to totally enclosed motors, steel guards that comply with OSHA standards, and cord sets that plug into standard 115 volt electrical outlets.

In general, the amount of circulation airflow needed is 2-1/2 to 3 CFM per square foot of floor space. Use the fans whenever the house exhaust fan system is not operating at full capacity. Circulator fans should be installed above the top of the crops to be cooled, but should be no closer than 1' from the roof. Use the figures to the right to determine the best fan layout for any type of building.

Type FH Horizontal Air Fans feature heavy gauge galvanized steel motor mounts, fan guards, and fan casing to provide the durability and corrosion resistance needed for greenhouse environments. Each FH fan comes with a chain mounting kit.

<table>
<thead>
<tr>
<th>Model</th>
<th>Fan Size</th>
<th>Motor HP</th>
<th>Voltage</th>
<th>Fan RPM</th>
<th>CFM</th>
</tr>
</thead>
<tbody>
<tr>
<td>FH18B11</td>
<td>18</td>
<td>1/15</td>
<td>115</td>
<td>1.000</td>
<td>2.000</td>
</tr>
<tr>
<td>FH18G11</td>
<td>18</td>
<td>1/4</td>
<td>115</td>
<td>1.050</td>
<td>3.000</td>
</tr>
</tbody>
</table>
HELPFUL PRODUCTS

Shade Cloth  
Black Knitted or woven polyethylene

Available from Imperial Building Supply, Atlas Greenhouse & FarmTek.
HELPFUL PRODUCTS

Galvanized Metal Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulevards (Line rail Clamp)</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>Top Rail Sleeves</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>EMT Conduit</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>Perforated Galvanized Pipe Strap</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>Brace Band</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td>Purlin Clamp</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td>Split Tee (End Rail Clamp)</td>
<td><img src="image7.png" alt="Image" /></td>
</tr>
<tr>
<td>Galvanized Mechanical Tubing</td>
<td><img src="image8.png" alt="Image" /></td>
</tr>
<tr>
<td>One-Hole Pipe Strap</td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
<tr>
<td>Two-Hole Pipe Strap</td>
<td><img src="image10.png" alt="Image" /></td>
</tr>
<tr>
<td>Galvanized Square Tubing</td>
<td><img src="image11.png" alt="Image" /></td>
</tr>
<tr>
<td>Galvanized Welded Wire Fabric</td>
<td><img src="image12.png" alt="Image" /></td>
</tr>
</tbody>
</table>

Available from Imperial Building Supply, Atlas Greenhouse & FarmTek.
HELPFUL PRODUCTS

Poly Greenhouse Film

Most Poly Films have a 4 Year warranty. 6 mil poly covering is used for single and double layer applications. Available in widths ranging from 14' to 48' and lengths up to 150'. Custom sizes can be provided upon request.

Clear & White poly Film for roofs & walls

White woven polyethylene for curtains & doors
HELPFUL PRODUCTS

Galvanized Metal Lath Sheets

Used to cover roofs & walls, acts as a 50% Shade cloth. Ideal to fill in Wall vents with roll-up curtains. Keeps the creatures out & allows the air to flow. It can also be used for tabletops. Very Durable.

Available from Seacoast Supply
HELPFUL PRODUCTS

Electrical Controls for Air & Water

Timers & temperature controls for all of your climate devises

Available from Imperial Building Supply, Atlas Greenhouse
HELPFUL PRODUCTS

In-line Water Filters

Filters to keep your water free of solids

Available from Imperial Building Supply, North Florida Irrigation
HELPFUL HINTS
HELPFUL HINTS

Have a backup Plan:

1. Have a generator for backup power.
2. Have an extra piece of shade cloth to cover the roof.
3. Have extra film & repair tape.
4. Have a backup heat source.
5. Have extra Thermostats, breakers, relays, fuses, GFI’s etc.
6. Have more than one source of water.
7. Have spare inductor, hose timers, batteries & spray wand.
8. Have a list with your back-up plan so someone will know what to do in your abstinence.
9. Have a person that can cover for you when you are gone.
HELPFUL HINTS

Hang 30% shade cloth in ceiling during Summer

March 21 to October 12
HELPFUL HINTS

Take advantage of overhead & wall hanging space

March 21 to October 12
HELPFUL HINTS

Keep under bench areas clean & free of vegetation
HELPFUL HINTS

A Wet Wall is a maintenance nightmare. They are largely ineffective and expensive to run and maintain.
<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>24’ x 24’ Covered with 8mil corrugated polycarbonate</td>
<td>$7,796</td>
</tr>
<tr>
<td>With personnel door, &amp; 6’ sliding door w/ screen</td>
<td></td>
</tr>
<tr>
<td>2 – 8’ x 24’ Roll-up Curtain systems</td>
<td>$870</td>
</tr>
<tr>
<td>4’ x24’ Auto Peak roll-up curtain</td>
<td>$841</td>
</tr>
<tr>
<td>80,000 BTU Modine Heater w/ install kit</td>
<td>$1,255</td>
</tr>
<tr>
<td>4 – 5’ x 14’ rolling benches</td>
<td>$1,308</td>
</tr>
<tr>
<td>Hanging rack system</td>
<td>$375</td>
</tr>
<tr>
<td>28’ x 25’ Aluminet Shade Cloth 50% w/ mounting hw</td>
<td>$371</td>
</tr>
<tr>
<td>2 Coolair HAF Fan</td>
<td>$450</td>
</tr>
<tr>
<td>24’ x 24’ Ground Cover</td>
<td>$205</td>
</tr>
<tr>
<td>100 AMP electrical service</td>
<td>$1,800</td>
</tr>
<tr>
<td>Install ¾” water line</td>
<td>$200</td>
</tr>
<tr>
<td>Concrete chain wall</td>
<td>$1,850</td>
</tr>
<tr>
<td>Erection Charge</td>
<td>$7,973</td>
</tr>
<tr>
<td>TOTAL (sales tax included)</td>
<td>$23,444</td>
</tr>
<tr>
<td>FOB St. Augustine FL</td>
<td></td>
</tr>
</tbody>
</table>

- Engineering drawings & permits are not included
SCHOLAR BY ATLAS

16’ x 36’ Covered with 8mil twin wall polycarbonate $9,298
With door w/ shutters,
2 – 30’ Roll-up Curtain systems 737
18” exhaust fan 449
80,000 BTU Heater 988
Heater vent pipe kit 135
Johnson Controls Thermostat 68
3 – 4’ x 24’ rolling benches 1,339
Hanging rack system 275
Shade Cloth 50% Aluminet 371
3 Coolair HAF Fan 675
16’ x 37’ Ground Cover 205
100 AMP electrical service 1,800
Install ¾” water line 200
Concrete chain wall 1,850
Erection Charge 7,000
TOTAL $25,400
Shipping 1,060

❖ Engineering drawings & permits are not included
<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>10’ x 27’ Covered with 6mil poly</td>
<td>$1,820</td>
</tr>
<tr>
<td>With door w/ shutters, 3 overhead purlins.</td>
<td></td>
</tr>
<tr>
<td>2 – 27’ Roll-up Curtain systems</td>
<td>664</td>
</tr>
<tr>
<td>18” exhaust fan</td>
<td>449</td>
</tr>
<tr>
<td>30,000 BTU Heater</td>
<td>561</td>
</tr>
<tr>
<td>Heater vent pipe kit</td>
<td>125</td>
</tr>
<tr>
<td>Johnson Controls Thermostat</td>
<td>68</td>
</tr>
<tr>
<td>2 – 2’ x 27’ stationary benches</td>
<td>410</td>
</tr>
<tr>
<td>4 – 27’ hanging basket rails</td>
<td>170</td>
</tr>
<tr>
<td>Shade Cloth 50% Aluminet</td>
<td>111</td>
</tr>
<tr>
<td>1 Coolair HAF Fan</td>
<td>225</td>
</tr>
<tr>
<td>10’ x 29’ ground cover</td>
<td>95</td>
</tr>
<tr>
<td>50 AMP electrical service</td>
<td>1,000</td>
</tr>
<tr>
<td>Install ¾” water line</td>
<td>200</td>
</tr>
<tr>
<td>Anchoring system</td>
<td>125</td>
</tr>
<tr>
<td>Erection Charge</td>
<td>1,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$7,013</td>
</tr>
<tr>
<td>Shipping</td>
<td>560</td>
</tr>
<tr>
<td>Pickup – pay sales tax</td>
<td>276</td>
</tr>
</tbody>
</table>
WHAT ELSE CAN I DO FOR NOT SO MUCH MONEY?
RECYCLED SPECIAL

Used frame covered in recycled polycarbonate with new metal lath & new roll-up curtains. Cost lest than $500.

11’ x 16’
1. Imperial Builders & Supply, Apopka, FL
   www.imperialbuilders.com, 407-889-0453
2. Atlas Manufacturing Inc. Alapaha, GA
   www.atlasgreenhouse.com 800-366-9902
3. Farmtek/Growers Supply Dyersville, IA
   800-814-0509
5. Greenhouse Megastore, Danville IL
   www.greenhousemegastore.com, 888-281-9337