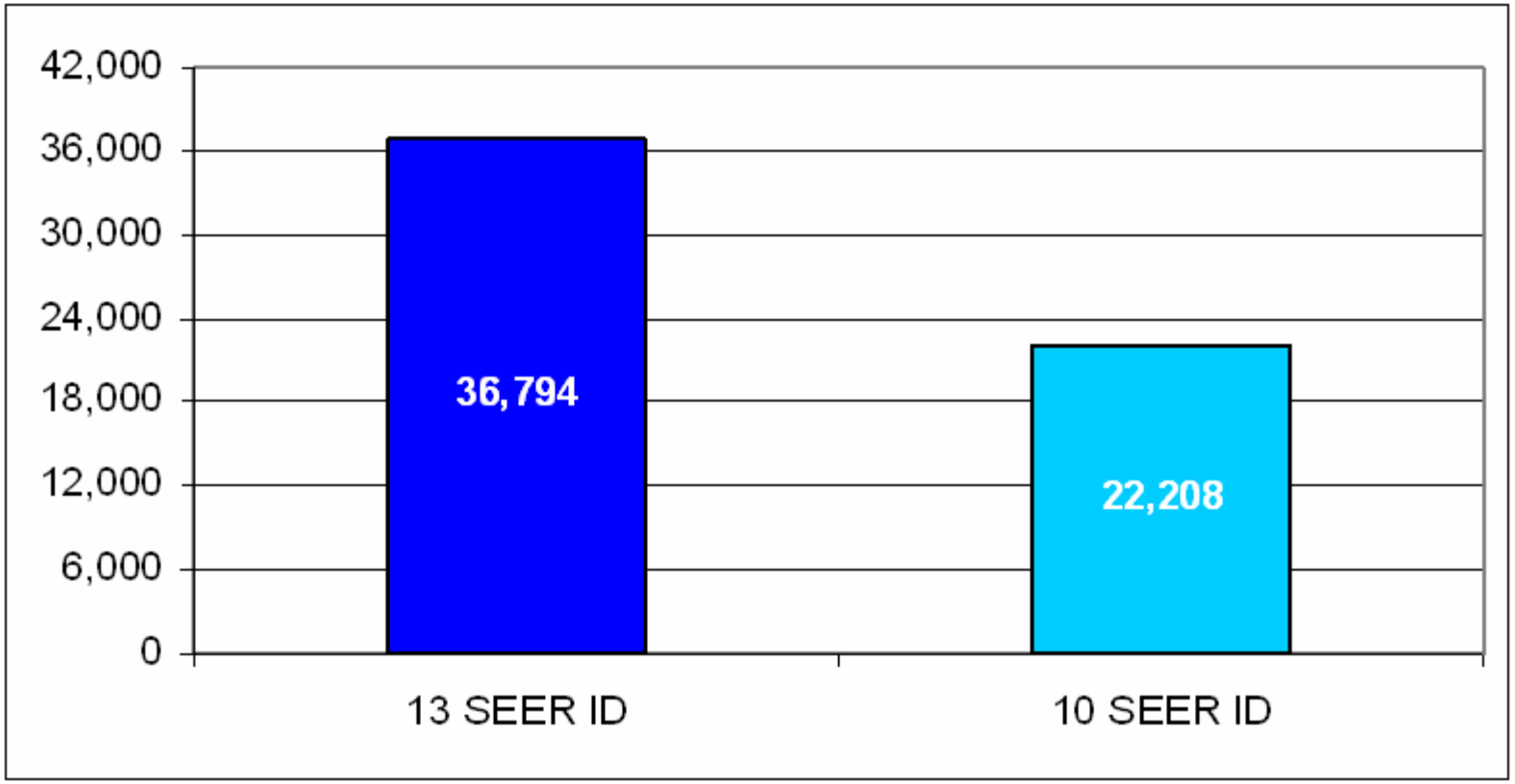
The “Value” of a Mismatched 13 SEER System

Alabama Power & Light Study on 13 SEER Heat Pumps with properly and improperly matched indoor coils

Study Details

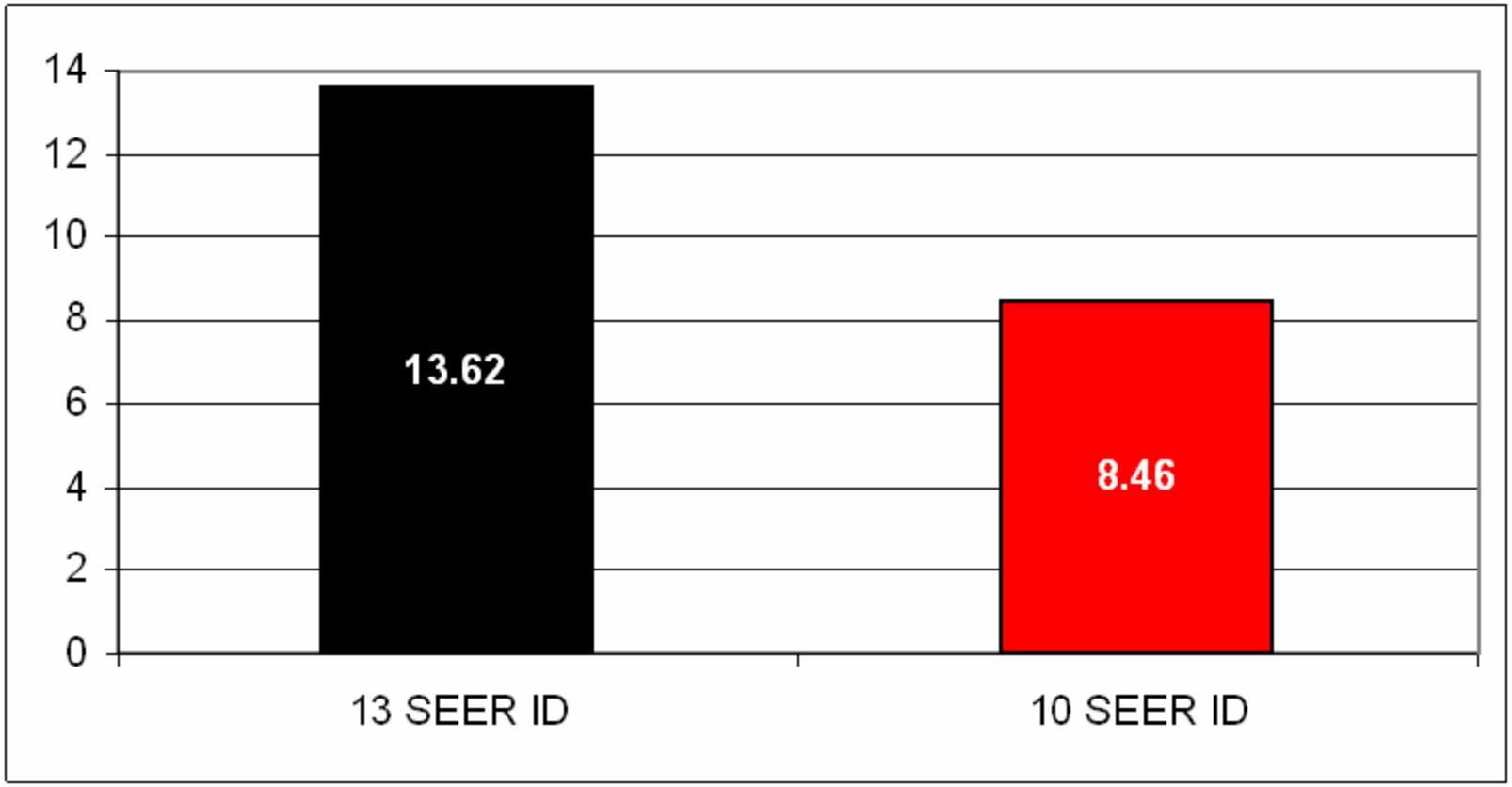
- Heat Pump Split System
- 3 ton Nominal Capacity
- 13 SEER – Unit
  - With 13 SEER ID coil – rated 13 SEER
  - With 10 SEER ID coil – not rated
- Tested in Heating and Cooling
- “Factory” Refr. Charge: 8 lb. 7 oz.

Capacity – BtuH/hr



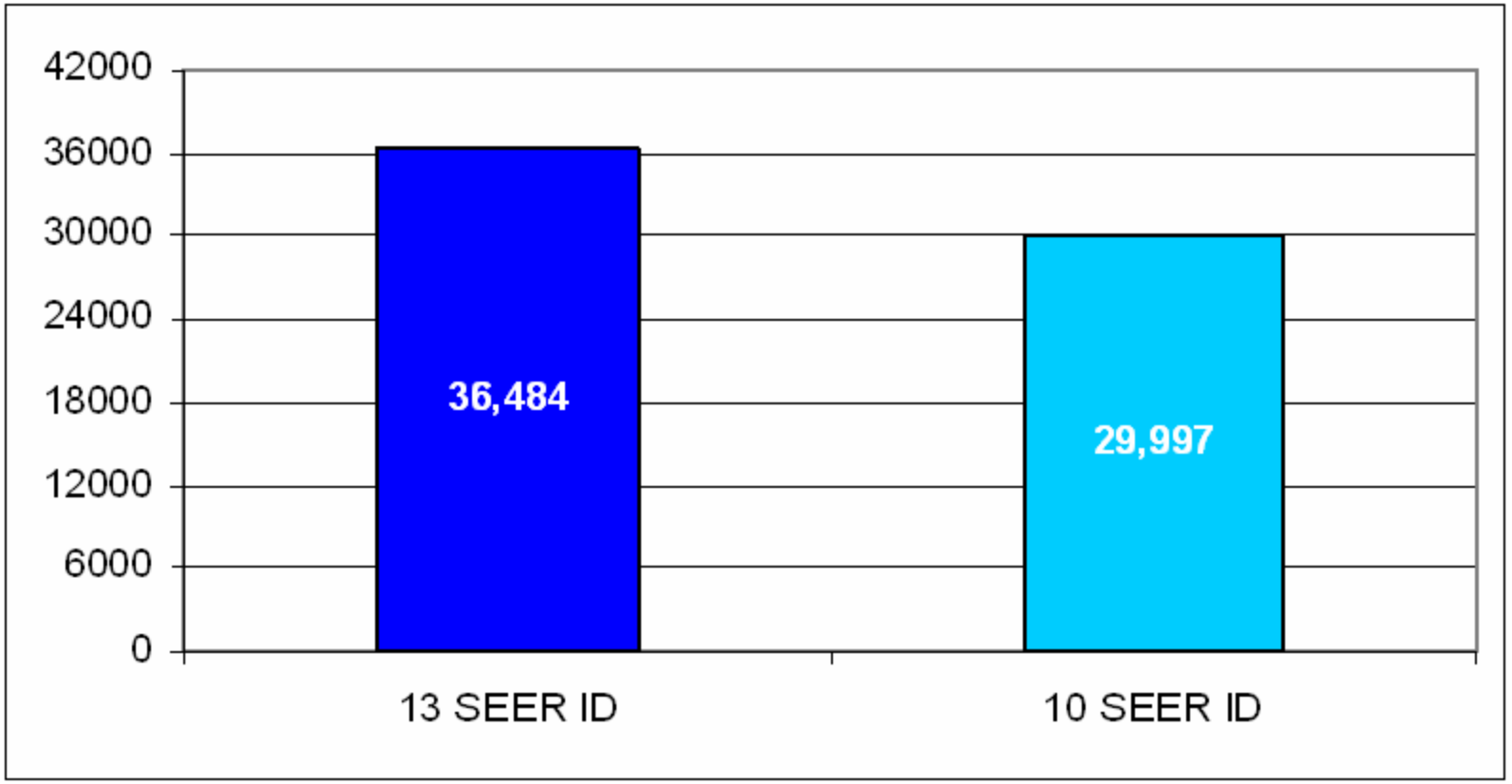
- **Cooling 95 F Outside / 80 F Inside**
- **Factory Refrigerant Charge: 8 lb 7 oz**
- **40% Reduction in Capacity**

Efficiency – SEER



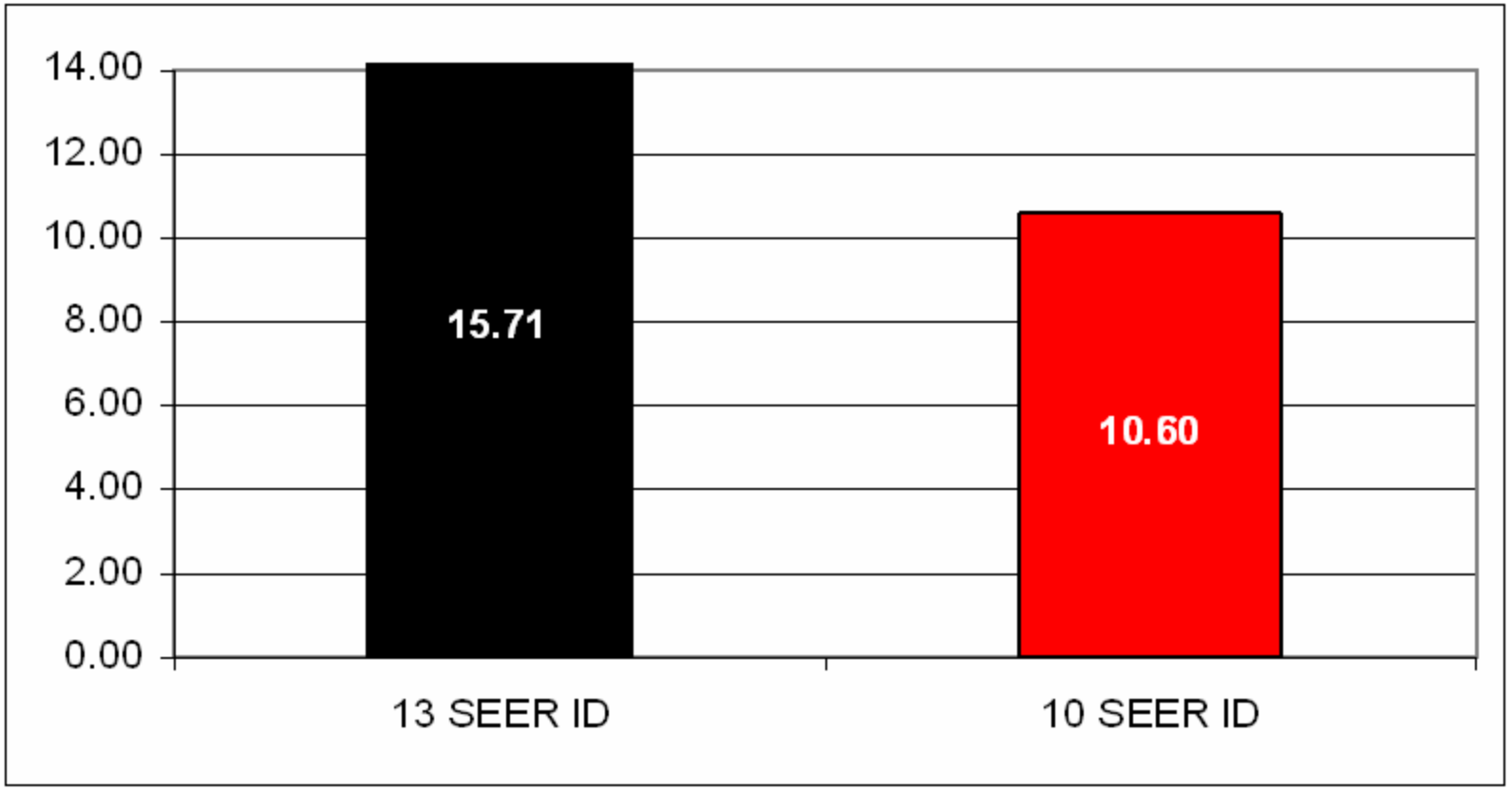
- **Cooling 95 F Outside / 80 F Inside**
- **Factory Refrigerant Charge: 8 lb 7 oz**
- **38% Reduction in Efficiency**

Capacity – BtuH/hr



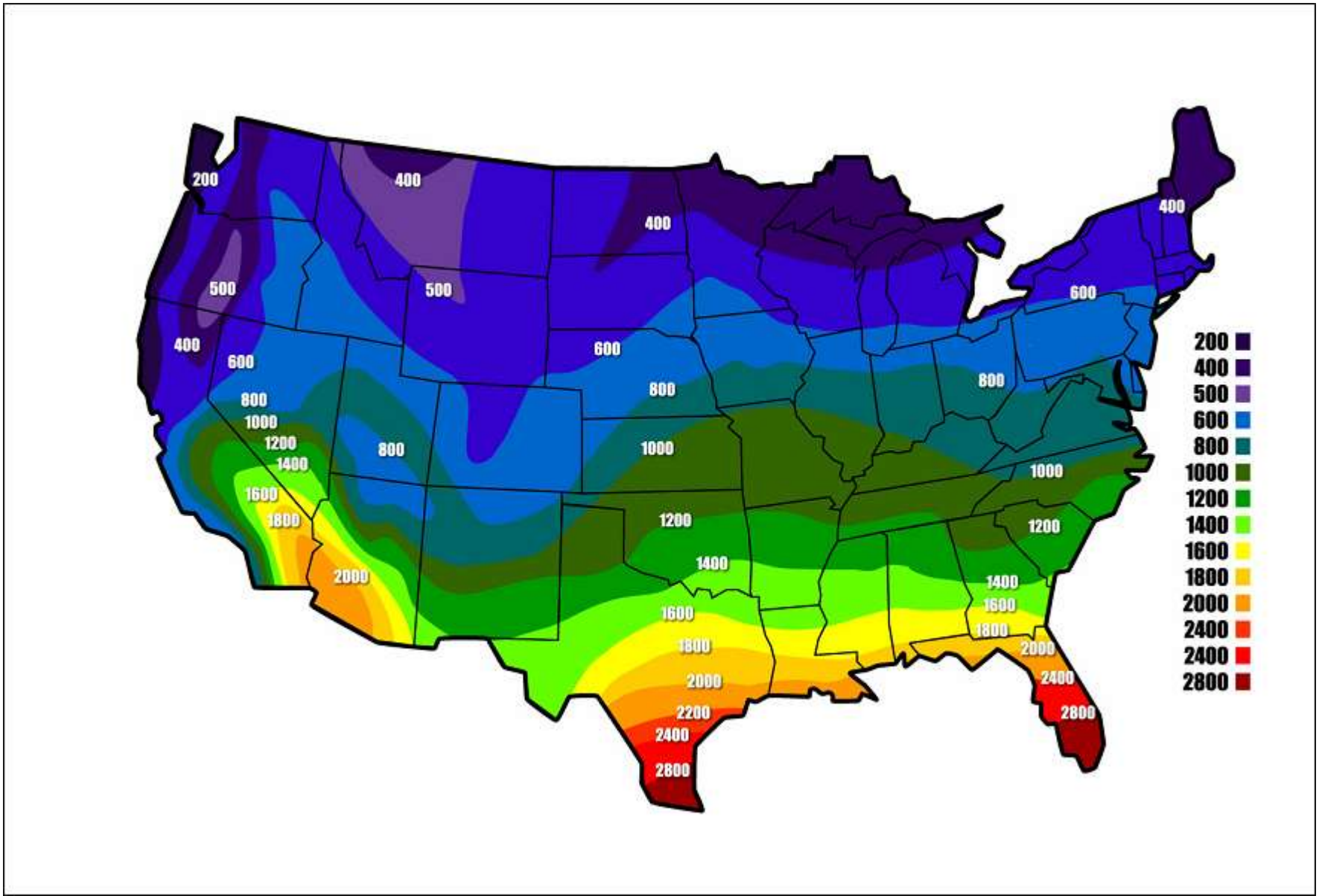
- **Heating 47 F Outside / 70 F Inside**
- **Factory Refrigerant Charge: 8 lb 7 oz**
- **18% Reduction in Capacity**

Efficiency – EER



- **Heating 47 F Outside / 70 F Inside**
- **Factory Refrigerant Charge: 8 lb 7 oz**
- **33% Reduction in Efficiency**

Cooling Load Hours



Calculate the “Value” of a Mismatched System - Cooling

City	State
Miami	Fl
Cooling Hours	**Electric Rate**
3000	$0.13

	"Good" System	"Bad" System	"Value" of a Mismatched System
Heat Gain	**13**	**8.5**	
18,000	$540	$826	**-$286**
24,000	$720	$1,101	**-$381**
30,000	$900	$1,376	**-$476**
36,000	$1,080	$1,652	**-$572**
42,000	$1,260	$1,927	**-$667**
48,000	$1,440	$2,202	**-$762**
60,000	$1,800	$2,753	**-$953**

Annual Cooling Cost Estimates & Savings

**Double-Click on the table and enter data in the GREEN cells*

Conclusions

- Significant capacity loss can result in inability to maintain setpoint and provide proper comfort
- Significant efficiency loss due to lower SEER/EER and with lower capacity, longer run times (cooling load hours increased)
- With improper ID coil match, overcharging is likely and causes significant problems for heat pump operations

Summary of “Value” of Mismatched System

- **Efficiency** - significantly reduced
- **Capacity** - significantly reduced
- **Reliability/Durability** - significantly reduced (especially for heat pumps)
- **Comfort** - significantly effected due to lost capacities, lost efficiencies, and lost reliability/durability