

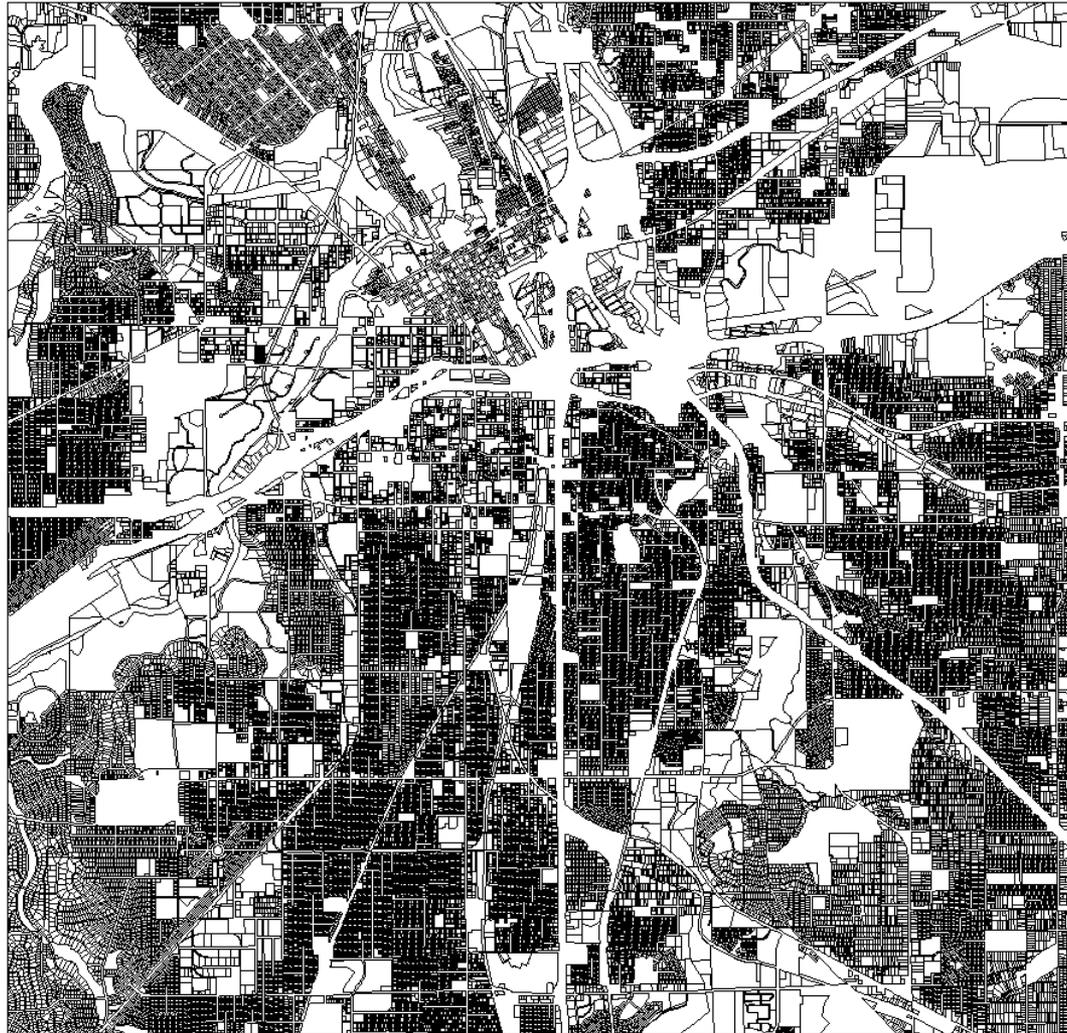
**TEAM BRUNDTLAND**

**FORT WORTH**

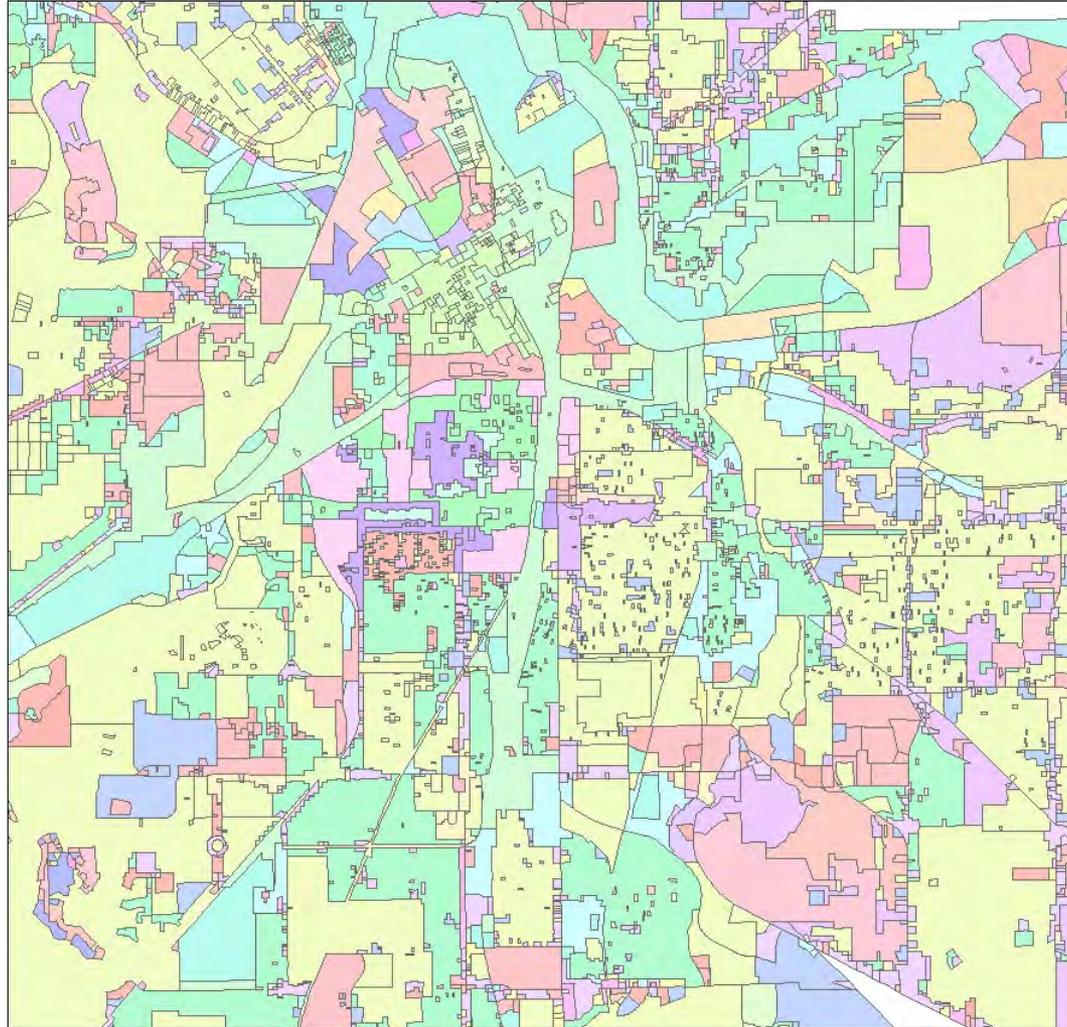
# ESTIMATING ENERGY USAGE



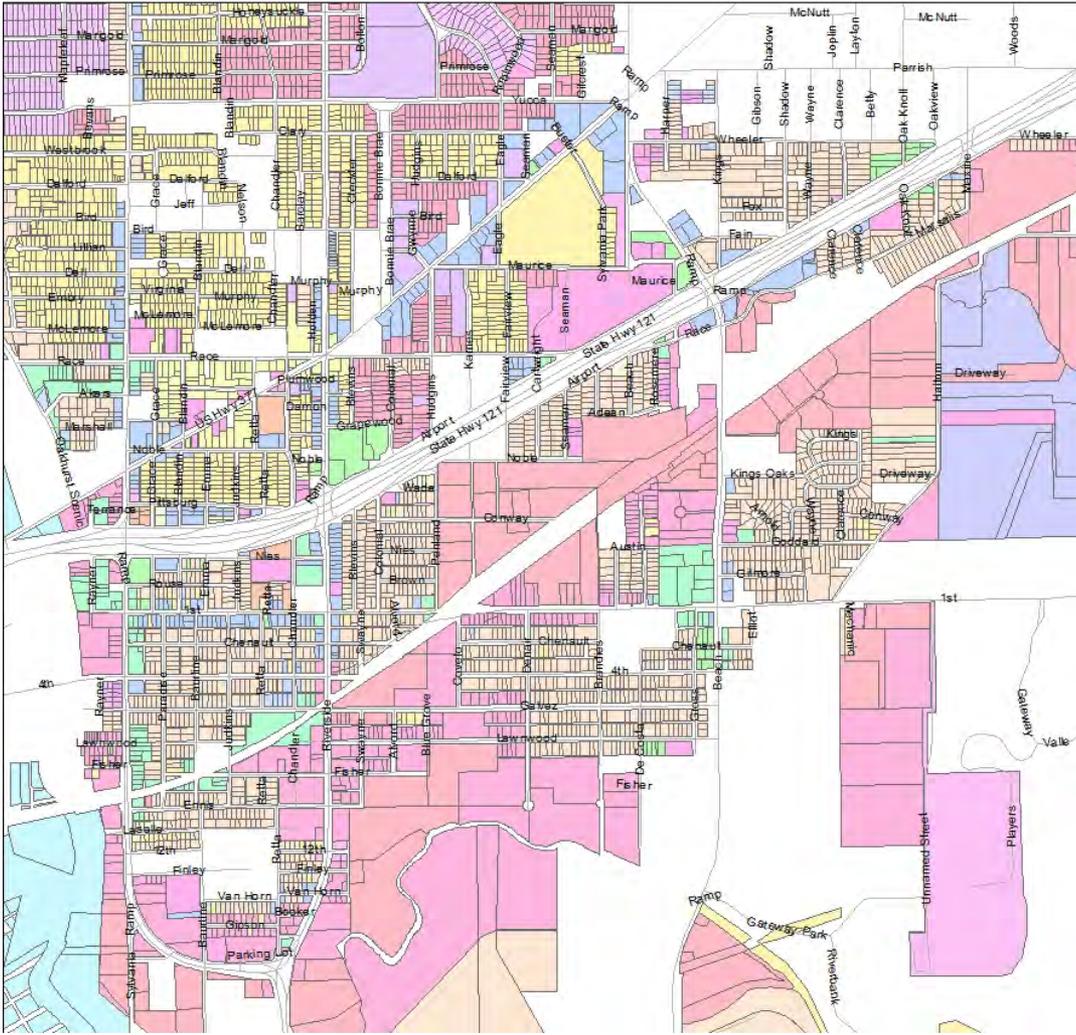
# PARCEL DATA



# ZONING DATA



# COMBINING ZONING AND PARCEL DATA



# BUILDING BREAKDOWN BY TYPE



# ESTIMATING ENERGY USE

Zoning Data

# ESTIMATING ENERGY USE

**Zoning Data**

**+**

**Residential  
Energy  
Consumption  
Survey**

**Commercial  
Building Energy  
Consumption  
Survey**

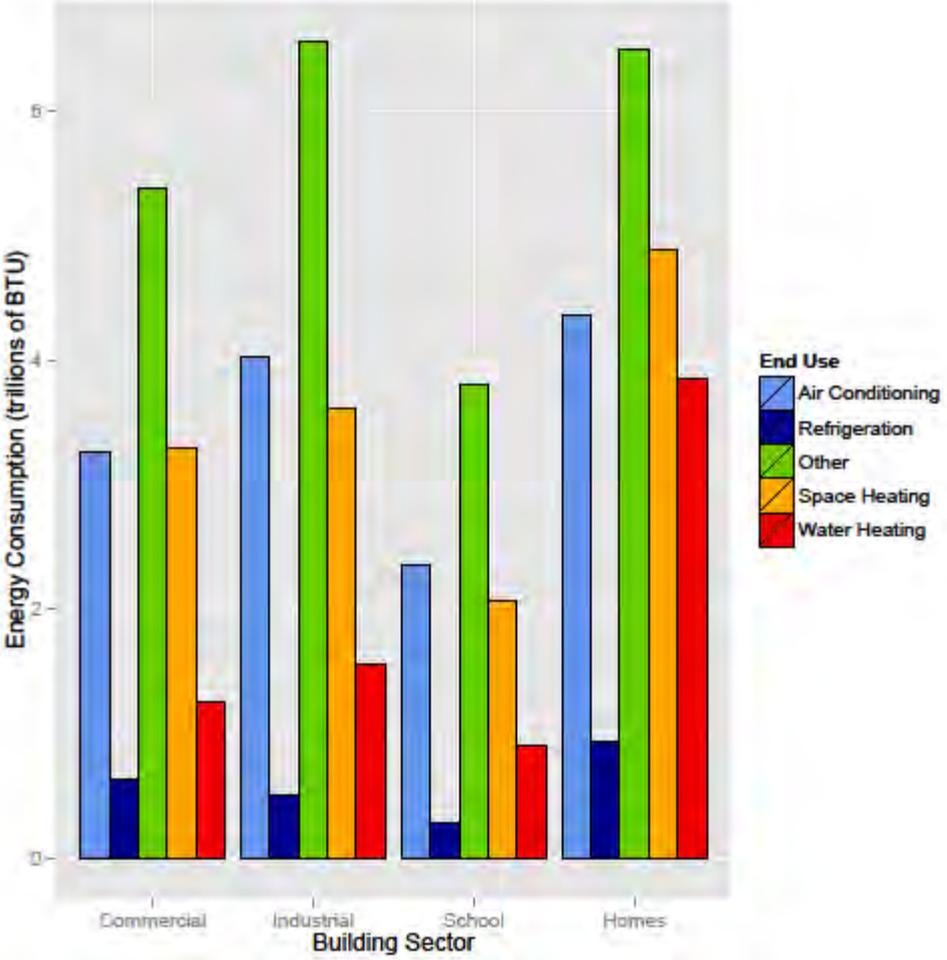
# ESTIMATING ENERGY USE

Zoning Data

+

Residential  
Energy  
Consumption  
Survey

Commercial  
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Survey



# CHOOSING OUR SECTORS



# CHOOSING OUR SECTORS



# SECTOR 1: SINGLE FAMILY HOMES

**Space heating & cooling and water heating: 60% of total single-family home energy requirements**

**Space heating: 15% electric, 85% natural gas**  
**Water heating: 30% electric, 70% natural gas**  
**Space cooling: 100% electric**

(Source: EIA, Residential Energy Consumption Survey, 2009)

**Empower home owners with more usable information on their energy usage in order to more intelligently pursue energy consumption measures.**

**Energy reductions can be achieved by providing more complete information to consumers**

# SECTOR 1: SINGLE FAMILY HOMES

## WIDER AWARENESS AND WISER USAGE OF SMART METER DATA

Revamp Biggest Energy Saver Program

Redesign Smart Meter Texas Website

Information campaign in industry and universities

Partners: Oncor, local universities, Lockheed Martin, Bell Helicopter

## INSTALLATION OF LEARNING THERMOSTATS

Offset initial investment cost of ~\$300

Provide financial incentives

Make incentives well known and easy to obtain

Partners: Texas Gas Service, hardware stores and contractors

**10 - 15% REDUCTION IN ENERGY USAGE**

(Source: Fischer, Corrina. "Feedback on household electricity consumption: a tool for saving energy?" *Energy Efficiency*. (2008) 1:79-104)

# SECTOR 2: INDUSTRIAL

| Targeted Technology   | Savings (%) as Compared to Base Technology |       |                | Simple payback period (yr.) |
|---|--|-------|----------------|-----------------------------|
|   | Electricity                                | Fuel  | Primary energy |                             |
| High-intensity fluorescent replacements for high bay high-intensity discharge | 50%  | N/A   | 50%            | 1.3                         |
| Daylighting with dimmable fluorescent replacement for HID                     | 80%  | N/A   | 80%            | 2.97                        |
| CHP using natural gas   | 100%                                       | -120% | 33%            | 6.9                         |
| Motor system optimization   | 20%  | N/A   | 20%            | 1.5                         |
| Improve pump efficiency   | 17%  | N/A   | 17%            | 3.0                         |

Recommend technologies for different industries (Martin et al. 2000)

**Partner with major local industrial players Lockheed Martin and Bell Helicopter to lead the initiative. Inform other industrial partners of the achieved benefits to encourage them to adopt similar strategies**

# SECTOR 3: SCHOOLS

## K-12

**Collaborative for High Performance Schools (CHPS)**

**30% of energy used inefficiently**

**Schools average of 40 years old**

**Mitigate incremental costs through PACE bonds and ESPCs with ESCOs**

## UNIVERSITIES

**LEED Certification**

**Partner with University of Texas at Arlington (largest university in Fort Worth). The example set will encourage other schools to follow suit.**

**Stipulate minimum compliance for energy optimization (20% level)**

**33% REDUCTION IN ENERGY USAGE**

*(Kats, Gregory. Greening America's Schools- Costs and Benefits. A Capital E Report, 2006.)*

# SECTOR 3: SCHOOLS

**Encourage sustainable practices and encourage positive habits through gamification.**

*Gamification: A strategy that uses friendly, reward-based competition to motivate participants to achieve set goals.*

## Energy Dashboard

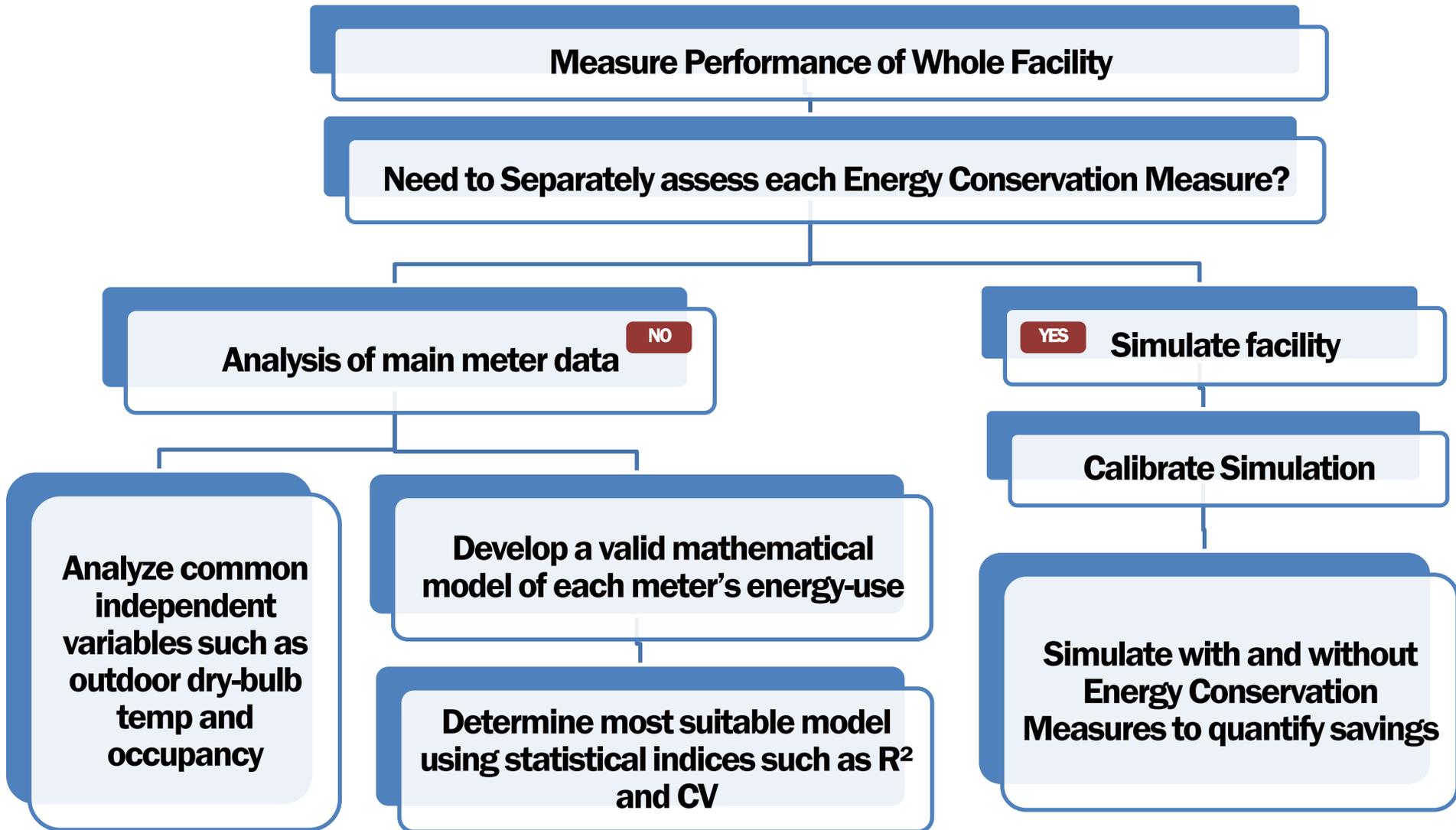
- Real-time web based interface
- Monitors energy consumption
- Compare schools through social networking
- Cost: \$10K to \$50K  
(depending on presence of meters)

**10-15% ENERGY REDUCTION**

(BuildingGreen.com. (2008). Energy Dashboards: Using Real-Time Feedback to Influence Behavior)



# MEASUREMENT & VERIFICATION



EVO. (2012). International Performance Measurement and Verification Protocol (Vol. 1); Efficiency Valuation Organization

# CONCLUSION

**STEP 1: Estimate energy usage to determine target sectors**

**STEP 2: Deploy sector-specific energy reduction strategies**

## Single Family Homes

**10 - 15% POSSIBLE REDUCTION IN ENERGY USAGE**

- Smart Meters
- Learning Thermostats

## Industrial

**17 - 80% POSSIBLE REDUCTION IN ENERGY USAGE**

*(per targeted technology)*

- Lighting
- Motor Systems
- CHP Using Natural Gas
- Improve Pump Efficiency

## Schools

**43 - 48% POSSIBLE REDUCTION IN ENERGY USAGE**

- CHPS and LEED Certification
- Gamification

**THANK YOU**

**QUESTIONS?**