

# INVESTMENT GRADE AUDIT MID-TERM UPDATE

City of Lawrence  
Energy Savings Performance Contract



# Agenda

- Introduction and Review
- IGA Preliminary Results
- Project Financials
- Next Steps



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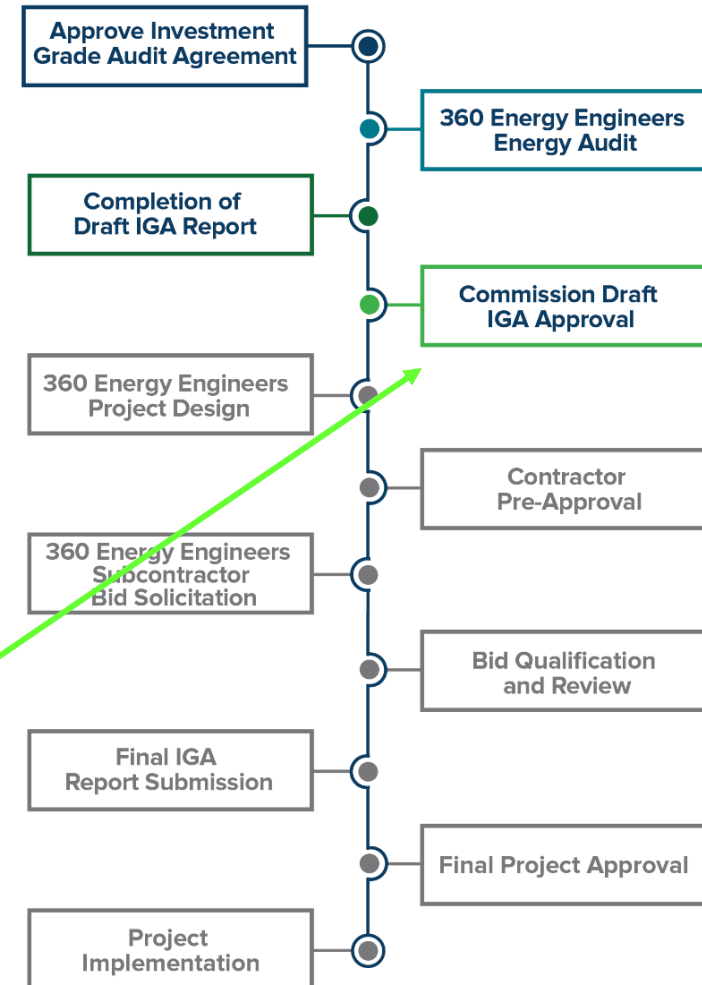


# Project Status Review

## Project Milestones:

- **December 2015:** Commission authorized joining FCIP Program
- **March 2016:** 360 Energy Engineers selected through competitive RFP process
- **May 2016:** Commission authorized initiating the Investment Grade Energy Audit
- **June & July 2016:** 360 conducts audits in 40+ buildings
- **August 2016:** IGA recommendations refined, prioritized with staff

**Today: Receive IGA Report,  
Approve next steps**



# Project Goals

## Improve Energy Efficiency

- Minimize energy wasted with outdated equipment and operation
- Remain a regional leader in energy efficiency

## Reduce Costs

- Recapture dollars currently wasted on inefficient operation
- Minimize maintenance expenses on outdated equipment

## Upgrade Facilities and Systems

- Replace antiquated or failing equipment
- Select systems with eye toward total life-cycle costs

## Support sustainability and GHG reduction goals

- Proposed project saves 3,625 tons of CO<sub>2</sub>e, equivalent to:
  - Taking 766 cars off the road each year.
  - Planting 3,431 acres of forest each year.



# 360's Role



# Agenda

- Introduction and Review
- **IGA Preliminary Results**
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# 1. City Wide: Web-Based Thermostats

## Projects

- Upgrade thermostats in selected buildings
- Install centrally controllable internet controls
- Allow for setback/setup and centralized control
- Cost-effective alternative to DDC Controls



Existing Standard Programmable



Recommended Web-Based System

## Buildings Impacted

Fire/Medical No. 2
Fire/Medical No. 3
Fire/Training Center
NH Parking Garage – Maintenance
NH Parking Garage – Parking Office
NH Parking Garage – Transit Office
Solid Waste Office
Streets Division Office
Airport Terminal
Maintenance Hangar
GUTS Hangar
Vehicle Maintenance Garage Offices





# 2. PW: Timer Control for Block Heaters

## Projects

- Block Heaters currently charge all night between shifts
- Timers will reduce time of charging
- Automatic charging will begin hours before shifts to ensure operation



Truck at Receptacle



Receptacles on Bollards

# 3. City Wide: Lighting Upgrade to LED

## Facilities Included in Recommended Lighting Scope

Riverfront Parking Garage	New Hampshire Street Parking Garage	Community Health
Library	Lawrence Arts Center	Indoor Aquatic Center
Community Rec Building	City Hall	Fire Station No. 5
Holcom Park Recreation Center	East Lawrence Recreation Center	Vehicle Maintenance Garage
Airport GUTS Hangar	Airport Hangars (A, B, and C)	Carnegie Building
Fire Station No. 2	Fire Station No. 4	Airport Maintenance Facility
Prairie Park Nature Center	Airport Terminal	Street Division – Red Barn
Fire Station No. 3	Parks & Recreation Maintenance	Fire & Rescue Training
Outdoor Aquatic Center	27 <sup>th</sup> Street Maintenance Building	Union Pacific Depot
South Park Administrative Office	YSI Sports Complex	Street Division Office
Street Division Salt Domes (Both)	Eagle Bend Clubhouse	Solid Waste Division
Parking/Animal Control/Transit	North Lawrence Pump Station	Venture Park Pump Station

### Notable Exclusions:

- Gymnasium Lighting
- Existing LEDs
- Sports Pavilion Lawrence



# 4. PW: Optimize DDC Controls

## Projects

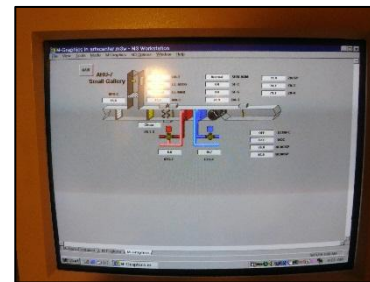
- Upgrade Outdated Community Health Controls
- Upgrade Outdated Control System at Lawrence Art Center
- Implement optimization strategies in select buildings
- Maximize performance in buildings with modern controls



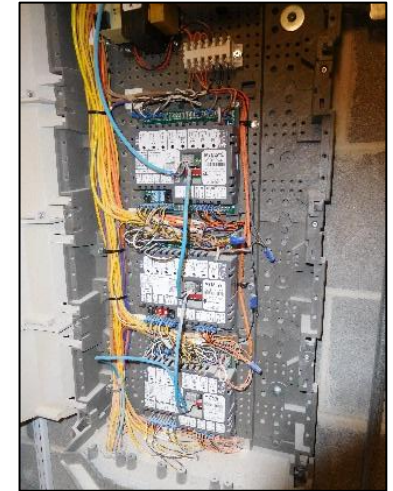
New Control Valve



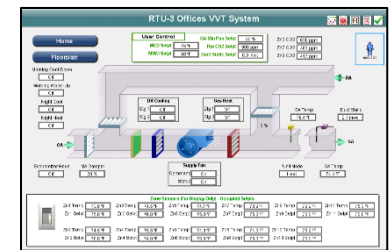
CO2 sensor for OA Control



Existing Windows '98 Interface at LAC



Aging JCI System



Modern Control System Interface



# 5. City Hall: Heater Replacements

## Projects

- Replace cabinet heaters in vestibules and stairwells
- Existing equipment has no effective control; creates comfort problems
- New equipment more efficient and more comfortable



Outdated cabinet heater

# 6. Building Weatherization Summary

## Projects

- Eliminate outdoor air infiltration
- Seal gaps on windows, doors, roof, etc.
- Will including caulking sealing, door sweeps, etc.



Sealing between wall and roof

## Buildings that Include Envelope Scope

Community Health Building	Fire & Rescue Training	South Park Administration Building
Indoor Aquatic Center	Parking/Animal Control/Transit	Community Building
Eagle Bend Clubhouse	Lawrence Art Center	Holcom Recreation Center
Airport Terminal	City Hall	Solid Waste Division
Airport Maintenance Facility	Union Pacific Depot	Street Division Office
Airport GUTS Hanger	East Lawrence Recreation Center	Library
Fire/Med #2, 3, 4 & 5	Prairie Park Nature Center	Carnegie Building





# 7. PW: Pole Lighting Upgrades

## Projects

- Convert existing lamps to LED
- Select poles will be replaced, as needed
- Most work in areas near downtown



# 8. Parks & Rec Lighting Upgrades

## Projects

- Existing parks lamps converted to LED
- Existing poles to remain



## Parks Included in Recommended Lighting Scope

Broken Arrow Park	Eagle Bend Golf Course	Prairie Park
Brook Creek Park	Edgewood Park	Rotary Arboretum
Burcham Park	Hand Park	South Park
Centennial Park	Hobbs Park	Veterans Park
Chief Jim McSwain Park	Holcom Park	Walnut Park
Clinton Park	Japanese Friendship Garden	Watson Park
Constant Park	John Taylor Park	Youth Sports Complex
Dad Perry Park	Ludlam Park	Clinton Lake Softball Complex
Deerfield Park	Lyons Park	



# 9. Comm. Health: Efficient Air Cleaners

## Projects

- Numerous small spaces at Community Health eliminate cost-effective option of limiting outdoor air ventilation
- High efficiency air filters are a cost effective alternative



Standard pleated filters



High-efficiency  
electronic air filters



# 10. Solid Waste: Replace Outdated RTU

## Projects

- Existing RTU beyond rated service life
- Replace with modern, more efficient unit
- Savings plus reduced maintenance justify immediate replacement



Outdated RTU at Solid Waste

# 11. Vehicle Maintenance: Ductless Split

## Projects

- Install ductless split system for server room
- Provides adequate cooling to service electronics in space

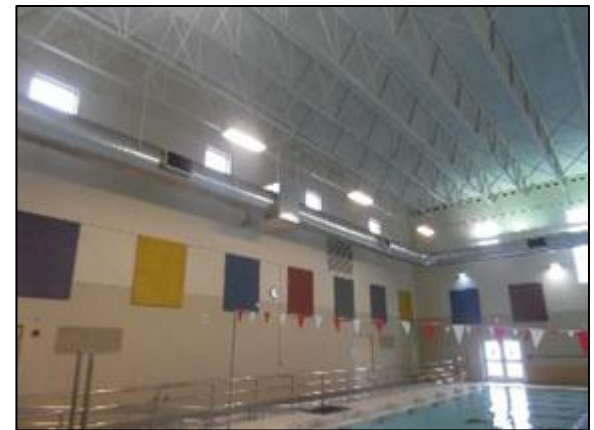
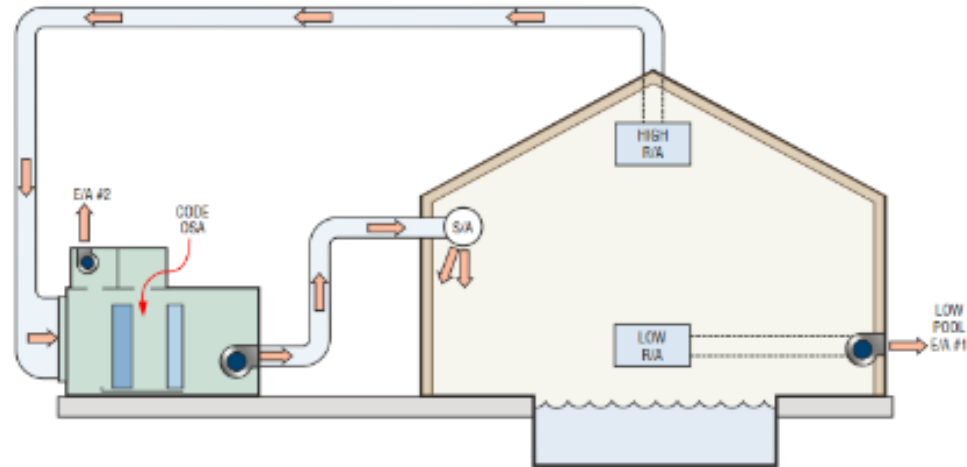


Ductless split system for server room

# 12. IAC: Humidity and IAQ Issues

## Projects

- Replace Dehumidification Units
- VAV Terminal Optimization
- Install Condensing Boilers
- Improved Air Distribution Design and Low Source Capture Exhaust
- Optimized Ventilation and Exhaust Control based on Activity
- Reduce Turnover & Tune Flows
- Replace Pool Heaters
- Replace corroded electrical gear



Ductwork in lap pool area





# 13. LAC: Upgrade Chiller

## Projects

- Existing chiller approximately 20 years old
- Unit is inefficient, maintenance intensive, and nearing end of service life
- New unit will be premium efficiency and provide 20+ additional years



Existing air-cooled chiller

# 14. Parks and Rec: Advanced Timers

## Projects

- Utilize advanced timers for tennis and basketball courts
- Lights shut off one hour after activation to prevent excess run times
- Similar to what City utilizes at Veterans park



Basketball Court with high-power lighting

### Parks Included

Broken Arrow Park	Centennial Park
Chief Jim McSwain Park	Deerfield Park
Edgewood Park	Hobbs Park
Holcom Park	Lyons Park



# 15. NH Garage: Replace HVAC Units

## Projects

- Existing heaters are antiquated and use electric for heat
- Propose installation of lower-maintenance, less costly to operate gas heaters



Proposed natural gas  
wall pack heater



# 16. Fire Station 5: Solar Installation

## Projects

- Best candidate for solar installation in Lawrence
- Utility rate based on consumption, not demand
- High visibility area
- Solar panels sized to 100 kW



Rendering of solar installation on Fire Station #5



# 17. E. Lawrence Rec: HVAC Upgrades

## Projects

- Three antiquated rooftop units (20+ years of age)
- Units near end of life, need replacement in near future
- New units will be more efficient, provide decades of future use
- Units are larger than standard, single-zone



1996 RTU at East Lawrence Recreation Center

# 18. Comm. Building: HVAC Upgrades

## Projects

- Numerous antiquated rooftop units (20+ years of age)
- Units near end of life, need replacement in near future
- New units will be more efficient, provide decades of future use
- Most units are standard, single-zone units



1993 RTU at Community Bldg



Hail Damage on RTU

# 19. Parks & Rec: Field Lighting

## Projects

- Existing lighting is 50+ year old metal halide
- Units near end of life, need replacement in near future
- Lights to be replaced with LED lamps



Existing metal halide lighting

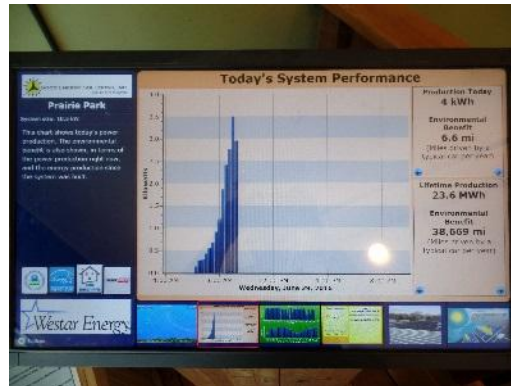
# 20. Prairie Park: GSHP System

## Projects

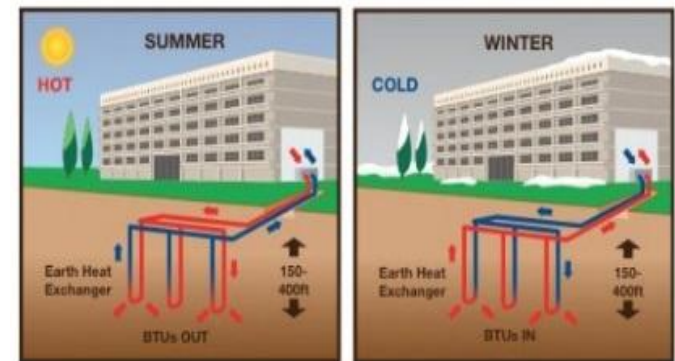
- Eliminate outdated HVAC system serving building
- Install new, ground-source heat pump system
- Wells can go under unused ground or existing parking lots
- System is both efficient and a great education opportunity for the City
- Will greatly improve indoor air quality (including odor)



20-year old furnaces



Educational interface



GSHP Schematic

# 21. City Hall: Replace Windows

## Projects

- Existing windows are largely outdated and inefficient
- Atrium area will not be addressed (other than weatherization)
- New windows will be double-paned and designed for commercial building
- Tinting, etc., to be determined with City staff



South-facing windows on City Hall





# 22. Outdoor Pool: HVAC & Pool Boilers

## Projects

- Common HVAC serves concession stand and main building
- New ductless split will be installed for concession stand
- Comfort, efficiency will be improved
- Condensing boilers installed to provide heat to pool



Existing, outdated pool boiler



Ductless Split System



# 23. Holcom: Install Gym HVAC Units

## Projects

- Remove existing, antiquated air handling units
- Eliminate outdated Ajax boiler
- Install packaged d/x HVAC units for heating and cooling
- New system will be more efficient and less maintenance intensive



Existing gym air handler



Existing Ajax boiler



Proposed packaged RTU

# 24. Comm. Health: Upgrade Chiller

## Projects

- Existing chiller approximately 20 years old
- Unit is inefficient, maintenance intensive, and nearing end of service life
- New unit will be premium efficiency and provide 20+ additional years



Existing air-cooled chiller



# 25. Airport Terminal: Replace HVAC

## Projects

- Existing split systems are near end of rated life
- CIP calls for upgrade of equipment
- New, higher-efficiency units to be installed



Sample new split system to be installed

# 26. Fire Station 2: HVAC Upgrades

## Projects

- Several antiquated rooftop units (20+ years of age)
- Units near end of life, need replacement in near future
- New units will be more efficient, provide decades of future
- Units are standard, single-zone units



Outdated RTU at Station 2

# 27. Fire Station 3: HVAC Upgrades

## Projects

- Multiple antiquated rooftop units (20+ years of age)
- Units near end of life, need replacement in near future
- New units will be more efficient, provide decades of future
- One unit will be relocated to provide better comfort and operation



Outdated RTU at Station 3

# 28. Holcom: Sports Field Lighting

## Projects

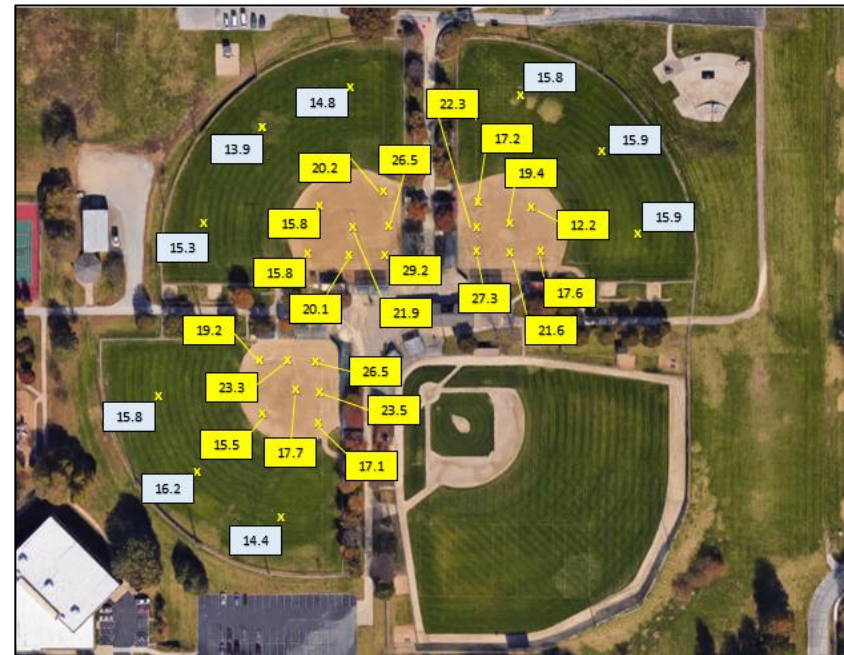
- Replace existing lamps and poles
- Redesign layout to maximize efficiency
- Improve light levels across all areas



ICE Field Lighting



Southwest Field



Field Light measurements taken at night



# 29. Comm. Health: Boiler Upgrade

## Projects

- Existing boilers at end of useful lives
- Equipment has been ongoing maintenance burden
- Boilers on CIP
- New equipment will be negligible gain in efficiency



Existing 20-year-old condensing boilers



# 30. Comm. Health: Roof Upgrade

## Projects

- Existing roof is outdated and showing substantial signs of wear
- Roof leaks becoming increasingly frequent
- Installation of modified bitumen or other new roofing system recommended



Substantial de-mineralization on roof

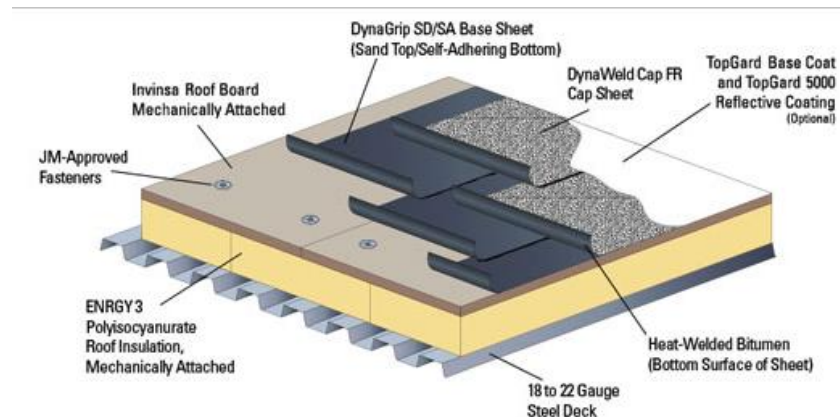
# 31. Fire Station 3: Replace Roof

## Projects

- Existing roof beyond rated useful life
- Leaks and condition dictate immediate replacement advisable
- CIP includes roof replacement
- Modified bitumen roof is recommended replacement



Existing roof deterioration



Modified Bitumen roof composition



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# Project Financial Overview

## Project Funded Using Savings Generated

- Depending on final project selection, positive payback each year
- Net positive of \$1,400,034 over 20 years to the city (Tier 1)
- Calculated using conservative 3% rate of energy escalation

## Addresses Future CIP & Other Infrastructure Projects

- Several projects completed from upcoming CIPs
- Additional priorities addressed that were under CIP threshold or on upcoming CIP

## Makes Best Use of Taxpayer Dollars

- Funds already allocated are being used to operate more efficiently



# CIP Projects Potentially Impacted

	Project Description	CIP Project #	CIP Request	Cost Paid	Annual Total
2017	Replace HVAC Units - Indoor Pool	PR1701CIP	\$330,000	\$330,000	\$1,050,000
	Roof Replacement - Fire/Med #3	PW17B2CIP	\$140,000	\$140,000	
	Downtown Canopy Lighting sidewalk and roofing	PW17B4CIP	\$350,000	\$30,000	
	Community Health Boiler Replacement	PW17B6CIP	\$225,000	\$225,000	
	Community Health Chiller Replacement	PW17B6CIP	\$325,000	\$325,000	
2018	Replace HVAC Units - Indoor Aquatics Center	PR1811CIP	\$330,000	\$330,000	\$1,655,000
	Holcom Park Center - HVAC Replacement (Gym)	PR1814CIP	\$250,000	\$250,000	
	HPSC Ball Diamond Light Replacement	PR1815CIP	\$500,000	\$500,000	
	Fire/Medical HVAC & General Repair	PW18B1CIP	\$120,000	\$75,000	
	Community Health Roof Replacement	PW18B3CIP	\$500,000	\$500,000	
2019	Pole Lighting and HVAC Upgrade Airport	PW19A1CIP	\$75,000	\$75,000	\$125,000
	Fire/Medical HVAC Replacement	PW19B1CIP	\$100,000	\$50,000	
2020	Lighting Upgrade New Hampshire Garage	PW20B1CIP	\$75,000	\$75,000	\$75,000
<b>Project Totals</b>			<b>\$3,320,000</b>	<b>\$2,905,000</b>	<b>\$2,905,000</b>



# Project Financing

## Seeking to Issue First Green Bonds in Kansas

- Designates to investors that funds are used for sustainable purposes
- International designation catching on in the United States since 2013
- Process to qualify for “Green” designation already planned to be followed

## Financing over 20 year period

- Matching period to life of improvements
- Planned general obligation with market rates determined at time of sale
- Preliminary analysis show financial estimates are reasonable
- Utilizes savings estimate to transfer from each department into debt service fund to make debt payment



# Purchasing Overview

## Competitive Selection of 360 Energy Engineers

- Included qualifications and financial criteria
- Selected firm positioned to provide best value to the City
- 360 will serve as turnkey, general contractor for project

## Subcontractor Selection

- City will work with 360 to pre-qualify potential subcontractors
- 360 issues specifications, receives competitive bids
- City and 360 review bid tabulations, agree upon subcontractor selection

## Competitive Process Embraced by City and 360

- Not “legally” required for energy performance contracting projects
- Both the City and 360 seeking to mirror City standard practices

# Agenda

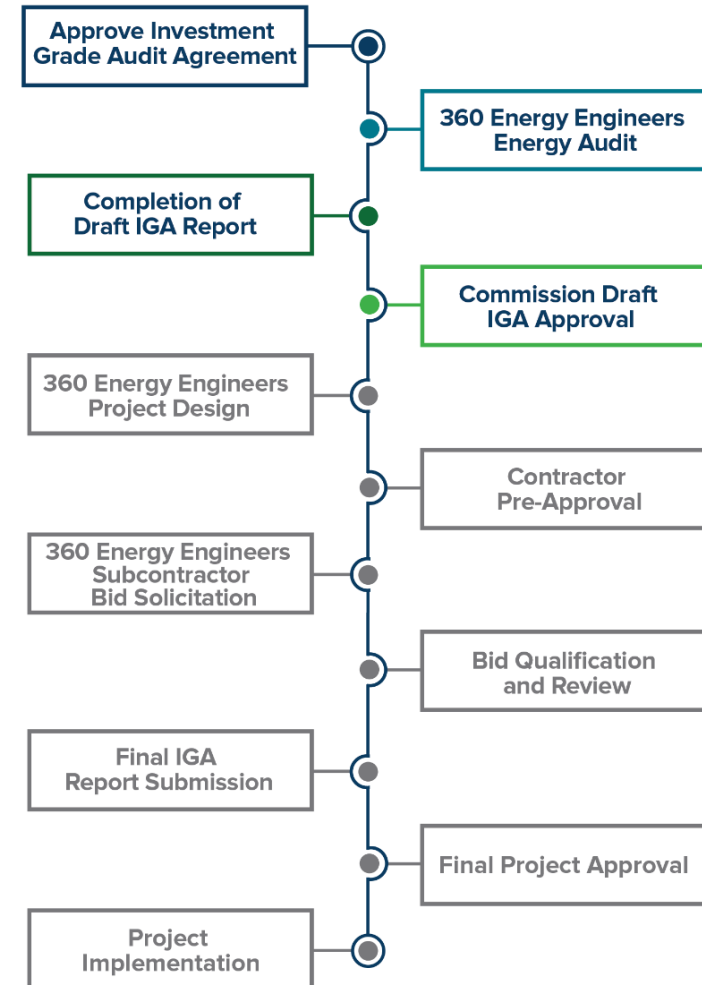
- Review of Goals
- IGA Preliminary Results
- Project Financials
- **Next Steps**



# Commission Approves Draft IGA

- City staff makes recommendations regarding scope of project
- Commission provides preliminary approval of scope for development

**Target Completion Date:  
Sept. 6, 2016**

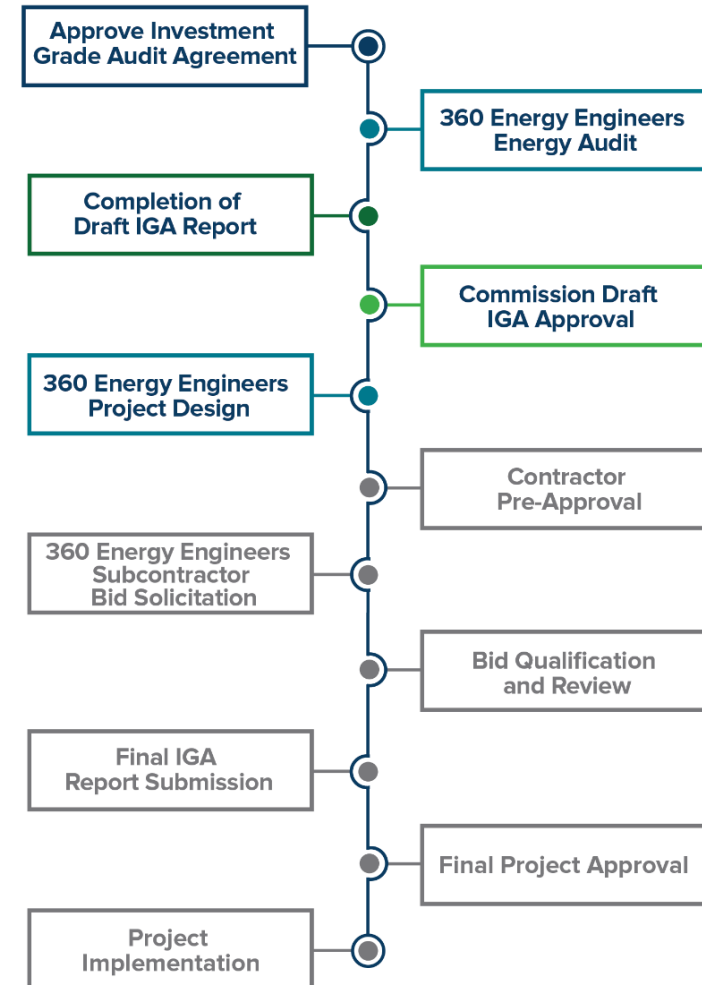




# Project Development

- Develop detailed project plans
- Create drawings for applicable projects
- Detailed specifications for all scope
- Work with City Finance office to identify preferred project financing options

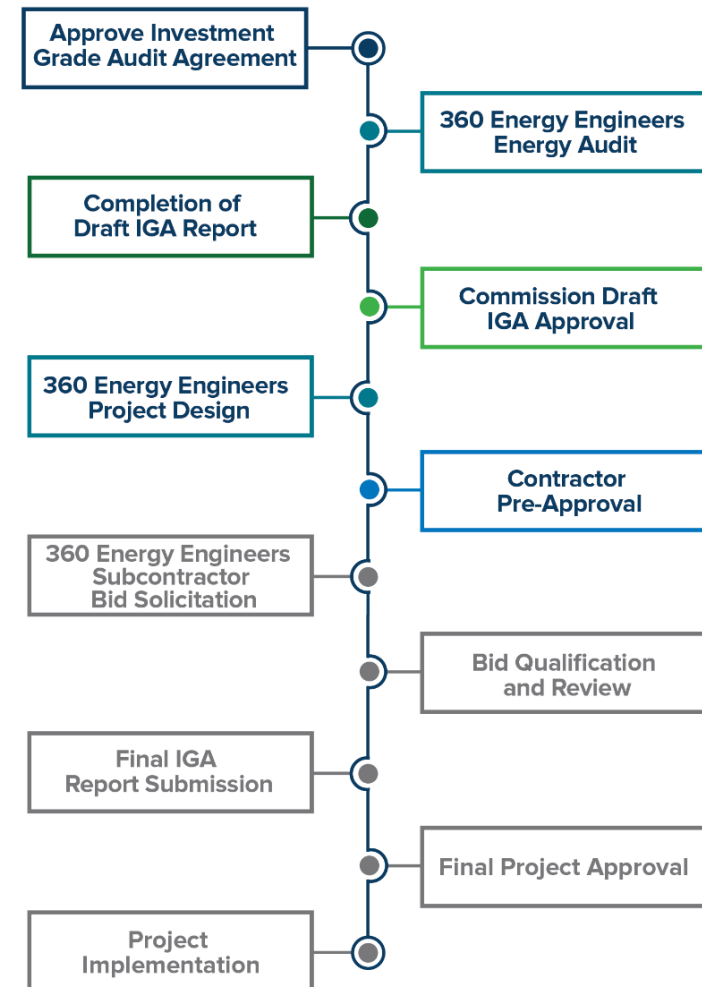
**Target Completion Date:  
November 2016**



# Subcontractor Pre-Approval

- City staff advertises projects to contractors, invites them to submit for pre-approval
- 360 Energy Engineers conducts pre-approval process to ensure experience, resources, etc.
- City staff and 360 Energy Engineers approve final list of subcontractors to be invited to bid

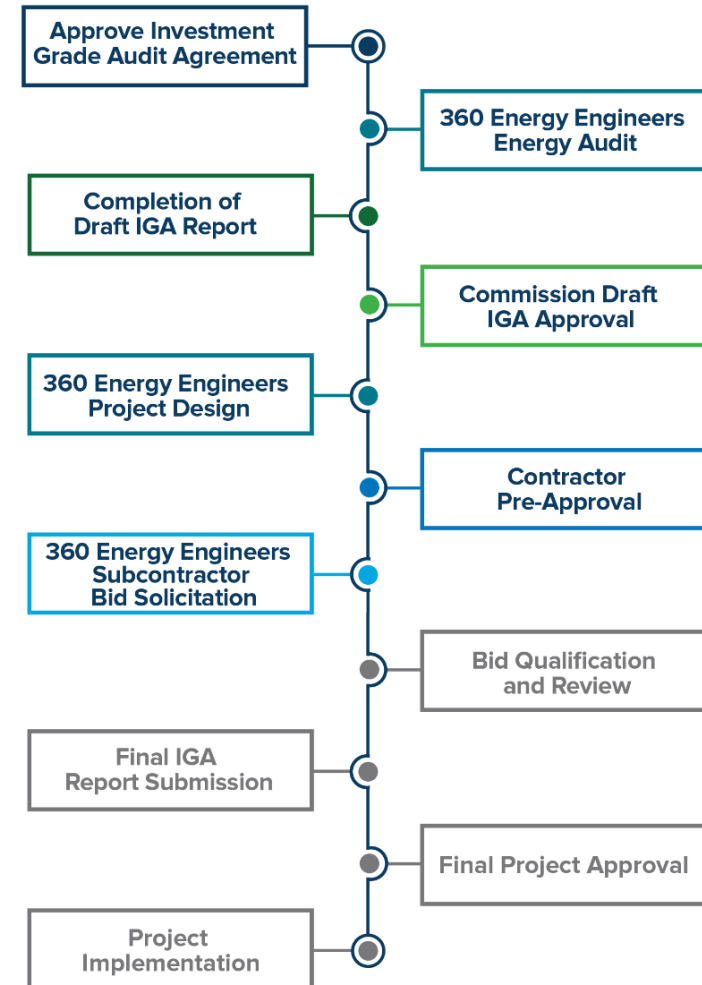
**Target Completion Date:  
November 2016**



# Subcontractor Bid Solicitation

- Provide bid specs to potential subcontractors
- Conduct site visit with each trade
- Manage questions, addenda, etc.
- Receive bids for all project components
- Receive bids for project financing, if City elects to use 3rd-party financing

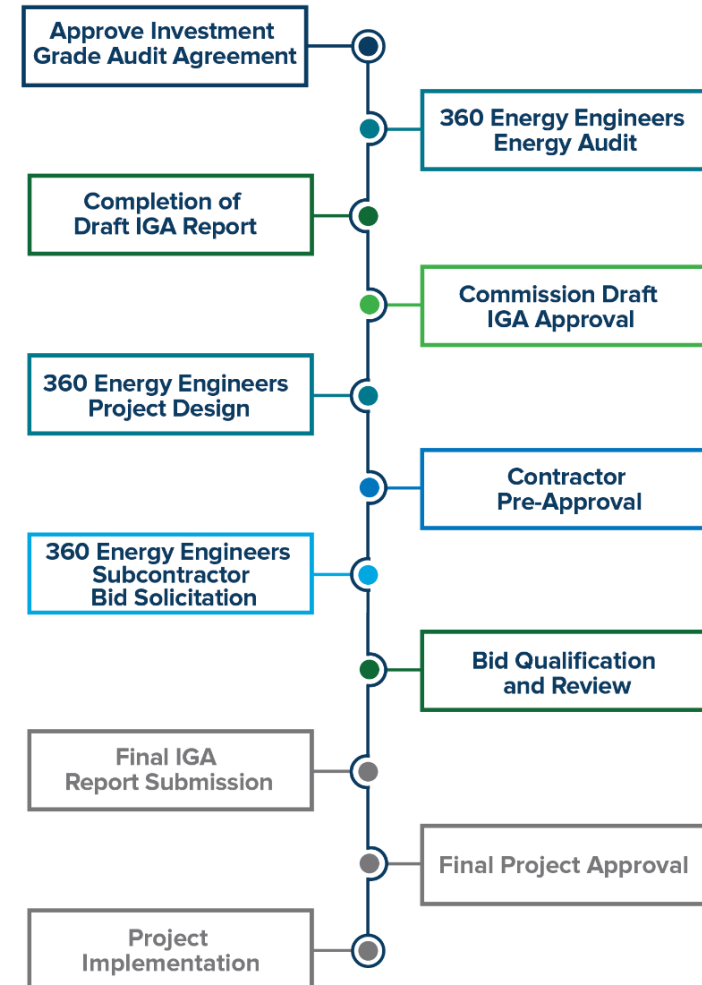
**Target Completion Date:  
December 2016**



# Bid Qualification & Review

- 360 Energy Engineers conducts reviews of bids received
- 360 Energy Engineers recommends most qualified low-bidder for each project
- City staff and 360 Energy Engineers review bid tabulations
- City staff and 360 Energy Engineers agree upon final list of recommended subcontractors

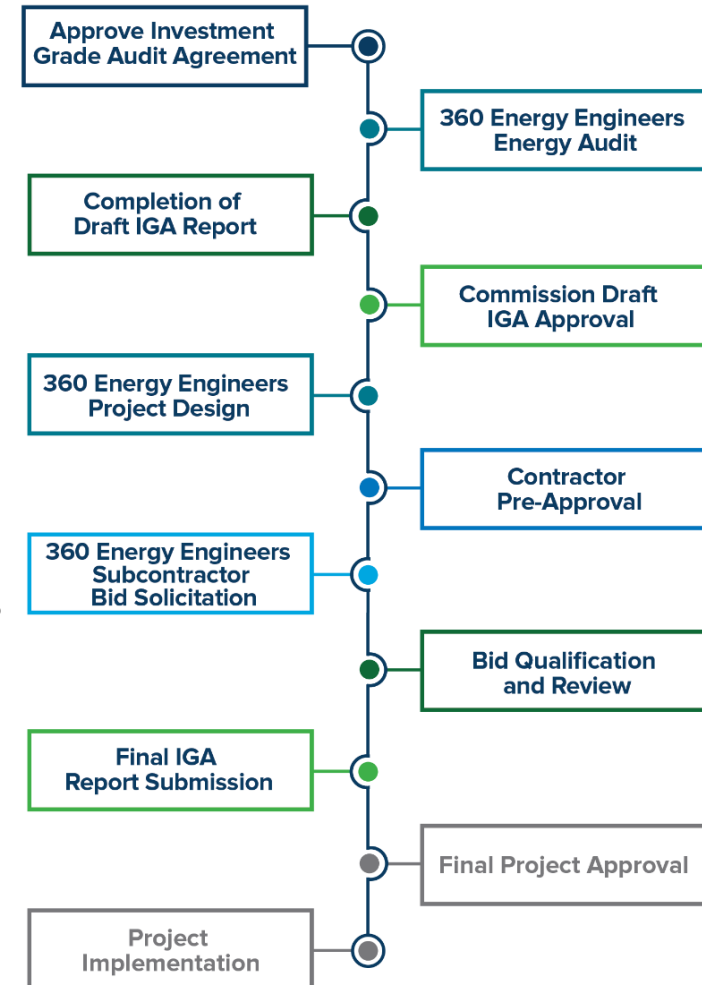
**Target Completion Date:  
December 2016**



# Final IGA Report Submission

- State Energy Office approves report findings
- 360 Energy Engineers provides final project price, guaranteed savings, and detailed scope of work
- City staff reviews final IGA Report
- City staff reviews financing options
- City and SEO attorneys approve contract docs

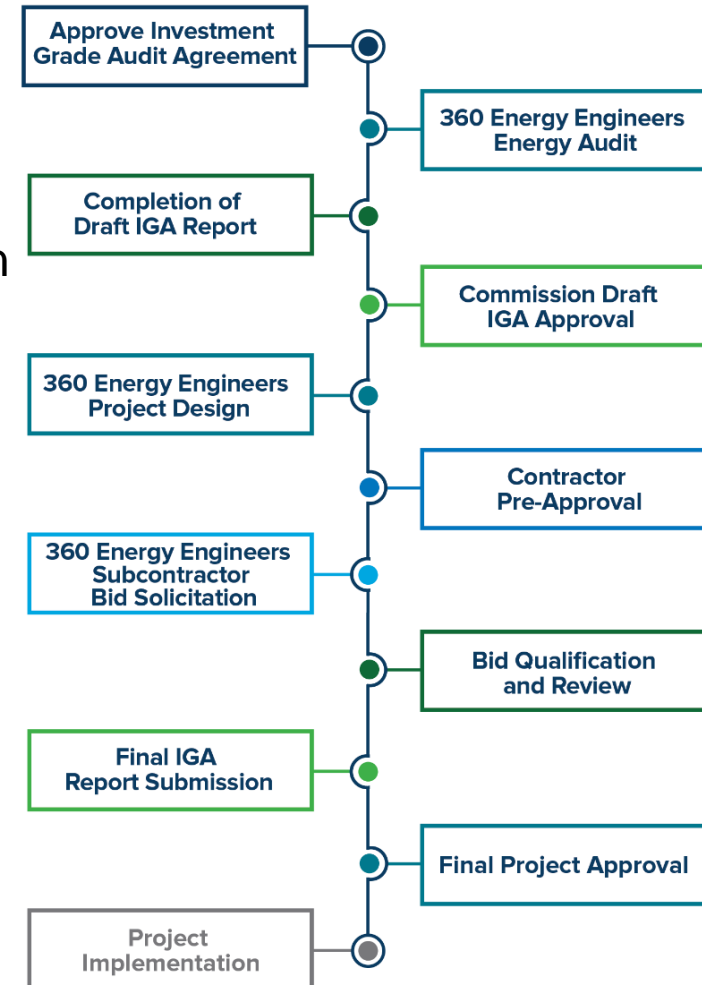
**Target Completion Date:  
January 2017**



# Final Contract Approval

- State Energy Office approves report findings
- Commission reviews staff recommendations
- Commission authorizes project implementation contract with 360 Energy Engineers
- City Commission reviews staff financing recommendations
- Commission authorizes project financing

**Target Completion Date:  
January 2017**

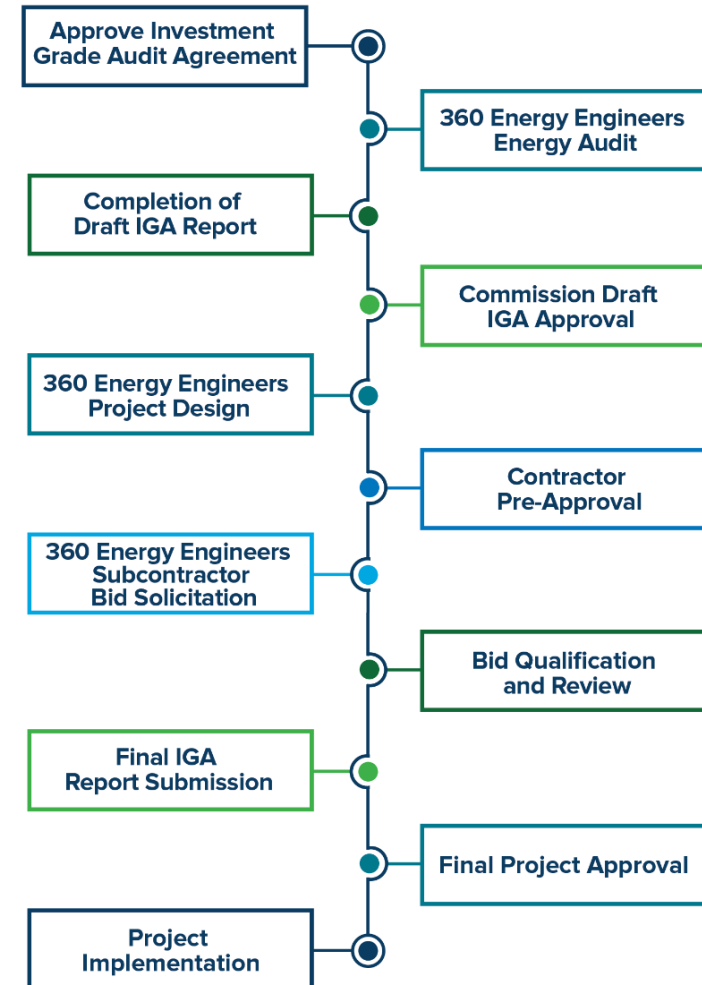




# Project Implementation

- State Energy Office approves report findings
- 360 Energy Engineers manages all aspects of implementation
- Frequent progress updates with City staff
- Written updates to commission
- Full system commissioning
- Ongoing performance maximization

**Target Completion Date  
Late 2017**



# Questions?

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