

COMMISSIONING

*DEVELOPMENT OF COMMISSIONING PROCESS IN
INDIA*

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AIR-CONDITIONING

AIR-CONDITIONING

- THE PRIMARY FUNCTION OF AN AIR-CONDITIONING SYSTEM IS TO MAINTAIN INSIDE DESIGN CONDITIONS AS REQUIRED FOR HUMAN COMFORT OR REQUIRED BY A PRODUCT OR PROCESS.
- TEMPERATURE, HUMIDITY, DUST, NOISE, ODOUR, PRESSURE, AIR QUALITY, ARE TO BE MAINTAINED AS PER DESIGN
- THE AIR-CONDITIONING CAPACITY IS BASED ON THE ACTUAL INSTANTANEOUS PEAK LOAD CONDITIONS AND CAN ONLY BE ESTIMATED.
- PEAK LOAD EXISTS HARDLY FOR 6 % AND 75% LOAD FOR 48% OF THE TIME; 50% LOAD FOR 36% AND 25% LOAD FOR 10% OF THE TIME IN A YEAR
- AS SUCH MAINTENANCE OF DESIGN CONDITIONS WILL NOT MEAN THAT HVAC SYSTEM IS RUNNING EFFICIENTLY

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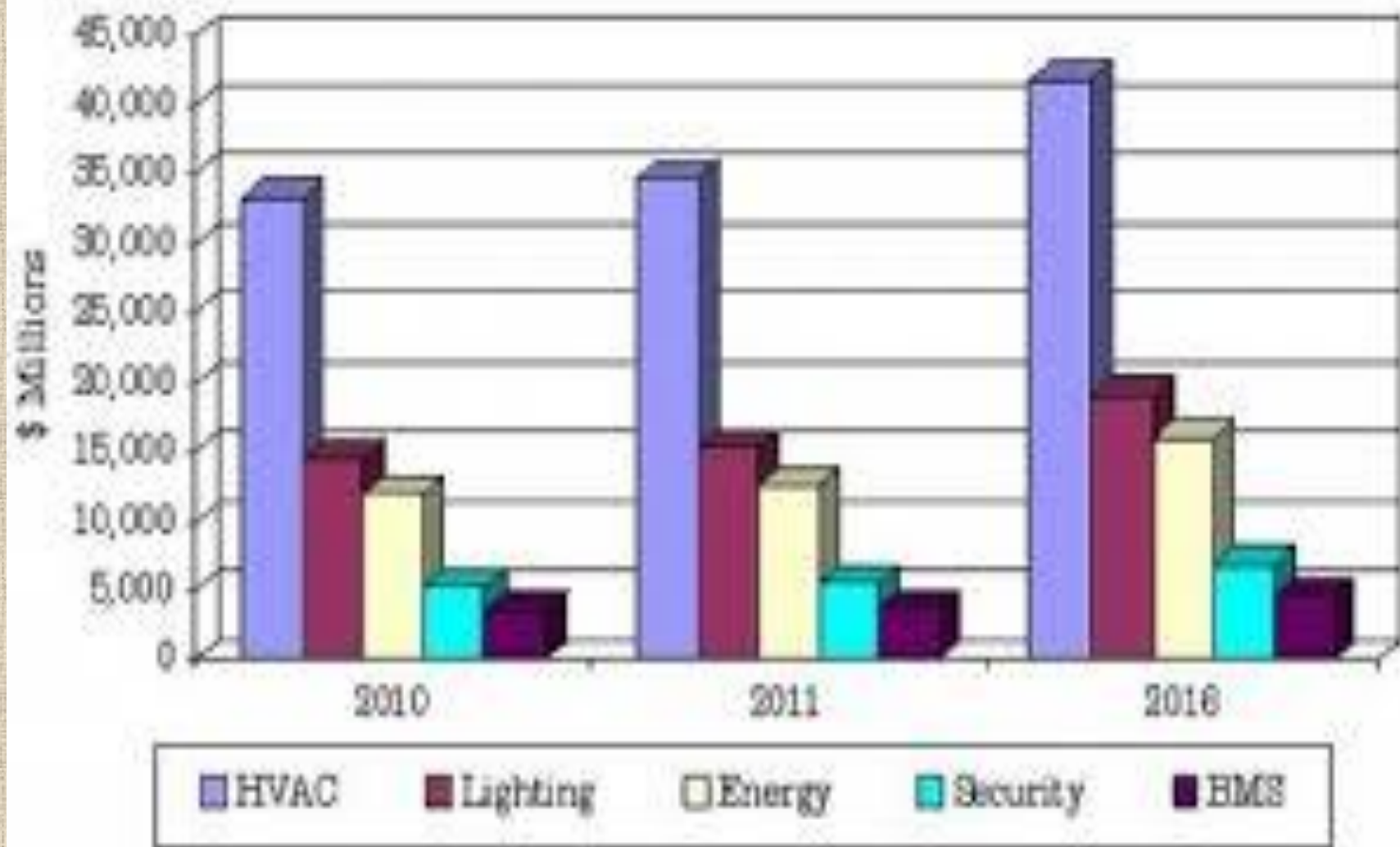
ENERGY SITUATION

- ENERGY SITUATION
- HIGH RATE OF GROWTH OF CONSUMPTION BUT REDUCTION IN PRODUCTION AND TRANSMISSION LOSS
- ENERGY PRODUCTION HAS ENVIRONMENTAL EFFECTS
- CONSUMPTION IN INDIA 1980 - 230 BILLION KWH
- CURRENT CONSUMPTION 835 BILLION KWH
- ONE UNIT SAVED IS TWO UNITS PRODUCED
- ENERGY SAVING IS THE BUZZ WORD
- HVAC SYSTEMS CONTRIBUTE 50% OF CONNECTED LOAD









HUGE SPURT IN HVAC DEMAND!



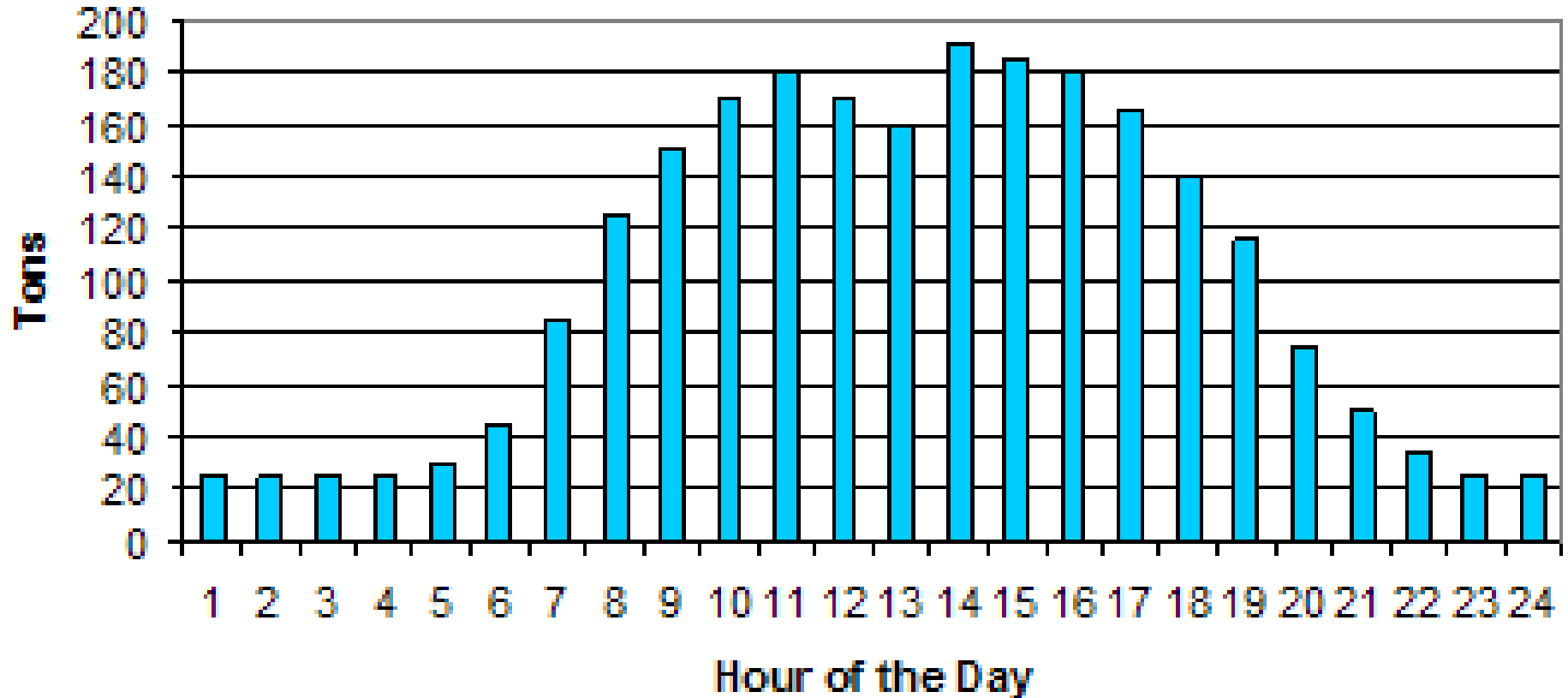
MEGA HVAC SYSTEMS!





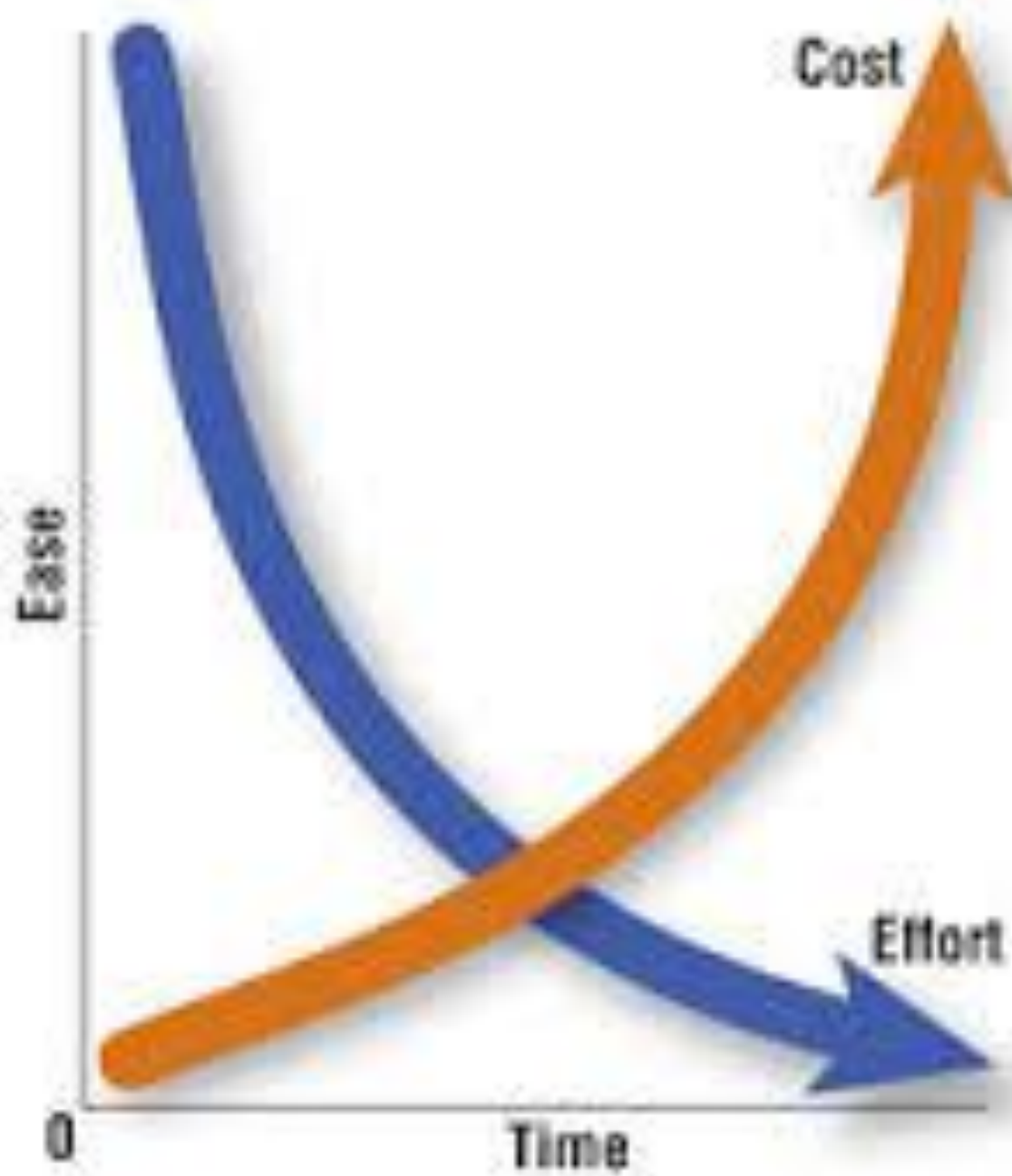


Daily Cooling Demand

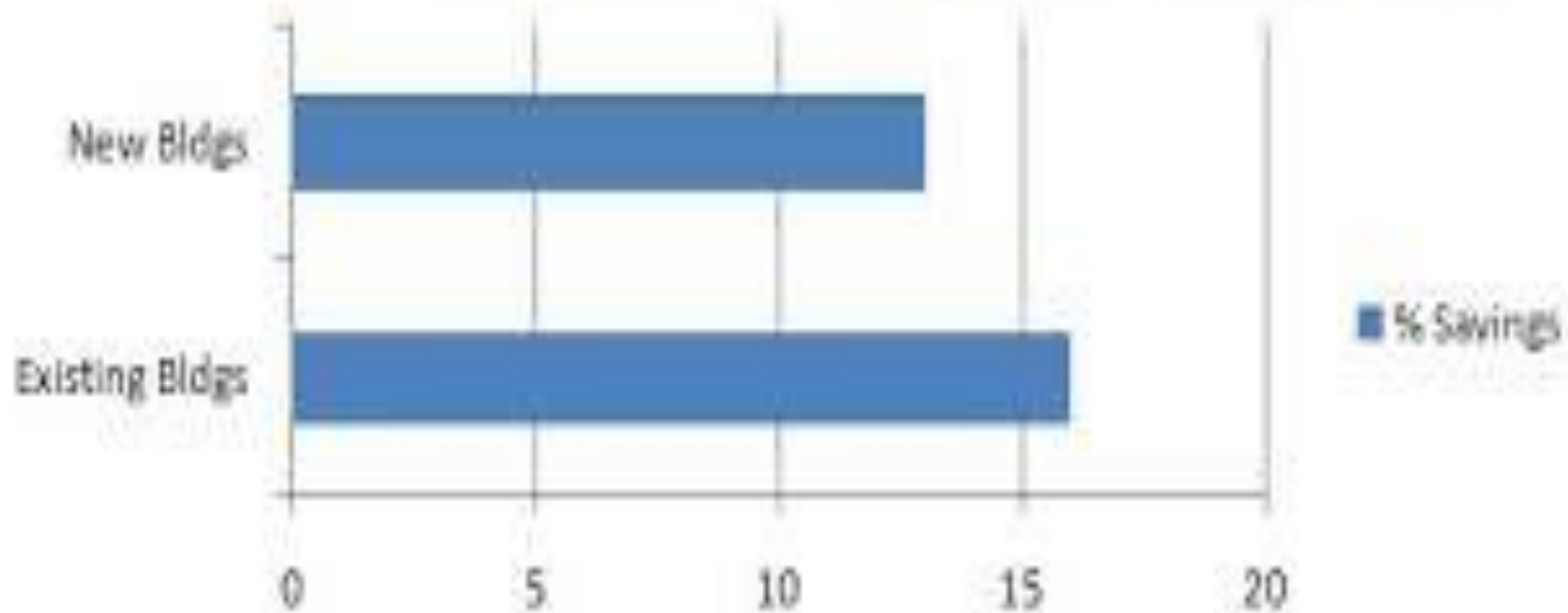




comissioning



% Energy Savings After Building Commissioning



Above chart based on commissioning results of 643 projects complete throughout U.S.





HVAC Testing & Commissioning



IAPD

**INTEGRATED APPROACH
TO PROJECT DELIVERY**



ISHRAE

Indian Society of Heating, Refrigerating
and Air Conditioning Engineers

EDUCATING THE STAKE HOLDERS

INTEGRATED APPROACH TO

PROJECT DELIVERY

THROUGH PANEL DISCUSSIONS

INTEGRATED APPROACH TO PROJECT DELIVERY

FIVE FINGERS IN THE HAND FOR A SUCCESSFUL PROJECT:

OWNERS/PROJECT MANAGERS

ARCHITECTS

CONSULTANTS

CONTRACTORS/MANUFACTURERS/SUPPLIERS

FACILITY MANAGERS

PROPER CO-ORDINATION IS REQUIRED AMONGST THIS FAMILY

ALL THE STAKE HOLDERS SHOULD BE ON THE SAME PAGE



ISHRAE

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and Air Conditioning Engineers

GUIDELINES WILL BE CONSOLIDATED TO ARRIVE AT THE TECHNICAL GUIDELINES, SEQUENCING, ROLES AND RESPONSIBILITIES OF EACH STAKE HOLDER AND CRITICAL TO QUALITY – WITH A BOOK – “**GUIDELINES – ISHRAE INTEGRATED APPROACH TO PROJECT DELIVERY**” WHICH WILL BE OF USE BY ALL THE STAKE HOLDERS

CERTIFICATION – ACREDITATION

ISHRAE CERTIFIED/ACREDITED PROFESSIONAL

THERE IS A SEVERE SHORTAGE OF THE CAPABLE MANPOWER IN THE INDUSTRY

ONLY QUALIFIED AND EXPERIENCED MANPOWER SHOULD BE ALLOWED TO WORK ON THE SYSTEMS

A SELF LEARNING WITH FULLY ANIMATED PROGRAM IN ENGLISH AND REGIONAL LANAGUAGES WILL BE DEVELOPED LEADING TO CERTIFICATION WHICH INCLUDES – COMMISSIONING PROFESSIONAL, PERFORMANCE EVALUATION PROFESSIONAL AND OPERATION AND MAINTENANCE PROFESSIONALS.



ISHRAE

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THIRD PARTY COMMISSIONING



3RD PARTY COMMISSIONING AGENCY REPORTS TO THE OWNERS AND CONSULTANTS

INVOLVED FROM DAY ONE INCLUDING DESIGN

STUDIES TECHNICAL SUBMITTALS AND DRAWINGS

VISITS PROJECT SITE AT INTERVALS AND CHECK THE PROVISIONS FOR COMMISSIONING

DOES COMMISSIONING

CHECKS PARAMETERS WITH DESIGN

DOCUMENTATION AND TRAINING IS DONE

... commissioning is NOT just turning up
the day after construction is complete
and pressing the

BIG GREEN BUTTON!



NEEDS
RESOURCES
PRIORITIES



PROVIDERS
PROCESS
CONTRACT



Commissioning
Cycle



**PRE-DESIGN PHASE
(PROGRAMMING)**

**OWNER PROJECT
REQUIREMENTS**

DESIGN PHASE
• schematic design
• design development
• documentation

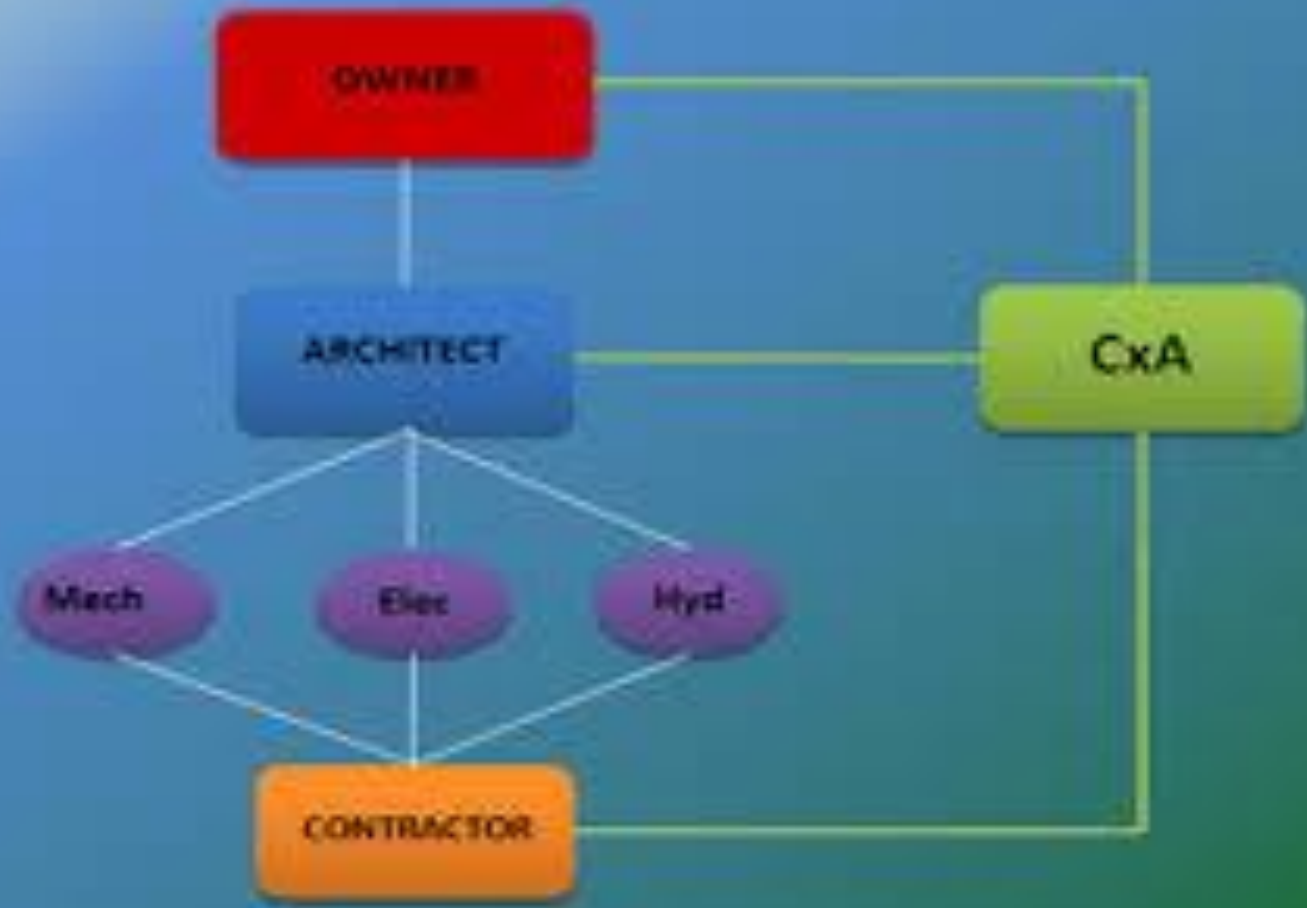
BASIS OF DESIGN
**DESIGN SUBMITTAL
REVIEWS**

CONSTRUCTION PHASE

**VERIFY INSTALLATION
PERFORMANCE TESTING**

**OCCUPANCY &
OPERATIONS PHASE**

**END-USER TRAINING
SYSTEMS MANUAL**



COMMISSIONING AUTHORITY

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graph TD; CA[COMMISSIONING AUTHORITY] --- CT[COMMISSIONING TEAM]; CA --- CP[COMMISSIONING PLAN];
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COMMISSIONING TEAM

- Commissioning Authority
- Owner
- Design team professionals
- Other professionals depending on construction phase

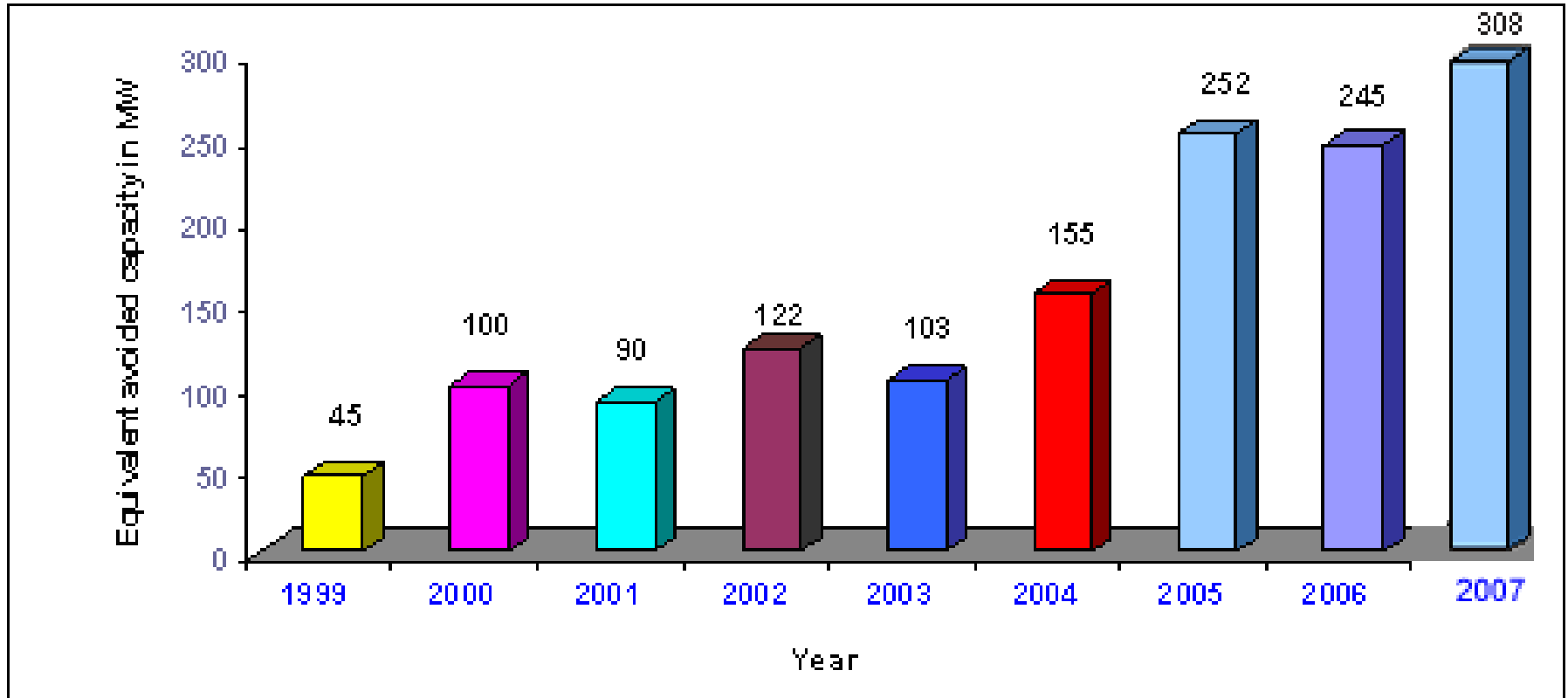
COMMISSIONING PLAN

- Outlines procedures to implement Commissioning Process, including info sharing
- Identify roles and responsibilities
- Schedule of activities, including major milestones
- Establish format for documentation
- Process for integrating into the design submittal process



SMART Commissioning
offers quick payback.

Electrical Energy Saving Equivalent Avoided Capacity in MW





COMMISSIONING PROCESS











Building Commissioning

- New and Existing Building Commissioning
- Retro-Commissioning
- Re-Commissioning
- Continuous Commissioning









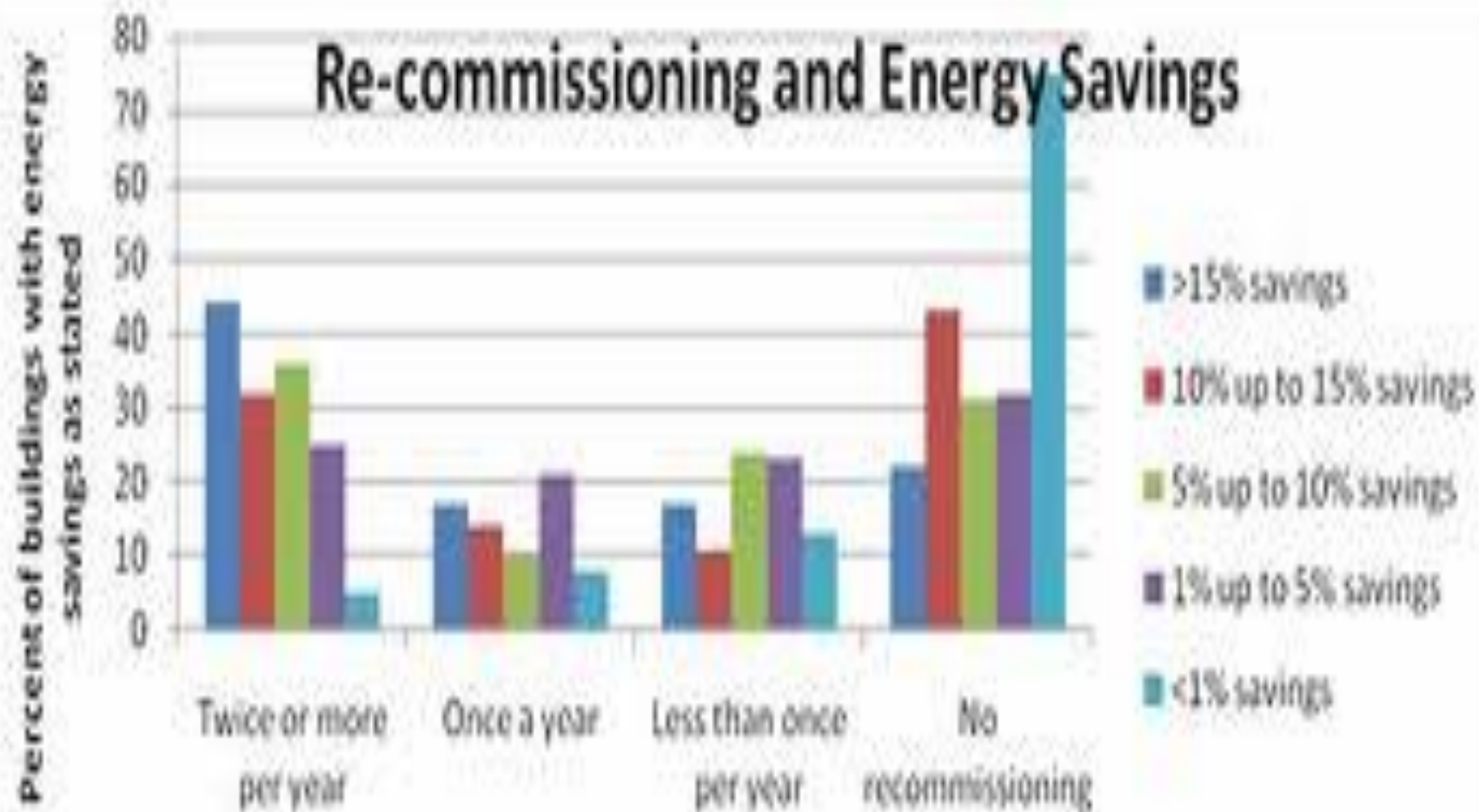




Testing in progress
Do not touch



Re-commissioning and Energy Savings



Percent of energy savings for different frequencies of re-commissioning









COMMISSIONING & HANDING OVER

COMMISSIONING & HANDING OVER

- COMMISSIONING IS A SYSTEMATIC PROCESS TO ENSURE THAT THE SYSTEM PERFORMS ACCORDING TO THE DESIGN INTENT
- COMMISSIONING MAXIMIZES ENERGY EFFICIENCY AND MINIMIZES ENVIRONMENTAL IMPACTS
- TRAINING SHALL BE PERFORMED BY QUALIFIED PERSONNEL TO ENSURE THAT THE FACILITY STAFF HAS ALL THE INFORMATION NEEDED FOR OPERATION WITH MANUALS AND DRAWINGS

COMMISSIONING BENEFITS

ENERGY CONSERVATION BENEFITS

- ENSURING PROPER FUNCTIONING OF HVAC SYSTEM ON CONTINUAL BASIS DECREASES MAINTENANCE COSTS
- OWNER BENEFITS WHEN THE SYSTEMS WORK CORRECTLY WHICH IN TURN REDUCES THE OCCUPANT COMPLAINTS AND ALLOWS THEM TO ENJOY A HEALTHIER AND PRODUCTIVE ENVIRONMENT
- SAVING IS ONLY A RELATIVE TERM AND IMPROVEMENT IS POSSIBLE AT EVERY STAGE ON CONTINUOUS BASIS AND THERE IS NO LIMIT FOR THIS!



"Save
Energy
Save
Planet"





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KILL•A•WATT

IT'S YOUR JOB

*It's everyone's responsibility
to reduce energy costs*



lights



plugs



vacuum



power

THANK YOU