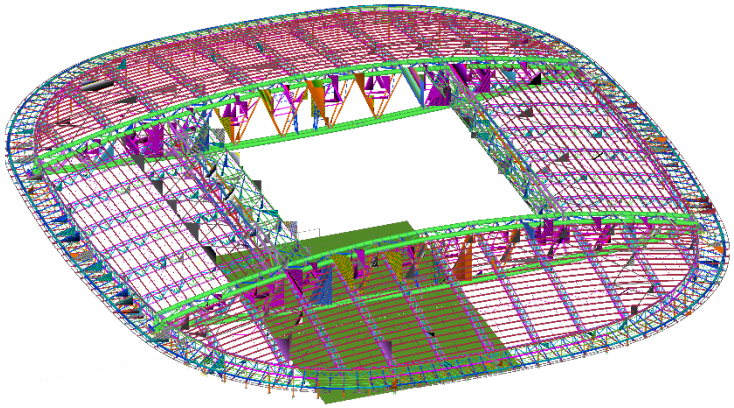
Research at BU – Civil Engineering

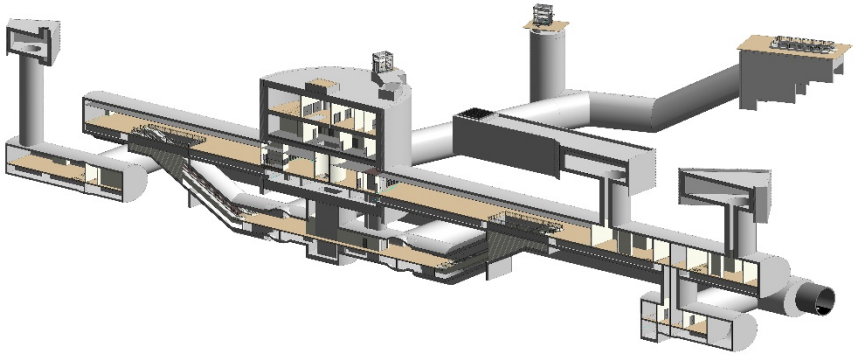
Research in Construction and Project Management

Construction and project management

1. BIM-enabled project management:

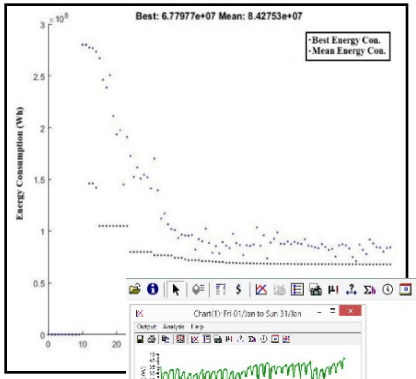
Investigation of critical success factors of BIM implementation process at construction project level

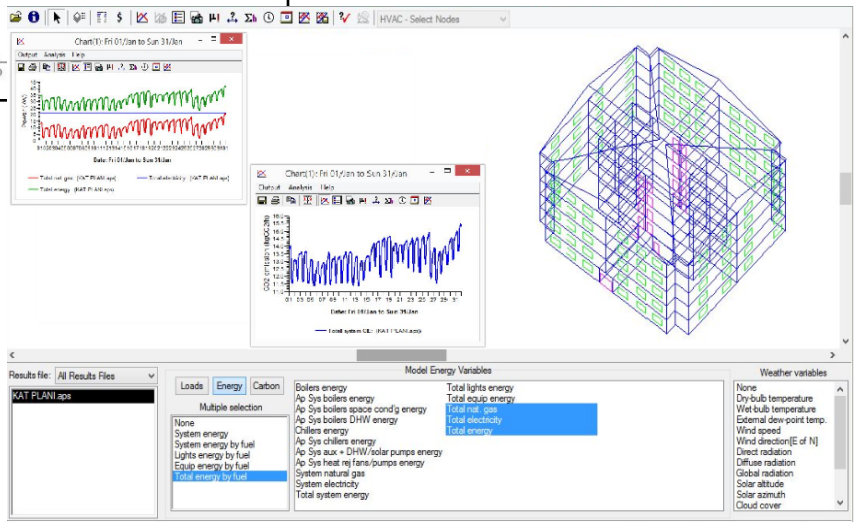




2. Energy-efficient building design:

Assisting early design decisions to optimize green building design using BIM and genetic algorithms





Construction and project management

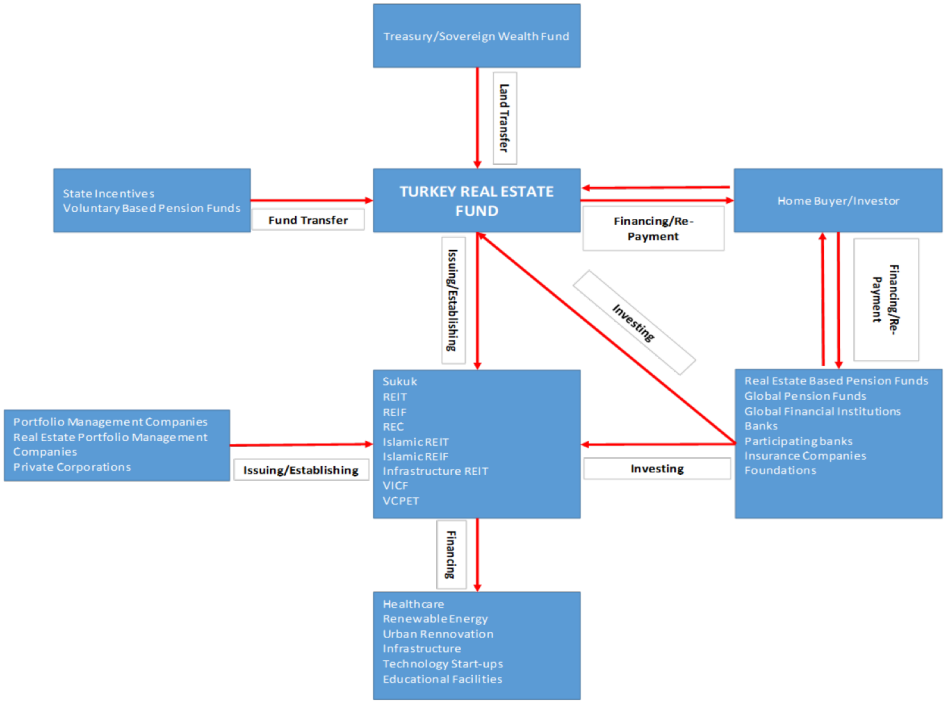
3. PPP projects:

Risk management and finance of healthcare PPP projects

PPP model type	Infrastructure-based model	Discrete Clinical Services model	Integrated PPP model
PPP model components	**Infrastructure + financing +** nonclinical services + clinical support services (as relevant)	Clinical services	**Infrastructure + financing +** nonclinical services + clinical and clinical support services
Private partner responsibilities	Private partner is contracted to **design**, **build**, **finance** and **maintain** facilities. Delivery of nonclinical services can be included (e.g., laundry, cafeteria). More advanced projects include delivery of clinical support services (e.g., lab, radiology)	Private partner is contracted to **deliver** discrete clinical services (e.g., clinical support services, specialty care services)	Private partner is contracted to **design, build, finance, operate** facilities and **deliver** nonclinical and clinical services
Common PPP model name(s)	Design Build Finance Maintain (DBFM), Design Build Finance Maintain Operate (DBFMO), Design Build Operate Transfer (DBOT), Private Finance Initiative (PFI), Infrastructure PPP, Accommodation model	Operation and management (O&M) contracts	Design Build Operate Deliver (DBOD), Clinical services PPP, Integrated PPP, Public Private Integrated Partnership (PPIP), Alzira model
Healthcare delivery impact	Lower → Higher		

4. Real estate funds:

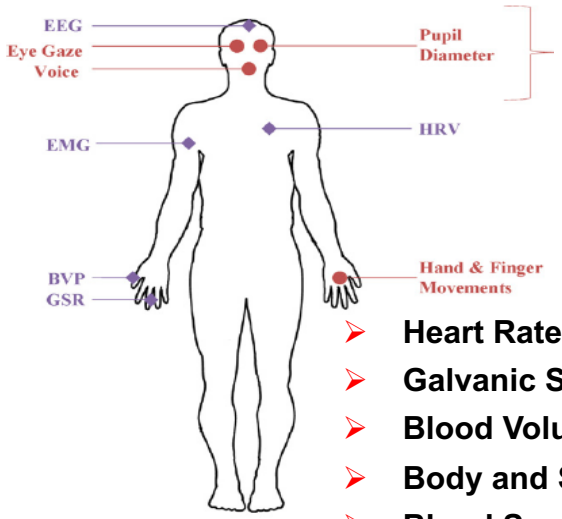
Development of a real estate-pension fund investment ecosystem



Advanced Safety Management

- **V-SAFE (Virtual Safety Analysis For Engineering applications)**
  - Developing a virtual environment based safety training tool for construction professionals.
  - Measuring the effectiveness of V-SAFE by using eye tracking technologies and biometric measures.
  - Student and field tests.

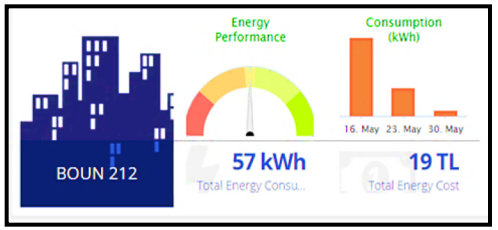
- **Analysis of Physiological Risk Factors for Occupational Accidents**
  - Accidents can occur during construction works due to fatigue, poor quality attention, physical or physiological strains.
  - Analyzing the relationship between the accidents and biometric parameters of the workers (HR, GSR, BVP,ST,BSL).

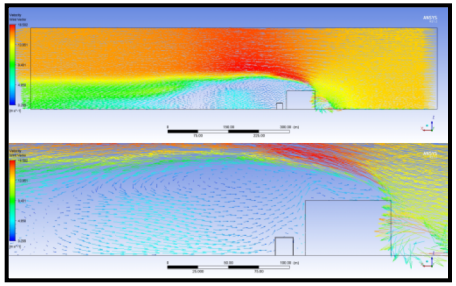


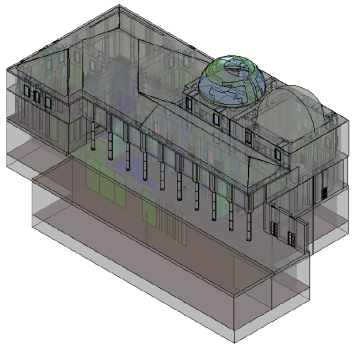
- Heart Rate (HR)
- Galvanic Skin Response (GSR)
- Blood Volume Pressure (BVP)
- Body and Skin Temperature (ST)
- Blood Sugar Level (BSL)

Building Energy Consumption Factors

- **Impact of Occupant Behavior on Energy Consumption**
  - Monitoring real time energy consumption in a university dorm. Identifying occupant types.
  - Analyzing the impact of occupant behavior on building energy consumption by using agent based simulation.
  - Analyzing the impact of occupant behavior on the retrofitting decision.
- **Impact of Nature and Nearby Environment**
  - The effect of turbulence area on heating and cooling energy consumption of buildings.
  - Multi building effect.
- **Impact of Building-related Characteristics**
  - Optimizing retrofitting decisions.
  - Improving the energy efficiency performance of heritage buildings.








Thank you