

Market Intelligence?

Eliciting valuable information from non-expert stakeholders

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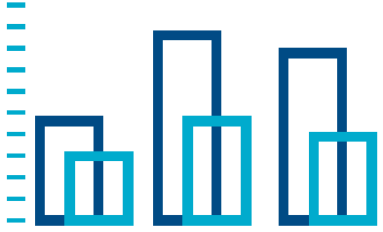
November 20, 2019

Project Overview

- » **Goal:** Support large commercial and institutional customers with formal procurement processes to choose clean technologies with confidence
- » **Sponsor:** California Energy Commission EPIC Program
- » **Researchers:**
 -  **UC DAVIS** Energy and Efficiency Institute
 - Partners: LBNL, UC Berkeley CBE, Energy Solutions, et al.



Project Objectives



- » **Evaluate market-ready technologies at early adoption phase:** Selected energy efficiency, renewable distributed energy generation and energy storage products will be evaluated at test facilities.



- » **Create a Buyers' guide:** Comprehensive evaluation results will be compiled to allow 'apples-to-apples' comparisons of similar products, and comparisons to existing government and industry standards.



- » **Disseminate information:** The Buyers' guide will be made available to commercial and institutional procurement officers through a public web platform.



PRODUCT TESTING FOR SMARTER PURCHASING

PRODUCTS TESTED IN OUR LABS

Objective laboratory testing by the world's preminent laboratories



Product Category



Product Category



Product Category



Product Category



Product Category



Product Category

Target Products

- » Electric Space Conditioning
- » Electric Water Heating
- » Commercial Refrigeration
- » Energy Management and Information Systems
- » Buildings Fenestration and Windows
- » Plug-load Products
- » Lighting
- » Agricultural Irrigation Systems
- » Energy Storage

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User Needs



Energy and
Greenhouse
Gas Impact



Evaluation
Feasibility
and Cost

Target Users

- School districts
- Ports
- Local governments
- State of California
- Military bases
- Construction industry
- Hospitals
- Colleges and Universities
- Agriculture
- Equipment vendors / installers
- Food processing, distribution and food service industry including supermarkets
- Data centers
- Commercial real estate
- Property management companies
- Design, consulting, engineering firms

Survey overview

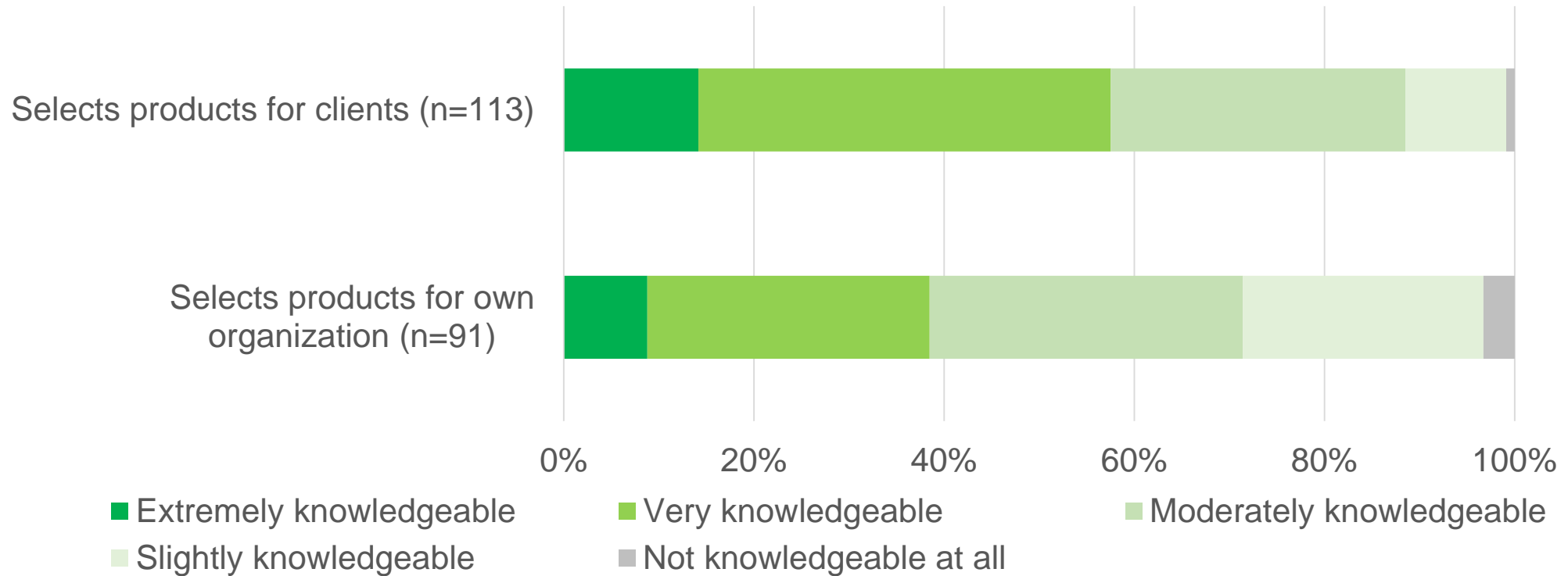
- » Platform: Qualtrics (online)
- » Incentives: \$20 gift card and chance to win \$500
- » Length: ~10 minutes
- » Target: 200 responses from across all target customer groups
- » Survey topics
 - User's organization, characteristics & priorities
 - Product priorities
 - Information needs
- » Screening questions (23 screened out)
 - Desired customer groups
 - Presence in California
 - Role (direct or indirect, current or anticipated) in selecting, specifying or recommending technology on behalf of one's own organizations or its clients

Respondents represented many stakeholder groups

Customer group	# Responses	% of Sample
Design, engineering, architecture, construction	51	21%
Energy or sustainability consultant, auditor, specialist	44	18%
Local Government (in California)*	42	18%
University or college*	39	16%
K-12 school*	24	10%
Agriculture or food production*	13	5%
Other commercial business (e.g., retailer, service provider)	9	4%
California State Government	6	3%
Commercial property management	4	2%
U.S. Military	4	2%
Maritime port	2	1%
Federal Government	1	0.4%
Hospital or hospital industry organization	1	0.4%
Total	240**	100%

0% from commercial builders, commercial real estate, data centers, and equipment vendors

Level of knowledge among survey participants' organizations/employers, by Role



~80 items needed participant input

Pump Protection Sand Separator
Automatic Self-Cleaning
Permanent Magnet Synchronous Motors
Open, Remote-Condensing
Open, Self-Contained
Refrigerated Beverage
Closed, Remote-Condensing
Freezers
Closed, Self-Contained
Smart Digital Dosing
Variable Frequency Drives
Smart Meter Based
Wireless Sensor Network
LED Horticulture Lighting
Automatic Commercial
Ceiling Fans
Walk-In Refrigerators
High-voltage Direct Current
Personal Comfort Systems
Ventilation Through the
High Temperature Heat
Exhaust Fans and Turbine Ventilators
Air Filters
Hydronic System Controls
Condenser Air Evaporative Pre-coolers
Li-Fi Wireless Communication Technology
Enterprise Servers with Integrated Power Management
Off-Grid LED Lighting Systems
Aerosol Sealing for Ducts and Building Envelopes
Direct and Indirect Evaporative Cooling Products
Exterior Shading



Pump Protection Sand Separator
Permanent Magnet Synchronous Motors
Heat Pump Water Heaters
Exhaust Fans and Turbine Ventilators
Off-Grid LED Lighting Systems
Smart Plugs

Networked Lighting
Smart Windows
Thermostats
Lighting Controls using Power Line Communication
Sensor Strip with Motion Sensors
Smart Light Emitting Diode Lamps
Forming Potential Refrigerants
Demand Control Ventilation Products
Air Source Heat Pumps
Thermal Energy Storage Products
Power Quality Improvement
Grid-Enabled Water Heaters
Smart Plugs
Task Oriented Lighting
Networked Electric Vehicle Charging Management Services with
Grid Integration
Second-Life Battery Cells

15
1 Wireless)

Heat Pump Water Heaters
Luminaires with Embedded Sensors and Self-contained Controls
(Luminaire Level Lighting Controls)
Thermal Energy Storage Products
Peak Shaving, Peak Shifting and Demand Response
Building Automation Systems
Energy Information Systems

CHALLENGE:

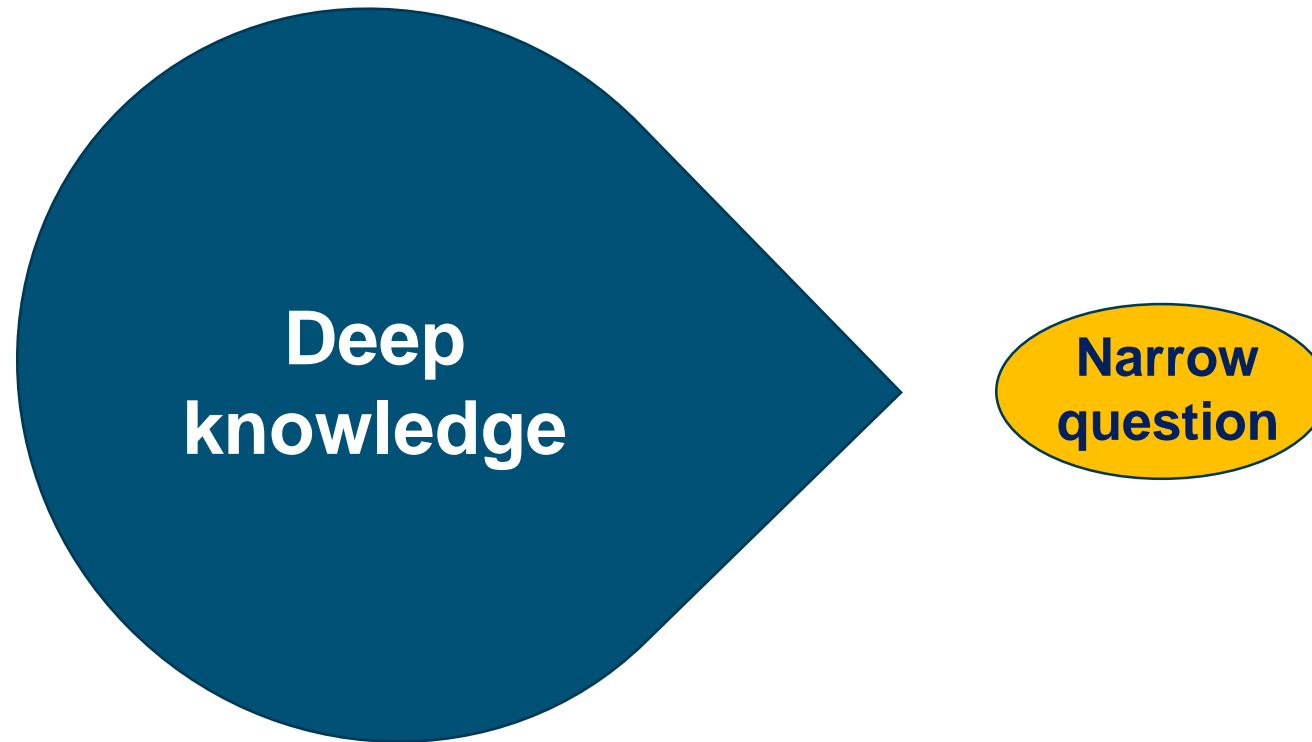
How can you get valuable data from stakeholders (with limited information)?

1. Study your subject(s)

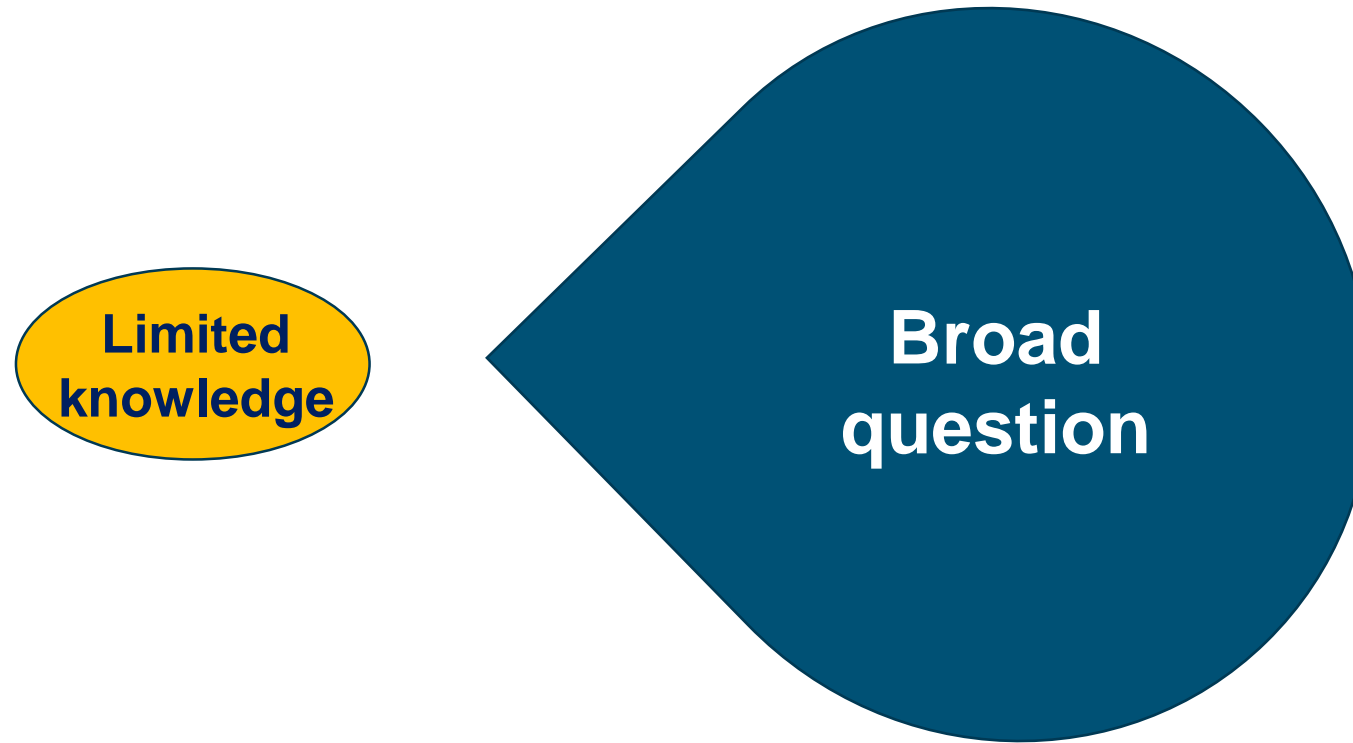


Photo credit: <https://researchguides.elac.edu/Sociology>

Knowledge is prerequisite for survey design



Interviews are the secret weapon



2. Get responses

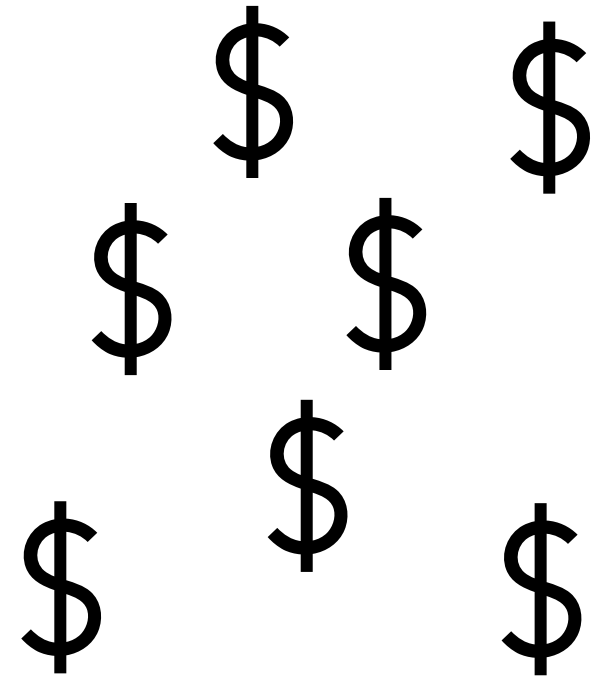
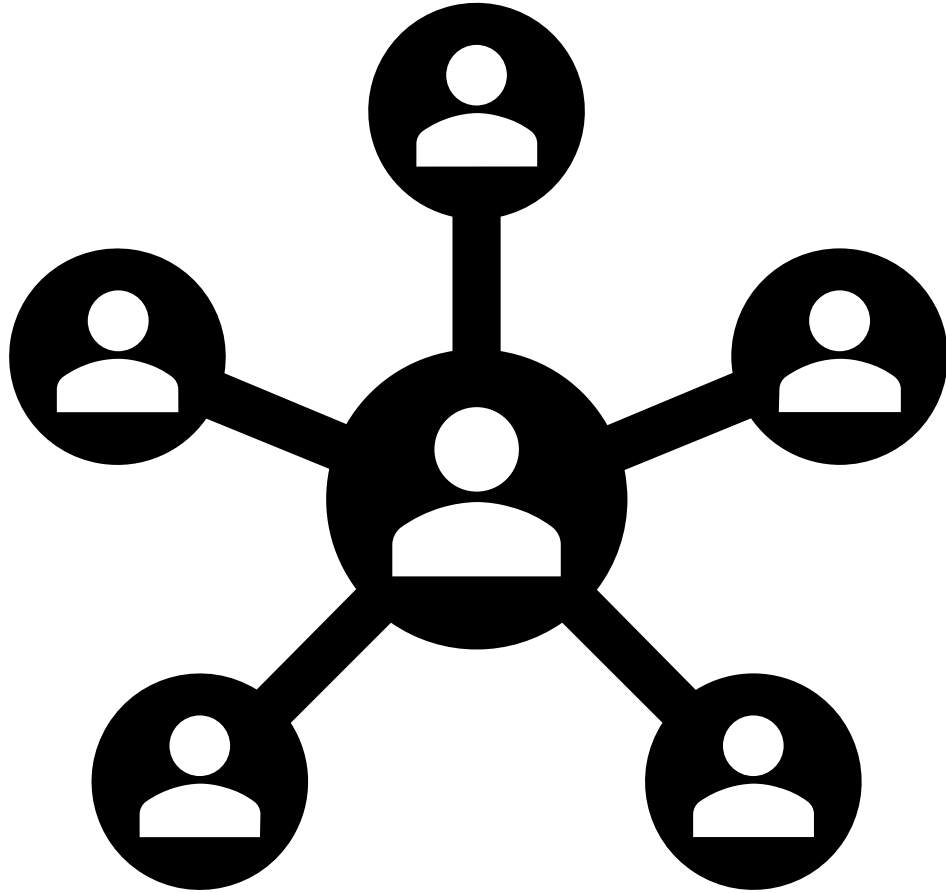


Photo credit: <https://www.researchworld.com/fundamentals-of-questionnaire-writing/>



Photo credit: <https://www.researchworld.com/fundamentals-of-questionnaire-writing/>

Leverage resources



3. Make survey questions accessible



Photo credit: www.idbinvest.org

Define all terms

Variable Refrigerant Flow Systems

Air Source Heat Pumps

High Temperature Heat Pumps

**Low Global Warming Potential
Refrigerants**

Thermal Energy Storage Products

Variable refrigerant flow (VRF) systems vary the flow of refrigerant to specific zones based on heating or cooling loads. The system delivers the refrigerant to multiple fan-coil units from a single condensing unit. The result is a ductless heating and cooling system that responds to the heating and cooling needs for each zone in a building. Savings are achieved by reducing electricity consumption by the supply fan since the VRF systems use smaller, individual fan-coil units in each zone. Additionally the system saves energy by supplying only the minimum amount of refrigerant needed to achieve the heating or cooling demand required in each zone. Since there is also little or no ductwork with VRF systems, energy wasted from duct losses is also eliminated. Ductwork is needed for ventilation air, which can be delivered using a complementary dedicated outdoor air system.

4. Avoid over-burdening participants



Photo credit: <https://www.techexplorist.com/parachutes-save-people-fall-airplanes/19459/>




Ask about level 1

	Very interested	Somewhat interested	Not interested	Not sure	N/A
Electric space conditioning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electric water heating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Commercial refrigeration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy management and information systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Building fenestration and windows	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Plug load products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lighting	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Agricultural irrigation systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distributed photovoltaics and energy storage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ask about level 2


Electric Space Conditioning



	Very interested	Somewhat interested	Not interested	Not sure	N/A
Heat pumps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Motors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ventilation products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Evaporative cooling products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thermal distribution system controls	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Aerosealing for ducts and building envelopes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thermal comfort and/or indoor air quality products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Ask about level 3

Heat pumps



	Very interested	Somewhat interested	Not interested	Not sure	N/A
Variable Refrigerant Flow Systems	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Air Source Heat Pumps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High Temperature Heat Pumps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Low Global Warming Potential Refrigerants	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thermal Energy Storage Products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Know who's who



Photo credit: <https://blog.hubspot.com/>



Photo credit: techrepublic.com

6. Analyze results in light of survey design

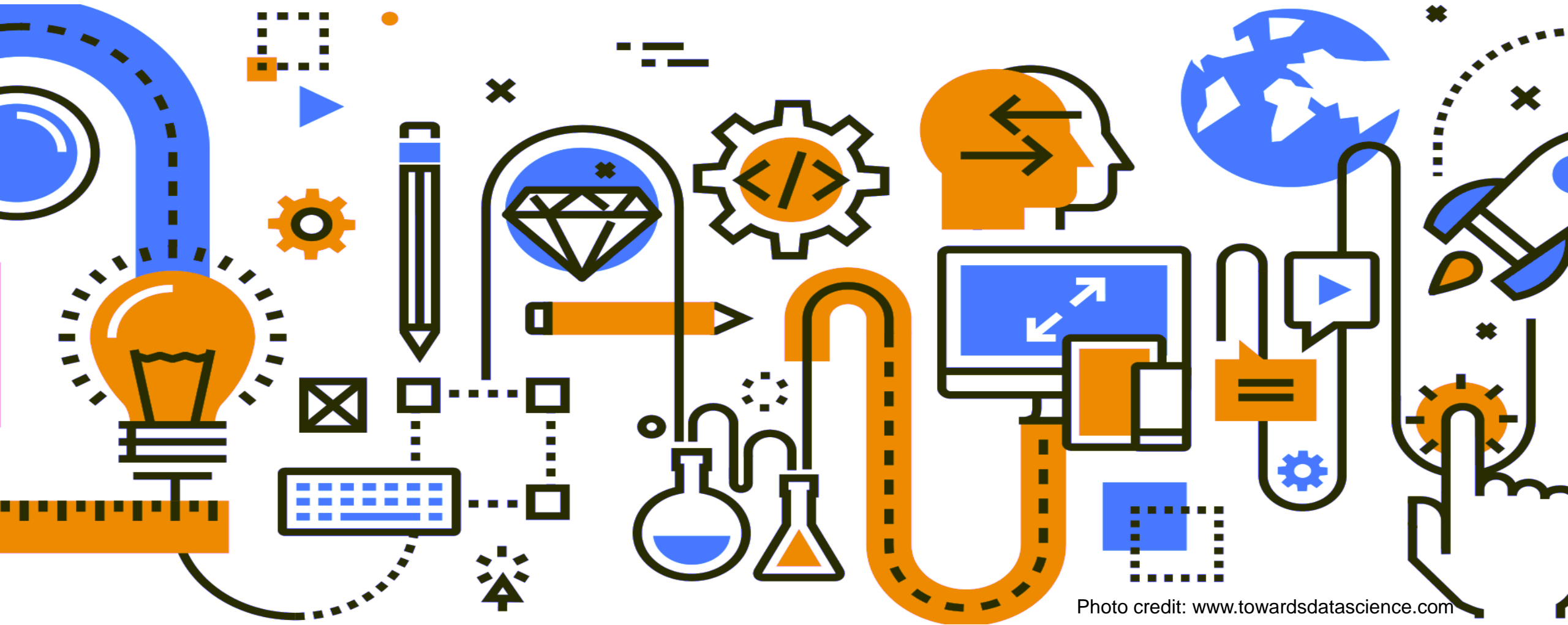
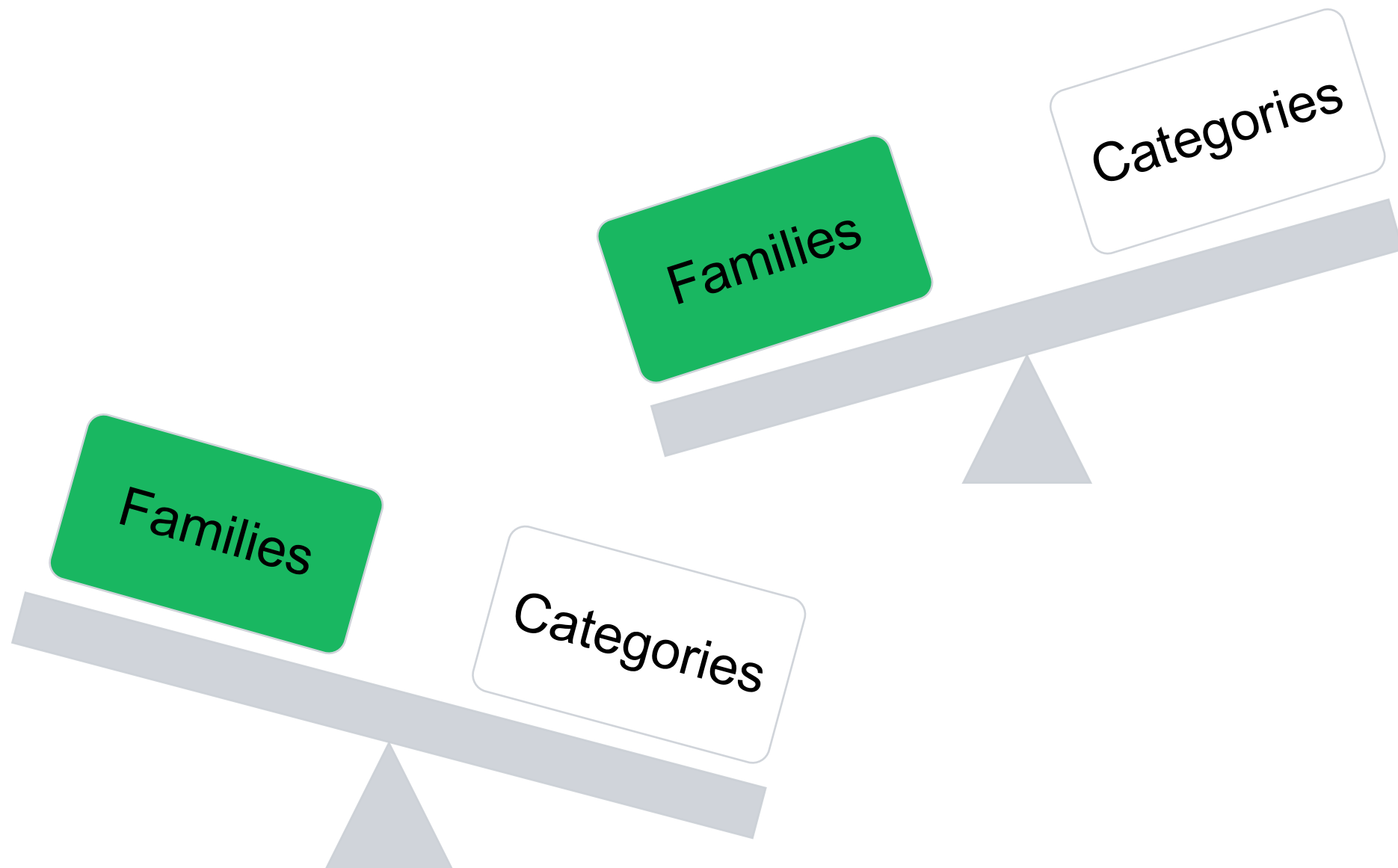
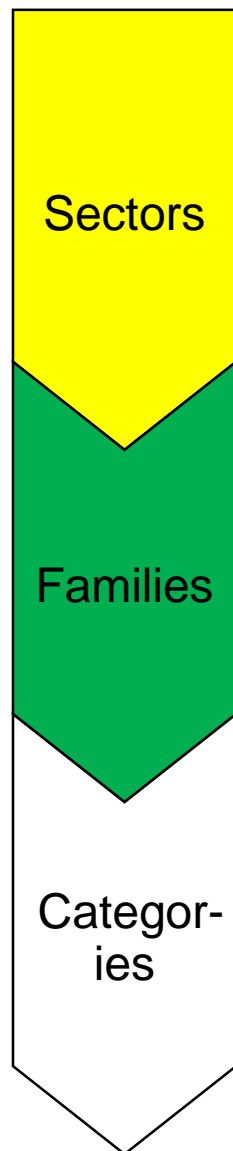


Photo credit: www.towardsdatascience.com



Key takeaways

1. Study your subject(s)
2. Get responses
3. Make survey questions accessible
4. Avoid overburdening participants
5. Know who's who
6. Analyze results in light of survey design

Questions?

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