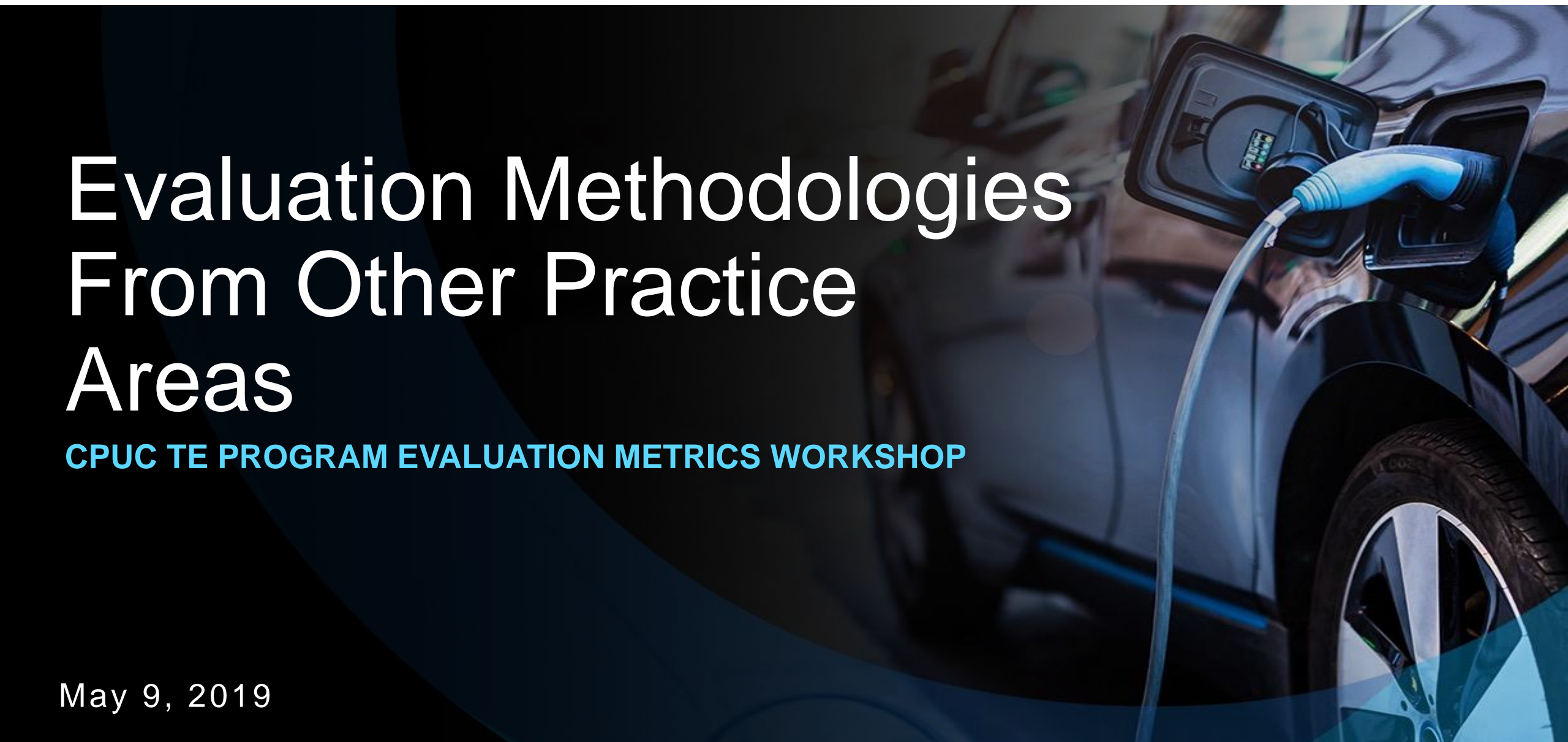


CADMUS

Evaluation Methodologies From Other Practice Areas

CPUC TE PROGRAM EVALUATION METRICS WORKSHOP

May 9, 2019



Introducing Cadmus's EM&V

Exceed expectations. Challenge and reward our team. Grow and prosper. Make a difference.

**Since
1983**

Employee-owned
social good
consultancy

33 years of

helping our clients address
complex challenges in a highly
collaborative environment



Started with
2 Co-Founders,
now
500+ strong

19
offices



Outline

- **Evaluation Philosophy**
- Evaluation Tools
- Transportation Electrification: Evaluation Opportunities and Challenges

EM&V definitions

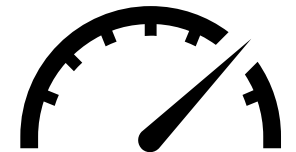
Evaluation, measurement, and verification (EM&V)

Evaluation is at the program & portfolio levels

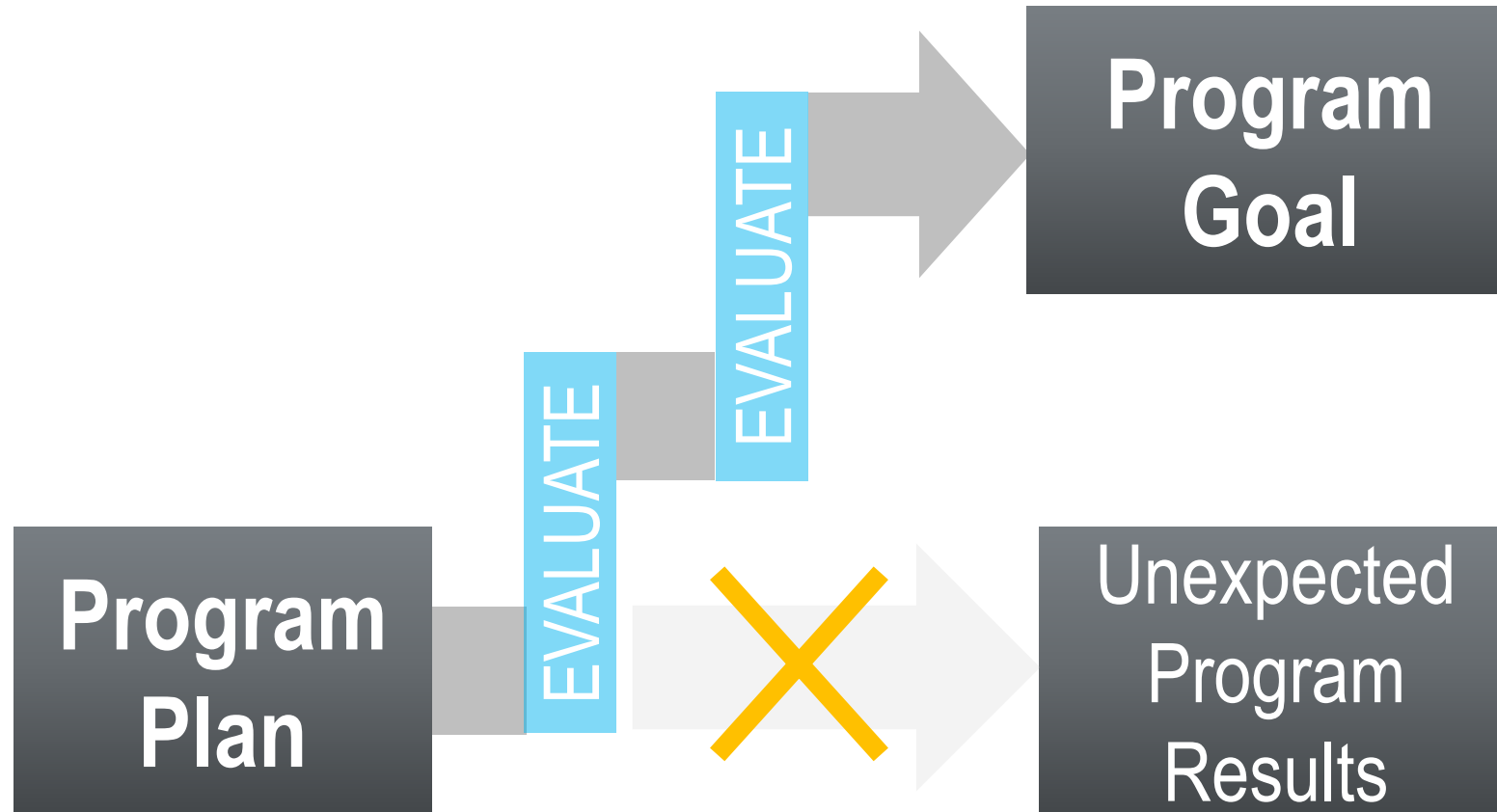
Measurement is at the project level

Verification is at the project level

Both M and V are often components of E!

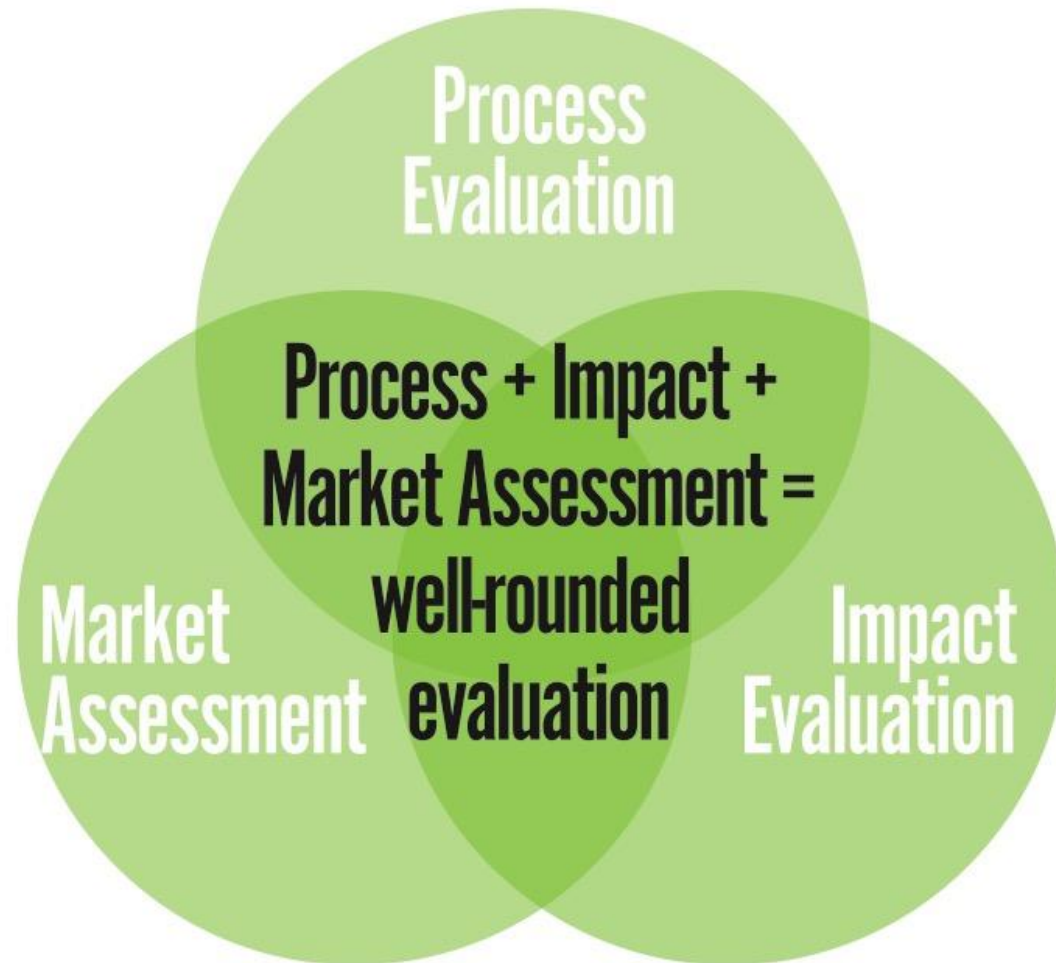


Why do EM&V?



Evaluation types

All require solid researchable questions as the foundation



Outline

- Evaluation Philosophy
- **Evaluation Tools**
- Transportation Electrification: Evaluation Opportunities and Challenges

Example tools of the trade

Not a comprehensive list

Process Evaluation

- Documentation review
- Pipeline and processing review
- Risk/opportunity analysis
- IDIs (administrator, implementor, stakeholder, etc)
- Customer surveys and intercept surveys
- Stakeholder engagement
- Focus groups

Impact Evaluation

- Verification
- Regression
- Billing analysis
- Difference-in-differences
- Sampling techniques
- RCTs
- Propensity score matching
- Random encouragement
- Random recruit deny/delay
- Site visits

Market Assessment

- Market data analysis
- GIS analysis
- IDIs with market actors
- Delphi panels
- Customer segmentation
- Choice-based conjoint analysis

Key Players

Interview key players in the program

Utility staff

Program managers and staff

Market actors (e.g., dealers, EVSPs, contractors)

Participating customers

Other stakeholders

Are there others who could give insight to the program?

Nonparticipating dealers

Nonparticipating customers

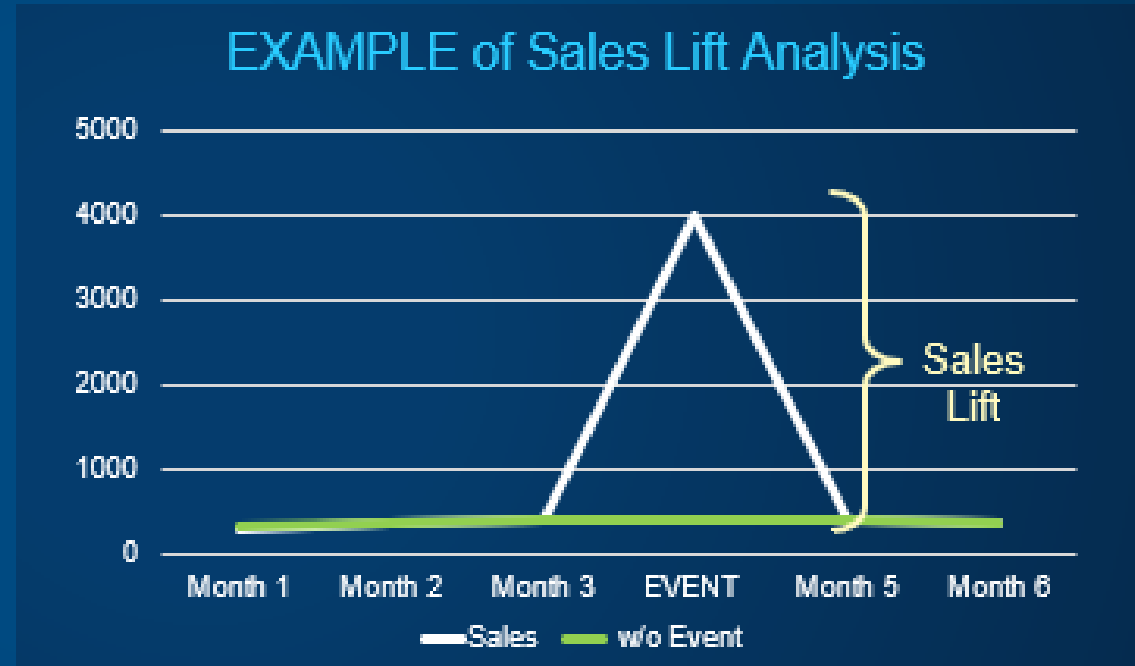
Program managers from other utilities with similar programs

Industry experts

Application: Dealership (assess market lift)

LED Sales Lift Analysis

- Uses comprehensive data on program bulb sales before, during and after event (obtained from retailers)
- Analysis by type of bulb
- Compare actual sales during event to likely sales during same period with no event



How would it apply at a dealership?

- Vehicle purchases subject to additional seasonal patterns
- Cars are much more differentiated
- Difference in differences with comparable dealerships?

Application: Public Charging (capture data on mobile participants)

Intercept surveys where “participants” or “users” not tracked

Traditional Evaluation

- Often done for midstream retail programs
- To gather critical data not available through other means for evaluation
 - Baseline equipment (e.g. bulb) being replaced
 - Leakage
 - Early replacement of old equipment

Transportation Electrification

- Could be applied at any public charging location
 - Understand the site – are people waiting there? Are there peak periods?
 - Is the EVSP able to facilitate online methods or is intercept the only option?
- To gather data on how important this charging location is for user – access to charging elsewhere (home, work), whether the user would otherwise frequent this location, their satisfaction, etc

Common needs:

- Should be short (5-6 questions)
- Requires approval from retailer (or site host)

Application: Workplace or public charging (inform design)

Survey Sampling & Respondent Characteristics




EV Owners (n=271)



- Own or lease an EV
- Utility customer
- Employed, does not work from home
- Does not work in market research

Prospective EV Owners (n=411)

- Interested in purchasing or leasing an EV within 2 years
- Utility customer
- Employed, does not work from home
- Does not work in market research

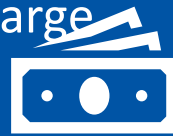
	Avg. Age	SF Dwelling	Income >\$100k	Bachelor's +
 EV Owners	46	84%	66%	80%
Non-EV Owners	46	91%	51%	66%

Application: Workplace or public charging (inform design)

Choice-Based Conjoint Model

Payment Approach

- Free/fully subsidized
- \$15/m unlimited
- \$30/m unlimited
- \$1.50 per hr. charge



Type Of Charging

- Level 1
- Level 2
- D/C Fast Charge



Availability

- Plenty
- Share
- Limited



Time Limit

- No limit
- Must move within 60 min of charge completion



Parking Proximity

- Close
- Moderate
- Far



Outline

- Evaluation Philosophy
- Evaluation Tools
- **Transportation Electrification: Evaluation Opportunities and Challenges**

Challenges

Not entirely unique to TE, but arguably more acute in TE

Disentangling
program impacts

Complexity of
participant
motivation

Customer/host
learning curve

Confidential
operational data

Diversity of
vehicles, EVSE,
and use cases

Changes to
schedule may
require adaptive
approach to eval

Limited historical
data and
standardization

Whether to
purposely design
control groups in
each case?

PRPs/SRPs
could impact
each others'
success

Opportunities

Involve evaluators early for evaluability

Leverage non-intrusive data collection

Develop sophisticated, up-to-date understanding of customers and their barriers

Customize approach to current position along the technology curve

TE is a massive market with substantial momentum and mandates. Important to tailor evaluation approaches accordingly.

CADMUS

Thank You

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